

Annual Report on Research 2006



AIT
ASIAN INSTITUTE OF TECHNOLOGY

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The Annual Report on Research 2006 is a summary of the on-going and completed sponsored and contracted projects initiated by the faculty and staff of the Asian Institute of Technology. This publication was compiled by the Vice President- Research Office, Research and Education Support Office and the Sponsored and Contracted Projects Unit at AIT.

PREFACE

The mission of AIT was and is to serve the region and beyond as a center of education and research. As a graduate school most students of this institute are involved in some form of research. With the dynamic changes of the present times some paradigm shifts need to be gradually incorporated into the research culture in order to derive a greater fraction of resources required to run an institute like ours from such activity.

In year 2006 the Institute continued to consolidate its research activities, identifying its strengths, experience in the region and beyond, as well as to make plans for the future. After initial suggestions on some thematic knowledge areas were made, there is an on-going brain storming exercise to determine the niche areas and we plan to include them in the Institute Strategy Development Plan. These research groups will have a critical mass of faculty and sufficient expertise in the region to create a niche for ourselves. The Thematic Areas under consideration are ICT for Development, Bioresources, Urban and Rural sustainability including climate change, Asian Model of Management, Water and Robotic and Sensor Networks for Intelligent Environment (RSNIE). These are being discussed with developing agencies, private sector and other stakeholders for proposing appropriate support on their part and serve as inputs to the overall research fund raising effort of the Institute. With the support of the stake holders it is hoped that the laboratories and facilities will be further strengthened, modernized and diversified.

It is evident that the research capacity and knowledge created by AIT research activities need to be harnessed. With this in mind a multi-pronged strategy was developed, namely:

- Protection of intellectual property
- Technology transfer and development of pre-incubators
- Development of consultancy services, etc.

The newly formed Institute Intellectual Property (IP) Committee reviewed and further developed policies to help protect potential innovative inventions, which either can be patented or be licensed directly to end users, who will convert the same to wealth creation. It also contributed towards the development of the IP initiatives of the Institute, played an important role in raising the awareness of the capital value of IP for AIT, and worked on the legal aspects of licensing contract negotiations. The Institute's first experience in capitalizing the intellectual property in its research as asset was through a patent license agreement between the institute and an important US IP management company. Under the agreement, the company acquired the licenses for specific invention disclosures based on the research conducted at AIT's School of Engineering & Technology. The agreement will open further developments in the field of converting research into intellectual property which will be protected by patents. Further models of IP protection

are being considered. The transfer of technology on the basis of research carried out here at AIT is also being pursued. The AIT consultancy service which will make use of the technical expertise available in order to coordinate projects with the Institute professionally is being planned.

A competition of the best research theses among the AIT graduating students in May 2006 was carried out to further promote an atmosphere of research in the institute, and acknowledge and showcase outstanding research conducted by its students. It has created an awareness of the type of work going on in various fields in the institute, gave students confidence in their research and presentation skills, exposed students to the appropriateness of their work thus paving the way to encourage excellence in graduate scholarly research and recognizing outstanding student accomplishments.

There were seven competition categories, namely: Energy and Environment, Resources, Development, Information and Communications Technologies, Industrial Systems & Engineering, Civil Engineering and Management. Theses presentations were judged according to the following criteria: relevance; originality; scientific/society contribution; general knowledge of the field; future potential for innovation; and presentation skills. The judges were renowned scientists, faculty colleagues, industry practitioners, senior officials from international organizations, government and academe. The competition

was sponsored by the Y. P. Singhania Group from India. The spin off achieved from these competitions were student placements, scholarships for study abroad, internships for students from subsequent batches, sponsored projects and market research, etc.

Administrative Decision Meetings in 2006 streamlined procedures and further actions to rationalize and promote sponsored projects. Schemes were put in place for research projects sponsored by government and development agencies, as well as for training projects, conferences and personal consultancies. Decisions were also made on faculty/staff time recovery from sponsored projects while a system of incentives was built into the system.

In line with the plan to encourage continuously stimulate active discussions and debate among community members, an Extramural Lecture Series was initiated, and steps were taken to revive the Institute's Professorial Lecture Series. The lecture series definitely instigated more fora for special speakers, and later, for the reporting of faculty research, and for the presentation of dissertation research by doctoral students. These will encourage AIT doctoral students to develop professional competencies at interacting and communicating across disciplines. Extramural speakers included Dr. Khunying Porntip Rojanasunan, deputy director of Thailand's Central Institute of Forensic Science; Dr Brian Atwater, renown tsunami expert from the US Geological Survey and author of "The Orphan Tsunami of 1700"; UNESCO Directors Prof. Dr.

Richard Meganck (Director/ Rector of UNECSO – IHE, Delft, the Netherlands) and Prof. Dr. Hubert Gijzen (Director, Jakarta office, Indonesia) on "UNESCO-IHE and the potential for collaboration with AIT" and "Windows of opportunities for UNESCO-AIT collaboration in the Asian region", respectively.

The stress on collaborative research and the initiative taken by faculty from the institute has been continuing with the year 2006 ending with about 210 ongoing projects valued at about 1.2 billion baht. Details of the projects initiated, ongoing and closed in the year 2006 and the publications resulting from research activities carried out in the institute are included in this document.

The strategies for growth of any region in the present flat world would include innovative linkages with industry, the public sector and the researchers in cooperative dialogue. In development there is a need for technologists, managers and social scientists to have good chains of communication with the local partners in order to bring real benefit to the end user. AIT, being a regional institute with strong linkages in all these sectors in the region, is well poised to provide the common platform required for this. This focus will move the institute from a center of higher education and research to a center of higher learning and knowledge.

Professor Sudip K. Rakshit
Vice President Research
Asian Institute of Technology
August 20, 2007

INTRODUCTION

1.1 *AIT Mission*

The Asian Institute of Technology promotes technological change and sustainable development in the Asian-Pacific region through higher education, research and outreach. Established in Bangkok in 1959, AIT has become a leading regional postgraduate institution and is actively working with public and private sector partners throughout the region and with some of the top universities in the world.

Recognized for its multinational, multi-cultural ethos, the Institute operates as a self-contained international community at its campus located 40 km (25 miles) north of Bangkok, Thailand.

Besides the usual laboratories and academic buildings, the main campus includes housing, sports, and medical facilities, a conference center, and a library with over 230,000 volumes and 830 print and on-line periodicals. All serve to fulfill **the AIT mission -**

to develop highly qualified and committed professionals who play leading roles in the region's sustainable development and its integration into the global economy.

1.2 *AIT Vision*

To become a leading and unique regional multicultural institution of higher learning, offering state-of-the-art education, research and training in technology, management and societal development.

With this clear, timeless vision, the multi-skilled team of students, faculty and staff at AIT are set to continuously strengthen the institution by becoming

- A trailblazer in advanced education in the region, with leadership in IT and new types of multidisciplinary programmes.
- An exemplary institution, with an emphasis on academic quality in terms of courses and other aspects of the operation.
- A leader in professional development programmes.
- A hub for the implementation of regional/transnational research projects, and a research facility for academic professionals. The hub will network with other academic and research institutions in the region and the world.
- A model international citizen.
- A collaborator and partner of national postgraduate institutions.
- A financially viable, self-sustaining institution, able to draw support from donors, the private sector and individuals, with good governance and strong leadership.
- A strong partner to its alumni, who are principal stakeholders through the AIT Alumni Association (AITAA).

Chapter 2: SCHOOL OF ENGINEERING AND TECHNOLOGY

2.1 Mission

In line with the mission of the Institute, the mission of the School of Engineering and Technology is:

To develop highly qualified engineers and technologists who play leading roles in promoting the region's industrial competitiveness in its integration into the global economy.

2.2 Thematic Groups, Fields of Study, and Multidisciplinary Programs

Information and Communications Group

Information and communications reflect the essential importance of access, connectivity and sharing. This collaboration on the creation of relevant knowledge provides economic opportunity and empowerment for all peoples of the region.

- Computer Science (CS)
- Information Management (IM)
- Remote Sensing and Geographic Information Systems (RS-GIS)
- Telecommunications (TC)
- *Information and Communications Technologies (ICT)**

Industrial System Engineering Group

For several decades, AIT has served the development of the region by equipping young engineers with high-tech knowledge required for

working in a complex industrial environment. Since its inception, the Industrial Systems Engineering (ISE) program at AIT has contributed to this mission by focusing on industrial competitiveness and innovation for sustainable growth of the region. ISE program acts as an umbrella for four fields of study:

Design and Manufacturing Engineering (DME)
Industrial Engineering and Management (IEM)
Mechatronics (MEC)
Microelectronics (MIC)
*Automotive Design and Manufacturing (ADM)**

Civil and Infrastructure Engineering Group

Since the start of AIT, civil engineering fields have acted as a catalyst in advancing modern methodologies, emerging technologies and innovative materials for the design and construction of safe and economical infrastructure in the region.

Construction, Engineering and Infrastructure Management (CEIM)
Geotechnical and Geoenvironmental Engineering (GTE)
Structural Engineering (STE)
Transportation Engineering (TRE)
Water Engineering and Management (WEM)
*Geosystem Exploration and Petroleum Geoengineering (GEPG)**

* *Interdisciplinary Areas*

2.3 Strategic Signature Areas

The changing landscape of engineering requires graduates to have not only the traditional technical knowledge of their predecessors, but also a new set of broader skills that will meet the demands of fast-moving, global and multidisciplinary environments. Engineers must now learn to understand and apply several disciplines to solve complex problems, adapt to new technology and rapidly changing situations, combine ideas to synthesize creative solutions, and learn to work in teams using excellent communication skills.

Although all fields of study at the School of Engineering and Technology cut across traditional disciplines, in order to better serve the present needs of the region, the school has identified several "Strategic Signature Areas" to further enhance the multidisciplinary offerings. The education, research and outreach activities across the disciplinary walls of traditional fields of knowledge of our faculty will drive these offerings. These courses build on several new and existing disciplines without focusing on one of the traditional fields that are already offered at AIT. A number of strategic multidisciplinary areas have been planned to help the sustainable economic and societal developments in the region as well as for its long-term industrial competitiveness. The two

existing areas already under operation are:

- Information and Communications Technologies (ICT)
- Geosystem Exploration and Petroleum Geoengineering (GEPG)

New strategic multidisciplinary areas to be launched in 2006-2007:

- Advanced and Nano Material Technologies (ANM)
- Automotive Manufacturing Engineering (AME)
- Disaster Engineering and Management (DEM)
- Offshore Technology and Management (OTM)
- Supply Chain Management and Logistics (SCL)
- Technology Venture and Entrepreneurship (TVE)
- Integrated Water Resources Development (IWRD)

2.4 Academic Outreach Centers

The School of Engineering and Technology has a wealth of innovative and untapped knowledge database from its masters and doctoral research activities. Many academic outreach centers are set up to transform the knowledge to serve industrial and societal needs. These academic outreach centers will also serve to tab the practical aspects and the society impacts of the knowledge and technology back to the class room, as well as connect the school with the world, outside the

academe. The academic outreach centers in the School of Engineering and Technology are:

Asian Center of Engineering Computations & Software (ACECOMS)

ACECOMS carries out research in engineering computations, develops and promotes computer software tools for engineering applications, and conducts training in the effective use of latest computing technology.

With 29 satellite centers in 21 cities in Asia and other regions, ACECOMS carries out research in engineering computations, develops computer software tools for engineering applications and conducts training in the effective use of latest computing technology. Visit ACECOMS: <http://www.acecoms.ait.ac.th/>

Asian Center for Soil Improvement and Geosynthetics (ACSIG)

Most capital cities in Southeast Asia are located in lowland areas with associated soft ground problems. ACSIG provides a strategic location for advanced technological education, researches and outreach activities on the application and effective utilization of ground improvement techniques. Visit ACSIG: <http://www.set.ait.ac.th/acsig/>

Asian Center for Transportation Studies (ACTS)

The need to address pressing problems in transportation-related issues in Asian cities, and anticipated trends brought about by modernization underscores

the importance of the Asian Center for Transportation Studies. ACTS activities include modules on intelligent transportation systems, traffic simulation, freight transport, urban road safety and road safety audit. Visit ACTS: <http://www.set.ait.ac.th/acts/>

Geoinformatic Center

Geoinformatic Center is dedicated to development and promotion of remote sensing research and activities in Asia-Pacific. Its mandate is to share satellite data, research results and experiences with researchers in the region. Various research facilities are established especially, NOAA AVHRR receiving station and Terra/Aqua MODIS receiving station to support research on global environmental study. Visit Geoinformatic Center: <http://www.geoinfo.ait.ac.th/>

Habitech Center (HABITECH)

The Habitech System is an innovative construction process implemented widely for housing, institutional and commercial building projects in the region. Its activities include research and outreach activities such as training in production and construction, provision of services associated with projects implemented by various organizations, agencies or the private sector.

Habitech International installs building material production facilities of prefabricated modular interlocking concrete blocks worldwide for residential, institutional and commercial building construction. Visit Habitech: <http://www.habitech->

international.com/
indexthai.html

**International Ferrocement
Information Center (IFIC)**

IFIC coordinates the activities of the International Ferrocement Society (IFS) including publication of an in-house *Journal of Ferrocement*, conducting continuing education courses, and sponsored research projects. Its members include engineers, architects, students, researchers and all those interested in low-cost construction materials. Visit IFIC: <http://www.sce.ait.ac.th/ific/>

**Regional Network Office for
Urban Safety (RNUS)**

The Regional Network Office for Urban Safety (RNUS) is a collaborative center jointly operated by the AIT and the University of Tokyo. Its priority task is the promotion of urban safety engineering utilizing advanced engineering technologies including remote sensing and GIS. Visit RNUS: <http://www.set.ait.ac.th/rnus/>

**Thailand Accident Research
Center (TARC)**

The Accident Research Center is an offspring of MOTC's Road Safety Master Plan acknowledging the lack of information on accidents in Thailand and the need to establish TARC. The support of TARC comes jointly from Department of Highways, Volvo Car Corporation and AIT. TARC provides academic back up and a base for road safety research. Visit TARC: <http://www.tarc.ait.ac.th>

**AIT Center of Excellence in
Nanotechnology (COE)**

The Center of Excellence in Nanotechnology is jointly supported by Thailand's Nanotechnology Center (NANOTEC) and AIT to cultivate and foster multidisciplinary activities including research and education in the applications of nanotechnology in the developing world. Visit COE: <http://www.nano.ait.ac.th/>

**2.5 School
Governance**

Dean of School

WORSAK KANOK-NUKULCHAI,
BEng (Hon),
Chulalongkorn Univ,
Thailand; MEng, AIT,
Thailand; PhD, Univ of
California (Berkeley), USA.

Professor

*(Computational
Mechanics; Finite
Element Methods; Tall
Building Static and
Seismic Analysis; Bridge
Engineering;
Microcomputer
Software for Structural
Engineering; Genetic
Algorithms; Nonlinear
Analysis of Structures
and Continua; Plate/
Shell Structures;
Engineering Education;
Nanomechanics)*

Associate Dean

JOYDEEP DUTTA, PhD, IACS,
Calcutta Univ, India; BSc
(Hon), MSc, North Eastern
Hill Univ, India.

Associate Professor

Functional materials,
nanomaterials,
Nanoparticles, self-
organisation, Biomimetic
processes,
Polyelectrolyte
deposition, Gas sensors,
Bio-sensors,
optoelectronic devices]

Chapter 3: SET – COMPUTER SCIENCE and INFORMATION MANAGEMENT FIELDS OF STUDY

3.1 Introduction

Computer Science

This field of study fosters high level teaching and research in computer science and aims to meet the growing regional demand for persons skilled in various aspects of computing. One focus is on educating educators who can, in turn, effectively disseminate knowledge and skills to more people.

The core curriculum in computer science covers all aspects of computing, with the faculty particularly active in artificial intelligence, software engineering, networking and information systems. The field of study also endeavors to enhance teaching and research activities in computer architectures, object orientation, neural networks, multimedia and other rapidly-evolving areas in computer science.

The courses and research topics range from those addressing the practical problems of applications development, to those dealing with the abstract and theoretical issues of computer science and advanced computing. Students are also encouraged to take courses and conduct research in areas of Computer Science which interact with Information Management, Industrial Engineering, Manufacturing Systems Engineering, Telecommunications, Mechatronics and other fields of study covered at the Institute.

Information Management

This field of study is a strategic response to society's changing needs. It will continue to evolve as organizations cope with the proliferation and complexity of new information technologies and services. It is the first of its kind in Southeast Asia.

Information is an essential resource for academic excellence, competitiveness in business and industry, scientific progress, and national development. Like any other resource, information must be managed. High-quality sources must be located, and arrangements must be made for access to timely, accurate, appropriate, and cost-effective information. Technological advances in telecommunications and the hardware and software of computing can be utilized to provide the optimum access to information.

The need for information management skills in government and private organizations is increasingly recognized. People knowledgeable in methods of facilitating information collection, dissemination, and use are in demand. Such persons should also be skilled in identifying information needs and in accessing, repackaging, and presenting information in such a way that it can be utilized in support of the objectives of the users.

The Information Management curriculum is designed to prepare students to respond to four basic challenges confronting organizations today:

Planning the effective use of information and communication technologies within organizations;

Developing corporate and government policies to maximize the benefits resulting from the widespread use of these technologies;

Improving the strategic management of information resources in business, government, and non-profit organizations; and

Increasing the productivity and creativity of managers and executives who work with information resources.

3.2 Research Facilities and Laboratories

Organized around ten Unix servers, some of them being multiprocessors, CSIM network comprise about 60 micro-computers, running desktop and engineering applications, scientific and research software and programming languages, with full access to the Internet. Through AI3 project, a broadband satellite link is available to Japan and other countries in the region. This link is primarily dedicated for research activities in the field of internetworking, like the new generation of Internet IPv6, distributed education, video conferencing, and unidirectional routing. Dedicated laboratories are set-up with specialized equipments. Full wireless coverage in the building allows students to conveniently work with their personal notebook computers.

3.3 Faculty and Research Staff

Full-time Faculty

MATTHEW N. DAILEY, BSc, MSc, North Carolina State University, PhD, University of California, San Diego.
Assistant Professor (Machine learning, Machine vision, Robotics, Systems security).

PHAN MINH DUNG, MSc, PhD, University of Technology, Dresden, Germany.
Professor (Computer and Network Security, Autonomous Computing, Logic Programming, Artificial Intelligence)

VATCHARAPORN ESICHAIKUL, BAcc, Chulalongkorn Univ, Thailand; MBA, Oklahoma

State Univ; PhD, Kent State Univ, USA.

Associate Professor
(Electronic Commerce/
Electronic Business, Web-
based Information Systems,
Hypermedia, Electronic
Government)

SUMANTA GUHA, MS, PhD,
University of Michigan, Ann
Arbor, USA; PhD, Indian
Statistical Institute, Calcutta,
India; BSc, MSc, University of
Calcutta, India.

Associate Professor
(Algorithms, Computer
Graphics, Computational
Geometry, Robotics)

PETER HADDAWY, BA, Pomona
College, Claremont, USA;
MSc, PhD, Univ of Illinois,
Urbana, USA.

**Professor and Vice President
for Academic Affairs**
(Decision-Theoretic Problem
Solving, Probabilities
Reasoning, Modeling of User
Preferences, Electronic
Commerce, Medical
Decision Making).

PAUL JANECEK, BSEE, US Military
Academy; MSc, Univ of
London, UK; PhD, Swiss
Federal Inst of Tech,
Switzerland.

Assistant Professor (Human-
Computer Interaction;
Analysis and Design of
Information Visualization
Systems, Semantic Fisheye
Views, Software Engineering
and Open-source Software
Development, and
Information System
Development)

KANCHANA KANCHANASUT, PhD,
MSc, Computer Science,
University of Melbourne,
Australia; Graduate
Diploma, Computer
Science, BSc Mathematics,
University of Queensland,
Australia.

**Professor, and IntERLab
Director** (Networking and
Distributed Computing,
Algorithms, Programming
Languages).

VILAS WUWONGSE, DEng Systems
Science, MEng Control

Engineering, BEng Control
Engineering, Tokyo Institute
of Engineering, Japan.

**Professor and Vice
President for External
Relations** (Information
Representation, Semantic
Web, Digital Libraries).

3.4 Grants and Sponsored Research Completed in 2006

Computer-Aided Learning Program for Health Professional Students in Diabetes Patient History Taking

Duration 1-Sep-04 to 30-Sep-06
Project Investigator Prof. Peter Haddawy
Sponsors Royal Thai Government (RTG)
Total Contracted Amount (Baht) 156,000

A Collaborative Intelligent Tutoring System for Medical Problem-Based Learning

Duration 1-Sep-04 to 30-Sep-06
Project Investigator Prof. Peter Haddawy
Sponsors Royal Thai Government (RTG)
Total Contracted Amount (Baht) 942,500

Ubiquitous Network Societies for Knowledge Based Economies

Duration 1-Mar-06 to 31-Jul-06
Project Investigator Dr. Paul Janeczek
Sponsors ADB-AIT Networking Project
Total Contracted Amount (Baht) 193,000

3.5 On-going Grants and Sponsored Research

Argumentation as Foundation for Semantic Grid

Project Description ARGUGRID aims at
providing a new model for
programming the Grid at a
semantic, knowledge-based level
of abstraction through the use of
argumentative agent technology.
Within this model, this technology is
used to provide the reasoning and
decision making processes
required to facilitate the dynamic
composition of Grid resources and
services into executable
workflows.

Duration 2-Jun-06 to 31-May-09
Project Investigator Prof. Pham Minh Dung
Sponsors European Commission
Total Contracted Amount (Baht) 10,000,000

Database Systems for Advanced Applications

Duration 1-Dec-06 to 31-May-07
Project Description As an
annual international conference in
Asia-Pacific Region, DASFAA 2007 is
an international forum for academic
exchanges and technical
discussions among researchers,
developers and users of database
from academia, business and
industry. The conference will

promote research and
development activities in database
field among participants and their
institutions in the Asia Pacific and
the world, as well.

Project Investigator Prof. Vilas Wuwongse
Sponsors Participants (Registration fees)
Total Contracted Amount (Baht) 1,700,000

Building an Integrated leading Euro-Asian higher Education and research community in the field of the Semantic Web

Duration 1-Oct-06 to 9-Sep-09
Project Description The goal of this
project is to build an Integrated
leading Euro-Asian Higher
Education and Research
Community in the field of Semantic
Web, the next generation of the
web. Direct target groups are:
graduate students, faculty staff
and enterprises management
personnel. Indirect target groups
are: European and Asian Students,
researcher and enterprises
personnel at large.

Project Investigator Prof. Vilas Wuwongse
Sponsors European Commission
Total Contracted Amount (Baht) 2,960,964

Ministry of Science and Technology Virtual Library

Duration 1-Dec-06 to 31-May-07
Project Description Develop a virtual
Library system for the Office of the
Permanent Secretary of Science
and Technology. The system will
be used to store the ministry's
published books and documents
and made them available to the
Web

Project Investigator Prof. Vilas Wuwongse
Sponsors Thaksin University, Thailand
Total Contracted Amount (Baht) 1,000,000

Statistical Approaches to Trinocular Stereo Robot Vision

Project Investigator Dr. Matthew Dailey
Sponsor: Thailand Research Fund
Completion: expected June 2007
Total Project Budget: 480,000

3.6 Publications

Refereed Journals

- S. Guha, K. T. Kh'anh, "Recognizing Convex Polygons with Few Finger Probes using Range Trees," submitted to Computer Vision and Image Understanding, 2006.
- C. Chuon, S. Guha, "Individual Profile Graphs for Location Management in PCS Networks," accepted subject to revision by Wireless Personal Communications, 2006.
- C. Chuon, S. Guha, "DIP-MIP: Distributed Individual Paging Extension for Mobile IP in IP-Based Cellular Networks," accepted and to appear Computer Communications, 2006.

Pongtawat Chippimolchai, Kiyoshi Akama, **Vilas Wuwongse**: Semantic Query Optimization: Correctness and Control, Journal of Advanced Computational Intelligence and Intelligent Informatics (JACIII) 10(3): 270-280 (2006)

Mohammad Nasir Uddin and **Paul Janecek**. Implementing faceted classification in a web information architecture: A framework using semantic web tools. To appear in *The Electronic Library*, 26(2), 2007.

Refereed Books / Chapters

Nisachol Chamnongsri, Lampang Manmart, **Vilas Wuwongse**, Elin K. Jacob: Applying FRBR Model as a Conceptual Model in Development of Metadata for Digitized Thai Palm Leaf Manuscripts, Lecture Notes in Computer Science in Digital Libraries: Achievements, Challenges and Opportunities, ICADL, 254-263, 2006.

Photchanan Ratanajaipan, Ekawit Nantajeewarawat, **Vilas Wuwongse**: Representing and Reasoning with Application Profiles Based on OWL and OWL/XDD. Lecture notes in Computer Science in The Semantic Web – ASWC, 256-262, 2006.

Conference Proceedings

S. Guha, P. Janecek, N. D. C. Song, "SimpliPoly: Curvature-based Polygonal Curve Simplification," submitted in 2006 and to appear at GRAPP 2007 (2nd International Conference on Computer Graphics Theory and Applications), Barcelona, 2007.

K. Khawaja, **S. Guha**, "Visual Agent Programming (VAP): An Interactive System to Program Animated Agents," submitted in 2006 and to appear at HCI International 2007 (12th International Conference on Human-Computer Interaction), Beijing, 2007.

Mong-Li Lee, Kian-Lee Tan, **Vilas Wuwongse**: Database Systems for Advanced Applications, 11th International Conference Proceedings, DASFAA 2006, Singapore, April 12-15, 2006, Springer, 2006

Simultaneous localization and mapping with stereo vision **Dailey, M.N.** and Parnichkun, M. In Proceedings of the International Conference on

Automation, Robotics, and Computer Vision, 2006.

Face Detection for Improved Security at Parking Lot Checkpoints Anuyouthapong, P., Luckboonjuang, O., Nawaeamwilai, S., and **Dailey, M.N.** In Proceedings of ECTI-CON, 2006.

Mohammad Nasir Uddin and **Paul Janecek**. Designing and implementing faceted classification for flexible search. In *Proceedings of the International Conference on Digital Libraries (ICDL 2006)*, New Delhi, India, December 5-8 2006.

3.5 Doctoral Students' Dissertation

Information Management

An Integrated Internet Geographic Information System for Crime Control
By: Roongrasamee Boondao
Supervisor: Dr. Vatcharaporn Esichaikul/Dr. Nitin Kumar Tripathi

Electronic Government Service Model
By: Wachai Varavithya
Supervisor: Dr. Vatcharaporn Esichaikul

Computer Science

Semantic Query Optimization for XML Database Based on Equivalent Transformation Framework
By: Pongtawat Chippimolchai
Supervisor: Prof. Vilas Wuwongse

3.6 Masters Students' Theses and Research Studies

Computer Science

Whiteboard: A Distributed Application Over Xcast
By: Justinus Andjarwirawan
Supervisor: Prof. Kanchana Kanchanasut

A Grid Based System to Support E-Migration
By: Phan Thuong Cang
Supervisor: Prof. Phan Minh Dung

Research Study: The Use of OPENGL ES in Chiang Mai's Tourism Industry
By: Somsarit Chatiket
Supervisor: Dr. Sumanta Guha

Research Study: OPENGL-based Solar System Simulation: Planetary Events
By: Prasit Chuaykue
Supervisor: Dr. Sumanta Guha

Peer to Peer Group Formation and Collaboration in a Remote Laboratory
By: Prithula Dhungel
Supervisor: Prof. Kanchana Kanchanasut

P2P Resource Discovery for an Interactive Architecture in Mobile Ad Hoc Network
By: Long Jiaoyan

Supervisor: Prof. Kanchana Kanchanasut

Virtual Backbone-based Reliable Multicasting in Mobile Adhoc Networks
By: Dipankaj Gobinda Medhi
Supervisor: Prof. Kanchana Kanchanasut

Constructing Security Reports by Correlating Alerts from IDS Sensors
By: Le Phuc
Supervisor: Prof. Phan Minh Dung

Smarttourist: An Intelligent Service for Tourists
By: Dau Vu Thai Anh
Supervisor: Prof. Vilas Wuwongse

A Case Study of Ontology-based Design of Multiagent Systems
By: Nguyen Ngoc Anh
Supervisor: Prof. Phan Minh Dung

Anatomical Sketch Segmentation: Local Refinement Method
By: Phatthanaphong Chomphuwiset
Supervisor: Prof. Peter Haddawy

Fast, Robust Anatomical Sketch Recognition
By: Le Hong Hai
Supervisor: Prof. Peter Haddawy

Visualization on Barter Trade
By: Dai Hanbo
Supervisors: Prof. Peter Haddawy/Dr. Paul Janecek

Attack Description using Action Language
By: Hoang Manh Hung
Supervisor: Prof. Phan Minh Dung

By: Udomsak Jantontapo
Research Study: OPENGL Embedded Systems: The Mapping of BTS Siam Station onto a Mobile Phone
Supervisor: Dr. Sumanta Guha

An Interactive System to Program Animated Agents
By: Kamran Khawaja
Supervisor: Dr. Sumanta Guha

Research Study: OPENGL-based Solar System Simulation: Formation of the Planets and their Orbits
By: Worasak Reangsirarak
Supervisor: Dr. Sumanta Guha

Curvature-based Polygonal Curve Simplification
By: Nguyen Duc Cong Song
Supervisor: Dr. Sumanta Guha

A Grid-based System for Construction Project Management
By: Shenglong Tan
Supervisor: Prof. Phan Minh Dung

Computer Network Intrusion: Detection and Response
By: Vu Ngoc Trinh
Supervisor: Prof. Phan Minh Dung

Information Management

A Decision Support System for Load Forecasting in the Electricity Market
By: Phan Sy Bach
Supervisor: Dr. Vatcharaporn Esichaikul

Web-based Decision Support System for Project Investment Selection: Case Study of Petrovietnam
By: Duong Van Dat
Supervisor: Dr. Vatcharaporn Esichaikul

A Framework for Measuring Effectiveness of an Online Learning Environment: A Case Study of Can Tho University
By: Tran Thanh Dien
Supervisor: Dr. Vatcharaporn Esichaikul

Integrating Knowledge Management in Results-based Management Framework
By: Tjerah Leonardo
Supervisor: Dr. Vatcharaporn Esichaikul

Research Study: A Prediction of the Bidding Price in the Electricity Market
By: Luong The Ngoc
Supervisor: Dr. Vatcharaporn Esichaikul

XML Document Generation Approach to Automatic Semantic Web Services Composition
By: Luong Viet Phong
Supervisor: Prof. Vilas Wuwongse

Sketch Understanding for Medical Tutoring: Integration of the UNAS System into COMET
By: Hemani Shringi
Supervisor: Prof. Peter Haddawy

E-Auction for Personnel Recruitment
By: Roma Basnet
Supervisor: Dr. Vatcharaporn Esichaikul

Chat Recognition for Medical Problem-based Learning
By: Narumol Charoenkijpaiboon
Supervisors: Prof. Peter Haddawy/Dr. Paul Janecek

Analysis of Relationships among Thai Web Communities
By: Lapho Deeroop
Supervisor: Prof. Vilas Wuwongse

An E-Learning System using Semantic Web Technology
By: Vo Ha Quang Dinh
Supervisor: Prof. Vilas Wuwongse

An Approach to XPath Optimization
By: Le Thi Bich Hang
Supervisor: Prof. Vilas Wuwongse

Visual Tool for the Strategic Use of Alumni Knowledge
By: Mi Mi Hnauang
Supervisor: Dr. Paul Janecek

A Framework for Home Stay Business Websites
By: Lerluck Kuerklung
Supervisor: Prof. Vilas Wuwongse

An Ontology-based E-Learning Management System
By: Nguyen Thi Nhu
Supervisor: Prof. Vilas Wuwongse

Research Study: Identification of Critical Success Factors and Barriers of E-Negotiations in B2B
By: Sandhya Sharma
Supervisor: Dr. Vatcharaporn Esichaikul

Development of Communicative VLOG for E-learning
By: Myat Thander Tin
Supervisor: Dr. Vatcharaporn Esichaikul

Implementing Faceted Classification within a Content Management System
By: Mohammad Nasir Uddin
Supervisor: Dr. Paul Janecek

Research Study: Use of the UMLS Ontology to Support Medical Tutoring
By: Thanapoom Veeranitinunt
Supervisor: Prof. Peter Haddawy

A New Approach to XML Access Control
By: Tanit Chaiyasit
Supervisor: Prof. Vilas Wuwongse

Optimizing Barter Trade under a Realistic Purchase Behavior Model
By: Kanit Tangkathach
Supervisor: Prof. Peter Haddawy

Analysis of Financial Statements through Web Services
By: Kulachet Chollasap
Supervisor: Prof. Vilas Wuwongse

Linking Ontologies with a Document Collection
By: Umar Memon
Supervisor: Dr. Paul Janecek

Mobile Commerce for Providing Telecommunication Services
By: Poosit Wibulsathien
Supervisor: Dr. Vatcharaporn Esichaikul

A Data Mining Model for Universities: Case Studies of AIT and Can Tho University
By: Nguyen Thai Nghe
Supervisor: Dr. Paul Janecek

Research Study: A Comparison of Multidimensional Scaling Layouts for an E-Catalog
By: Nattakan Praprutdee
Supervisor: Dr. Paul Janecek

Bargain Hunting Using an Interactive Spatial View
By: Monrawee Chainchainirattisai
Supervisor: Dr. Paul Janecek

Web Based Spatial Decision Support System for Avian Influenza Control
By: Ha Thi Thanh Nga
Supervisor: Dr. Paul Janecek

Research Study: Assessment of Internet Banking Performance through Usage and Customers Satisfaction: A Case Study of Thai Banks
By: Marie Francoise Gaelle Vitry Audiber Tierz
Supervisor: Dr. Vatcharaporn Esichaikul

Chapter 4: SET – CONSTRUCTION, ENGINEERING AND INFRASTRUCTURE MANAGEMENT FIELD OF STUDY

4.1 Introduction

The Construction, Engineering and Infrastructure Management field trains professionals to play leading roles in the international construction industry and in infrastructure development and management. It offers courses in four levels - operations, project, strategic issues and corporate issues. It prepares students to become effective managers and decision-makers familiar with modern techniques of construction management, engineering management and infrastructure management.

The field's courses are delivered based on a hierarchical knowledge scale that considers principles and fundamentals, applications (tools and techniques), and emerging issues. In offering courses spanning fundamentals to advanced, the emphasis is on shifting from classical to innovative knowledge.

4.2 Faculty and Research Staff

Full-time Faculty

STEPHEN O OGUNLANA, BSc, MSc, Univ of Ife, Nigeria; PhD, Loughborough, Univ of Tech, UK.

Professor (*Construction Economics; Project Management; Productivity Improvement, Dynamic Modeling and Simulation, Human Resources Management*)

CHOTCHAI CHAROENNGAM, BEng, King Mongkut's Inst of Tech, Thonburi, Thailand; MS, Univ of Kansas; PhD, Univ of Texas at Austin, USA

Associate Professor (*Project Planning, Scheduling, and Controls; Construction Productivity Improvement; Information Technology in Construction Management;*

Construction Disputes and Litigation)

BONAVENTURA H W HADIKUSUMO, BEng, Univ of Diponegoro, Indonesia; MEng, AIT; PhD, Univ of Hong Kong.

Assistant Professor (*Construction Information Technology; Construction Site Safety, Virtual Reality application in construction; Web-based project design and management; Design for X-ability; Construction simulation; Construction site safety; Cost control*)

PANNAPA HERABAT, BS, MS, PhD, Carnegie Mellon Univ, USA.

Assistant Professor [*Asset Management System; Pavement Management System; Bridge Management System (BMS); Infrastructure Economics; and Computer-Aided Engineering Management*]

4.3 Grants and Sponsored Research Completed in 2006

Consistency of Safety and Health Management System Implementation

Duration: May 2005 to December 2006
Investigator: Dr B H W Hadikusumo
Sponsor: Bovis Lend Lease
Total Contracted Amount: Baht 88,500.00

Safety Culture Under Bovis Lend Lease Safety and Health Management System

Project Description: This study investigates the safety culture performance under Safety and Health Management System of Bovis Lend Lease (BLL). The performance to be investigated includes labor productivity and stakeholders' satisfaction. The performance of BLL projects is benchmarked with projects managed by other companies in order to study the strength and weakness of BLL safety and health management systems.

Duration: December 2006 to Dec2008
Investigator: Dr B H W Hadikusumo
Sponsor: Bovis Lend Lease (Thailand) Ltd

Total Contracted Amount: Baht 100,000.00

Inspection Manuals and Procedures for Expressway Transit Authority of Thailand

Project Description: Development of Inspection Manuals for Expressway & Rapid Transit Authority of Thailand. Detailed inspection procedures and manuals are developed in this project to assist the Expressway Rapid & Transit Authority to visually inspect the structural components of their existing expressways. Systematic inspection results are valuable data for maintenance management. In addition, this project will link the developed inspection procedures and manuals with the maintenance management system used by ETA.

Duration: December 2005 to June 2006

Investigator: Dr Pannapa Herabat
Sponsor: Expressway Transit Authority of Thailand

Total Contracted Amount: Baht 600,000.00

Strategic Budgeting System II

Project Description: The performance-based budgeting system has been developed and applied in parts of the Royal Thai Government reform. This project is to assist in system development in collaboration with Chulalongkorn University at the Bureau of Budget, RTG.

Duration: October 2004 to March 2006

Investigator: Dr Chotchai Charoenggam
Sponsor: Chulalongkorn University

Total Contracted Amount: Baht 1,000,000.00

4.4 Ongoing / In Progress Grant and Sponsored Research

Construction Work Performance Under Bovis Lend Lease Safety and Health Management System

Project Description: This study investigates the construction work performance under Safety and Health Management System of Bovis Lend Lease (BLL). The performance to be investigated includes labor productivity and stakeholders' satisfaction. The performance of BLL projects is benchmarked with projects managed by other companies in order to study the strength and

weakness of BLL safety and health management systems.

Duration: December 2006 to December 2007

Investigator: Dr B H W Hadikusumo

Sponsor: Bovis Lend Lease (Thailand) Ltd

Total Contracted Amount: Baht 100,00.00

Seminar on Dispute Prevention and Resolution on Mega Construction Projects

Duration: 1-Oct-06 to 30-Sep-07

Investigator: Prof. Stephen O. Ogunlana

Sponsors: Warner/PPP

Total Contracted Amount: Baht 418,689.70

EU-Asia Network of Competence Enhancement on Public-Private Partnerships (PPPs) in Infrastructure Development.

Project Description: An International Network on Public Private Partnerships. Researching into PPPs and developing teaching curriculum for PPPs. The Network members are Bauhaus Univesitat Weimar, University of Manchester Institute of Science and Technology, Indian Institute of Technology, Madras, Asian Institute of Technology, and Tsinghua University. The three-year EU funded research started in April 2004.

Duration: April 2004 to April 2007

Investigator: Prof Stephen O Ogunlana

Sponsor: The European Union

Total Contracted Amount: Euro 400,000.00

The Strategic Portfolio Program Management

Project Description: To assist the Ministry of Foreign Affairs, RTG, in designing and developing strategic program and management system that can be used to coordinate portfolio of initiatives arising from different government agencies under the National Foreign Affairs Strategy set forth by the 4-year National Strategy Framework.

Duration: October 2005 to March 2007

Investigators: Dr Chotchai Charoenngam
Dr B H W Hadikusumo

Sponsor: Ministry of Foreign Affairs

Total Contracted Amount: Baht 4,978,000

4.4 Publications

Refereed Journals

Teerajetgul, W. and Charoenngam, C. (2006), "Factors inducing knowledge creation: empirical evidence from Thai Construction Projects", *Engineering, Construction and Architectural Management*, Vol. 13 (6), 2006.

Dorji, K. and Hadikusumo, BHW, (Printed). Safety Management Practices in The Bhutanese Construction Industry, *Journal of Construction in Developing Countries*, CIB Journal. (2006)

Yosia, R., Hadikusumo, BHW and Ogunlana, S. (Accepted), Emotional Intelligence and Leadership Styles in Construction Project Management, *Journal of Management in Engineering*, American Society of Civil Engineer (ASCE).

Ogunlana, S.O., Niwawate, C., Quang, T., and Thang, L.C., The effect of humor usage by engineers on construction sites. *ASCE: Journal of Management in Engineering*, 22 (2) 2006, pp.81-88.

Meeampol, S and S.O. Ogunlana, Factors affecting cost and time performance on highway construction projects: evidence from Thailand. *Journal of Financial Management of Property and Construction*, Vol. 11, No. 1, 2006, pp. 3-20.

Abednego M.P. and Ogunlana, S.O., Good governance for proper risk allocation in public-private partnerships in Indonesia. *International Journal of Project Management*, 24, 2006 pp. 622-634.

Manowong, E and Ogunlana, S.O. Public hearings in Thailand's infrastructure projects: effective participations? *Engineering Construction and Architectural Management*, Vol. 13, No. 4, 2006, pp. 343-363.

Raju Bahdur Shrestha and Stephen Ogunlana, Comparative Study of Power Purchase Agreements in the Nepalese Environment. *Journal of Financial Management of Property and Construction*, Vol. 11, No. 3, pp.105-116, Dec. 2006.

Dey P K, J Kinch and S O Ogunlana, "Managing Risk in Software Development Projects", *Industrial Management and Data Systems*, Accepted for publication.

Dey P K, C Charoenngam, S O Ogunlana and D Kajornkiat, "Multi-party risk management helps manage cement plant construction", *International Journal of Services Technology Management*, Accepted for publication.

Conference Proceedings

Thanet Aksorn and Hadikusumo, 2006. Critical Success Factors of Safety Programs Implementation in Thai Construction Projects, CIB W99 International Conference on

Global Unity for Safety and Health in Construction, Beijing, China.

Ogunlana, S.O., Sustainable Buildings: Where are we heading? *Proceedings of the International Conference on The Built Environment: Innovation, Policy and Sustainable Development*. Covenant university, Ota-Nigeria. January 24-26, 2006, Sustainable Buildings, pp.26-3.

Toor, S.R. and Ogunlana, S.O., Successful Project Leadership: Understanding the personality traits of leaders and project leadership. *CIB-W107 International Symposium on Construction in Developing Economies: New Issues and Challenges*, 18-20 January, 2006, Santiago, Chile.

Toor, S.R. and Ogunlana, S.O., Managing the communication and coordination interfaces on large and international construction projects. *Proceedings of the EASEC-10 Conference, Bangkok Thailand*, 3-5 August, 2006, Pp. 111-116.

Manowong E. and Ogunlana, S.O., Good governance: the evolving social and ethical issues in construction management in Thailand. *Proceedings of the EASEC-10 Conference, Bangkok Thailand*, 3-5 August, 2006, Pp. 189-194.

Oei F.J. and Ogunlana, S.O. An assessment of the activities of an institution from a customer perspective: a relational marketing approach. *Proceedings of the EASEC-10 Conference, Bangkok Thailand*, 3-5 August, 2006, Pp. 195-200.

Abednego, M.P. and Ogunlana, S.O. Proper risk allocation through good project governance for better project performance: case studies of tollway projects under public-private partnership procurement system. *Proceedings of the EASEC-10 Conference, Bangkok Thailand*, 3-5 August, 2006, Pp. 209-214.

Toto Yoyu and Stephen Ogunlana: Culture and the behavior of joint venture parties: A case study in Thailand, *2nd International Conference on Joint Ventures in Construction*, Hanoi, Vietnam. September 27-29, 2006

Maria Novana and Stephen O. Ogunlana (2006) Organizational profile of construction companies in Thailand. *Proceedings of the International joint conference on Construction Culture, Innovation and Management*, The British

University of Dubai, UAE,
November 26-29. (CD ROM)
Ektewan Manowong and S.O.
Ogunlana, Assessing the
performance of public hearing
as participation tool for
effective governance in project
management, ICIBE, Kuala
Lumpur, 2006.
Shamas-Ur-Toor and Ogunlana, S.O.,
Critical success factors in large
projects. ICIBE, Kuala Lumpur,
2006.

4.5 Doctoral Students' Dissertation

Project Performance
Improvement in the Public
Sector: The Case of Thailand
By: Mr. Suphachoke Meeampol
Supervisor: Prof. Stephen O.
Ogunlana

An Assessment of the
Performance of Public Hearing
as Vehicle of Public Participation
in Infrastructure Development
Project in Thailand
By: Mr. Ektewan Manowong
Supervisor: Prof. Stephen O.
Ogunlana

Strategic Project Selection in
Public Sector: Construction
Projects in the Ministry of
Defence in Thailand
By: Mr. Surapon Puthamont
Supervisor: Dr. Chotchai
Charoenngam

4.6 Masters Students' Theses and Research Studies

Assessment of Critical
Infrastructures: December 2004
Tsunami in the Southern Region
of Thailand
By: Mr. Bunpot Luttakoon
Supervisor: Dr. Pannapa Herabat

Capital Investment Analysis
Model From Outputs/Outcomes
Framework of Public-Private
Partnership (PPP) Project: The
Case Study of the Bangkok Mass
Rapid Transit Project
By: Mr. Warut Neamnoi
Supervisor: Dr. Chotchai
Charoenngam

IT Application for Construction
Safety Management: Planning,
Monitoring and Trending
By: Mr. Bhaskar Jyoti Das

Supervisor: Dr. B.H.W. Hadikusumo
Special Purpose Vehicle (SPV) for
Infrastructure Projects Financing
through Public Private
Partnerships (PPPs)
By: Mr. Abu Naser Chowdhury
Supervisor: Dr. Chotchai
Charoenngam

Development of Performance
Model for an International
Construction Joint Venture: A
System Dynamics Approach
By: Mr. Muhammad N. Mahmood
Supervisor: Dr. B.H.W. Hadikusumo

Modeling Contractor's and
Subcontractor's Trust: A System
Dynamics Approach
By: Ms. Azmeri Rahman
Supervisor: Dr. B.H.W. Hadikusumo

Risk-based Multicriteria Decision
Management for a Railway
System in Thailand
By: Mr. Arthit Krachang
Supervisor: Dr. Pannapa Herabat

Stakeholders' Perspective on
Risks and Opportunities of Bot
Infrastructure Projects in
Vietnam: A Case Study of Yen
Lenh Bridge Project
By: Mr. Nguyen Duy Ninh
Supervisor: Prof. Stephen O.
Ogunlana

Case Studies on Risk Allocation in
Highway Projects Under Bot
Scheme in Vietnam
By: Mr. Nguyen Tuan Nghia
Supervisor: Prof. Stephen O.
Ogunlana

Profiling a Truly World-Class
Construction and Engineering
Company
By: Mr. Muhammad Afzal
Supervisor: Prof. Stephen O.
Ogunlana

Strategic Financial Modeling for
Capital Investment Program
By: Mr. Aung Khin Tun
Supervisor: Dr. Chotchai
Charoenngam

A study of safety budgets
process in Thai Construction
projects
By: Mr. Siwachon Limpakornkul
Supervisor: Dr. B.H.W. Hadikusumo

Consistency of Safety
Management System

Implementation: A System
Dynamics Approach
By: Mr. Niraj Baidya
Supervisor: Dr. B.H.W. Hadikusumo

Cost Variances During
Construction Period: A Case
Study of Indonesian Contractors
By: Mr. Ariono Dhanisworo Indra
Budhi
Supervisor: Dr. Chotchai
Charoenngam

Constraints-Based Scheduling of
Precast Housing Project: A Case
Study of Preuksa Village III
By: Mr. Prawat Tuptone
Supervisor: Prof. Stephen O.
Ogunlana

Enhancing Financial Viability
Through Government Support
Machanism in Public Private
Partnership (PPP) Contractual
Framework
By: Miss Yessie Agustina
Supervisor: Dr. Chotchai
Charoenngam

Subcontractor Management
Strategy: An Approach to
Manage Subcontractor in
Construction Project
By: Mr. Allan Janwar Tannaya
Supervisor: Dr. B.H.W. Hadikusumo

Chapter 5: SET – DESIGN & MANUFACTURING ENGINEERING AND INDUSTRIAL ENGINEERING & MANAGEMENT FIELDS OF STUDY

5.1 Introduction

Design and Manufacturing Engineering

Design and Manufacturing Engineering field of study prepares students to manage advanced manufacturing technologies, focusing on the selection, use, control, design and integration of computer controlled manufacturing systems. The Design and Manufacturing Engineering curriculum reflects the objective of imparting fundamental knowledge to develop the ability to address the complex interaction between manufacturing, computers and industry.

Industrial Engineering and Management

Industrial Engineering and Management field of study prepares students for manufacturing management and decision support positions in industry and public sector, by equipping them with a broad range of decision making skills for a variety of applications. The IE&M curriculum reflects the objective of imparting fundamental knowledge to develop the ability to address complex industrial issues, emphasizing on how to design, run, control, and optimize the production systems.

5.2 Research Facilities and Laboratories

IEM and DME fields share all the laboratory facilities with Mechatronics and Microelectronics fields of study. There are several well equipped laboratories with the primary function of supporting the students and faculty for teaching and research and to conduct outreach programs.

Computer Integrated Manufacturing (CIM) Laboratory

The Computer Integrated Manufacturing (CIM) laboratory was officially inaugurated on September 23, 1991. It provides the hardware and software support for Industrial Systems Engineering. Many research activities have been undertaken in close collaboration with industry and government sectors in the area of Computer Aided Design (CAD), Computer Aided Manufacturing (CAM), Computer Numerical Control (CNC), Rapid Prototyping (RP) and Medical Technology. The CIM Laboratory also provides specialized training and consultancy services in CAD, CAM, CNC Machining, Reverse Engineering, Rapid Prototyping, Packaging Technology, Flexible Manufacturing Systems [FMS], and Development of Postprocessor for 5-axis CNC.

The CIM Laboratory is equipped with production and training CNC machines including EMCO TURN242 industrial production CNC lathe, EMCO VMC200 CNC vertical machining center for universal production, MAHO MH600E2 5-axis universal milling and boring machine, an EMCO compact 5 CNC, an EMCO F1 CNC, a LVD CNC press brake, a LVD water-jet cutting CNC, ZOLLER tool presetting system, and a Mondiale Gallic G-420 Industrial CNC lathe, EMCO CNC training system. The available CAD/CAM software includes UNIGRAPHICS NX4, Master CAM 9.1, Mechanical Desktop 6, AutoCAD Inventor Series, SolidWorks 2005, CAM 2000, Mimics 6.3 & Magic 5.4.

Metrology Laboratory

Metrology Laboratory provides the hardware and software support for Industrial Systems Engineering. Metrology Laboratory is equipped with Measuring Instruments (Zeiss CMM, Mitutoyo Profile Projector, Taylor Hobson Surface

Roughness Tester, Lab View Hardware & Software).

Mechatronics and Automation Laboratory

The Mechatronics and Automation laboratory is well-equipped with many PLC systems (S5, S7-200/ 300/400, INDRAMAT, BOSCH), distributed control systems (PCS7), operator panels (OP5, OP17/DP, OP35), PC-based human machine interface package (WINCC), and networked fieldbuses (PROFIBUS, INTER-BUS, SERCOS).

The lab has mobile robots (NOMAD, PIONEER 2), Robot arms (CRS), Industrial Robot (KUKA-KR15), a self-made Open Architecture CNC machine, CNC control systems (MTC200, SINUMERIK 81 00/8400), image processing systems (DVT, MATROX), and FPGAs (XILINX-1i VIRTEX PRO, ALTERA). Software packages such as SYNOPSIS IC Design, ANYSIM, ANSYS, ADAMS, and many types of special sensors and actuators are also available for the research use.

Many research activities have been undertaken in close collaboration with industry and government sectors in the area of industrial automation, robotics, control, system design and integration. Some examples of the research are: medical tele-analyzer, automated visual inspection systems, MEMS design, autonomous flying robot, automating centrifuge machines, autonomous under-water robot, automating crystallization process, etc.

Simulation Laboratory

This lab is equipped with networks of Pentium PC for general applications and internet access, high end CAD/CAM & Simulation software such as ARENA and AutoMOD. In addition, a high performance computer facility with parallel cluster is also available for research use.

Microelectronics Laboratory

The microelectronics facilities consist of two main laboratories:

IC Design Lab
Nanotechnology

The Integrated Circuit Design laboratory gives students access to a wide variety of professional software applications including ANSYS, Orcad, ModelSim SE, Xilinx ISE, Synopsys, Leonardo Spectrum LS, Tanner (S-Edit for Schematic Capture, T-Spice and W-Edit for Simulation and L-Edit for Physical Layout) are some of the software which are available. All the computers are networked through a high end (Intel XEON) server which is secure from external attacks. The laboratory facilities are used for Analog and digital circuit design, Microchip design and fabrication, MEMS, Micro-actuators and micro-sensors design, Computational electronics, etc. The fabrication is done in cooperation with National Electronics Technology Center (NECTEC) and the National Science and Technology Development Administration (NSTDA) located in the nearby Science Park.

The Nanotechnology Laboratory consists of a chemistry lab, instrumentation room and an electronics laboratory. The chemistry laboratory is equipped with standard chemical tables and hood for carrying out wet-chemical processing. The instrumentation room consists of equipments like optical spectrophotometer, microscope etc. The electronics laboratory is equipped with digital oscilloscopes, signal generators, power supplies, standard voltage and current meters as well as stocked with discrete devices for testing and research. This laboratory is used for teaching and research especially in the processing related subjects.

5.3 Faculty and Research Staff

Full-time Faculty

MARIO T TABUCANON, BSEE, BSME, Cebu Inst of Tech, Philippines; MEng, DEng, AIT, Thailand.

Professor (*Multiple Criteria Decision Making; Operations and Production Management; Operations Research; Project Management; Systems Modeling*)

ERIK L J BOHEZ, Burgerlijk WerktuigKundig Electro-Technisch Ingenieur, Rijks Universiteit Gent (State University Ghent, Belgium); Kandidatuur Burgerlijk Ingenieur, Rijks Universiteit Gent (State University Ghent, Belgium); Technisch Ingenieur Electro-Mechanica, Hoger Technisch Instituut Sint Antonius Gent, (High Technical Institute Saint Antonius Ghent; Belgium).

Associate Professor (*Computer Aided Design; Computer Aided Manufacturing; Computer Graphics; Computer Numerical Control; Five Axis Machining; Fractal and Holistic Manufacturing; Robust Control; Simulation of Metal Removal; Virtual Axis Machine*)
[CNC/CAD/CAM; Five Axis Machining; Holonic and Fractal Manufacturing; Mold and Die Design, Eco-Design]

VORATAS KACHITVICHYANUKUL, BS, Natl Taiwan Univ; MEng, AIT, Thailand; PhD, Purdue Univ, Indiana, USA

Associate Professor (*Simulation; ERP; Scheduling, Metaheuristics; Parallel Computing*)

[Planning and Scheduling Systems; Enterprise Resource Planning Systems; Supply Chain Modeling and Analysis; Discrete Event Simulation Software Development;

Manufacturing System Simulation; Manufacturing Decision Support Systems; Just-in-Time Manufacturing System]

PISUT KOOMSAP, BEng, Thammasat Univ, Thailand; MSc, Univ of Louisville; PhD, Pennsylvania State Univ, USA

Assistant Professor (*Sensing and Control for Manufacturing Processes and Systems; Laser Applications in Manufacturing; Rapid Prototyping; Condition-Based Maintenance; Continuous Improvement*)
[Rapid Prototyping; Sensing and Control for Manufacturing Processes and Systems; Laser Applications in Manufacturing; Condition-Based Maintenance; Continuous Improvement]

HUYNH TRUNG LUONG, BEng, Ho Chi Minh City Univ of Tech, Vietnam; MEng; DEng, AIT, Thailand.

Assistant Professor [Emergency inventory policies and inventory policies for perishable products; Supply chain design; Measures of bullwhip effect in supply chains; Availability-based and reliability-based maintenance; Fuzzy quality control charts; Statistical design of experiments; Network flows related problems]

5.4 Ongoing / In Progress Grant and Sponsored Research

Biodegradable Polylactide and Natural Rubber for Multicolor Articles Rapid Prototyping

Project Description: Rapid Prototyping (RP) is a method to manufacture products without mold and die. Three-dimension CAD solid models are translated into stacks of 2D cross-sections, used to generate commands to fabricate physical prototypes layer by layer. Several of RP systems are commercially available in the market today, and many techniques are in research. The trend of new RP techniques is

towards low cost systems that are compatible with various types of materials, and capable of making multicolor articles. This research proposes to develop a process to produce multicolor articles from two economically significant raw materials of Thailand; the environmental-friendly polylactide and natural rubber to strengthen the capability of Selective Vacuum Manufacturing (SVM), a new RP technique being developed at AIT. In this proposed process, four process-colored pigments are mixed with base materials according to the input color from the design, and transferred to feeder of SVM system, where the material is filled layer-by-layer to manufacture multicolor parts. The outcome of this research will provide a capability of producing multicolor articles from environment-friendly materials with inexpensive RP technique, affordable to middle and small companies.

Duration: December 2005-2007
Investigator: Dr Pisut Koomsap
Sponsor: Royal Thai Government
Total Contracted Amount: Baht 785,000

Evaluation of the Modernization of Technical Education in Production Technology

Project Description: The purpose of the project is to evaluate the results of the Project "Modernization of Technical Education in Industrial Production Technology" Phase I, implemented between 1994 and 1998 by EMCO under contract with Rajamangala Institute of Technology (RIT). The study was limited to 10 sites, which were the object of the Phase I of the Project. The result of the evaluation is that the project was highly successful. A plan for further development is provided and suggestions to link to the Thai industry are given. Investments in new site campuses and CNC Technology Center are given. Curriculum and required training for RIT faculty and staff are suggested.

Duration: July 2001-Dec 2007
Investigator: Asso Prof Erik Bohez
Sponsor: EMCO/RIT
Total Contracted Amount: Baht 450,000

5.5 Completed Sponsored Research

Organization the International Conference on Micro/Nano Fabrication Technologies (ICM/NFT06) in Bangkok

Duration: 1-Aug-05 to 31-Jul-06
Organizer: Assoc Prof Erik L. J. Bohez, Chair
Collaborator: Xpert Management Co., Ltd., Thailand
Sponsors: AIT; The University of Toledo/ PMMC, USA; American Society for Abrasive Technology, USA; Siamrak Co., Ltd., Thailand.
Total Contracted Amount: Baht 600,000

Organization The 7th Asia Pacific Industrial Engineering & Management Systems Conference, and The 9th Asia Pacific Division Meeting of the International Foundation for Production Research in Thailand

Duration: 17-20 December 2006
Organizer: Dr. Voratas Kachitvichyanukul, Chair
Sponsors: NSTDA; MTEC; Commission of Higher Education-Thailand; EMP-Kasetsart Univ.; Center for Logistics Management-Mahidol Univ.; Thai Airways Int. Public Co., Ltd.; The Bangchak Petroleum Public Co., Ltd.; Toyota Motor Thailand Co., Ltd.; Thai Acrylic Fibre Co., Ltd.-Thailand
Total Contracted Amount: Baht 3,000,000

5.6 Publications

Refereed Journals

- J. Sirikum, and A. Techanitisawad, "Power Generation Expansion Planning with Emission Control: A Nonlinear Model and GA-based Heuristic Approach", *International Journal of Energy Research*, Vol. 30, pp. 81-99, 2006.
- K. Sreprateep, and E.L.J. Bohez, "Computer Aided Modeling of Fiber Assemblies", *Computer-Aided Design and Applications*, Vol. 3, Nos. 1-4, pp. 367-376, 2006.
- S. Wannarumon, and E.L.J. Bohez, "New Aesthetic Evolutionary Approach for Jewelry Design", *Computer-Aided Design and Applications*, Vol. 3, Nos. 1-4, pp. 385-394, 2006.
- S.L. Campanelli, G. Cardano, R. Giannoccaro, A.D. Ludovico, and E.L.J. Bohez, "Statistical Analysis of the Stereolithographic Process to Improve the Accuracy", *Computer-Aided Design*, Vol. 39, Issue 1, pp. 80-86, January 2007.
- W. Anotaipaiboon, S.S. Makhanov, and E.L.J. Bohez, "Optimal Setup for Five-Axis Machining", *International Journal of Machine Tools & Manufacture*, Vol. 46, Issue 9, pp. 964-977, 1 July 2006. **Top 25 most downloaded paper in Science Direct for period Apr-Jun 2006**
- E.L.J. Bohez, B. Ariyajunya, C. Sinlapeecheewa, T.M.M. Shein, D.T. Lap, and G. Belforte, "Systematic Geometric Rigid Body Error Identification of 5-Axis Milling Machines", *Computer-Aided Design*, (in Press), doi: 10.1016/j.cad.2006.11.006.
- H.T. Luong, and N.H. Phien, "Measure of Bullwhip Effect in Supply Chain: The Case of High Order

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- P. Pongchairerks, and V. Kachitvichyanukul, "A Comparison of Variable Neighborhood Search with and without PSO", *Proceedings of the APIEMS 2006 Conference*, December 2006, Bangkok, Thailand.
- P. Pongchairerks, and V. Kachitvichyanukul, "Particle Swarm Optimization with Multiple Social Structures", *Proceedings of the International Computers and Industrial Engineering Conference*, June 2006, Taipei, Taiwan.
- L. Rookapibal, and V. Kachitvichyanukul, "Particle Swarm Optimization for Job Shop Scheduling", *Proceedings of the International Computers and Industrial Engineering Conference*, June 2006, Taipei, Taiwan.

5.7 Doctoral Students' Dissertation

Industrial Engineering & Management

GA-decomposition Methods for Power Generation Expansion Planning with Emission Controls
By: Jiraporn Sirikum
Supervisors: Dr. Voratas Kachitvichyanukul/Dr. Anulark Techanitisawad

Multiple Colony Ant Algorithm with Two-Way Scheduling Approach for Solving the Job-shop Scheduling Problem
By: Apinanthana Udomsakdigool
Supervisor: Dr. Voratas Kachitvichyanukul

5.8 Masters Students' Theses and Research Studies

Industrial Engineering & Management

An Integrated Framework of MRP II and JIT Using Optimal Junction Point Approach
By: Lala Anil Kumar Maheshwari
Supervisor: Assoc. Prof. Erik L. J. Bohez

Particle Swarm Optimization for Vehicle Routing Problems
By: Komsan Rawiwan
Supervisor: Dr. Voratas Kachitvichyanukul

A Two-Stage Genetic Algorithm for Multi-Objective Job Shop Scheduling Problems
By: Siriwan Sitthitham
Supervisor: Dr. Voratas Kachitvichyanukul

Preventive Maintenance Policy with Two Failure Modes
By: Thach Bao An
Supervisor: Dr. Huynh Trung Luong

Simulation Study of Order Release Policies for Double Bottleneck Systems
By: Kanyanat Arunvipas
Supervisor: Dr. Voratas Kachitvichyanukul

Optimal Preventive Maintenance Policy for a Warranted System
By: Nguyen Thanh Binh
Supervisor: Dr. Huynh Trung Luong

Development of a Simulation Tool for Generic Job-shop Operations
By: Do Tri Dung
Supervisor: Dr. Voratas Kachitvichyanukul

An Integrated Production-Inventory Policy for Perishable Products with Stock Dependent Demand Rate and Partial Backlogging
By: Hoang Van Hien
Supervisor: Dr. Huynh Trung Luong

*A Continuous Review Model for
Emergency Inventory Policy with
Order Expediting*

By:Ngo Sy Hieu

Supervisor: Dr. Huynh Trung Luong

*Selective Maintenance Policy with Time-
Window Constraint*

By:Mai Thanh Hoai

Supervisor: Dr. Huynh Trung Luong

*A Genetic Algorithm for Strip Packing
Problem*

By:Tran Doan Hong Ngoc

Supervisor: Dr. Huynh Trung Luong

*Particle Swarm Algorithm for Job Shop
Scheduling Problems*

By:Luksamee Rookkapibal

Supervisor: Dr. Voratas Kachitvichyanukul

*A Multicommodity Distribution Network
Design in Supply Chain Management*

By: Manavit Vinaipanit

Supervisor: Dr. Voratas Kachitvichyanukul

*Measure of Bullwhip Effect in Supply
Chains: The Case of Arma Demand
Process*

By:Nguyen Duc Vu

Supervisor: Dr. Huynh Trung Luong

*Decision Support System for Emergency
Medical Services*

By:Dennis Ziemer

Supervisor: Dr. Voratas Kachitvichyanukul

Design and Manufacturing Engineering

*Investigation on Difference in 3-axis and 5-
axis Machining of Stamping Die Insert*

By:Maharaj Singh

Supervisor: Assoc. Prof. Erik L. J. Bohez

*Filament Winding Emulation on 5-Axis
Milling Machine*

By:Poramade Dhanarun

Supervisor: Assoc. Prof. Erik L. J. Bohez

*Modeling and Performance Evaluation of
a FMS by Colored Petri Nets*

By:Phan Thi Huyen Chau

Supervisor: Assoc. Prof. Erik L.J. Bohez

*A Geometric Algorithm for Optimal Flat
End Mill to Improve Surface Quality*

By:Polpat Chuinklin

Supervisor: Assoc. Prof. Erik L. J. Bohez

*Computer Aided Parametric Modeling
and 5-Axis Milling of a Marine Propeller*

By: Aldrin Cantor Munar

Supervisor: Assoc. Prof. Erik L.J. Bohez

Chapter 6: SET – GEOTECHNICAL AND GEOENVIRONMENTAL ENGINEERING FIELD OF STUDY

6.1 Introduction

Beside the traditional areas of foundation engineering, earth structures, underground excavations, land subsidence, and landslide mitigations, geotechnical engineers and researchers are increasingly involved in new and dynamic areas of ground improvement, geosynthetic engineering, land reclamation, lightweight materials, forensic engineering and the effective recycling of waste materials.

Furthermore, geotechnical engineers are increasingly challenged to solve environmental problems related to the reduction of construction wastes, provision of efficient waste disposal facilities, clean-up of contaminated sites as well as geological related hazards such as landslides and soil erosion.

The GTE field of study also includes onshore and offshore exploration. In accommodating these requirements, the courses in the field have been enhanced to equip geotechnical engineers not only with traditional knowledge of soil mechanics and geology but also with skills in hydrogeology, geochemistry, biological processes, petroleum engineering, resource exploration, and geophysics.

Students in the field are exposed to geomaterials, continuum mechanics and particulate/discontinuous media.

6.2 Research Facilities and Laboratories

The Geotechnical and Geoenvironmental Laboratory can be boasted as one of the most equipped geotechnical laboratories in the region with more than 30 years of experience in both soil and rock testing. The laboratory, which offer technical services on testing and research on the engineering behavior and properties of soil and rock;

geologic mapping; environmental geophysical surveys; and testing of geosynthetic materials conducted by ACSIG, consists of five (5) sections - Soil Mechanics, Rock Mechanics, Engineering Geology, Geophysics, and Geoenvironmental Engineering.

Soil Mechanics Laboratory

The Soil Mechanics Laboratory has facilities for testing and research on the engineering behavior and fundamental properties of soil. It is equipped to test compaction, seepage, compressibility, deformation and shear strength, soil dynamics, and ground improvement.

Among other equipment, it has an automatic Central Data Acquisition System (CDAS) and two temperature-controlled rooms that house triaxial and consolidation equipment. Its field operation unit has a full range of tools for sampling soils and rocks and field test equipments for vane tests, Dutch cone tests, piezocone tests, pressuremeter tests, screw plate tests, electric logging, and vibration measurements.

Rock Mechanics Laboratory

The Rock Mechanics Laboratory has facilities to determine a variety of the physical and mechanical properties of rocks and rock aggregates required for research and practice.

Moreover, the laboratory is capable of determining hardness, swelling and slake durability index properties of weak rocks. The laboratory has provided testing services to a large number of infrastructure projects in the region.

Engineering Geology Laboratory

The Engineering Geology Laboratory has facilities for research on the engineering behavior and fundamental properties of rocks and minerals. It provides classification and characterization tests for rock

and minerals including petrographic and X-ray diffraction studies. It has stereoscopes, radial line planimetric plotter, stereo-sketch and sketch masters for analysis and interpretation of airphotos as applied to mineral explorations, transportation route studies, forestry, and civil engineering.

Geophysics Laboratory

The Geophysics Laboratory is being developed for training and researches in Geosystem Exploration and Petroleum Geoengineering. It has a number of seismic, electric, magnetic and radiometric instruments, including some of the most advanced equipment such as DAS-1 (OYO), a multi-purpose hi-performance seismic data acquisition system, or SYSCAL R1 Plus (IRIS Instruments), an all-in-one multi-electrode resistivity and induced polarization (IP) imaging system.

The Laboratory is capable of conducting and assisting in geophysical field surveys for engineering, environmental, mineral resources, oil and gas exploration as well as in performing analysis, interpretation and visualization of geophysical data acquired.

Geoenvironmental Laboratory

The Geoenvironmental Laboratory provides a variety of equipment for geoenvironmental engineering research. It has equipment for geotechnical and chemical analysis that supports research in fundamental processes related to soil, water and chemical interactions that are applied to site and risk assessment, waste containment systems, and remedial technology. The chemical analysis equipment, spectrophotometer, from which the ion concentration can be determined with good accuracy and precision, enables research on soil-contaminant interaction. Flexible wall permeameter, rigid

wall permeameter and consolidation cell with permeameter are used to analyze water and chemical migration through waste containment systems. While the electrokinetic cell with advanced monitoring and controlled system is utilized for research in site reclamation and site remediation.

6.3 Faculty and Research Staff

Full-time Faculty

DENNES T BERGADO, BSCE, Mindanao State Univ, Philippines; MEng, AIT, Thailand; PhD, Utah State Univ, USA
Professor (*Soil/Ground Improvement Techniques, Geosynthetic Engineering, Landfill Liners, In-Situ Testing, and Geotechnical Engineering for Mitigation of Natural Hazards*)
 [Ground improvement techniques and geosynthetics, In-situ testing, Geotechnical disaster mitigation, and Probabilistic/numerical methods in geotechnical engineering]

ULRICH GLAWE, Dipl-Geol, Univ of Erlangen-Nuremberg, Germany; MSc, Imperial College, UK; PhD, Univ of Erlangen-Nuremberg, Germany.
Associate Professor (*Geoenvironmental Engineering; Engineering Geology*)
 [Geological hazards; Ground improvement using electrochemical stabilization; Contaminant transport in fine-grained soils; Landfill design for developing countries and in wet lands; Tsunami deposits]

NOPPADOL PHIEN-WEJ, BEng, Chulalongkorn Univ, Thailand; MS, PhD, Illinois at Urbana-Champaign, USA.
Associate Professor (*Tunnelling and other underground excavations in rocks and soils; Slope stability and retaining structures; Landslides; Earth structures and dams; Pile*

foundations; Buried pipes and culverts)
 [Soft ground tunnelling; Underground excavations in rock; Deep excavations; Land subsidence from deep well pumping; Rock properties]

KYUNG-HO PARK, BEng, MEng, Korea Univ; DEng, SUNY at Buffalo, USA.
Assistant Professor (*Geotechnical Engineering; Geomechanics; Computational Mechanics; Boundary Element Methods*)

Research Staff

PHAM HUY GIAO, DEng, MEng, Asian Institute of Technology, Thailand; Dipl Ing (MSc), Bucharest University, Romania
Senior Research Engineer (*Exploration and Engineering Geophysics; Geotechnical Engineering; Computer-Aided Analysis in Geoengineering*)

6.4 Completed Grant and Sponsored Research

Development of System for Tunneling-induced Building Damage Risk Assessment Using Analytical Methods
Duration 1-Sep-04 to 31-Dec-06
Project Investigator Dr. Kyung-Ho Park
Sponsors Noweng Co. Ltd., Seoul, Korea
Total Contracted Amount (Baht) 376,972

Soft Bangkok Clay Improvement by Thermal Consolidation with Prefabricated Vertical Drains(PVD)
Duration 30-Sep-04 to 31-Jul-06
Project Investigator Prof. Dennes Bergado
Sponsors Royal Thai Government (RTG)
Total Contracted Amount (Baht) 950,000

Full-Scale Test of Reinforced Segmental Wall/Embankment Using High Strength Geogrid Reinforcement with Lightweight Rubber Tire Chip-Sand Fill on Soft Ground
Duration 30-Sep-04 to 30-Jun-06
Project Investigator Prof. Dennes Bergado
Sponsors Royal Thai Government (RTG)
Total Contracted Amount (Baht) 600,000

Seismic Hazard Assessment and Mitigation of Seismic Risk in Thailand (Phase I): Sub-projects 3 and 4

Duration 1-Sep-02 to 31-Dec-06
Project Investigators Dr. Pennung Warnitchai and Dr. Noppadol Phienwej
Sponsors Thailand Research Fund
Total Contracted Amount (Baht) 3,154,000

Characterization of Soft Soil in Mekong Delta, a Collaboration Project

Duration: 2004 to 2006
Research Team Member: Dr Pham Huy Giao
Investigator: Geotechnical Group Tokyo Institute of Technology (TIT).
Sponsor: Japanese Government

Development of System for Tunneling-induced Damage Risk Assessment using Analytical Methods

Project Description: The project aims at developing the design manual for evaluating the tunneling-induced building damage risk assessment using analytical methods.
Duration: 1 Sept-04 to 30-Dec-06
Investigator: Dr Kyung-Ho Park
Sponsor: NOWENG Co, Ltd
Total Contracted Amount: B376,972.00

Post-Tsunami Reconstruction for Sustainable Coastal Development

Investigator: USAID/SERD/Dr Amrit Bant
Participant: Prof D T Bergado
Total Contracted Amount: US \$5.0 M

Rubber Tire Chips Mixed with Sand Reinforced with Geogrid

Project Description: The aim of this research is to study the behavior of high strength geogrid with lightweight rubber tire chip-sand fill. The parameters obtained in this project will be utilized for development of design procedure and design criteria for MSE construction with lightweight fill and high strength geogrid reinforcements as well as compare the design procedure and criteria obtained from this project with other design methods such as coherent gravity and tie-back methods. This study will be completed after one year.
Duration: January 2005 to March 2006
Investigators: Prof Dennes T Bergado Dr Noppadol Phienwej
Sponsor: Royal Thai Government (RTG)

Total Contracted Amount: B 600,000.00

Thermal Stabilization of Soft Bangkok (Phase 2)

Project Description: The significant characteristics of Bangkok clay, thick deposited soft clay, are low permeability, low strength, high compressibility, and high water content. These properties create problem in foundation and infrastructure engineering such as low bearing capacity, unstable slope, large settlement by consolidation when loaded and taking a long time to achieve the primary consolidation settlement. In order to reduce the future settlement contributed by the primary consolidation of thick layers of low permeability foundation soil, improvement in the soil drainage system is deemed necessary. This research work studied the new innovation technique to hasten the consolidation rate of soft Bangkok clay by using the combination of prefabricated vertical drain (PVD) and thermal method. Both laboratory and field works have been done. The results show that raising the clay temperature up to 90°C increases its permeability about 3 to 4 times. Therefore, this technique accelerates the rate of consolidation because the permeability and the pore pressures increase with temperature. Moreover, elevated temperature tend to increase the shear strength of clays at drained condition.

Duration: January 2005 to March 2006

Investigators: Prof Dennes T Bergado

Dr Noppadol Phien-wej

Sponsor: Royal Thai Government (RTG)

Total Contracted Amount: Baht 900,000

6.5 Ongoing / In Progress Grant and Sponsored Research

Bridge-Development of Human Resources in Development of Academic Programmes in Sustainable Geosystem Exploration and Engineering (BRIDGE)

Project Description: Considering the growing demand for an international training and education in geo-system engineering and exploration in the Mekong region countries, this 3-year project aims to help develop human resources at Vietnam National University (VNU) and National University of Laos (NUOL). Project partners are VNU, NUOL, AIT, ITC (The Netherlands) and Stockholm University (SU). Overall objective of the action is to develop human resources in the Mekong Region in the integrated field of Geosystem Engineering and Exploration. The main scopes and activities include: (i) Training and upgrading of teaching staff at VNU and NUOL in Geosystem engineering and exploration; (ii) Training and upgrading of administrative and

managerial staff in international graduate educational management; (iii) Exchange of new teaching materials and new teaching tools; and (iv) Provide support to development of course modules that will be integrated in the international programs in geo-system engineering and exploration, under development at NUOL and VN.

Duration: 1 Nov- 2005 to 30 Nov- 2008

Investigators: Dr Pham Huy Giao

Dr Noppadol Phien-wej

Sponsor: ITC (The Netherlands)

European Commission

Total Contracted Amount: B4,674,126.00

Research on the Damages on the North East Reef of Male, The Maldives

Duration: 1 May 2006 to 30 April 2009

Project Description: The project involves laboratory investigations, development of failure criteria for highly porous rocks (reef limestone) and numerical modeling through the engagement of a doctoral student.

Project Investigator: Dr. Ulrich Glawe

Sponsors: Environment Research Center Male, MV

Total Contracted Amount (Baht): 1,563,109

Technology Transfer of Geotechnical and Geophysical Field Testing Techniques

Duration: 15 March 2006 to 30 April 2006

Project Description: The training is concerned with the transfer of technology in geotechnical and geophysical field testing techniques.

Project Investigator: Dr. Pham Huy Giao

Sponsors: Hanoi University of Mining and Geology, Vietnam

Total Contracted Amount (Baht): 90,000

Geotechnical Advice in Construction Supervision on Foundation and Tunnel Works, Kwaenoi Dam Project

Duration: 1 March 2006 to 30 Sept. 2006

Project Description: The project aims to provide geotechnical advice to CSC of the Kwaenoi Dam Project of the Royal Irrigation Department of Thailand on matters related to foundation and diversion tunnel works of the dam. The project, which was initiated by H.M. the King of Thailand for irrigation and flood control purpose, involves construction of two high rockfill dams in Khorat, Thailand.

Project Investigator: Dr. Noppadol Phien wej

Sponsors: P&C Management Co., Ltd., Thailand

Total Contracted Amount (Baht): 321,000

Geotechnical Study Hutgyi Hydropower Project

Duration: 1 April 2006 to 30 November 2006

Project Description: Under a collaboration with the Faculty of Science and Engineering of Chulalongkorn University, the project aims to assist and provide recommendations to EGAT Plc's engineers on geotechnical

investigation of the Hutgui Hydropower project in Myanmar in the Feasibility Study Stage for purpose of dam type selection and foundation design. It also aims to evaluate the investigation data and provide recommendations on the foundation treatment of the dam and other appurtenance structures. A training workshop on numerical analysis for dam and tunnel design with emphasis on the use of the computer program "Phase 2" will also be given to EGAT's engineers / project staff.

Project Investigator: Dr. Noppadol Phien-wej

Sponsors: EGAT Public Co., Ltd., Thailand

Total Contracted Amount (Baht): 749,000

6.6. Publications

Referred Journals

Abuel-Naga, H.M., Bergado, D.T. and Bouzza, A. (2006), Thermally Induced Volume Change and Excess Pore Water Pressure of Soft Bangkok Clay, *Engineering Geology*, Vol. 89, pp. 144-154.

Abuel-Naga, H.M., Bergado, D.T. and Chaiprakaikeow, S. (2006), Innovative Thermal Technique for Enhancing the Performance of Prefabricated Vertical Drain during the Preloading Process, *Geotextiles and Geomembranes*, Vol. 24, pp. 359-370.

Abuel-Naga, H.M., Bergado, D.T., Ramana, G.V., Grino, L., Rujivipat, P., and Thet, Y. (2006), Experimental Evaluation of Engineering Behavior of Soft Bangkok Clay under Elevated Temperature, *ASCE Journal of Geotechnical and Geoenvironmental Engineering*, Vol. 132, No. 7, pp. 902-910.

Bergado, D.T., Ramana, G.V., Sia, H.I. and Rai, V., Evaluation of Interface Shear Strength of Composite Liner System and Stability Analysis for a Landfill Lining System in Thailand, *Geotextiles and Geomembranes*, Vol. 24, No. 6, pp. 371-393.

Bergado, D.T., Taechakumthorn, C., Lorenzo, G.A. and Abuel-Naga, H.M. (2006), Stress-Deformation Behavior under Anisotropic Drained Triaxial Consolidation of Cement-Treated Soft Bangkok Clay, *Soils and Foundations*, Vol. 46, No. 5, pp. 657-665.

Kumar, A., Glawe, U. and Takemura, J. (2006): Chloride effective diffusion coefficient of the soft Bangkok Clay.- *Mehran University Research J. of Eng. And Tech.* [ISSN 0254-7821], Vol. 25, No. 3, pp. 259-270.

Lai, Y.P., Bergado, D.T., Lorenzo, G.A. and Duangchan, T. (2006), Full-Scale Reinforced Embankment on Deep Jet Mixing Improved Ground, *Ground Improvement*, Vol. 10, No. 4, pp. 153-164.

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Lorenzo, G.A., Bergado, D.T. and Sorlump, S. (2006), New and Economical Mixing Method of Cement-Admixed Clay for DMM Application, *Geotechnical Testing Journal*, Vol. 29, No. 1, pp. 54-63.

Minh, N.H. and Bergado, D.T. (2006), Numerical Modelling of a Full Scale Reinforced Embankment on Deep

- Mixing Cement Piles, Australian Geomechanics, Vol. 41, No. 2, pp. 77-88.
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- Park K.H. and Banerjee, P.K.** (2006), 'A simple BEM formulation for poroelasticity via particular integrals', International Journal of Solids and Structures 43(11-12), 3613-3625.
- Park K.H. and Kim, Y.J.** (2006), 'Analytical solution for a circular opening in an elastic-brittle-plastic rock, International Journal of Rock Mechanics and Mining Sciences 43(4), 616-622.
- Park, K.H.** (2006). Closure to 'Elastic solution for tunneling-induced ground movements in clays', International Journal of Geomechanics ASCE, 6(1), 73-74.
- Phienweij, N., Giao, P.H. and Nutalaya, N.** (2006), "Bangkok Land Subsidence", Engineering Geology, International Journal, Vol. 82, Issue 4, 2 February 2006, pp.187-201.
- Phienweij, N., Hong, C.P. and Sirivachiraporn, A.** (2006), "Evaluation of Ground Movements in EPB-shield Tunnelling for Bangkok MRT by 3D Numerical Analysis", Proc. of World Tunnel Congress 2006, Seoul, Korea. 6 p. & Journal of Tunnelling and Underground Space Technology,
- Bergado, D.T.** (2006), BeauDrain-S PVD Vacuum System on Soft Bangkok Clay, Keynote Lecture, Proc. 6th Intl. Symposium on Soft/Ground Improvement and Geosynthetics, Bangkok, Thailand.
- Bergado, D.T.** (2006), Innovative Thermal Technique for Enhancing the Performance of PVD Performance, Keynote Lecture, Proc. 1st International Conference on New Development in Geoenvironmental and Geotechnical Engineering, Incheon, Korea.
- Bergado, D.T.** (2006), Mitigation and Rehabilitation Coastal and Waterways Erosion and Scour Cause by Tsunamis and Severe Storms, Plenary Lecture, Proc. 2nd International Engineering Research Conference, Cebu City, Philippines.
- Bergado, D.T.** (2006), Properties, Functions, Testing and Earth Reinforcement of Geosynthetics, Keynote Lecture, Proc. International Civil Engineering Education Congress and 7th National Civil Engineering Education Congress, Angeles City, Philippines.
- Bergado, D.T., Abuel-Naga, H.M. and Bouzza, A.** (2006), Temperature Effects on Engineering Behaviour of Soft Bangkok Clay, Proc. 4th International Conference on Soft Soil Engineering, Vancouver, Canada.
- Bergado, D.T., Abuel-Naga, H.M., and Chairprakaikew, S.** (2006), Effect of Temperature on the Consolidation of Soft Bangkok Clay with PVD, Proc. 16th International Offshore and Polar Engineering Conference, San Francisco, U.S.A.
- Bergado, D.T., Abuel-Naga, H.M., Chairprakaikew, S. and Than, N.Y.** (2006), Innovative Thermo-PVD for Soft Ground Improvement, Keynote Lecture, Proc. International Symposium on Lowland Technology, Saga, Japan.
- Bergado, D.T., Saowapakpiboon, J., Kovittayanun, N. and De Zwart, T.P.** (2006), Innovative PVD Vacuum System for Improvement of Soft Bangkok Clay at the Second Bangkok Airport, Invited Lecture, Proc. International Workshop, Bukyung University, Busan, Korea.
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6.7 Doctoral Student Dissertation

Thermo-Mechanical Behavior of Soft Bangkok Clay: Experimental Results and Constitutive Modeling
 By Hossam M.A. Naga
 Supervisor: Prof. Dennes T. Bergado

6.8 Masters Students' Theses and Research Studies

Laboratory Investigation of Stiffened Deep Cement Mixed Pile
 By Anil Bhandari
 Supervisor: Prof. Dennes T. Bergado

Seismic Design and Analysis for Tunnel Lining in Seoul Subways
 By Kim Woo Jin
 Supervisor: Dr. Kyung-Ho Park

Seismic Design and Analysis for Tunnel Lining in Bangkok MRT Subway
 By Kullachai Tantayopin
 Supervisor: Dr. Kyung-Ho Park

Anisotropic Behaviour of Bangkok Clay in Vane Shearing Mode
 By Norawat Rattananarungsan
 Supervisor: Dr. Noppadol Phienwej

Removal of Disturbed Zone around Prefabricated Vertical Drain (PVD) using Thermal Method
 By Nyo Mar Than
 Supervisor: Prof. Dennes T. Bergado

Three Dimensional Analysis of Ground Movement in EPB Shield in Bangkok Soils
 By Parin Mruetusatorn
 Supervisor: Dr. Noppadol Phienwej
 Dr. Kyung-Ho Park (Co-chair)

Characterization of Recent Tsunami Deposits at the Andaman Coast of Thailand
 By Saidul Alam
 Supervisor: Dr. Ulrich Glawe

Prediction and Performance of Reinforced Rubber Tire-Sand Test Embankment
 By Taweesak Kanjananak
 Supervisor: Prof. Dennes T. Bergado

Investigation of Recent Tsunami Deposits Andaman Coast, Thailand
 By Wanna Phyoo
 Supervisor: Dr. Ulrich Glawe

Heavy Metal Diffusion under High Gradients and Diffusion Anisotropy in the Soft Bangkok Clay
 By Zaheer Ahmed Almani
 Supervisor: Dr. Ulrich Glawe

Kwaenoi Dam Foundation and Tunnels
 By Saw Marcus
 Supervisor: Dr. Noppadol Phienwej

Tunnel Risk Analysis Evaluation in the Bhumibol Reservoir Inflow Augmentation Project
 By Nunthanis Wongvatana
 Supervisor: Dr. Noppadol Phienwej

Investigation of Thermo-Mechanical Behavior of Normally Consolidated Soft Bangkok Clay
 By Laricar Dominic Ortega Trani
 Supervisor: Prof. Dennes T. Bergado

Development of a Geophysical Test Site in AIT Campus

By Chanarop Vichalai
 Supervisor: Dr. Noppadol Phienwej
 Dr. Pham Huy Giao (Co-chair)

An Geotechnical-Geophysical Study of the Red River Delta Clay with Reference to Highway Network Upgrading
 By Doan Huy Hien
 Supervisor: Dr. Noppadol Phienwej
 Dr. Pham Huy Giao (Co-chair)

Geophysical Investigation of Sinkholes in the Tsunami-affected Area in Southern Thailand
 By Naratip Prechavit
 Supervisor: Dr. Noppadol Phienwej
 Dr. Pham Huy Giao (Co-chair)

A Study on Horizontal Well Efficiency with Reference to Improved Oil Recovery of the South-East Dragon Oil Field, Vietnam
 By Nguyen Minh Quy
 Supervisor: Dr. Noppadol Phienwej
 Dr. Pham Huy Giao (Co-chair)

Visualization of Bangkok Subsurface
 By Sornchai Apibarnponlatham
 Supervisor: Dr. Noppadol Phienwej
 Dr. Pham Huy Giao (Co-chair)

An Experimental Study on Ultrasonic and Microtremor Signal with Reference to Hydrocarbon Exploration
 By Wong Jing T.
 Supervisor: Dr. Noppadol Phienwej
 Dr. Pham Huy Giao (Co-chair)

Chapter 7: SET – MECHATRONICS AND MICROELECTRONICS FIELDS OF STUDY

7.1 Introduction

Mechatronics

At present, most academic institutions and industries in the Asian region are only system integrators. Components are procured from more developed countries (e.g. computer numerically controlled machines, robots, and automated guided vehicles) and are integrated as a system (e.g. flexible manufacturing system). To support the growth of the region's economy, expertise not only as system integrators but also as builders of components of advanced technologies must be developed. The growing number of electronic devices and the strong interactions between mechanical and electronic parts no longer permit separate investigations of these components.

Mechatronics provides new insights through an integrated consideration of mechanics, electronics and information technology. The curriculum is designed to provide multidisciplinary knowledge and to develop the ability to design mechatronics systems.

Microelectronics

The region's growing industrial sector and the increasing demand for high technologies have brought the need for expertise in microelectronics to a critical level. The students are prepared to cope with the needs of the electronics industry in the region. The curriculum is equally balanced between the analog and digital design of circuits as well as the processing related topics including failure analysis, suitable for this electronics industrial sector in the region. The curriculum has been designed and constantly adapted in partnership with microelectronics industries and collaborating universities overseas. Miniaturisation of IC

and the possibilities of completely new technologies like nanotechnology have also been introduced.

7.2 Research Facilities and Laboratories

Mechatronics and Microelectronics fields of study share all the laboratory facilities with IEM and DME fields of study. There are several well equipped laboratories with the primary function of supporting the students and faculty for teaching and research and to conduct outreach programs.

Mechatronics and Automation Laboratory

The Mechatronics and Automation laboratory is well equipped with many PLC systems (S5, S7200/300/400, INDRAMAT, BOSCH), distributed control systems (PCS7), operator panels (OP5, OP17/DP and OP35), a PC-based human machine interface package (WINCC) and networked field buses (PROFIBUS, INTER-BUS and SERCOS). The lab has mobile robots (NOMAD, PIONEER 2), robot arms (CRS), an industrial robot (KUKA-KR15), a self-made open architecture CNC machine, CNC control systems (MTC200, SINUMERIK 8100/8400), image processing systems (DVT, MATROX) and FPGA's (XILINX-1i VIRTEX PRO, ALTERA). Software such as SYNOPSIS IC Design, ANYSIM, ANSYS, ADAMS and many types of special sensors and actuators are also available for research use.

The Integrated Circuit Design laboratory gives students access to a wide variety of professional software applications including ANSYS, Orcad, ModelSim SE, Xilinx ISE, Synopsys, Leonardo Spectrum LS and Tanner (S-Edit for Schematic Capture, T-Spice and W-Edit for Simulation and L-Edit for Physical Layout). The laboratory's facilities are used for analog and digital circuit design, microchip design and

fabrication, MEMS, micro-actuators and micro-sensors design, computational electronics, and so on. Fabrication facilities are available through the National Electronics Technology Center and the National Science and Technology Development Administration located in nearby Science Park. Mechatronics faculty and students work in close collaboration with industry and government sectors in the areas of industrial automation, robotics, control, system design and integration. Some examples of ongoing projects include a medical tele-analyzer, automated visual inspection systems, MEMS design, an autonomous flying robot, automating centrifuge machines, an autonomous underwater robot and automating crystallization processes.

Simulation Laboratory

This lab is equipped with networks of Pentium PC for general applications and internet access, high end CAD/CAM & Simulation software such as ARENA and AutoMOD. In addition, a high performance computer facility with parallel cluster is also available for research use.

Microelectronics Laboratory

The microelectronics facilities consist of two main laboratories:

- (1) IC Design Lab
- (2) Nanotechnology

The Integrated Circuit Design laboratory gives students access to a wide variety of professional software applications including ANSYS, Orcad, ModelSim SE, Xilinx ISE, Synopsys, Leonardo Spectrum LS and Tanner (S-Edit for Schematic Capture, T-Spice and W-Edit for Simulation and L-Edit for Physical Layout). The laboratory's facilities are used for analog and digital circuit design,

microchip design and fabrication, MEMS, micro-actuators and micro-sensors design, computational electronics, and so on. Fabrication facilities are available through the National Electronics Technology Center and the National Science and Technology Development Administration located in nearby Science Park.

The Nanotechnology laboratory consists of a chemistry lab, an instrumentation room and an electronics laboratory. The chemistry laboratory is equipped with standard chemical tables and hoods for carrying out wet-chemical processing. The instrumentation room consists of equipment such as optical spectrophotometers and microscopes. The electronics laboratory is equipped with digital oscilloscopes, signal generators, power supplies and standard meters, and it is stocked with a variety of discrete devices for testing and research.

Computer Integrated Manufacturing (CIM) Laboratory

The Computer Integrated Manufacturing (CIM) laboratory provides hardware and software support for Industrial Systems Engineering. Many research activities have been undertaken in close collaboration with industry and government sectors in the area of Computer Aided Design (CAD), Computer Aided Manufacturing (CAM), Computer Numerical Control (CNC), Rapid Prototyping (RP) and Medical Technology. The CIM laboratory also provides specialized training and consultancy services in CAD, CAM, CNC machining, reverse engineering, rapid prototyping, packaging technology, flexible manufacturing systems (FMS), and development of a postprocessor for 5-axis CNC. The CIM laboratory is equipped with production and training CNC machines including an EMCO TURN242 industrial production CNC lathe, an EMCO VMC200 CNC vertical machining center for universal production, a MAHO MH600E2 5-axis universal milling and boring machine, an EMCO compact 5 CNC, an

EMCO F1 CNC, a LVD CNC press brake, a LVD water-jet cutting CNC, a ZOLLER tool presetting system, a Mondiale Gallic G-420 Industrial CNC lathe and an EMCO CNC training system. The available CAD/CAM software includes UNIGRAPHICS NX4, Master CAM 9.1, Mechanical Desktop 6, AutoCAD Inventor Series, SolidWorks 2005, CAM 2000, Mimics 6.3 and Magic 5.4. The Metrology laboratory also provides hardware and software support for Industrial Systems Engineering. The Metrology Laboratory is equipped with measuring instruments including Zeiss CMM, Mitutoyo Profile Projector and a Taylor Hobson surface roughness tester, as well as LabVIEW hardware and software.

Metrology Laboratory

The Metrology laboratory also provides hardware and software support for Industrial Systems Engineering. The Metrology Laboratory is equipped with measuring instruments including Zeiss CMM, Mitutoyo Profile Projector and a Taylor Hobson surface roughness tester, as well as LabVIEW hardware and software.

7.3 Faculty and Research Staff

Full-time Faculty

NITIN V AFZULPURKAR, BEng, Univ of Poona, India; PhD, Univ of Canterbury, New Zealand
Associate Professor
[Computer vision (pattern recognition and image processing); MEMS design, fabrication for electronic and bio medical applications; Soft computing algorithms for robotics and automation applications; Mechatronics applications for industrial use]

JOYDEEP DUTTA, BSc (Hons), St Edmund's College; MSc (Physics), North Eastern Hill Univ; PhD, IACS, Calcutta Univ, India.
Associate Professor
[Functional materials,

nanomaterials, Nanoparticles, self-organisation, Biomimetic processes, Polyelectrolyte deposition, Gas sensors, Bio-sensors, optoelectronic devices]

MANUKID PARNICHKUN, BEng, Chulalongkorn Univ, Thailand; MEng, PhD, Univ of Tokyo, Japan
Associate Professor
[Robotics, control, and measurement (involves with design and development of hardware and software of mechatronics devices); New robot mechanism, novel control algorithm, and innovative measurement concept are investigated]

Visiting Faculty

LERTSAK LEKAWAT, BE King Mongkut's Institute of Technology Ladkrabang, Thailand; MSc., George Washington University USA; PhD Carnegie Mellon University, USA
Visiting Lecturer
[Data Storage System, Analog design, digital design, mixed signal design]

DENIS SWEATMAN, B.Sc. ; Ph.D., the University of Queensland, Australia.
Visiting Lecturer
[Analog and Digital Devices, Circuits, Sensors and Optic Communications]

UDUPI SRIPATI, B.Eng. , Mangalore University; M.Tech. ; NITK Surathkal; and Ph.D., Indian Institute of Science. Visiting Senior Lecturer [Linear lcs and applications; antennas and propagation; advanced digital communications, signal detection and estimation, error control coding, information theory, transmission lines and wave-guides, RF circuit techniques]

7.4 Completed Grant and Sponsored Research

Development of a Systemic-Error-Compensate CNC Controller Project

Project Description: Nowadays, accuracy of products is one of the most critical considerations for manufacturers. Since many work-pieces are produced by Computer Numerical Control Machine (CNC Machine), thus, work-pieces accuracy depends directly on accuracy of the CNC Machine.

Actually, CNC machine is able to produce work-piece accurately up to the level of 1 mm. However, in reality, it is very difficult to control the machine at this level since the CNC machine always includes the following inaccuracies in the system: (1) inaccuracy in CNC machine assembly, especially with movable components, (2) thermal distortion of CNC machine and work-pieces during manufacturing, (3) inaccuracy induced by cutting forces, (4) cutting tool wear, (5) fixture errors, etc. Inaccuracies from (1), (2), and (3) are the main factors of manufacturing errors in CNC machines.

Mostly, manufacturing error is time-variant (not constant with time), it depends on many factors including machine condition, environment temperature, work-pieces material and weight, and so on at the instant of operation.

In this research, the researchers will develop a systematic-error-compensate CNC controller. The developed controller collects necessary information: e.g., position and displacement, temperature, forces, etc., from CNC machine and uses this information in the error compensate algorithm to compensate error in real time. Output from the error compensation is applied to correct command to the CNC machine.

Duration: 1-Jan-02 to 31-Dec-06
Investigator: Dr. Manukid Parnichkun
Sponsor: Mitutoyo Association for Science and Technology
Total Contracted Amount: Baht 828,000

A Study of Development of an Intelligent Vehicle Project

Project Description: The project is to develop an intelligent vehicle for use to improve highway safety and fuel consumption. The intelligent vehicle can also be employed by handicapped and elderly persons who are normally unable to effectively and safely travel around by themselves, which can translate into some significant savings for the nation. The project main objective is to develop an intelligent vehicle which is able to move from one place to another autonomously, without help from human. Operator only needs to provide information about his/her destination to the vehicle. The vehicle receives intelligence from various sensors installed on board. These sensors are used to determine the position of the vehicle, the directions of other vehicles in the vicinity, static and dynamic obstacles, traffic lines, symbols, signs, inter-vehicle distances, etc. It also receives intelligence from the Global Positioning

Satellites (GPS) to help in navigation, control, and avoidance of accidents.

Duration: March 2005 to December 2006
Investigator: Dr Manukid Parnichkun
Sponsor: National Electronics and Computer Technology Center
Total Contracted Amount: Baht 1,000,000

Conjugated Semiconductor Nanoparticles as Fluorophores for Rapid Detection of Bacteria's

Project Description: This project will study the assembly of fluorescent inorganic nanoparticles (nanophosphor), ZnS:Mn²⁺ and biomimetic polymers and its subsequent attachment to bacteria's and will try to address the two major challenges for the rapid detection of a single bacterium are the achievement of (i) short to real-time detection and (ii) ultrasensitivity in bioanalysis. Here, we propose a bioconjugated nanophosphor (ZnS:Mn²⁺)-based bioassay for in situ pathogen quantification. The bioconjugated nanoparticle would provide the fluorescent signal for bioanalysis that can be easily incorporated with biorecognition molecules, such as an antibody.

Duration: Dec 2005 to Dec 2006
Investigator: Dr Joydeep Dutta
Sponsor: NANOTECH/NSTDA
Total Contracted Amount: Baht 1,498,992

Development of an Automated Visual Inspection System (2005-2006)

Project Description: To develop a prototype of Automated visual inspection system which can identify significant defects in computer hard disk drive during the assembly process. The developed system will consists of hardware (camera and jig) and customized image processing software.

Duration: Nov 2004 to Dec 2006
Investigator: Dr Nitin Afzulpurkar
Sponsors: Consortium of Seagate, Hitachi, Western Digital and NEC/TEC
Total Contracted Amount: Baht 1,500,000

Development of an Automatic Tide Sensing Unit for Tsunami Early Warning System

Project Description: The main objective of this project is to study and develop an automatic tide sensing unit for Tsunami early warning system. The sensing unit will have a capability to detect automatically tide information; including tide height, wave amplitude, wave length, and wave speed. All the information will be transmitted to a ground station to analyze possibility of Tsunami, its magnitude and arrival time at each coastal location for proper action and warning to the concerned parties.

Duration: Dec 2005 to Dec 2006
Investigator: Dr Manukid Parnichkun
Sponsor: Royal Thai Government Joint Research Fund
Total Contracted Amount: Baht 1,000,000

7.5 Ongoing / In Progress Grant and Sponsored Research

Brain-Machine Interface for Robo-Animal Control Project

Project description: It is widely known that robots are very useful in the applications beyond human limitation, e.g., a small and narrow area where human cannot access. Small robots accompanied with various kinds of moving mechanism; serpentine, belt, legs, for instances, are being developed to enhance the moving efficiency. However there are also some limitations of using these robots, for examples, difficulty in self decision making in an unknown environment, long time consuming in remote control operation where operator has to instruct the robot to work in detail for every step, difficulty of moving in an environment obstructed by obstacles. From the above reasons, if we are able to control actions and motions of animals or small lives, the above limitations will disappear. The animal under control will act as a robo-animal. The operator just sends a high level command to the robo-animal, and then lets the animal solve a low level problem by itself, for examples, avoiding crashing with obstacles, stepping over the obstructed objects. There are plenty of potential applications of using robo-animal; for examples in rescue, demining, agricultural pest control, surveillance, and searching purposes. Brain-machine interface concept will be applied to control the robo-animal. An array of electrodes will be implanted into the animal's brain. Commands which are in the form of electrical signal will then be applied to stimulate the animal's brain. This concept has potential to be used in medical treatment of Parkinson, and abnormal of sensory and neuron system in human.

Duration: 31 July 2006 to 30 July 2009
Investigator: Dr. Manukid Parnichkun
Sponsor: Thailand Research Fund
Total Contracted Amount: Baht 1,200,000

Development of an Exoskeleton Robot for Handicapped People Project

Project Description: There many arm or leg handicapped people in Thailand. These people rely on supporters and becoming family and social expenses. Wheel chairs are used to facilitate leg handicapped people. However, slope ways are not installed properly in many places in Thailand, supporters are still required at the staircases. Arm prostheses are used for arm handicapped people. However, only light weight load is still the limitation. The main objective of the project is to develop an exo-skeleton for handicapped people. The leg exo-skeleton would help the leg handicapped people to move on flat floors by themselves. The arm exo-skeleton would help the arm

handicapped people to carry heavier load.

Duration: 1-Jul-06 to 30-Jun-09
Investigator: Dr. Manukid Parnichkun
Sponsor: National Electronics and Computer Technology Center, Thailand

Total Contracted Amount: Baht 2,043,100

Development of a Medical Tele-Analyzer by Force-Displacement-Hybrid Tactile Sensor and Actuator for Abdominal Mass Analysis (Phase 2) Project

Project Description: Presently, expert medical doctors in abdominal mass analysis are insufficient in Thailand. Patients staying far away from the hospitals, where the expert doctors are working, have to bear to get cured at near hospitals without any choices. Some patients might choose to move to the expert hospitals but they have to spend a lot of money and time. It is too late for many times. Furthermore, in the case of heavy infection patients, doctors cannot approach the patients directly. This problem needs urgent solution.

From the above reasons, our research group has an idea to develop a medical tele-analysis system. The developed system consists of 2 subsystems; doctor-side subsystem and patient-side subsystem. In the doctor side subsystem, an array of displacement sensor is equipped to detect movement of doctor's hand and fingers. The detected information is transmitted to the patient side to be used in medical disease analysis. On the other hand, the patient-side subsystem consists of an array of displacement actuators which is used to follow displacement of doctor's hand and fingers. An array of force sensors is used to detect forces between patient and the equipment.

Since the above mentioned analysis and control need real time operation, the desired communication channel has to be direct-line type. Telephone line, satellite, or other coming media is the choice of selection.

Automatic database system, which helps doctor to analyze disease, will be implemented on the developed tele-analyzer. This database system collects data in the previous analysis to help the system to learn and record the data automatically. Supervised teaching by expert medical doctor in necessary to help medical students or less experience doctors in analyzing disease and also in self learning.

Not only using in medical tele-analysis, the proposed system can also be used in any tele-force-displacement controls of processes.

Duration: August 2004 to December 2008
Investigator: Dr. Manukid Parnichkun
Sponsor: National Electronics and Computer Technology Center

Total Contracted Amount: Baht 1,674,200

Nanocomposite Polymer-metal

Plasmon Sensors

Project Description: This project aims on the development of nanotechnology activities amongst the partners making use of the cross-disciplinary competence of the principal investigators of this project. The nanoparticle synthesis will be carried out in AIT in close co-operation with the Polymers group that will advice on the functionalisation of these particles. Simultaneously the group in Uppsala will develop the polymers to be used in this project. Nanocomposites will then be fabricated for specific sensor applications. In order to successfully build any meaningful project, it is thus necessary to have cross-disciplinary competence that will lead to innovation, which can profoundly influence the lives of ordinary people. The researcher in Thailand will benefit from this project by getting world-class support from the Angstrom Laboratory and the researcher in Sweden would benefit from a decade old experience in inorganic nanoparticles of the group in Thailand and also the support of interfacing and automation of any devices that come out of the project, due to the existing competence at AIT for such purposes.

Duration: May 2005 to April 2008

Investigator: Dr. Joydeep Dutta

Sponsor: SIDA Research Grant, Sweden

Total Contracted Amount: 367,000 Swedish Kroner

Printed Electronics Using Direct Writing Technology

This project evaluates the performance of piezoelectric print-head for printing simple passive electronic components like resistors, capacitors, and inductors employing novel colloidal nanoparticle-based conducting inks. Among the advantages of this concept is that ink-jet printing is additive, reducing waste and processing steps compared to subtractive fabrication methods. It is data-driven, requiring no masks, reducing turnaround time over lithographic processes. Ink-jet printing is less limited by substrate composition and morphology, and can accommodate a greater number of layers and range of materials than can lithography and subsequent semiconductor-based batch processing. Ink-jet printing thus presents a number of advantages as a fabrication technology. Coupled with the novel use of nanoparticles as the building material, the process enables a practical route to a desktop fabrication system for electronic circuitry or MEMS.

Duration: 2006-2009

Collaborator: Dr. Apinunt Thanachayanont, King Mongkut's Institute of Technology Ladkrabang, Thailand

Investigator: Dr. Joydeep Dutta

Sponsor: National Science and Technology Development Agency, Thailand

Total Contracted Amount: Baht 2,498,776

Photocatalytic Thin Film Coating Technology Program Research

Photocatalytic coating is a basic technological subject of great importance to industrial development. One part of the project utilizes solution processing methods, such as sol-gel, dip-coating and spray pyrolysis techniques to fabricate e.g. TiO₂ films on glass and hard plastics, with an aim for applications in food and agricultural industry. The other part explores the method of plasma sputtering deposition, mainly of TiO₂ on glass, which is applicable in optical component industry. In addition, the project will attempt to investigate novel methods for photocatalytic coatings, for example, sputtering processing with substrates at room temperature, coating on other types of surface, and development of novel photocatalytic materials.

Duration: 2006-2008

Investigator: Dr. Joydeep Dutta

Sponsor: National Electronics and Computer Technology Center, Thailand

Total Contracted Amount: Baht 3,402,000

Fabrication and Properties of Nanoparticles Array

Project Description: The aim of this project is to study the growth process of multilayer thin film based on Layer by Layer (LBL) deposition of Nanoparticles. The LBL thin films will be constructed with ZnS capped with a polyelectrolyte and another oppositely charged polymer or nanoparticles.

Duration: 11-Jan-06 to 31-Dec-07

Investigator: Dr. Joydeep Dutta

Sponsor: KIST

Total Contracted Amount: B 1,150,00.00

Nanotechnology based Pressure Sensors for Tsunami Detection

Project Description: The main objective of this project is to study and develop a 'stand alone pressure sensing device' for Tsunami early warning system. The device will be fabricated using a demonstrated multilayered thin film deposition technique that has been developed at AIT, comprising of alternate layer stacks of gold nanoparticles and doped or undoped ZnS nanoparticles by a novel layer-by-layer modified polyelectrolyte deposition process.

Duration: Dec 2005 to Dec 2006

Investigator: Dr. Joydeep Dutta

Sponsor: AIT-RTG Joint Research Project

Total Contracted Amount: Baht 875,000

Nanotechnology Center of Excellence (CoEN):

The Center of Excellence in Nanotechnology addresses the creation of knowledge in areas relevant to Thailand, its industries and its people. Activities include joint research with other local and international universities and institutes, education and training personnel in the field of nanotechnology, technology transfer and promotion of public and

industrial awareness of nanotechnology. This center provides international platform for academicians and researchers from Thailand, AIT and our partnered universities worldwide to work together in partnership with the industries. Current research activities at the CoEN is based on a unifying concept of using inexpensive wet chemical methods and self-organisation processes to fabricate innovative materials, develop diagnostic tools, and apply nanoparticles to environmental issues amongst others. Activities of the CoE at AIT include, but not exclusively, research and development focused on the application of nanoparticles, nanomaterials, devices and sensors. The CoE will support innovative research suited to the region, education and training of highly qualified personnel and in increasing public and industrial awareness of nanotechnology, amongst other activities like arranging conferences, workshops etc.

Duration: **May 2006-2010**

Investigator: **Dr. Joydeep Dutta**

Sponsor: **NANOTEC, NSTDA & Royal Thai Govt.-AIT**

Total Contracted Amount **Baht 5,000,000**

Development of Generic smart MEMS based Control Systems

Project Description: In this research, electrostatic actuator combined with accelerometer sensor using polymums and cmos processing technology is designed and fabricated. A micropump and micro valve system are then designed and fabricated. The possible application areas are smart devices for HDD, medical and automotive applications.

Duration: **Feb 2004 to Dec 2006**

Investigator: **Dr Nitin Afzulpurkar**

Sponsor: **National Science and Development Agency, Thailand**

Total Contracted Amount: **Baht 3,880,800**

Automated Pick and Place of Concrete Roof Tile at the Pressing Machine Operation

Project Description The project aims to study the concept of using industrial pick and place mechanism in the roof tile manufacturing process; to make conceptual and detailed design of the industrial pick and place mechanism for automated pressing line by utilizing the collected data. The design may include: pick and place mechanism design, conveyor modification to suit the automation process, and communication. A prototype mechanism will be made and tested.

Duration: **1 June 2006 to 30 June 2007**

Investigator: **Dr. Nitin Afzulpurkar**

Sponsor: **CPAC Roof Tile Co., Ltd., Thailand**

Total Contracted Amount **Baht 1,350,000**

7.6 Publications

Refereed Journals

N.H. Thuy, N.V. Afzulpurkar, P.A. Tuan, and H.H. Manh, "Development of Profibus Interface for Intelligent Automation Devices Using Asic Technology",

International Journal of Manufacturing and Management Technology, Interscience, UK. (in Press) Impact Factor (IF) 0.206

N.V. Afzulpurkar, and V.T. Minh, "Development of a Fault Detection Model-Based Controller", *Lecture Notes in Computer Science*, Springer-Verlag GmbH, 2006. (in Press) IF 0.402

W. Mamanee, A. Tuantranont, N.V. Afzulpurkar, N. Porntheerapat, S. Rahong, and A. Wisitsoraat, "PDMS Based Thermopneumatic Peristaltic Micropump for Microfluidic Systems", *Journal of Physics: Conference Series*, 34(2006) pp. 564-569, Institute of Physics Publishing doi:10.1088/1742-6596/34/1/093.

V.T. Minh, and N.V. Afzulpurkar, "A Comparative Study On Computational Schemes for Nonlinear Model Predictive Control", *Asian Journal of Control*, Vol. 8, No. 4, December 2006, (in Press), IF 0.466

K. Saeed, and N. V. Afzulpurkar, "Real-time Dynamic Target Tracking and Servoing using Image Motion", *International Journal for Manufacturing Science and Technology*, Vol. 8, No. 2, pp 46-51, 2006.

S.H.M Jafri, J. Dutta, D. Sweatman, and A.B. Sharma, "Current-Voltage Characteristics of Layer-by-Layer Self-Assembled Colloidal Thin Films", *Applied Physics Letters*, Vol. 89, pp. 133123- 133125, 2006.

A. Sugunan, H. Warad, M. Boman, and J. Dutta, "Zinc Oxide Nanowires in Chemical Bath on Seeded Substrates: Role of Hexamine", *J. Sol-Gel Science and Technology*, Vol. 39, No. 1, pp. 49-56, 2006.

S.H.M. Jafri, A.B. Sharma, C. Thanachayanont, and J. Dutta, "Directed Self-Assembly of Multilayer Thin Films of ZnS and Gold Nanoparticles by Modified Polyelectrolyte Deposition Technique" (*Invited*), *Materials Research Society Symposium Proceedings*, Vol. 901E © 2006 Materials Research Society (0901-Rb18-01.1).

A. Sugunan, and J. Dutta, "Novel Synthesis of Gold Nanoparticles in Aqueous Media" (*Invited*), *Materials Research Society Symposium Proceedings*, Vol. 901E © 2006 Materials Research Society (0901-Ra16-55-Rb16-55.1).

P. Roy, O. Pummakaranchana, B.S. Vaseashta, E.J. Brumfield, K.T. Tripathi, J. Dutta, and A. Vaseashta, "Atmospheric Parameters Sensing Using Nanotechnology Based Sensors and Image Processed Real-time Satellite Data", *NATO Science Series II: Mathematics, Physics and Chemistry*, Springer Verlag, pp. 443 (6), 2006.

S. Puntunan, and M. Parnichkun, "Online Self-Tuning Precompensation for a PID Heading Control of a Flying Robot", *International Journal of Advanced Robotic Systems*, Vol. 4, No. 3, pp. 323-330, 2006.

T. Chatchanayuenyong, and M. Parnichkun, "Neural Network Based-Time Optimal Sliding Mode Control for an Autonomous Underwater Robot", *International Journal of Mechatronics*, Elsevier Science Ltd., Pergamon, Vol. 16, No 8, pp. 471-478, 2006.

Impact Factor 0.679 referred from <http://www.sciencegateway.org/impact/if02j1.html>

M.N. Dailey, and M. Parnichkun, "Landmark-based Simultaneous Localization and Mapping with Stereo Vision", *International Journal for Manufacturing Science & Technology*, Advanced Manufacturing Solutions, Vol. 8, No. 2, pp. 17-22, 2006.

Refereed Books / Chapters

K. Kiatpanichagij, and N.V. Afzulpurkar, Chapter in DAAAM International Scientific Book,

Branko Katalinic (ed.), Publisher DAAAM International Vienna: Automated Visual Inspection for Contamination Detection in Electronic Industry, Vol. 5, 2006, ISBN 3-901509-47-X, hard cover.

Conference Proceedings

K. Kiatpanichagij, and N.V. Afzulpurkar, "Automated Visual Inspection for Contamination Detection in Electronic Product", *29th Electrical Engineering Conference (EECON-29)*, November 2006, Chonburi, Thailand. (Accepted for publication)

N.V. Afzulpurkar, V.S. Vyawahare, and I.A.K. Saeed, "Ceramic Tile Process Modeling for Quality Improvement using ANN", *IEEE International Conference on Industrial Technology, ICIT 2006*, December 2006, Mumbai, India. (Accepted for publication)

V.S. Vyawahare, and N.V. Afzulpurkar, "Uncalibrated Eye in Hand Visual Servoing for Fixtureless Assembly Automation", *IEEE International Conference on Industrial Technology, ICIT 2006*, December 2006, Mumbai, India. (Accepted for publication)

N.D. Thanh, and N.V. Afzulpurkar, "Page Decomposition for Document Images with Complex Layout", *4th International Conference on Computer Science and its Applications (ICCSA-2006)*, 27-29 June 2006, San Diego, California, USA. (Accepted for publication)

N.H. Thuy, N.V. Afzulpurkar, P.A. Tuan, and H.H. Manh, "Development of Profibus Interface For Intelligent Automation Devices Using Asic Technology", *International Conference on Manufacturing Science and Technology*, August 2006, Malaka, Malaysia. (Accepted for publication)

P. Khuntontong, A. Tuantranont, N.V. Afzulpurkar, and A. Wisitsoraat, "Design and Simulation of Push-Pull Transverse Electrostatic Microactuator for Hard Disk Drive", *The Asia-Pacific Conference of Transducers and Micro-Nano Technology (APCOI)*, June 2006, Singapore.

N.V. Afzulpurkar, and S. Jain, "Numerical Simulation Results for MEMS Based Active Slider Attitude Control", *International Conference on Nano-micro Fabrication Technology*, May 2006, Bangkok, Thailand.

A. Sugunan, S. Promnimit, S.H.M. Jafri, and J. Dutta, "Self Organization of Gold Nanoparticles and Its Applications"

(Invited), International Conference on Lasers and Nanomaterials (ICLAN), 30 November – 2 December 2006.

S.H.M. Jafri, S. Promnimit, C. Thanachayanont, and J. Dutta, "Characterization of Layer by Layer Devices Fabricated by Nanotechnology", New Technologies for Urban Safety of Mega Cities in Asia (USMCA 2006), 16-17 November 2006, Phuket, Thailand.

J. Dutta, "Self Organization of Inorganic Nanoparticles-Natures' Way" (Invited), International NanoBioScience Conference, 6-8 August, 2006, Pune, India.

S. Basu, A. Hansson, A. Sugunan, J. G. Hilborn, and J. Dutta, "Facile Phase Transfer of Large Aqueous Gold Nanoparticles with Peg-Dithiol Surface Functionality (Oral)", Eighth International Conference on Nanostructured Materials, NANO-2006, 20-25 August 2006, Bangalore, India.

R. Ullah, and J. Dutta, "Photocatalysis of Mn doped ZnO Nano Crystallites" (Oral), Eighth International Conference on Nanostructured Materials, NANO-2006, 20-25 August 2006, Bangalore, India.

S.H.M. Jafri, A.B. Sharma, and J. Dutta, "Device Characterization of Multilayer Films from Colloids", Eight International Conference on Nanostructured Materials, NANO-2006, 20-25 August 2006, Bangalore, India.

A. Sugunan, P. Melin, J.G. Hilborn, and J. Dutta, "Novel Self-Assembly of Colloidal Gold Nanoparticles on Living Fungal Mycelia" (Oral), Eighth International Conference on Nanostructured Materials, NANO-2006, 20-25 August 2006, Bangalore, India.

H.C. Warad, B. Athoff, J.G. Hilborn, and J. Dutta, "Chitosan Clad Bio-Compatible ZnS:Mn2+ Quantum Dots for Fluorescent Labeling" (Oral), Eighth International Conference on Nanostructured Materials, NANO-2006, 20-25 August 2006, Bangalore, India.

J. Hilborn, T. Bowden, F. Nederberg, A. Sugunan, and J. Dutta, "Synthesis of Bio-Inspired and Bio-Directed Assemblies", 3rd IUPAC-sponsored International Symposium on Macro- and Supramolecular Architectures and Materials (MAM-06): Practical Nano-Chemistry and Novel Approaches, 28 May - 1 June 2006, Tokyo, Japan.

M. Parnichkun, and K. Sangpetchsong, "Development of an Automatic Tide Sensing Unit for AIIT's Tsunami Tracking and Alerting System", Proceedings of the Fifth International Symposium on New Technologies for Urban Safety of Mega Cities in Asia, USMCA 2006, Phuket, Thailand, 2006. (Conference CD-ROM).

M.N. Dailey, and M. Parnichkun, "Simultaneous Localization and Mapping with Stereo Vision", Proceedings of the Ninth International Conference on Control, Automation, Robotics and Vision, ICARCV 2006, Singapore, 2006. (Conference CD-ROM).

S. Puntunan, and M. Parnichkun, "Hybrid Adaptive Neuro-Fuzzy Model Reference Control based Control of

6 DOF Fully Autonomous Flying Robot", Proceedings of the 2006 TRS Conference on Robotics and Industrial Technology, CRIT 2006, Bangkok, Thailand, 2006, pp. 9-14.

Kinematic Design and Implementation of a Robotics Assistive Walking Device for Hemiplegic People
By: Pham Bach Duong
Supervisor: Dr. Nitin V. Afzulpurkar

Other Publications

A. Suebsomran, and M. Parnichkun, "Disturbance Observer-Based Hybrid Control of Displacement and Force in a Medical Tele-Analyzer," Journal of the Thai Robotics Society, Vol. 4, No. 1, pp. 31-46, 2006.

Patents Applications

C. Widmer, and J. Dutta, Method for Producing Plastic Mouldings for Fitting to Ear, Comprises Taking Appropriate Moulding, forming plastic article corresponding to this, forming data set by digitizing and finely adjusting shape of plastic article using this data, WO200105207-A2; AU200072654-A (Examined on 06.04.2006)

C. Widmer and J. Dutta, Method and Apparatus for Manufacturing an Ear Device Shell, Int. Cl. H04R 25/00 (2006.01); AU-B-2000272654 (Examined on 12.01.2006)

C. Widmer and J. Dutta, Method for Manufacturing an In-the-ear Hearing Device, and an In-the-Ear Hearing Device, Int. Cl.H04R 25/00 (06.04.2006); AU-B-2000253848 (Examined on 06.04.2006)

Adaptive Reverse Engineering for Layered Manufacturing
By: Dang Phi Van Hai
Supervisor: Dr. Pisut Koomsap

Machine Vision based Speed Control of an Intelligent Vehicle
By: Dinh Cong Huan
Supervisor: Dr. Manukid Parnichkun

Balancing a Rotational Inverted Pendulum by Fuzzy and PID Controllers
By: Jeyarajah Jathunathanan
Supervisor: Dr. Manukid Parnichkun

Development of an Unmanned Flying Paramotor Robot
By: Paradin Juntakhet
Supervisor: Dr. Manukid Parnichkun

Disturbance Observer Based Control of a Pneumatic System
By: Orachat Kaothien
Supervisor: Dr. Manukid Parnichkun

An Elephant Trunk-like Robot Actuated by Binary Manipulators based on Series Stewart Platform
By: Nguyen Quang Khanh
Supervisor: Assoc. Prof. Erik J. Bohez

Design of Revolution Adjustable Wheel Module for Electric Vehicles
By: Vu Thang Long
Supervisor: Dr. Pisut Koomsap

Embedded Finger Motion based Spelling Recognition System using ASIC
By: Trinh Huu Phuc
Supervisor: Dr. Nitin V. Afzulpurkar

Traffic Control System for Hochiminh City in Vietnam
By: Huynh Huu Phuong
Supervisor: Dr. Nitin V. Afzulpurkar

The Development of Leg Exoskeleton for Walking Disabilities Aids
By: Rattapon Pisaisawat
Supervisor: Dr. Manukid Parnichkun

Development of Power Enhancement Arm
By: Sirawit Rungrattanaubol
Supervisor: Dr. Manukid Parnichkun

Fully Automated and Integrated Hot Stamp and Barbell Assembly Machine
By: Kadlaskar Vikram Sanjeev
Supervisor: Dr. Nitin V. Afzulpurkar

Adaptive Geometry Track Design and Implementation for an All Terrain Mobile Robot
By: Wanayuth Sanngoen
Supervisor: Dr. Nitin V. Afzulpurkar

PLC Based Motion Control for a Flexible Packing Machine
By: Kabilan Santhanam
Supervisors: Dr. Nitin V. Afzulpurkar/Assoc. Prof. Erik Bohez

Development of a Gyroscopic Unmanned Bicycle
By: Suprpto
Supervisor: Dr. Manukid Parnichkun

A Human-following Robot
By: Tran Minh Thuan
Supervisor: Dr. Nitin V. Afzulpurkar

7.7 Doctoral Students' Dissertation

Mechatronics

Disturbance Observer-based Hybrid Control of Force and Displacement in a Medical Tele-analyser
By: Anan Suebsomran
Supervisor: Dr. Manukid Parnichkun

Development and Control of an Autonomous Underwater Mobile Robot
By: Theerayuth Chatchanayuenyong
Supervisor: Dr. Manukid Parnichkun

7.8 Masters Students' Theses

Mechatronics

Vision based Steering Control System for an Intelligent Vehicle
By: Ngo Hoang Anh
Supervisor: Dr. Manukid Parnichkun

FPGA Based Image Processing for Autonomous Vacuum Cleaning Robot
By: Geethamani Arumugam
Supervisor: Dr. Nitin V. Afzulpurkar

Speech Recognition based on Hidden Markov Model
By: Nguyen Viet Dung
Supervisor: Dr. Manukid Parnichkun

Development of Profibus Interface for Intelligent Automation Devices using Technology

By: Nguyen Huy Thuy
Supervisor: Dr. Nitin V. Afzulpurkar

Balancing Analysis and Control of a Rotating Machine

By: Nguyen Anh Tuan
Supervisor: Dr. Manukid Parnichkun

Driver Based Rear-end Collision Avoidance Algorithm

By: Nguyen Le Tuong
Supervisor: Dr. Pisut Koomsap

Finding and Safe Storage Objects in Hazardous Environments using Mobile Robots

By: Nguyen Thi Thanh Van
Supervisor: Dr. Nitin V. Afzulpurkar

Implementation of Speech Recognition on a Microcontroller for Controlling Wheelchair

By: Thiang
Supervisor: Dr. Manukid Parnichkun

Microelectronics

A 12-Bit Low Voltage Continuous-Time Delta-Sigma Modulator

By: Awinash Anand
Supervisors: Dr. Nitin V. Afzulpurkar/Dr. Apisak Worapishet

Quantum Tunneling Based Electronics Pressure Sensor using Nanotechnology

By: Syed Hassan Mujtaba Jafri
Supervisor: Dr. Joydeep Dutta

Electrical Characterization of Series Resistance for 0.8 Micron CMOS Technology

By: Anand Padmanabhan
Supervisor: Dr. Lertsak Lekawat

Photocatalytic Activities of Metal Oxide Nanoparticles

By: Ruh Ullah
Supervisor: Dr. Joydeep Dutta

Design and Simulation of Microactuator for Magnetic Recording Head

By: Kajohn Choobthaisong
Supervisor: Dr. Nitin V. Afzulpurkar

Implementation of Low Delay, Low Bit-Rate Audio Compression for Wireless Digital Audio System

By: Jessada Karnjana
Supervisors: Dr. Nitin V. Afzulpurkar/Dr. Pasin Isarasena

Study of RF MEMS and Optimization of Transceiver Design

By: Karthik Ramamurthy
Supervisor: Dr. Nitin V. Afzulpurkar

Chapter 8: SET – REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEMS FIELD OF STUDY

8.1 Introduction

Geoinformatics comprising **Remote Sensing (RS)**, **Geographic Information System (GIS)** and **Global Positioning System (GPS)** provides extremely useful tools for environmental and natural resources management. They are widely recognized as supporting tools for the planning, monitoring, and management of the appropriate utilization of resources at the country, regional and global levels.

While they represent multidisciplinary backgrounds, students in RS&GIS share a common interest, that is, to use remote sensing, GIS, GPS and other space technologies as tools in pursuing their academic work as well as in developing new technologies that are applicable to the region.

Because of the complexity of the technologies together with the heavy dependence on advanced computer skills, application specialists need to have a sound knowledge of the theoretical aspects and practical approaches to integrate many resources of information that address different applications. Furthermore, scientists, planners or engineers interested in these technologies should be familiar with past, present and future satellite systems, their appropriate usage, data acquisition and handling and integration with other data sources.

The curriculum well covers the theoretical aspects and application of space technology, especially in Remote Sensing and GIS. It provides students ample time to gain application know-how through laboratory sessions. Students are free to use satellite data received by the NOAA, AVHRR and MODIS Satellite

Receiving Stations for their theses or research studies.

The demand for RS&GIS graduates is very high as there is lack of professionals in these disciplines, particularly those with a vast knowledge of the practical utilization of these technologies. Employment opportunities are available in a wide range of areas, including agriculture, forestry, coastal development and management, urban planning and development, medical technology, mapping and planning, disaster mitigation and environmental management.

Major areas covered in the coursework are fundamentals of remote sensing and GIS, earth-energy interaction, atmospheric correction, application potential in various disciplines, GIS data sources, map projection, geo-statistics, spatial modeling, automated mapping, digital terrain model, GPS data acquisition, and integration of GIS, remote sensing and GPS.

8.2 Research Facilities and Laboratories

The RS&GIS field of study provides excellent facilities for teaching, research and projects which consists of the Digital Image Processing laboratory, Institute-wide GIS laboratory, Asia e-learning project experiment room, meeting rooms, and the Geoinformatics Center laboratory. The RS&GIS field of study has a policy of maintaining the best working environment for students, staff and faculty. Apart from the Institute-provided access to the Internet and electronic mail, each student of the RS&GIS field of study is allocated computer space for individual use of about 1-2 Gb (extendible). The space for personal web pages to be hosted on RS&GIS network, can also be provided upon request.

The RS&GIS LAN Network can also be monitored in real time.

Besides, it has a very good archive of over 600 scenes of satellite imagery of SPOT, Landsat-TM, NOAA, ADEOS, ERS-SAR, and JERS-SAR to serve the students in their research and thesis studies. Other data, such as topographic, landuse, soil, geology maps of Thailand and some aerial photographs, are also available.

The RS&GIS library also provides students with more specialized books, journals, and computer manuals.

Some equipment in its laboratory available for academic activities include: Trimble geoexplorer; Garmin GPS Series III and V; laptop computer; digital camera; wireless hub/switch; wireless USB; network switch; network hub; black/white and color laser printers; A4 and A0 scanners; table and personal stereoscopes; and an LCD projector.

8.3 Faculty and Research Staff

The Institute is deeply grateful that **Her Royal Highness Princess Maha Chakri Sirindhorn** has seen fit to share her expertise and experience with faculty, staff and students, as an Honorary Faculty Member. In this singular position, Her Royal Highness is associated with the Remote Sensing and Geographic Information Systems Field of Study.

Full-time Faculty

XIAOYONG CHEN, BS, MS, PhD,
Wuhan Technical Univ of
Survey and Mapping,
People's Republic of China.
Associate Professor
(*Automated Mapping, GIS,
Photogrammetry, Remote
Sensing, Mathematical
Morphology and Database
Management System*)

[Remote sensing and geographic information system; particular emphasis on GIS theory, digital image analysis and real-time mapping; key research areas on theoretic framework of geo-spatial information science, digital photogrammetry, laser range data processing, multi-dimensional / multi-scale / multi-accuracy / multi-media geo-spatial data modeling; GIS application in urban planning, intelligent transportation system, environment monitoring, disaster mitigation, archaeology and tourism]

(GPRS) used for real-time spatial data logger and air-pollution monitoring]

based on data fusion techniques. One of such applications is early drought warning system targeting field measurement, model development and application]

Visiting Faculty

MICHIRO KUSANAGI, BS, MS, Univ of Tokyo, Japan; MS, Ph.D, Univ of California, USA.
Visiting Professor (*Aerospace System Engineering, Space System Engineering*)

SEISHIRO KIBE, BEng, MEng, DEng, University of Tokyo, Japan
Visiting Professor (*Aerospace System Engineering*)
[Dynamics and Control of the Tethered satellite System, as an application for the active removal of Space Debris from the orbit; Hypervelocity Impact Analysis, using the so-called Hydrocode, AUTODYN3D, the complex phenomena including three material phases, solid, liquid and gas, are analyzed and experimental study to simulate the space debris impact in space over 7 km/s is also conducted; Application of aerospace technology in the field of Remote Sensing and GIS, such as GPS and RS Satellites]

JUNICHI SUSAKI, BEng, MEng, DEng, Univ of Tokyo, Japan

Visiting Assistant Professor (*Environmental Information Extraction and Validation, Social Environmental Change detection, Automatic Pattern Recognition, Remote Sensing and GIS development*)

[Satellite data processing from data receiving to application; field measurements of physical parameters on surface such as Bidirectional Reflectance Distribution Function (BRDF) and albedo, and used the data for model development and validation; Environmental change monitoring using on satellite and meteorological data

Research Staff

MANZUL KUMAR HAZARIKA, PhD, University of Tokyo, Japan; MEng, Asian Institute of Technology, Bangkok, Thailand; MTech, Indian Institute of Technology, Kharagpur; BTech, J N Krishi Vishwa Vidyalyaya (J. N. Agriculture University), India
Senior Research and Training Specialist (*RS and GIS Applications to Global Environment, Terrestrial Carbon Cycle and NPP*)
[Handling independent projects, conducting research and analysis, identifying issues, formulating options, and making conclusions and recommendations; Theories, concepts and applied approaches related to carbon cycle and ecosystem models, which require an integration of multiple, complementary and independent data and methods in a spatial domain for accurate estimation of carbon sequestered in forests at a reasonable cost]

SURAT LERTLUM, BS, Norwich University; MS, The George Washington University, USA; DTechSc Computer Science, Asian Institute of Technology, Thailand
Research Scientist (*GIS, RS, Digital Image Processing, Surveying, Mapping*)
[Low-resolution (NOAA AVHRR) forest classification, High-resolution (Landsat TM), and Multi-resolution forest classification includes thermal band; Object-Oriented data model for multi-resolution / multi-temporal remote sensing and GIS data sets; related-research with NOAA AVHRR and MODIS data; related-

KIYOSHI HONDA, BAg, DEng, Tokyo Univ, Japan
Associate Professor (*Image Processing, Erosion control, Terrain modeling*)
[Modeling and Simulation on Near Real Time Ubiquitous Geo-Informatics; Web-GIS, including development of remote sensing and GIS server on Web Map Service (WMS) using Open Source Software such as Minnesota Map Server; Tsunami WMS development; Real time Mapping; volcano slope development; Crop/Plant Modeling; Debris Flow Simulation; Parallel computing]

NITIN KUMAR TRIPATHI, BTech, National Institute of Technology, Warangal, India; MTech, IIT; PhD, IIT, Kanpur, India.
Associate Professor (*GIS, Remote Sensing, Environment, Socio-economic Impact, Agriculture, Health, Applications*)
[Application of Geoinformatics in environment, marine, health and agriculture fields; Development of wireless GIS using the concept of Internet GIS and wireless devices such as wireless LAN, personal digital assistant (PDA) with mobile phone

research on Real Time Kinematics Differential GPS and the development of mobile system utilizing open source software; related-research on the archaeological remote sensing and GIS including the remote sensing and GIS for archaeology in Southeast Asia; related-research on the archaeological Virtual Reality, including 3D modeling from digital photographs and from laser scanning]

LAL SAMARAKOON, PhD
Visiting Senior Scientist;
Director, ACRORS and GAC
(GIS, RS, Digital Image Processing, Surveying, Mapping)

MARC SOURIS, PhD, Université de La Rochelle, France
Visiting Research Scientist
(Remote Sensing and GIS development)

TARAVUDH TIPDECHO, BSc, MSc, Chiangmai Univ, Thailand; DTechSc, Remote Sensing & GIS, Asian Institute of Technology, Thailand
Research Specialist I
(Advanced Mapping, Terrestrial Scanning)

8.4 Completed Grant and Sponsored Research

Analysis of Factors Influencing Rice Grain Quality cv. KDML 105 Using Geographic Information System

Project Description: To investigate the effect of environment and management factors which could contribute to the grain quality of Khao Hom Mali and identification of potential growing areas.

Duration: **November 2005 to October 2006**
Investigator: **Dr Xiaoyong Chen**
Co-investigator: **Dr Srisaang Kaojarern**
Sponsor: **RTG-Budget-Joint Research Project FY 2005**

Total Contracted Amount: **Baht 1,000,000**

Applying Parallel Computing on Cluster and Grid Systems for Agricultural Monitoring Based on Crop Model and

Remote Sensing (RTG-CLUSTER)

Project Description: To implement SWAO-GA on cluster and grid computing system to make it possible to perform agriculture monitoring which is based on data assimilation on crop model and remote sensing.

Duration: **October 2004 to June 2006**
Investigator: **Dr Honda Kiyoshi**
Sponsor: **RTG-Budget-Joint Research Project FY 2004**

Total Contracted Amount: **Baht 975,000**

Asian Highway GIS

Technical Abstract: To design and develop an information system for the Asian Highway based on GIS utilizing remote sensing images. Master database which will provide public through Web Map Service will be developed. Also a stand alone system to provide good human interface without internet connection will be developed. The data includes Asian Highway data such as route, spec of road, Socio-economic data and remote sensing images and elevation data

Duration: **August 2003 to April 2006**
Investigator: **Dr Honda Kiyoshi**
Sponsor: **UN-ESCAP**

Total Contracted Amount: **Baht 652,500**

E3P Environmental Protection and Pig Production

Duration: **March 2005 to February 2006**
Investigator: **Dr Frederic Borne**
Sponsor: **Centre de Cooperation Internationale en Recherche Agronomique pour le Development, France**

Total Contracted Amount: **Baht 324,000**

Geographic Information System and Nutritional Status of Lamphoon Province People Thailand

Project Description: To set up a GIS database to analyse nutritional status of Thai people: 1) to investigate the distribution and frequency of protein energy malnutrition (PEM) of preschool and school children using GIS technology, 2) to study the associations between nutritional/ environmental determinants and PEM in preschool and school children.

Duration: **Sept-2004 to Aug-2006**
Investigator: **Prof Michiro Kusanagi**
Co-Investigator: **Dr Srisaang Kaojarern**
Sponsor: **RTG-Budget-Joint Research Project FY2004**

Total Contracted Amount: **Baht 600,000**

Human Network Project

Project Description: Geoinformatics Center has trained more than 1000 personnel, most of them belonged to various agencies of the Asian region since its inception in 1995. It was found that many of the trainees have moved from their original agencies to other agencies, while some of them have excelled to become leaders or experts. This project is aimed at re-establishing the link with the past trainees in order to promote JAXA and AIT activities in applications of space technologies in the region

through them. Further, it is expected that it will help JAXA and AIT in finding new areas for applications and opportunities. During this project, 6 countries will be visited for holding 1-day seminar inviting past trainees. Their information will be compiled and posted in a website.

Duration: **January 2005 to June 2006**
Investigator: **Dr Lal Samarakoon**
Sponsor: **JAXA - Bangkok, Project FY 2005-2006**

Total Contracted Amount: **Baht 774,810**

JST Japan Science and Technology

Project Description: This research grant was provided by the Japan Science and Technology Agency (JST). The Yasuoka Laboratory, Institute of Industrial Sciences, University of Tokyo facilitated the project for satellite data receiving and archiving. Geoinformatics Center was requested to receive, archive and distribute NOAA and MODIS data among the research centers in Japan and collect field data for validations. This research project is expected to continue for few more years.

Duration: **January 2005 to March 2006**
Investigator: **Dr Lal Samarakoon**
Co-Investigator: **Dr Junichi Susaki**
Sponsor: **Japan Science Technology, Project FY 2005-2006**

Total Contracted Amount: **Baht 2,242,270**

Road Management Research

Duration: **February 2002 to February 2006**
Investigator: **Dr Honda Kiyoshi**
Sponsor: **Japan Bank of International Cooperation**

Total Contracted Amount: **Baht 1,111,968**

Spatial Analysis of Malaria Risk to the Determination of Epidemiological Surveillance in an Endemic Region of Thailand and the effectiveness of a New Control strategy

Duration: **October 2004 to October 2006**
Investigator: **Dr Honda Kiyoshi**
Sponsor: **RTG**

Total Contracted Amount: **Baht 1,000,000**

JAXA Mini Project (WSSD-2)

Project Description: This project was awarded as a part of JAXA's contribution to the Asia-Pacific region for capacity building. This project comprise of three parts: Caravan Training Programs, Mini-Projects, and Workshops. Caravan Programs are being conducted since 1997 with the help of JAXA sponsorship. Each year two countries are being selected. In 2005-06, trainings were conducted in Lao PDR and Sri Lanka and 9 Mini-Projects were supported in 6 countries. Two workshops were conducted in 2005-06 for information sharing, one as a parallel session during the Asian Conference of Remote Sensing (ACRS) and the other one at ASEAN Subcommittee on Space Technology and Applications (SCOSA), both were held in Hanoi.

Duration: April 2005 to March 2006
Investigator: Dr Lal Samarakoon
Co-Investigator: Dr Manzul Hazarika
Sponsor: Japan Aerospace Exploration Agency, Project FY 2005-2006
Total Contracted Amount: B 14,730,000

Development of marine and coastal resources database of Thailand

Project Description: To develop the fundamental GIS database for key components of marine and coastal resources in Thailand, namely coral reefs, mangrove forests, seagrass beds, animals for conservation (e.g. turtles, dugong) and threats e.g. coastal erosion. The database will be stored on the server computer for National Coastal and Marine Information Centre under DMCR to be shared by many potential users such as governmental, non-government and researchers to help in the conservation and coastal zone management.

Duration: One Year
Investigator: Dr K Ikejima
Co-Investigator: Dr Nitin Kumar Tripathi
Sponsor: UNEP
Total Contracted Amount: Baht 2,460,000

Road Management

Project Description: To develop a methodology on the use of remote sensing data and digital elevation model (DEM) for evaluating risk of mass movement such as collapse, landslides, debris flow for the purpose of road management in especially planning and detail designing phase. The study area is selected in Catanduanes island in the Philippines.

Duration: February 2002 to February 2006
Investigator: Dr Honda Kiyoshi
Sponsor: Japan Bank of International Cooperation
Total Contracted Amount: Baht 1,111,968

Spatial Analysis of Malaria Risk to the Determination of Epidemiological Surveillance in an Endemic Region of Thailand and the effectiveness of a New Control strategy (RTG-MALARIA)

Project Description: To carry out geo-spatial risk assessment on malaria to come up with better control strategies by combining expertise of Mahidol University (Malaria disease) and AIT (geo-informatics)

Duration: October 2004 to June 2006
Investigator: Dr Honda Kiyoshi
Sponsor: RTG -Budget-Joint Research Project FY 2004
Total Contracted Amount: Baht 1,000,000

The GIS Component in Tsunami Early Warning System of AIT (RTG-TSUNAMI-GIS)

Project Description: To implement GIS components to Tsunami Early Warning System of AIT : 1) to develop a real time GIS for Tsunami Information Management using FOSS, 2) to collect Real Time Tsunami Sensor

Data and update GIS database, 3) to collect earthquake on line from Web and E-mail and update GIS database, 4) to publish Tsunami Sensor Information and Earthquake Information to concerted people over the Internet, 5) to carryout 3D Tsunami Simulation.

Duration: Dec 2005 to Dec 2006
Investigator: Dr Honda Kiyoshi
Sponsor: RTG-Budget-Joint Research Project FY 2005
Total Contracted Amount: Baht 875,000

8.5 Ongoing / In Progress Grant and Sponsored Research

Asia e-learning Project Experiment by Multi-point Distant Learning Network System

Project Description: AIT have been conducting distant education pilot experiment via Super bird C since 2003 with Tsukuba University and Multimedia University. AIT's part is to provide RS & GIS contents as well as supporting fundamental experiment as Thai side counterpart. This will continue on as one of the WINDS (Giga bit rate satellite) utilization program.

This project is to try to investigate about the status of health condition of school children utilizing GIS technology for their distributions

Duration: Since 2003
Investigator: Prof Michiro Kusanagi
Sponsor: Japanese Space Exploration Agency JAXA

Digital Asia

Project Description: Keio University has established Digital Asia Research Center (DARC) and looking forward to establish a network in the region to collaborate with Node Agencies for data sharing. This network attempts to link all participating agencies and provide a place where they can obtain useful information for developing their own applications. During the five-year project period, attempt will be made to establish 30 Nodes in the region with high-end computer hardware and software necessary for data/information sharing over the Internet.

Geoinformatics Center participates as a collaborator for developing browser software, promoting data sharing, teach/train Node Agencies and supporting the system.

Duration: April 2005 to March 2009
Investigator: Dr Lal Samarakoon
Sponsor: Keio University, Project FY 2005-2009
Total Contracted Amount: Baht 700,000 (Annually)

JST 2006-2007

Duration: 1 April 2006 to 31 March 2007

Project Description: The project deals with the development of network system for environment and disaster monitoring and prediction in Asia by integrating satellite observation and modeling.

Project Investigator: Dr. Lal Samarakoon
Sponsors: Japan Science and Technology Agency, Japan
Total Contracted Amount (Baht) 831,750

JAXA Mini Project 2006-2007

Duration: 1 April 2006 to 1 May 2007
Project Description: In this project, the very advanced sensor data obtained from ALOS are used to carry out activities on calibration / validation in various application areas. This is done in collaboration with experts from EROC and JAXA.

Project Investigator: Dr. Lal Samarakoon
Sponsors: Japan Aerospace Exploration Agency, Japan
Total Contracted Amount B12,308,800

Strengthening Capacity on multi-Hazard Risk Assessment in Tsunami

Duration: 15 August 2006 to 1 August 2007
Project Description: Implementing several projects on Flood Mapping and Risk Assessment (Bangladesh, Cambodia, China, and Lao (PDR) and Drought Mapping and Monitoring (Philippines) in collaboration with relevant ministries and departments of the respective countries. The main goal of these projects is to capacity building through development of country-specific case studies and replicate those in other areas. Special emphasis is given on use of spatial information (Remote Sensing and GIS) for risk assessment of flood and drought.

Project Investigator: Dr. Manzul Hazarika
Sponsors: USAID
Total Contracted Amount (Baht) 3,604,702

Water Storage Development Planning for Flood Water Retention for Dry Season Requirements in Chi River Basin

Project Description: Northeast Thailand has always been subjected to floods and droughts problem and the problems are getting more severe with increasing water demands, land use change, deforestation, etc. The Chi river basin is one main river basin of this region that suffers flood during rainy season and drought during dry season. This research proposal aims to develop a methodology to alleviate the floods and droughts problems of the Chi river basin. A water budget model for the basin will be developed to find the water availability and demand. The scarcity of the water during the drought is the main issue that will be addressed by finding the locations for the rainwater harvesting structures using the digital terrain model and the remote sensing data. Planning the water retention structures will be modeled by integrating hydrologic model, hydraulic model, remote sensing and GIS and hierarchy optimization techniques.

Duration: October 2005 to October 2006

Investigator: Dr Nitin Kumar Tripathi
Sponsor: RTG-Budget-Joint Research
Project FY 2005
Total Contracted Amount: Baht 970,000

Remote Sensing Images Analysis around the Mesopotamia Marsh

Project Description: To carry out image processing, data analysis and preparation of a GIS database of remote sensing image around the Mesopotamia marsh.

Duration: January 2004 to June 2007
Investigator: Dr Honda Kiyoshi
Sponsor: Digital Service International Co, Ltd (DSI)

Total Contracted Amount: Baht 1,092,530

8.6 Publications

Refereed Journals

- Akhter, S, Jangjaimon, I, Chemin, Y, Uthayopas, P and Honda, K,** "Development of a GRIDRPC Tool for Satellite Images Parallel Data Assimilation in Agricultural Monitoring", *International Journal of Geoinformatics*, ISSN 1686-576, Vol. 2, No. 3, pp.29-33, 2006.
- Boulos, M N K and Honda, K,** "Web GIS in practice IV: publishing your health maps and connecting to remote WMS sources using the Open Source UMN MapServer and DM Solutions MapLab", *International Journal of Health Geographics*, 5:6, 2006.
- Chemin, Y and Honda, K,** "Spatio-temporal fusion of rice actual evapotranspiration with genetic algorithms and an agro-hydrological model", *IEEE Transactions on Geoscience and Remote Sensing*, Vol.44, No. 11, pp.3462-3469, 2006.
- Dansagoonpon, S and Tripathi, N T,** "Modeling Site Suitability of Oil Palm Plantations in Southern Thailand", *GIScience & Remote Sensing*, Vol. 43, No. 3, 1-6, 2006.
- Deng, M, Cheng, T, Chen, X and Li, Z,** "Multi-level Topological Relations Between Spatial Regions Based Upon Topological Invariants", *Geoinformatica*, 2006 (accepted 18 July 2006)
- Deng, M, Li, Z, and Chen, X,** "The Extended Hausdorff Distance for Spatial Objects in GIS", *International Journal of Geographic Information Science*, 2006 (accepted 9 October 2006)
- Ines, A V M, Honda, K, Gupta, A D, Droogers, P and Clemente, R,** "Combining remote sensing-simulation modeling and genetic algorithm optimization to explore water management options in irrigated agriculture", *Agricultural Water Management*, Volume 83, Issue 3, Pages 221-232, 2006.
- Kassahun, D, Tripathi, N T and Honda, K,** "Development of spectral band cloning techniques for soil nutrients estimation" *International Journal of Remote Sensing*, Vol. 27, Nos. 18 20, September October 2006, 4213 4225, 2006.
- Patil, A A, Tripathi, N K, and Annachhatre, A P,** "Detection of nutrients in coastal waters using satellite remote sensing", *Journal of GIS, Remote*

- Sensing and Dynamic Modelling*, ISSN1412-2049, No.5, 2005. (In Press)
- Pirasteh, S, Tripathi, N K and Ayazi, M H,** "Localizing ground water potential zones in parts of Karst Pabdeh Anticline, Zagros Mountain, Southwest Iran using geospatial techniques", *International Journal of Geoinformatics*, Vol. 2, No. 3, 35-42, 2006.
- Pummakarnchana, O and Tripathi, N K,** "A real time air pollution monitoring using portable semiconducting gas sensors and Internet GIS. Trans. on Information Science and Applications. Vol. 3, Issue 7, ISSN 1790-0832, 1273-1280, 2006.
- Yongping, Y, Chen, X, Jingnan, Y and Jie, D,** "Urban construction land area demand prediction based on dynamic adaptive double fuzzy neural networks" *Journal of Wuhan University*, 2006 (accepted)

Refereed Books/Chapters

- Roongrasamee, B and Tripathi, N K,** "Social Implications and Challenges of E-Business", *Book Editor: Dr. Feng Li, Idea Group Publishing*, PA 17033-1240, USA.

Conference Proceedings

- Dammalage, T L, Samarakoon, L and Susaki, J,** "Application and benefits of Internet GNSS data streaming base on NTRIP Protocol in modern GPS surveying systems", *Proceeding of the First International Symposium, Sabaragamuwa University of Sri Lanka*, July 2006.
- Dammalage, T L, Samarakoon, L, Susaki, J, Srinuandee, P and Srisahakit, T,** "Potential accuracy and practical benefits of NTRIP protocol over conventional RTK and DGPS observation methods", *Proceedings of the 5th Annual International Conference of Map Asia 2006*, Bangkok, Thailand, September 2006.
- Dammalage, T L, Samarakoon, L and Susaki, J,** "Accuracy Enhancement of Low-Cost GPS Receiver Observations via Internet DGPS", *Proceedings of the 5th International Symposium on New Technologies for urban safety of mega cities in Asia (USMCA2006)*, November, 2006.
- Hazarika, M K, Kafle, T P, Shrestha, K G and Prathumchai, K,** "Integration of remote sensing data with a flood simulation model in GIS for flood hazard mapping and flood prediction for early warning", *Proceedings of the 2nd International Symposium on Geo-information for Disaster Management*, Goa, India, September 25-26 2006.
- Honda, K, Hung, N D and Shimamura, H,** "Linking Open Source Based Web Map Server to Google Earth for 3D Visualization of Geospatial Data", *Proceedings of SICE - ICASE International Joint Conference 2006*, SA15-1, CD, 2006.
- Kafle, T P, Hazarika, M K, Shrestha, K G, Prathumchai, K, and Samarakoon, L,** "Integration of remote sensing and GIS with flood simulation model for flood hazard mapping in the Bagmati River, Nepal", *Proceedings of the Fifth International Symposium on New*

- Technologies for Urban Safety of Mega Cities in Asia*, Phuket, Thailand, 16-17 November 2006.
- Kibe, S,** "Manned Space Mission for Space Frontier", *Proc. of Japan Geoscience Union Meeting 2006*, May 14-17, 2006 in Tokyo, Japan.
- Kibe, S and Ohnishi, M,** "Long Term Plans of Manned Space Activities in Japan and the World", *Proc. of 2006 SEE Conference*, June 10-11, 2006 in Hukuoka, Japan.
- Kibe, S and Ohnishi, M,** "Manned Space Mission for Space Frontier", *Proc. of The 50th Space Science and Technology Conference*, Nov.8-10, 2006 in Kitakyusyu City, Japan.
- Lertlum, S,** "Geo-Informatics to Reveal the Past: Case Study at Ayutthaya, Thailand", *Ancient Cultures, New Technologies*, Maha Chakri Sirindhorn Anthropology Centre, Bangkok, Thailand, June 24, 2006.
- Lertlum, S and Choulean, A,** "Living Angkor Road: Integration of Local Knowledge and People", *Ancient Cultures, New Technologies*, Maha Chakri Sirindhorn Anthropology Centre, Bangkok, Thailand, June 24, 2006.
- Mehdiyev, M, and Samarakoon, L,** "High Resolution Data Fusion: Increasing Image Quality for detection and identification of different objects", *Proceedings of the 27th Asian Conference on Remote Sensing*, Ulaanbaatar, Mongolia, 9-13, October 2006.
- Mehdiyev, M, Parida, B R, Samarakoon, L, Asilo, S A, Casiwan, C B and Collado, W B,** "Rainfed Rice Area Mapping and Backscatter Analysis Using Multi-temporal RADARSAT-1 Images in Pangasinan and Nueva Ecija Provinces of Philippines", *Proceedings of the 27th Asian Conference on Remote Sensing*, Ulaanbaatar, Mongolia, 9-13, October 2006.
- Narumi, T, Hanada, T, Kawamoto, S and Kibe, S,** "LEO Debris Environment Modeling in Japan", *Proc. of the 57th International Astronautical Congress, IAC-06-B6.206*, Oct. 2-6, 2006 in Valencia, Spain.
- Parida, B R, Hazarika, M K and Samarakoon, L,** "Application of Terra/MODIS satellite data for LST & NDVI relation in groundnut and cotton using crop profile", *Proceedings of the International Conference On Space Technology & Geo-Informatics 2006*, Pattaya, Thailand, 5 - 8, November 2006.
- Phonekeo, V and Samarakoon, L,** "Development of Near Real-Time MODIS Fire Information System for Forest Fire Monitoring in Southeast Asia:", *ACRS 2006*, Ulaan Bataar, Mongolia, October 9-13 2006
- Prathumchai, P and Samarakoon, L,** "Application of Remote Sensing and GIS for Flood Vulnerability Assessment and Mitigation Planning in Munshiganj District of Bangladesh", *Proceedings of at the Fifth International Symposium on New Technology for Urban Safety of Mega Cities in Asia*, Phuket, Thailand in November 2006.
- Prathumchai, P and Samarakoon, L,** "Application of Remote Sensing and GIS for Flood Vulnerability Area and Mitigation Planning in Munshiganj District of Bangladesh", *Proceedings of the International Conference on*

Space Technology&Geo-Informatics, Thailand, November 2006.
Prathumchai, P and Samarakoon, L,
 "Comparison of Point Data Interpolation Method to create DEM", *Proceedings of the 27th Asian Remote Sensing Conference*, Mongolia, October 2006.

Prathumchai, P and Samarakoon, L,
 "Assessment of Flood Vulnerability Area and Mitigation Planning in Munshiganj District of Bangladesh", *Proceedings of the 27th Asian Remote Sensing Conference*, Mongolia, October 2006.

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 "Analysis on temporal change of soil moisture with SAR images for agricultural drought monitoring in northeastern part of Thailand", *Proceedings of the 27th Asian Conference on Remote Sensing (ACRS)*, October, 2006

Susaki, J, Thanyapraneedkul, J, Samarakoon, L and Yasuoka, Y,
 "Estimation of soil moisture by active microwave remote sensing and IEM model for drought monitoring: A case study of Buri Rum province, Thailand", *Proceedings of the 5th International Symposium on New Technologies for Urban Safety of Mega Cities in Asia (USMCA2006)*, November, 2006.

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Thanyapraneedkul, J and Susaki, J,
 "Estimation of forest plantation productivity using Physiologically Based Model driven with meteorological data and satellite-derived estimates of canopy photosynthetic capacity", *Proceedings of International Geoscience and Remote Sensing Symposium (IGARSS2006)*, July, 2006.

Yongping, Y, Chen, X, Jingnan, L and Jie, D, "Spatiotemporal based on evolutionary cellular automata" *Geoinformatics Conference*, Wuhan, China, October 2006

Yongping, Y, Chen, X, Jingnan, L and Jie, D, "The dynamic visualization of land use based on mathematical morphology", *Geoinformatics Conference*, Wuhan, China, October 2006

Other Publications

Tripathi, N K, Phaisarn, S, and Pakorn, A,
 "Real-time spatial data logging Device for Open GIS", RTG-AIT Report, 2006.

Susaki, J, "Mapping of soil moisture in paddy fields from temporal JERS-1/ SAR images for drought assessment in Buriram Province, Thailand", *ICUS (International Center for Urban Safety Engineering*, Institute of Industrial Science, Univ. of Tokyo) Report 2006-06, ISBN4-903661-05-9, December, 2006

8.7 Doctoral Students' Dissertation

CROP SUBSTITUTION MODELING USING REMOTE SENSING AND GIS
by Sutat Dansagoonpon
Supervisor: Dr Nitin Kumar Tripathi

DEVELOPMENT OF A NEW APPROACH FOR IMPLEMENTING THE POSITIONAL ERROR MODEL USING MINKOWSKI WEIGHTED AVERAGE
by Chanin Tinnachote
Supervisor: Dr Xiaoyong Chen/Prof Michiro Kusanagi

FUSION OF SPATIO-TEMPORAL REMOTELY SENSED EVAPOTRANSPIRATION BY DATA ASSIMILATION FOR IRRIGATION PERFORMANCE
by Yann H. Chemin
Supervisor: Dr Kiyoshi Honda

INFLUENCE OF SOCIO-ECONOMIC, PHYSICAL, AND ENVIRONMENT FACTORS ON DENGUE EPIDEMIC IN THAILAND USING GIS-BASED ANALYSIS
by Kanchana Nakhapakorn
Supervisor: Dr Nitin Kumar Tripathi

NEAR REAL TIME AIR POLLUTION MONITORING IN URBAN ENVIRONMENT USING INTERNET GIS
by Ornprapa Pummakarnchana
Supervisor: Dr Nitin Kumar Tripathi

8.8 Masters Students' Theses

APPLICATION OF GIS & RS FOR FLOOD DISASTER RISK ASSESSMENT IN HEI LONGJIANG PROVINCE, CHINA
by Wang Lianzhong
Supervisor: Dr Manzul Kumar Hazarika

THE APPLICATION OF MATHEMATICAL MORPHOLOGY IN GIS DATA INTERPOLATION PROCESSING
by Zhang Hongwen
Supervisor: Dr Xiaoyong Chen

A COMPARISON BETWEEN REMOTE SENSING DATA AND METEOROLOGICAL DATA: A CASE STUDY OF EVAPOTRANSPIRATION OF JASMINE RICE IN NORTH-EAST OF THAILAND
by Tran Trung Kien
Supervisor: Dr Xiaoyong Chen

DEVELOPMENT OF A NEW APPROACH FOR THE INTERPOLATION OF SPATIAL OBJECTS
by Kamolratn Chureesampant
Supervisor: Dr Xiaoyong Chen

DEVELOPMENT OF A SYSTEM TO ENHANCE THE ACCURACY OF ANY GPS OBSERVATIONS VIA INTERNET
by Thilantha Lakmal Dammalage
Supervisor: Dr Junichi Susaki

DEVELOPING A NATIONAL SPATIAL DATA INFRASTRUCTURE MODEL FOR PHUTAN UNDER THE FRAMEWORK OF GLOBAL SPATIAL DATA INFRASTRUCTURE
by Kinzang Thinley
Supervisor: Dr Nitin Kumar Tripathi

EVAPOTRANSPIRATION DATA ASSIMILATION WITH GENETIC ALGORITHMS AND SWAP MODEL FOR DEMAND IRRIGATION
by Baburao Dashrath Kamble
Supervisor: Dr Kiyoshi Honda

EXPLORING GEOSPATIAL FACTORS CONTRIBUTING TO MALARIA INCIDENCE IN KANCHANABURI PROVINCE, THAILAND
by Phaisarn Jeefoo
Supervisor: Dr Nitin Kumar Tripathi

FISH HABITAT MAPPING IN TONLE SAP GREAT LAKE USING REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEM
by Heng Suthy
Supervisor: Dr Junichi Susaki

FOREST CHANGE DETECTION IN DHAKA FOREST DIVISION, BANGLADESH
by Md. Zaheer Iqbal
Supervisor: Dr Xiaoyong Chen

FOREST LAND COVER CHANGES DETECTION AND MAPPING AFFORESTATION SUITABILITY IN DONG NAI RIVER BASIN OF VIETNAM
by Le Ngoc Lam
Supervisor: Dr Nitin Kumar Tripathi

GIS BASED TELEPHONE OUTSIDE PLANT INFORMATION SYSTEM FOR SERVICE AND MANAGEMENT
by Le Van Thuan
Supervisor: Dr Nitin Kumar Tripathi

GEO-EPIDEMIOLOGY OF HIGHLY PATHOGENIC AVIAN INFLUENZA USING REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEM
by Jothiganesh Shanmugasundaram
Supervisor: Dr Nitin Kumar Tripathi

GEO-SPATIAL DATABASES DESIGN FOR CITYPHONE NETWORK
by To Anh Hue
Supervisor: Dr Xiaoyong Chen

AN INTEGRATED GIS AND REMOTE SENSING APPROACH FOR MONITORING URBAN GROWTH PATTERN IN PATHUMTHANI, THAILAND
by Arthit Limpiyakorn
Supervisor: Dr Nitin Kumar Tripathi

LAND COVER CHANGE AND SOIL EROSION IN TONLE SAP WATERSHED, CAMBODIA USING REMOTE SENSING AND GIS
by Kyaw Zaya Htun
Supervisor: Dr Lal Samarakoon

LANDSLIDE HAZARD AND RISK ASSESSMENT FOR ROAD NETWORK USING RS AND GIS: A CASE STUDY OF XIN MAN DISTRICT, VIETNAM
by Lai Tuan Anh
Supervisor: Dr Kiyoshi Honda

MAPPING OF GROUNDWATER POTENTIAL AND RECHARGE ZONES USING GEOINFORMATICS: A CASE STUDY IN MYANMAR
by San Lwin Htwe
Supervisor: Dr Nitin Kumar Tripathi

MINERAL POTENTIAL MAPPING OF GOLD IN LOEI PROVINCE, NORTH EASTERN PART OF THAILAND USING GIS, REMOTE SENSING AND GEOPHYSICAL DATA
by Rittick Borah
Supervisor: Dr Junichi Susaki

MODELLING THE CHANGES OF SAL (SHOREA ROBUSTA) FOREST USING REMOTE SENSING DATA AND GIS: A CASE STUDY OF DHAKA FOREST DIVISION, BANGLADESH
by Md. Ali Haider Khan
Supervisor: Dr Kiyoshi Honda

NDVI-LAI RELATIONSHIP FOR DATA ASSIMILATION IN SWAP: COMPARISON OF FIELD DATA AND REMOTE SENSING DATA
by Kamal Thapa

Supervisor: Dr Kiyoshi Honda

ONBOARD WEIGHT-IN-MOTION
MEASUREMENT SYSTEM

by Jiang Fenghuan

Supervisor: Dr Xiaoyong Chen

PROBABILITY DISTRIBUTION OF CROPPING
FACTORS IN THE RS-SWAP-GA DATA
ASSIMILATION TECHNIQUE

by Rushikesh Prakashrao Kulkarni

Supervisor: Dr Kiyoshi Honda

SPATIAL DIRECTION RELATION MODELS
BETWEEN SPATIAL OBJECTS IN 2D GIS

by Lin Hai

Supervisor: Dr Xiaoyong Chen

SPATIAL DYNAMIC MODELING OF URBAN
AREAS: A CASE STUDY OF THIMPHU, BHUTAN

by Yeshe Dorji

Supervisor: Dr Xiaoyong Chen

STUDY OF SPATIAL DISTRIBUTION OF
DISASTER LOGISTICS BY GIS: CASE STUDY
BANDA ACEH, INDONESIA

by Ko Ko Lat

Supervisor: Dr Junichi Susaki/Dr Shinya
Hanaoka

3D MODELING FOR GENERATION OF
VIRTUAL CAMPUS

by Fang Cao

Supervisor: Dr Xiaoyong Chen

WEB AND MOBILE GIS FOR TELEPHONE
FAULT MANAGEMENT: A CASE STUDY OF
HO CHI MINH CITY POST AND
TELECOMMUNICATIONS

by Nguyen Cao Van

Supervisor: Dr Kiyoshi Honda

WETLAND LAND-COVER CLASSIFICATION
USING LINEAR SPECTRAL MIXTURE ANALYSIS
OF LANDSAT IMAGERY IN THE HAN RIVER
ESTUARY, KOREA

by Lee Mi-Jung

Supervisor: Dr Xiaoyong Chen

Chapter 9: SET – STRUCTURAL ENGINEERING FIELD OF STUDY

9.1 Introduction

Structural engineering has always been seen as one of the few fields of study where one can combine real technical skills with artistic flair. Structural engineers are known to be people who enjoy innovation, opportunities, responsibility and excitement, whilst working within a creative profession. Structural engineers plan and design various structures such as buildings, bridges, sport stadiums, towers, and underground structures.

The built environment which is designed and constructed by structural engineers has an enormous impact on our everyday lives. In order to design and construct safe and economic structures, they need to keep abreast with the latest methods of structural analysis, modeling concepts for computation, advanced design, material technology, and improved knowledge in structural loadings.

The field educates professionals who will be at the forefront of advanced research in Structural Engineering. They are trained to respond creatively to the industrial requirements of infrastructure development.

9.2 Faculty and Research Staff

Full-time Faculty

WORSAK KANOK-NUKULCHAI, PhD, Univ of California (Berkeley), USA. ; MEng, AIT, Thailand; BEng (Hon), Chulalongkorn Univ, Thailand .
Professor
[Computational Mechanics; Finite Element Methods; Tall Building Static and Seismic Analysis; Bridge Engineering; Microcomputer Software for Structural Engineering; Genetic Algorithms; Nonlinear Analysis of

Structures and Continua; Plate/Shell Structures; Engineering Education; Nanomechanics]

PICHAJ NIMITYONGSKUL, DEng, MEng, AIT, Thailand; BEng, Chulalongkorn Univ, Thailand.
Associate Professor
[Concrete Engineering; Building Design; Construction Materials; Prestressed Concrete Structures; Plate Structures; Advanced Reinforced Concrete; Advanced Concrete Technology; Materials and Products for Construction; Experimental Methods in Structural Engineering]

PENNING WARNITCHAI, DEng, MEng, University of Tokyo, Japan; BEng (Hon), Chulalongkorn Univ, Thailand.
Associate Professor
[Structural Dynamics; Earthquake Engineering; Wind Effects of Structures; Bridge Engineering and Control of Structural Vibration]

Emeritus Professor

PISIDHI KARASUDHI, PhD, Northwestern Univ., USA.; MEng, AIT, Thailand; BEng, Chulalongkorn Univ, Thailand.
[Solid Mechanics]

Visiting Faculty

YOSHITAKA KATO, DEng, MEng, BEng, University of Tokyo, Japan.
Visiting Assistant Professor
[Concrete material and maintenance management, specifically in maintenance management of concrete structures based on risk evaluation, evaluating environmental impacts on concrete structures; estimating concrete quality of existing structure

using multiple NDT (Non-Destructive Test) and modeling of diffusion of substances in concrete]

Adjunct/Affiliated Faculty

THANAKORN PHEERAPHAN, PhD and MSc, Massachusetts Institute of Technology, USA., BSc., Virginia Military Institute, USA.
Adjunct Assistant Professor
[Concrete Technology; Structural Analysis; Engineering Materials; Composite Materials; Advanced Concrete Technology; Mechanics of Materials]

RAKTIPONG SAHAMITMONGKOL , DEng, MEng, University of Tokyo, Japan; BEng, Sirindhorn International Institute of Technology, Thailand.
Adjunct Instructor
[Cracking Resistance of Expansive Concrete; Chemically Prestressed Concrete; Inspection on Concrete Structures & Performance Based Design; Non-Destructive Testings for Concrete Structures; Tension Stiffening Effect and Bonding Characteristic of Reinforced Concrete]

PRUETTHA NANAKORN, DEng, University of Tokyo, Japan; MEng, AIT, Thailand; BEng (Hon), Chulalongkorn Univ, Thailand.

Adjunct Faculty

[Computational Mechanics; Finite Element Analysis; Meshless Methods; Structural Optimization]

NAVEED ANWAR, DEng, MEng, AIT, Thailand; BScEng., Univ. of Engineering & Tech., Lahore, Pakistan.
Affiliated Faculty
[Structural Analysis and Design; Computational Mechanics; Computer Application; Bridge

Engineering; Tall Buildings;
Software Development]

Research Staff

SUN SAYAMIPUK, DEng, MEng, AIT,
Thailand; BEng, Kasetsart
Univ., Thailand.
Senior Laboratory Supervisor

9.3 Completed Grant and Sponsored Research

Natural Rubber Composites for Railway Sleepers: A Feasibility Study

Project Description: In this proposal, different natural rubber composites will be studied with the aim to be utilized as railway sleepers. Natural rubber is proposed as the primary raw material because Thailand is currently the largest producer of rubber in the world. If the project finds a successful composite of natural rubber that fits for railway sleepers, the country will benefit from being able to exploit the large stock of natural rubber she over- produces every year. This in turn will stabilize the market price of natural rubber. Prototypes of railway sleepers will be made from different composites of natural rubber, and will be tested based on the functional requirements of railway sleepers in cooperation with the State Railway of Thailand. As railway tracks can be installed by regular spikes as in the case of wooden sleepers, Thailand will not need to import special fasteners. In addition, once the technology is well proven, Thailand can export this technology oversea.

Duration: 16 May 2003 to December 2006
Investigators: Prof Worsak Kanok-
Nukulchai, Dr Noppadol Phien-wej
Sponsor: Royal Thai Government
Total Contracted Amount (Baht) 996,000

Chemical Modification of Natural Rubber Composites for Structural Application

Project Description: Natural rubber (NR) is naturally soft and highly deformable at room temperature. After crosslinking (or vulcanization), rubber becomes more elastic but still possesses low compressive modulus. From our pervious investigation, mechanical properties of NR were significantly enhanced by increasing crosslinking density of NR vulcanizates, and by adjusting types and amounts of reinforcing fillers. It was found that by increasing crosslinking density of NR vulcanizates, the rubber product becomes very stiff and inelastic, whereas, by adjusting the type and amount of reinforcing fillers at low to moderate crosslinking density, the stiffness of the rubber is still low crosslinking density demands

expensive chemicals and a large amount of reinforcing fillers to achieve desirable properties.

Duration: 30 Sept 2004 – 31 Dec 2006
Investigator: Prof. Worsak Kanok-Nukulchai
Sponsor: Royal Thai Government (RTG)
Joint Research Fund
Total Contracted Amount B 996,000.00

Seismic Behavior of Steel Beam- Column Connection with Knee Brace (Knee Braced Frame)

Project Description: The research proposed herein will involve an experimental study of a new structural system to resist seismic forces called moment frames with knee brace. The research work involves a quasi-static testing and numerical simulations of the frame assemblages.

Duration: Nov 2005 to Nov 2006
Investigator: Dr Pennung Warnitchai
Collaborators: Dr Sutat Leelataviwat, King
Mongkut's Univ. of Technology,
Thonburi
Dr. Arnon Wongkaew, Burapha
University, Chonburi
Sponsor: Royal Thai Government
Total Contracted Amount: Baht 996,000

Seismic Hazard Assessment and Mitigation of Seismic Risk in Thailand (Phase 1): Sub-Projects 3 and 4

Project Description: In Sub-project 3, ambient vibrations of fifty (50) buildings with height varying from 20 to 210 meters and number of stories from 5 to 54 were measured, and several key dynamic properties of the buildings were identified. These key dynamic properties are: natural periods, vibration mode shapes, and critical damping ratios. Approximate empirical relations between natural periods and building height were derived by regression analyses. Finite-element models of six (6) selected buildings were formulated, and their dynamic properties were derived from the models and compared with those obtained from the ambient vibration measurements. A reasonably fair agreement was obtained. The Sub-project 4 focused on the evaluation of actual seismic capacity of typical reinforced concrete (RC) buildings in Bangkok, most of which were designed and constructed without any consideration on seismic loading. The research works were divided into two main parts: (1) seismic performance of critical RC components and (2) seismic capacity of the whole building structures. In the first part, seven RC column specimens, four beam-column subassemblages, and one post-tensioned flat slab-column connection were tested under quasi-static cyclic loading to study their seismic behavior. In the second part, the seismic capacity of the whole building structures was determined by a nonlinear pushover analysis procedure following the guidelines of the ATC-40 and FEMA-273 documents. Six existing buildings were selected to represent typical RC buildings in Bangkok. Many measures to improve the seismic performance of buildings were also investigated. Among these, seismic

detailing of some critical members and adding shear walls were found to be very effective measures.

Duration: 1 Sept 2002 to 31 Dec 2006
Investigator: Dr Pennung Warnitchai
Collaborators: Dr Noppadol Phienweij, AIT
Dr. Nakhorn Poovarodom, Thammasat
Univ.
Dr. Virote Boonyapinyo, Thammasat
Univ.
Dr. Amorn Pimanmas, Sirindhorn
International Institute of Technology
Dr. Anat Ruangrassamee,
Chulalongkorn Univ.
Dr. Anek Sirpanichgorn, King
Mongkut's Univ. of Technology,
Thonburi
Sponsor: Thailand Research Fund
Total Contracted Amount Baht 3,154,000

9.4 Ongoing / In Progress Grant and Sponsored Research

Reconstruction and Development in the Tsunami-Hit Phangnga Province

Project Description The project aims to contribute to the sustainable rehabilitation and development after the tsunami destruction in Thailand by designing, applying, evaluating and disseminating appropriate innovative technologies for energy-efficient housing and water management.

Investigator: Mr. Bernard Levebre
Duration: 1 Dec 2005 to 31 Dec 2008
Sponsor: EU-Asia Pro Eco IIB Post Tsunami
Programme, European Commission
Total Contracted Amount (Baht) 3,021,700

Testing of Structural Integrity of Concrete Structure for Hopewell Column (Hopewell 2005)

Project Description: To study the structural integrity of Hopewell's column and to observe and identify the extent of deterioration or damage of concrete structure and to determine the strength of concrete by using either non-destructive test for North Bound Train System in a Bangkok (Bang sue-Rangsit) and Bang Sue Train Station.

Duration: August 2005 to March 2007
Investigator: Dr Pichai Nimityongskul
Sponsor: NTBR
Total Contracted Amount (Baht) 3,000,000

Mix Design of RCC for Nam Ngum 3 Dam

Project Description: Mix design of Roller
Compacted Concrete (RCC) for
Nam Ngum 3 Dam

Duration: Nov-06 to Sept-07
Investigator: Dr. Pichai Nimityongskul and
Dr. Sun Sayamipuk
Sponsors: MDX Lao Co. Ltd.
Total Contracted Amount (Baht) 395,328

Load Test for the Second Mekong International Bridge

Project Description The second Mekong
International Bridge is constructed
completely in September 2006 by
SVSK JV. The SVSK JV requested AIT

thought STE to carry out the load test of the bridge on the site. This is to ensure that the main bridge has been constructed in a manner that its loading capacity conforms to the design loads and the specification.

Duration: Nov-06 to Sept-07

Investigator: Dr. Pichai Nimityongskul and Dr. Sun Sayamipuk

Sponsors: Sumitomo Mitsui-Vichitbhan-Siam Syntech-Krung Thon JV (SVSK JV)

Total Contracted Amount B 962,000.00

Finite Element Modeling of Tsunami Propagation on the Coast of Thailand

Project Description: On December 26, 2004, coastal regions of the Indian Ocean were devastated by large tsunami initiated by a large earthquake in the ocean near Indonesia's province of Aceh. Much of tragic loss of lives and injuries could have been prevented if there were early warning systems in those countries surrounding the Indian Ocean, including Thailand. In order to set up a reliable warning system in Thailand, it is necessary to have good wave sensors in the ocean to detect potential tsunami as well as good mathematical and numerical tools to predict behavior of tsunami. This study aims to establish a finite element model for simulating tsunami propagation on the coast of Thailand. The obtained model can be used in conjunction with wave sensors to form a tsunami warning system. The obtained software application will encourage Thailand to rely on its own strength in tsunami disaster prevention and mitigation.

Duration: 1 Nov 2005 to 31 Oct 2007

Investigator: Prof Worsak Kanok-Nukulchai

Sponsor: Royal Thai Government (RTG) Joint Research Fund

Total Contracted Amount (Baht) 875,000

Investigation of Structural Integrity of Eua Arthorn Housing

Project Description: AIT conduct an inspection to investigate the structural integrity of Eua Arthorn Housing Authority.

To Evaluate of structural integrity by compared with standard design i.e. International organization for standard and Thai Industrial Standard Institute.

To certified and approve the construction methodologies.

To certified and approve the construction materials. Especially, the materials are used as joint of elements. The material testing is operated by the structural engineering laboratory of AIT, which is concerned strength of materials, durability and safety of structures.

Duration: 10 May 2004 to 31 Dec 2007

Investigator: Dr Pichai Nimityongskul

Sponsor: National Housing Authority

Total Contracted Amount B 3,750,000

Adjustment to the Building Energy Code

Project Description: Development of Energy Development and Promotion

(DEDP) is implementing a project entitled "Adjustments of the Building Energy Code" with assistance from the Danish Cooperation for Environment and Development (DANCED). The main Purpose of the Project is to update the Building Codes relate to energy. The existing codes and standards relates to energy will be adjusted or updated according to the latest available knowledge. Comprehensive and valuable knowledge on energy issues related to buildings already exists in Thailand. To emphasis the sustainability of the project it is obvious to utilize this national resource.

Duration: 27 June 2002 - 30 June 2008

Investigator: Prof. Worsak Kanok-Nukulchai

Sponsor: Dansk Energi Management A/S

Total Contracted Project B 14,040,000

9.5 Conferences/ Symposiums

New Technologies for Urban Safety of Mega Cities in Asia

Project Description: The 5th International Symposium on New Technologies for Urban Safety of Mega Cities in Asia is co-organized by the Asian Institute of Technology and the International Center for Urban Safety Engineering of the University of Tokyo, with support from the Japan Aerospace Exploration Agency, the Geoinformatics and Space Technology Development Agency of Thailand and Center of Excellence (COE), the University of Tokyo. The symposium aims to be a forum for researchers, practicing engineers and decision makers from more than 10 countries to share and exchange their views on new technologies, techniques and innovations in diverse areas related to natural disasters and urbanization.

Duration: August 2006 to January 2007

Investigator: Dr. Yoshitaka Kato and Dr. Raktipong Sahamitmongkol

Sponsors: Japan Aerospace Exploration Agency

Total Contracted Amount (Baht) 927,500

EASEC-10 Conference

Project Description: This conference is the tenth in the EASEC Series of Conferences organized biennially in Asia. The EASEC conferences serve to provide a forum for professional structural and construction engineers and researchers working in Asia and the Pacific region to present recent progress in research and development, and to discuss the implementation of new tools and technology in professional applications. In particular, the EASEC conferences intend to promote mutual understanding and share common ideas. EASEC has been held biennially since 1986.

Duration: 25 June 2005 to 31 Dec 2007

Investigator: Prof Worsak Kanok-Nukulchai

Sponsor: Participants/Donors/Subsidy

Total Contracted Amount Baht 8,800,000

9.6 Publications

Refereed Journals

- Sahamitmongkol R., Kato Y., Tangtermsirikul S., Uomoto T., "Preliminary Inspection of Traffic Bridges with Short Span in Bangkok Metropolitan Area", SEISANKENKYU, Vol. 58, No. 3, pp.61-64, 2006.05.
- Sancharoen P., Kato Y., Uomoto T., "Probabilistic model for repairing time of RC structure deteriorated by salt attack", SEISANKENKYU, Vol.58, No.3, pp.85-88, 2006.05.
- Nanayakkara O. and Kato Y., "Effect of Environmental Non-homogeneity by Chloride ions on Macro-cell Corrosion in Reinforcement bar", SEISANKENKYU, Vol.58, No.3, pp.117-120, 2006.05.
- Sahamitmongkol R., Kanada H., Kato Y., Uomoto T., "Development of New Method to Inspect Deteriorated Concrete Using NIR Spectroscopic Technique Research and Development", *Journal of the Engineering Institute of Thailand*, 2006.12.
- Sahamitmongkol R., Kanada H., Kato Y., Uomoto T., "Development of Portable Energy Dispersive X-Ray Fluorescence Analyzer for Concrete Inspection Research and Development", *Journal of the Engineering Institute of Thailand*, 2006.12.
- Sayakourmmame V. and Kanok-Nukulchai W., "A Meshless Analysis of Shells Based on Moving Kriging Interpolation", *International Journal of Computational Methods*, 3, 3 (2006), PP. 1-23
- Warnitchai P. and Hoang, N., "Optimal placement and tuning of multiple tuned mass dampers for suppressing multi mode structural response", *Smart Structures and Systems, an International Journal of Mechatronics, Sensors, Monitoring, Control, Diagnosis, & Life Cycle Eng.*, Volume 2, Number 1, January 2006, pp. 1-24.
- Boonyapinyo, V., Warnitchai, P., and Intaboot, N., "Seismic capacity evaluation of post-tensioned concrete slab column frame buildings by pushover analysis", *Songklanakarin Journal of Science and Technology*, Vol. 28, No. 5, Sep-Oct. 2006, pp. 1033-1048.
- Uddin Mohammed, T. and Warnitchai, P., "Nonlinear Liquid Sloshing in Rectangular Tank," *UAP Journal of Civil and Environmental Engineering*, Vol. 2, No.1, pp. 1-8, 2006, published by Department of Civil Engineering, The University of Asia Pacific, Dhaka, Bangladesh (also available online at <http://www.uap-bd.edu/cee/cee/technicaljournal/>).

Conference Proceedings

- Kato Y. and Uomoto T., "Modeling of Material Diffusivity in Concrete Considering with Heterogeneous Property of Concrete", *Proceedings of the second fib Congress*, 2006.06.
- Sancharoen P., Kato Y., Uomoto T., "Life cycle repairing cost of RC structure

- deteriorated by salt attack based on probabilistic model" *Proceedings of The Tenth East Asia-Pacific Conference on Structural Engineering and Construction (EASEC-10)*, August 3-5, 2006, Bangkok, 2006.08.
- Sancharoen P., **Kato Y.**, Uomoto T., "Effect of uncertainties of prediction model on the maintenance program for concrete structure", *Proceedings of the fifth International Symposium on NEW TECHNOLOGIES FOR URBAN SAFETY OF MEGA CITIES IN ASIA*, 2006.11
- Sancharoen P., **Kato Y.**, Uomoto T., "Effect of variation of parameter used in the deterioration prediction model on the R&M plan" *Proceedings of the second international conference of Asian Concrete Federation (ACF)*, 2006.11.
- Nanayakkara O. P., **Kato Y.**, "Effect of Environmental Non-Homogeneity on Macro-Cell Corrosion in Reinforced Bar, JSCE 61th Annual Conference, pp.499-500, 2006.09.
- Sahamitmongkol R., **Kato Y.**, Uomoto T., "Effect of Mix Proportion and Cover Thickness on Electromagnetic Properties of Concrete Measured by Radar Method" *Proceedings of the second international conference of Asian concrete federation, ACF, Bali, Indonesia*, 2006.11.
- Sahamitmongkol R., **Kato Y.**, Uomoto T., "Measurement of Electromagnetic Properties of Concrete by Radar and Key Influencing Factors", *Proceedings of the second Annual Concrete Conference, Thai Concrete Association*, 2006.10.
- Nanayakkara O.P. and **Kato Y.**, "Macro-cell Corrosion Considering Chloride Contents Along the Reinforced Bar" *Proceedings of the fifth International Symposium on New Technologies For Urban Safety of Mega Cities in Asia*, 2006.11.
- Nanayakkara O. P. and **Kato Y.**, "Time Dependency of Macro-cell Corrosion in Reinforced Concrete Member due to Material and Environmental Non-Homogeneity" *Proceedings of the second international conference of Asian Concrete Federation (ACF)*, 2006.11.
- Pheeraphan, T., Joyklad P., and **Nimityongskul P.**, "Experimental study on blast load resistance of ferrocement panels," *Proceeding of the 8th International Symposium of Ferrocement and Thin Reinforced Composites*, Bangkok, Thailand, pp. 355-364, February 2006.
- Pheeraphan, T., Joyklad P., and **Nimityongskul P.**, "Blast load test on ferrocement sandwich panels," *Proceeding of the 8th International Symposium of Ferrocement and Thin Reinforced Composites*, Bangkok, Thailand, pp. 365-374, February 2006.
- Pheeraphan, T., Rattanaporamakul P., and **Nimityongskul P.**, "Experimental study on blast load resistance of ferrocement bomb baskets," *Proceeding of 4th Engineering Study Conference in the 28th Council Engineering Dean of Thailand Annual Meeting*, Nakornratchasima, Thailand, pp.303-310, May 2006.
- Sayamipuk S. and **Nimityongskul P.**, "Use of Fly Ash and Natural Pozzolan from Myanmar as Supplementary Cementitious Material", *Proceeding of the International Conference on Pozzolan, Concrete and Geopolymer*, Khon Kaen, Thailand, May 2006.
- Parichatprecha R., Subedi P. B. and **Nimityongskul, P.**, "Influence of Pozzolanic Materials on the Rapid Chloride Permeability Test of High Strength and Durable Concrete", *Proceeding of the International Conference on Pozzolan, Concrete and Geopolymer*, Khon Kaen, Thailand, May 2006.
- Hengsadeekul T. and **Nimityongskul P.**, "The Prefabricated Vetiver Grass-Clay Composite Blocks: Design and Production", *Proceeding of the Forth International Conference on Vetiver: ICV4*, Caracas, Venezuela, October 22-26, 2006. (This paper received "the King of Thailand Vetiver Awards" from Her Royal Highness Princess Maha Chakri Sirindhorn of Thailand, the Patron of the Vetiver Network)
- Pimanmas, A., Supaviriyakit, T., and **Warnitchai, P.**, "Effect of removing initial bond between beam bar and concrete on cyclic response of non-ductile beam-column joint", *Proc. of the 10th East Asia-Pacific Conference on Structural Engineering and Construction (EASEC-10)*, August 3-5, 2006, Bangkok.
- Leelataviwat, S., **Warnitchai, P.**, Manakarn, P. and S. Boonpao, "Seismic behaviour and design of steel moment frames with knee braces", *Proc. of the 10th East Asia-Pacific Conference on Structural Engineering and Construction (EASEC-10)*, August 3-5, 2006, Bangkok.
- Warnitchai, P.**, "Tsunami 2004: experiences and lessons learned in Thailand", *Proc. of the 10th East Asia-Pacific Conference on Structural Engineering and Construction (EASEC-10)*, August 3-5, 2006, Bangkok.
- Nguyen, D. V., Kim, K. D. **Warnitchai, P.** and Lee, C. S., "Three-dimensional modeling and dynamic analysis of high-speed train-bridge interaction", *Proc. of the 10th East Asia-Pacific Conference on Structural Engineering and Construction (EASEC-10)*, August 3-5, 2006, Bangkok.
- Warnitchai, P.**, "Mitigating the collapse risk of large billboards", *Proc. of the 5th International Symposium on New Technologies for Urban Safety of Mega Cities in Asia (USMCA 2006)*, November 16-17, 2006, Phuket, Thailand.
- Nguyen, D. V., Kim, K. D., **Warnitchai, P.**, and Duc, D. M., "Evaluation of Passenger Ride Comfort, Noise and Operation Safety of Elevated High-speed Trains", *Proceedings of the 12th International Student Seminar on Transport Research Symposium (ISSOT 2006)*, November 14-16, 2006, Bangkok, Thailand, pp. 166-175.
- Wicaksana C. and **Kanok-Nukulchai W.**, "Dynamic Analysis of Timonsheko Beam and Mindlin Plate by Kriging-Based Finite Element Methods, in Emerging Trends", *Proceedings of The Tenth East Asia-Pacific Conference on Structural Engineering and Construction*, August 3-5, 2006, Bangkok, pp. 515-524.
- Masood Z. and **Kanok-Nukulchai, W.**, "An adaptive mesh generation for Kriging Element free Galerkin method based on Delaunay triangulation, in Emerging Trends", *Proceedings of The Tenth East Asia-Pacific Conference on Structural Engineering and Construction*, August 3-5, 2006, Bangkok, pp. 499-508.
- Tjong W.F. and **Kanok-Nukulchai W.**, "Kriging-based finite element method for analyses of Reissner-Mindlin plates", *Proceedings of The Tenth East Asia-Pacific Conference on Structural Engineering and Construction*, August 3-5, 2006, Bangkok, pp. 509-514.
- Sommanawat W. and **Kanok-Nukulchai W.**, "The enrichment of material discontinuity in moving Kriging methods", *Proceedings of The Tenth East Asia-Pacific Conference on Structural Engineering and Construction*, August 3-5, 2006, Bangkok, pp. 525-530.
- Wongkiattikun C., **Kanok-Nukulchai, W.**, Munasinghe S., and Patjavit A, "Global flexibility index for monitoring health of existing highway bridges, in Analytical and Computational Methods", *Proceedings of The Tenth East Asia-Pacific Conference on Structural Engineering and Construction*, August 3-5, 2006, Bangkok, pp. 167-174.
- Anwar N. and **Kanok-Nukulchai W.**, "Framework for component-based structural engineering software, in Analytical and Computational Methods", *Proceedings of The Tenth East Asia-Pacific Conference on Structural Engineering and Construction*, August 3-5, 2006, Bangkok, pp. 283-290.
- Wijaya G.B. and **Kanok-Nukulchai W.**, "Numerical simulation of tsunami propagation using the characteristic based split method, in Recent Advances in Structural Engineering, Mechanics and Materials", edited by N. Rajapakse, A.C. Wijeyewickrema, and W. Kanok-Nukulchai, *The Pisidhi Karasudhi Symposium*, August 4-5, 2006, pp. 199-208

Refereed Books/Chapters

- Sayakourmmane V. and **Kanok-Nukulchai W.**, "A Meshless Analysis of Shells Based on Moving Kriging Interpolation", *International Journal of Computational Methods*, 3, 3 (2006), pp. 1-23
- Kanok-Nukulchai W.**, Munasinghe S. and Naveed A., "Emerging Trends: Keynote Lectures and symposia, 2006", *Proceeding of EASEC-10 Conference*, Asian Institute of Technology, Pathumthani, ISBN 974-8257-22-3, 569 pages.
- Kanok-Nukulchai W.**, Munasinghe S. and Naveed A., "Analytical and Computational Methods, 2006", *Proceeding of EASEC-10 Conference*, Asian Institute of Technology, Pathumthani, ISBN 974-8257-21-5, 370 pages.
- Kanok-Nukulchai W.**, Munasinghe S. and Naveed A., "Wind and Earthquake Engineering, 2006", *Proceeding of EASEC-10 Conference*, Asian Institute of Technology, Pathumthani, ISBN 974-8257-23-1, 504 pages.

Kanok-Nukulchai W., Munasinghe S. and Naveed A., "Real Structures: Bridges and Tall Buildings, 2006", *Proceeding of EASEC-10 Conference*, Asian Institute of Technology, Pathumthani, ISBN 974-8257-17-7, 813 pages.

Kanok-Nukulchai W., Munasinghe S., and Naveed A., "Construction and Professional Practices, 2006", *Proceeding of EASEC-10 Conference*, Asian Institute of Technology, Pathumthani, ISBN 974-8257-20-7, 522 pages.

Kanok-Nukulchai W., Munasinghe S., and Naveed A., "Materials, Experimentation, Maintenance and Rehabilitation, 2006", *Proceeding of EASEC-10 Conference*, Asian Institute of Technology, Pathumthani, ISBN 974-8257-18-5, 529 pages.

Kanok-Nukulchai W., Munasinghe S. and Naveed A., "Supplementary Papers, 2006", *Proceeding of EASEC-10 Conference*, Asian Institute of Technology, Pathumthani, ISBN 974-8257-25-8, 206 pages.

Rajapakse N., Wijeyewickrema A.C., and **Kanok-Nukulchai W.**, "Recent Advances in Structural Engineering, Mechanics and Materials, 2006", *The Pisdhi Karasudhi Symposium*, Asian Institute of Technology, Pathumthani, ISBN 974-8257-16-9, 273 pages.

Student: Zeeshan Masood
Supervisor: Prof. Worsak Kanok-Nukulchai

Title: Effect of Mineral Admixture and Chloride Ion Content on the Quality of Concrete Evaluated by Non-Destructive Test.

Student: Laziza Amin Mistee
Supervisor: Dr. Yoshitaka Kato

Title: Development of Fiber Reinforced Polymer Composite Tubes and its Application to Bridge Decks.

Student: Subash Paudel
Supervisor: Dr. Pichai Nimityongskul

Title: Development of a Deformational Adaptive Mesh Generation Based on Kriging Interpolation.

Student: Danny Proboyo
Supervisor: Prof. Worsak Kanok-Nukulchai

Title: Three Dimensional Finite Element Model of Unconfined Rubber within a Concrete Structure.

Student: Pitch Roongsattam
Supervisor: Prof. Worsak Kanok-Nukulchai/
Dr. Sunil Munasinghe

Title: Seismic Performance of Concrete Framed Buildings with Soft and Weak Story in Low to Moderate Seismic Regions.

Student: Noorma Shrestha
Supervisor: Dr. Pennung Warnitchai

Title: Effects of Pile Foundation Flexibility on the Dynamic Characteristics of Multi-story Buildings in Bangkok.

Student: Thanun Singlumpong
Supervisor: Dr. Pennung Warnitchai

Title: Explosive Testing of a Ferrocement Bomb Basket.

Student: Pinit Ruttanaporamakul
Supervisor: Dr. Pichai Nimityongskul

Title: Chloride Permeability of Mortar Containing Metakaolin.

Student: Amrit Siri-isanant
Supervisor: Dr. Pichai Nimityongskul

Title: Development of Rapid Testing of Iron Sulfide Inclusion in Aggregate.

Student: Prot Surawattananan
Supervisor: Dr. Pichai Nimityongskul

Title: Bleeding and Abrasion Resistance of Mortars Containing Different Pozzolans.

Student: Pattira Tongprakob
Supervisor: Dr. Pichai Nimityongskul

Title: Dynamic Analysis using Kriging-based Finite Element Methods.

Student: Citra Wicaksana
Supervisor: Prof. Worsak Kanok-Nukulchai

Title: Investigation of an Isoparametric Element Based on Kriging Shape Functions.

Student: Sissilia Windy
Supervisor: Prof. Worsak Kanok-Nukulchai

Title: Global Flexibility Index Evaluation of a Steel Bridge Model under Accelerated Damages.

Student: Chalernpol Wongkiattikun
Supervisor: Prof. Worsak Kanok-Nukulchai

Title: Seismic Performance of Bonded Post-Tensioned Interior Flat Slab-Column Connections with Drop Panel.

Student: Chondro Hidayat Tandian
Supervisor: Dr. Pennung Warnitchai

9.7 Doctoral Students' Dissertation

Utilization of Vetiver Grass as Construction Materials.

Student: Thammanoon Hengsadeeikul
Supervisor: Dr. Pichai Nimityongskul

Approximate Modal Decomposition of Inelastic Dynamic Responses of Wall Buildings.

Student: Chanet Sangarayakul
Supervisor: Dr. Pennung Warnitchai

Applications of Moving Kriging Interpolation for Element-Free Galerkin Method.

Student: Patthanapong Tongasuk
Supervisor: Prof. Worsak Kanok-Nukulchai

9.8 Masters Students' Theses

Title: Seismic Behavior of Steel Beam-Column Connections with Knee Braces.

Student: Siriluck Boonpao
Supervisor: Dr. Pennung Warnitchai

Title: Appropriate Technology Development of Aerated Lightweight Mortars using Pulverized Fly Ash and Bottom Ash.

Student: Andrian Gunawan
Supervisor: Dr. Pichai Nimityongskul

Title: Influence of Mix Proportion and Cover Depth on Dielectric Constant and Ultrasonic Wave Velocity of Concrete.

Student: Sharida Hoque
Supervisor: Dr. Yoshitaka Kato

Title: An Adaptive Mesh Generation for Kriging Element-Free Galerkin Method Based on Delaunay Triangulation.

Chapter 10: SET – TELECOMMUNICATIONS FIELD OF STUDY

10.1 Introduction

The Telecommunications program offers areas of specialization in transmission systems; switching systems; telematics; network planning, and in collaboration with the School of Management, telecommunications management.

The courses offered emphasize modern telecommunications skills in systems planning and engineering, telecommunications software development, and administrative and financial aspects of telecommunications management.

Graduates from the master's program form the nucleus for effective high-level technical planning and management operations at their employer organizations. Some of the graduates are engaged in planning, development, and service activities leading to the installation, commissioning, management, design etc. of value-added systems. Given the important role of our graduates in the development of the telecommunications sector, the learning is of significant benefit to the users of telecommunications services within the region.

Graduates of the doctoral program play key roles in enhancing the level of education and research in the national universities of the region, and promote and strengthen the R&D potential of emerging regional manufacturing industries.

Research covers a wide variety of topics at the cutting edge of research and development. Specific issues addressed in the broad fields of transmission and switching systems are, for example, coherent optical communications, multiple-access strategies for cellular-

mobile and cabled networks, as well as questions of congestion control and new services in ISDN and future B-ISDN networks.

10.2 Research Facilities and Laboratories

Today's fast-booming world of Telecommunications and Computer networking plays a significant leadership role. To support this achievement the Telecommunications field of study puts the effort to continue the development of Telecommunications technologies and systems. It covers a wide variety of research in telecommunications ranging from modeling, analysis wire line and wireless systems to application and protocol development.

Its research subjects are in coherent optical communications; congestion control, ATM, and B-ISDN networks; error correction and detection methods; nobile and Internet traffic studies; multiple-access strategies for cellular-mobile, satellite systems, and cabled networks; network performance analysis, planning and design; and speech processing. Its research specialisations are in broadband networks; network planning; awitching systems; telecommunications management in collaboration with the School of Management; telematics; and transmission systems.

Transmission and Switching Lab (TSL)

The Transmission and Switching lab is equipped with Nokia Digital Switching Exchange DX200 (DX220, DX210) that supports PSTN and ISDN. There are also several telephone switches, traffic simulators, protocol analyzer, PDH/SDH (STM1 & STM4) transmission

systems, fiber optic line equipment, transmission line analyzer, error rate meter which are available for experiment in switching, transmission and internetworking. The switching and transmission systems are integrated as real telecommunications network. Among the applications whose study has been made possible by these systems are Operation and Maintenance, performance measurements of real narrowband and broadband telecommunication networks, as well as new services.

Network Planning Lab (NPL)

High performance computer aided network planning tools are supported by several workstations at the Network Planning lab. This lab provides hands-on experience design and optimization in radio network, fixed network and fiber optical network.

Wireless Lab (WL)

The main purpose of the Wireless laboratory is for measurement and performance analysis. It is equipped with Modulation and Error rate measurement meters, Simulation software like SATSIM, which was developed by the students, is a simulation package to calculate the subsatellite points of a LEO/ MEO/GEO and its orbital parameters. It also displays graphically on a two-dimensional earth map the instantaneous position and path traced by the satellite (Multi orbit and Multi satellite). Another is NMS/X, is a measurement system for GSM, DCS and NMT networks tracing, capable of measuring up to four networks simultaneously. The results are used for benchmarking service quality of operational cellular networks. These results can be analyzed and can be used for tuning the network parameters in NPS/X.

Communications Labs (CL)

The Communications lab is used to perform experiments courses under Signal and Systems, Communications Electronics, Digital Transmission Technology and Digital Signal Processing. Test bench equipment includes analog and digital oscilloscopes, function generators, analog and digital Spectrum analyzers, Digital sampling oscilloscopes and DSP cards and workstations which have simulation applications like MATLAB.

Computer Laboratory (PCL)

There are two Computer Laboratories in Telecommunications Program. One is for Senior students and one is for Junior Students. All computers are latest powerful computers.

TC Library

In Telecommunications Program, there is a small library, from where students can borrow telecommunication related journals, manuals and reference books.

10.3 Faculty and Research Staff

Full-time Faculty

KAZI MOHIUDDIN AHMED, MSc, Inst of Communications, Leningrad, USSR; PhD, Univ of Newcastle, Australia.

Professor

(Telecommunication Networks; Digital Modulation Techniques; Satellite Communications; Cellular Mobile Communications; Digital Transmission and Communications)

[Wireless Systems and Networks; Disaster Warning and Post-disaster Communications; Applications of ICT in Sustainable Development; Propagation and Channel Modeling in Mobile Communications; Multiple Access Techniques & Protocols; Satellite Communications; Antenna

Array Processing; Signal Processing]

R M A P RAJATHEVA, BSc, Moratuwa Univ, Sri Lanka; MSc, PhD, Univ of Manitoba, Canada.

Associate Professor
(Equalization Algorithms for Frequency Selective Channels)

[Digital and Mobile Communications, Space Time Processing- MIMO Performance analysis, OFDM and Multicarrier Techniques, Multiuser Detection, Application of Channel Coding for Distributed Source/Video Coding, Architectures for Emergency Communication Systems, Security Issues]

TEERAPAT SANGUANKOTCHAKORN, BEng, Chulalongkorn Univ, Thailand; MEng, DEng, Tokyo Institute of Technology, Japan.

Associate Professor *(Data Communications; Broadband Integrated Services Digital Networks; Multimedia Communications and Systems; Network Quality of Service)*

[Digital Signal Processing, especially Image Compression for Moving and Still Image, the routing algorithm in the network such as IP and MPLS network, High Speed Network, IP-based multimedia applications; QoS provisioning in Networks]

POOMPAT SAENGUDOMLERT, BSE, Princeton Univ; MS, PhD, Massachusetts Inst of Tech, USA

Assistant Professor

[Communication theory, optical networks, resource allocation problems, and array processing; Recent research activities have focused on optical network designs based on existing infrastructure networks and communications for disaster management]

Visiting Faculty

A B SHARMA, BSc, Univ of Newcastle-upon Tyne, UK; LicTech, DTech, Helsinki Univ of Tech, Finland.

Visiting Professor *(Fiber-Optic Systems; Digital Transmission Technologies; Signals and Systems; Modulation Techniques; Coding Theory)*

[High-speed all-optical networks (WDMA, TDMA, CDMA); Optical WDM local access using spectrally sliced ASE; Radio-over-fiber for future broadband cellular systems]

TAPIO J ERKE, MSc, Helsinki Univ of Tech, Finland.

Visiting Associate Professor

[Traffic measurements, modeling, and performance in various telecommunication networks, PSTN, Cellular, Internet, ATM, and optical networks; Resource allocation for different services, network dimensioning and optimization, and switching structures]

Research Staff

MIKKO KOVALAINEN, PhD

Visiting Senior Researcher

[Knowledge management, Project management, HighTech management, Software business, Technology strategies]

10.4 Completed Grant and Sponsored Research

Algorithm and System Design of Signal Processing on Quantum Cryptography System: Simulations

Project Description: Experimental results and implementation of quantum key distribution (QKD) system which employs four polarization states encoding key bits in two non-orthogonal bases were reported. The transmitter uses four diode lasers with

emission wavelength of 830 nm at 1 MHz repetition rate as weak coherent sources and passive optical components to assign individual photon polarization. The receiver comprises similarly passive optical components to analyze the polarization of arriving photons, and four silicon avalanche photodiodes operated in Geiger mode to detect single photons, and to optically synchronize the system. In a demonstration experiment the QKD system enabled to generate shifted-key about 5,000 bits/s, at an average of about 0.06 photons per pulse at clock rates of 1 MHz. An average quantum bit error rate (QBER) was about 6.5 % for a 6.5 m free space transmission test range.

Duration: 15 Sept 2004 to 31 March 2006
 Investigator: Dr Teerapat Sanguankotchakorn
 Sponsor: Royal Thai Government (RTG) Joint Research Fund
 Total Contracted Amount: B 810,000.00

10.5 Publications

Referred Journals

- L.W. Chen, P. Saengudomlert, and E.H. Modiano, "Uniform versus non-uniform band switching in WDM networks," *Computer Networks*, vol. 50, no. 2, pp. 149-167, February 2006.
- P. Saengudomlert, E.H. Modiano, and R.G. Gallager, "On-Line Routing and Wavelength Assignment for Dynamic Traffic in WDM Ring and Torus Networks," *IEEE/ACM Transactions on Networking*, vol. 14, no. 2, pp. 330-340, April 2006.
- Pragtong, P., Ahmed, K, and Erke, T. "Analysis and Modeling of Voice over IP Traffic in the Real Network", *IEICE special section on New Technologies and their Applications of the Internet IV*, vol. E89-D, no. 12, December 2006
- W.A.R.J. Weerakkody, W.A.C. Fernando, A.B.B. Adikari, R.M.A.P. Rajatheva, "4-PSK TTCM for Wyner-Ziv frame coding in DVC", *IEICE Electronic Express*, Vol.3, No.8, 178-183, April 25, 2006.
- P. Kocharoen, K.M. Ahmed, R.M.A.P. Rajatheva, W.A.C. Fernando, "Mesh Based Video Coding for Low bit-rate Communication," *IEEE Transactions on Consumer Electronics*, Volume 52, Issue 2, May 2006 Page(s): 611 – 620.
- Md. Abdur Rahman and Kazi M. Ahmed, "Optimum Cell Size Evaluation for Telecommunications in Riverine Transportation Systems in 5.8 GHz Band", Accepted for publications in *AIUB Journal of Science and Engineering (AJSE)*, Vol. 5, Issue 1, August 2006.
- ### Conference Proceedings
- P.T. Lwin and P. Saengudomlert, "Optimal provisioning of light-trails for optical storage area networks," *Proceedings of ICOCN 2006, China*, 18-22 September 2006.
- Poonlap Lamsrichan and Teerapat Sanguankotchakorn: "Embedded Image Coding using Context-based Adaptive Wavelet Difference Reduction," *The IEEE International Conference on Image Processing (ICIP 2006)*, Atlanta GA, USA, October, 8-11, 2006.
- Pituk Panthong, Surasak Chiangga, Teerapat Sanguankotchakorn and Keattisak Sripimanwat: "Single-Photon Transmissions in BB84-Quantum Cryptography System," *The 29th Electrical Engineering Conference (EECON29)*, The Ambassador City Jomthien Pattaya Hotel, Choburi, Thailand, November 9-10, 2006.
- Nawat Kamnoonwatana, Andey Kuprianov, Poompat Saengudomlert, Teerapat Sanguankotchakorn and Kanchana Kanchansut: "DVTS Video Frame Rate Adjustment Based on Motion Detection," *The IEEE 2nd International Conference on Automated Production of Cross Media Content for Multi-channel Distribution (axmedis2006)*, University of Leeds, UK, pp. 229-235, December 13-15, 2006.
- Tran Tuan Anh, Erke, T., and Kilkki K. "Push to Talk over Cellular Traffic Modeling", *IEEE International Conference on Networks (ICON 2006)*, vol. II, 578-584 pp. 13-15 September 2006, Singapore
- W.A.R.J. Weerakkody, W.A.C. Fernando, A.B.B. Adikari, R.M.A.P. Rajatheva, "Distributed Video Coding of Wyner-Ziv Frames using Turbo Trellis Coded Modulation," *International Conference on Image Processing (ICIP 2006)*, Atlanta, GA, USA, October 8-11.
- K.D.P. Dharmawansa, R.M.A.P. Rajatheva, K.M. Ahmed, "A New Result for the Distribution of the Sum of Nakagami-Random Variables," *IEEE ICC 2006 Conference*, Istanbul, Turkey, June 11-15, 2006.
- K.D.P. Dharmawansa, R.M.A.P. Rajatheva, K.M. Ahmed, "On the Bivariate and Trivariate Rician Distributions," *IEEE 64th VTC-Fall*, 2006, Montreal Canada, September 25-28. <http://www.ieeevtc.org/vtc2006fall/>
- V.H. Nam, R.M.A.P. Rajatheva, "On the performance analysis of MIMO-OFDM Multiband UWB systems in lognormal fading channel," *IEEE 64th VTC-Fall*, 2006, Montreal Canada, September 25-28.
- A.H.M. Rezaul Karim, R.M.A.P. Rajatheva, Kazi Ahmed, "An Efficient Collaborative Intrusion Detection System for MANET Using Bayesian Approach," *9th ACM-IEEE International Symposium on Modeling, Analysis and Simulation of Wireless and Mobile Systems (MSWiM 2006)*, October 2-6, Malaga, Spain. <http://www.cs.unibo.it/mswim2006/>
- K.D.P. Dharmawansa, R.M.A.P. Rajatheva and Hlaing Minn, "An Exact Error Probability Analysis of OFDM Systems with Frequency Offset," *MILCOM 2006*, 23-25 October, 2006, Washington, DC <http://www.milcom.org/>
- Surya Bahadur Kathayat and Nandana Rajatheva, "Interest Based Group Management Mechanisms For E-Learning Design Using The Peer-To-Peer Technologies," *International Conference on Web Information Systems and Technologies (WEBIST 2006)*, April 11-13, Portugal <http://www.webist.org/2006/>
- Md. Abdur Rahman, Kazi M. Ahmed and R.M.A.P. Rajatheva, "Cell Size Evaluation for Transport to Riverside Communications in Riverine Systems", *Proceedings of 4th International Conference on Electrical & Computer Engineering*, Dhaka Bangladesh, December 19-21, 2006
- Md. Abdur Rahman, Kazi M. Ahmed and R.M.A.P. Rajatheva, "A New TD-SCDMA Based MAC Protocol For Densely Deployed Wireless Sensor Networks", *Proceedings of 9th international Wireless Personal Multimedia Communications (WPMC'06)*, San Diego, CA, USA, September 17-20, 2006.
- Md. Abdur Rahman, Mohammad Upal Mahfuz, Kazi M. Ahmed and R.M.A.P. Rajatheva, "Wireless Networked Remote Area Connectivity: Harnessing ICT for Poverty Alleviation", *Proceedings of First International Conference on Next-Generation Wireless Systems (ICNEWS 2006)*, Dhaka, Bangladesh, pp. 287-291, January 2006.
- Md. Abdur Rahman, Abul Hasanat Md. Rezaul Karim, Kazi M. Ahmed and R.M.A.P. Rajatheva, "E-Governance for overall development by empowering disadvantaged communities", *Proceedings of First International Conference on Next-Generation Wireless Systems (ICNEWS 2006)*, Dhaka, Bangladesh, pp. 297-301, January 2006.
- Md. Abdur Rahman, Abul Hasanat Md. Rezaul Karim, Shamim Akhter, Afroza Nahar, Kazi M. Ahmed and R.M.A.P. Rajatheva, "Agricultural e-Commerce for Marginalized Communities: An Effective Utilization of ICT for Bangladesh", *Proceedings of First International Conference on Next-Generation Wireless Systems (ICNEWS 2006)*, Dhaka, Bangladesh, pp. 292-296, January 2006.
- Md. Abdur Rahman and Kazi M. Ahmed, "Wireless Navigation System for Riverine Transportation: Improved Communications and Effective Management", *Proceedings of First International Conference on Next-Generation Wireless Systems (ICNEWS 2006)*, Dhaka, Bangladesh, pp. 277-281, January 2006.
- Md. Abdur Rahman, Mohammad Upal Mahfuz and Kazi M. Ahmed, "Strategies for e-Exam Infrastructure in Developing Countries: A Perspective of Bangladesh", *Proceedings of First International Conference on Next-Generation Wireless Systems (ICNEWS 2006)*, Dhaka, Bangladesh, pp. 326-329, January 2006.
- Abul Hasanat Md. Rezaul Karim, R. M. A Premanandana Rajatheva, Kazi Mahmuda Akhter, Md. Abdur Rahman, and Kazi M. Ahmed, "Analyzing E-Governance Models and proposing a new model (Comparative Decisive Flow Model) for E-Government in Bangladesh",

Proceedings of First International Conference on Next-Generation Wireless Systems (ICNEWS 2006), Dhaka, Bangladesh, pp. 302-306, January 2006.

- A. H. M. Rezaul Karim, **R. M. A. P. Rajatheva**, and **Kazi M. Ahmed**, "An Efficient Collaborative Intrusion Detection System for Ad Hoc Network Using Bayesian Approach" Proceedings of ACM/IEEE conference MSWiM, Spain, 2006 .
- A. H. M. Rezaul Karim, **R. M. A. P. Rajatheva**, Kazi Mahmuda Akhter, **Kazi M. Ahmed** and Mohammad Manirul Islam, "Development of Bangladesh by Women Employment Utilizing ICT", Proceedings of First International Conference on Next-Generation Wireless Systems (ICNEWS 2006), Dhaka, Bangladesh, January 2006.
- Utsula Pradhan, **Kazi M. Ahmed** and **R. A. M. P. Rajatheva**, "Performance Evaluation of UWB MIMO System over IEEE UWB Channel using Pulse Position Amplitude Modulation Scheme", International Symposium on Wireless Personal Multimedia Communications, WPMC 2006, San Diego, USA, September 17-20, 2006 <http://www.wpmc2006.org/>
- Jittilertwirun, C.: **Ahmed, K.M.; Rajatheva, R.M.A. Premanandana**, "Performance of Two-User Cooperation in Frequency Selective Rayleigh Fading Channel," Systems and Control in Aerospace and Astronautics, 2006. ISSCAA 2006. 1st International Symposium on Page(s):822 - 827 2006, 19-21 Jan.

10.6 Doctoral Students' Dissertation

- Mesh Based Coding of Low-Bit Rate Video Sequences*
By: Preecha Kocharoen
Supervisor: Prof. Kazi M. Ahmed
- Analysis and Modeling of Voice over IP Traffic in Real Network*
By: Padungkrit Pragtong
Supervisors: Prof. Kazi M. Ahmed/Assoc. Prof. Tapio J. Erke
- Embedded Image Compression Using High-Order Context Modeling for Wavelet Difference Reduction*
By: Poonlap Lamsrichan
Supervisor: Dr. Teerapat Sanguankotchakorn

10.7 Masters Students' Theses and Research Studies

- Research Study: Security of VOIP Network in MPLS Supported Diffserv Environment*
By: Souvik Basu
Supervisor: Prof. Kazi Mohiudin Ahmed
- Research Study: Traffic Measurement and Analysis of the CDMA2000 1X Mobile Cellular Radio*

Access Network: A Case Study of S-fone Network, Ho Chi Minh City, Vietnam
By: Thai Thanh Binh
Supervisor: Assoc. Prof. Tapio J. Erke

A Robust MIMO System using RCMC CDMA in a Frequency Selective Rayleigh Fading Channel
By: Sampurna Chakraborty
Supervisor: Prof. Kazi Mohiudin Ahmed

Performance of Cooperative Uplink MC-CDMA System Employing V-Blast in a Rich Scattering Wireless Channel
By: Surachai Chieochan
Supervisor: Dr. R.M.A.P. Rajatheva

Research Study: A Study of Traffic Engineering Over MPLS Based Network using RSVP-TE Signaling
By: Tran Mac Ngoc Ho
Supervisor: Dr. Teerapat Sanguankotchakorn

Research Study: MPLS Traffic Measurement in a Metropolitan Area Network: A Case Study of Hochiminh City, Vietnam
By: Huynh Thanh Hoa
Supervisor: Assoc. Prof. Tapio J. Erke

Research Study: Upstream Dynamic Bandwidth Allocation Algorithm for Different Service Classes in Ethernet Passive Optical Networks
By: Ronruechai Jamfoong
Supervisor: Dr. Poompat Saengudomlert

Research Study: Performance Evaluation of Wireless Multi HOP MAC Protocol for Disaster Management
By: Sehrish Khan
Supervisor: Dr. Poompat Saengudomlert

Research Study: Optimal Provisioning of Light-Trails for Optical Storage Area Networks
By: Phay Thet Lwin
Supervisor: Dr. Poompat Saengudomlert

Research Study: CDMA2000-1X System Performance Improvement: A Case Study of EVNT's Mobile System, Vietnam
By: Ngo Binh Minh
Supervisor: Prof. Kazi Mohiudin Ahmed

Research Study: Resource Allocation for Wideband, Instantaneous Request and Overflow Calls
By: Saw Su Myat
Supervisor: Assoc. Prof. Tapio J. Erke

Performance Analysis of MIMO-OFDM Multiband UWB Systems in a Lognormal Fading Channel
By: Vien Hoai Nam
Supervisor: Dr. R.M.A.P. Rajatheva

Energy-efficient Hierarchical LEACH-based Multi-hop Routing for Wireless Sensor Networks
By: Maung Maung Phyto
Supervisor: Dr. Poompat Saengudomlert

Performance Evaluation of the UWB-MIMO System with STC over IEEE Channel Model
By: Utsula Pradhan
Supervisor: Prof. Kazi Mohiudin Ahmed

High Speed Uplink Packet Access (HSUPA) Capacity Analysis for Universal Mobile Telecommunications System (UMTS)
By: Nuraj Lal Pradhan
Supervisor: Prof. Kazi Mohiudin Ahmed

Realistic Channel Model for Capacity Analysis of Multi-user MIMO System
By: Sivasothy Senthuran
Supervisor: Dr. R.M.A.P. Rajatheva

Multimode Source Modeling and its Implementation in GSM/GPRS Network
By: Chaitya Shova Shakya
Supervisor: Assoc. Prof. Tapio J. Erke

Research Study: Code Acquisition in Optical CDMA Systems using a Novel Two-level Serial Search Algorithm
By: Md. Sohel Mahmud Sher
Supervisor: Dr. Poompat Saengudomlert

Research Study: Traffic Measurement at the Interface between a Fixed-line Network and Mobile Networks: A Case Study in Ho Chi Minh City, Vietnam
By: Pham Anh Tuan
Supervisor: Assoc. Prof. Tapio J. Erke

Sub-Optimal Chip-level Equalizer Combined with Parallel Interference Canceller for MIMO CDMA Downlink Channels
By: Pham Tran Tung
Supervisor: Dr. R.M.A.P. Rajatheva

Research Study: Traffic Demand of Different Subscriber Categories in a Fixed Network: A Case Study in Ho Chi Minh City, Vietnam
By: Huynh Tien Quoc Viet
Supervisor: Assoc. Prof. Tapio J. Erke

Multiple Transmitters for Performance Improvement of Downlink Indoor Optical Wireless Communications through Dispersive Channels
By: Supreeya Pakpinetch
Supervisor: Dr. Poompat Saengudomlert

Chapter 11: SET – TRANSPORTATION ENGINEERING FIELD OF STUDY

11.1 Introduction

Industrialization and population growth have tremendous impacts in the movement of people and goods. Everyday, movement is hampered by congestion, insufficiency of public transport facilities, traffic accidents, and other conditions. Moreover, as manufacturing expands globally, businesses want to reduce transportation costs by limiting the number of distribution nodes. Concerns over congestion on highways, increasing pollution and hazardous materials all emphasize the need to effectively maximize transportation systems. Thus, the issue of transportation is obviously crucial, not only now but in the future.

The **Transportation Engineering** field exposes students to the process of alleviating transportation problems. The coursework and research in the area provide advanced knowledge in transportation planning and economics, traffic engineering and safety, and the design of highways/pavements and other transportation facilities. Transportation Engineering students acquire advanced skills concerning the planning, design, operations, maintenance, rehabilitation, performance, and evaluation of transportation systems, including their economic and public policy aspects.

The field imbibes in each student the development of analytic, problem-solving, design, and management skills suitable for public and private sector professional work.

11.2 Faculty and Research Staff

Full-time Faculty

JOHN HUGH JONES, B.S., B.Eng.,
University of California, USA
Emeritus Professor
(Highway Engineering,

Transportation
Engineering)

YORDPHOL TANABORIBOON, PhD,
Virginia Polytechnic
University, MS, BS,
Oklahoma State
University; USA.

Professor (*Transportation
Planning, Traffic
Engineering, Public
Transportation Systems*)

[Road safety audit,
accident investigation and
reconstruction, application
of data mining in road
safety, road user
behaviors, database
development, disaster
management, and
sustainable development]

SHINYA HANAOKA, D Info Sc, M
Info Sc, BEng, Tohoku
University; Japan.

Assistant Professor

[Transport planning and
logistics; air transport,
which includes evaluation
of the air traffic distribution
policies in multiple-airport
region and the activity of
low-cost carriers in Asia;
transport logistics, which
includes city logistics,
intermodal logistics,
maritime transport, air
cargo and so on; Public
transport market and the
environmental impact of
transport, such as air
pollution and noise]

KUNNAWEE KANITPONG, PhD,
University of Wisconsin-
Madison; MS, University of
Maryland at College Park,
USA; BS, Chulalongkorn
University, Thailand.

Assistant Professor

[Highway pavements with
emphasis on several major
aspects including: highway
materials and construction,
pavement design and
analysis, pavement
management system,
asphalt rheology, and
asphalt concrete mixture
design]

Adjunct Faculty

TAKASHI NAKATSUJI, D. Eng., M.
Eng., B. Eng., Hokkaido
University; Japan.

Associate Professor

(Traffic Engineering,
Traffic Flow Simulation,
Winter Maintenance,
Traffic Accident
Reconstruction]

PRAPANSAK BURANAPRAPA, PhD,
Oklahoma State
University, USA, M. Eng.,
SEATO Graduate School
of Engineering;
B. Eng., Chulalongkorn
University; Thailand.

Adjunct Associate

Professor (Road and
Pavement Design;
Highway and Pavement
Engineering)

Research Staff

ANJALI KUMARI, M. Sc, B .Sc,
University of Bihar, India.
Research Assistant (Logistic
Management Project)

KRITSDA TANGKAVACHIRANON,
D.Eng., M. Eng.,
(Transportation
Engineering), Asian Institute
of Technology, Thailand; B.
Eng. (Civil Engineering), King
Mongkut's Institute of
Technology Thonburi,
Thailand.
Assistant Manager (TARC
Project)

MOINUL HOSSAIN, M. Eng.
(Transportation
Engineering), Asian Institute
of Technology, Thailand;
B.Sc.Eng. (Civil), Bangladesh
University of Engineering &
Technology, Dhaka,
Bangladesh.
Research Associate (TARC
Project)

MOUYID BIN ISLAM, M. Eng.
(Transportation
Engineering), Asian Institute
of Technology, Thailand;
B.Sc. Eng. (Civil),
Bangladesh University of

Engineering & Technology, Dhaka, Bangladesh. Research Associate (TARC Project)

NUTAPONG BOONTOB, M. Eng. (Transportation Engineering), Asian Institute of Technology; B. Eng. (Civil Engineering), King Mongkut's Institute of Technology Ladkrabang, Thailand. Research Associate (TARC Project)

PARAMET LUATHEP, M.Eng. (Transportation Engineering), Asian Institute of Technology; B.Eng. (Civil Engineering), King Mongkut's Institute of Technology Ladkrabang, Thailand. Research Associate (TARC Project)

PAWINEE IAMTRAKUL, Ph.D (Major in Urban and Transportation Planning, Civil Engineering), Saga University, Japan; M. Eng (Infrastructure and Transportation Engineering), Asian Institute of Technology, Thailand; B.Eng. (Civil Engineering), Thammasat University. Project Researcher (Road Safety Audit Project, CSUR Project and Fatigue Driving Project)

SATTRAWUT PONBOON, M. Eng. (Transportation Engineering), Asian Institute of Technology, Thailand; B.Eng. (Transportation Engineering), Suranaree University of Tech., Nakhon Ratchasima, Thailand. Research Associate (TARC Project)

SUPATTRA KACHATHONG, M.A. (Library and Information Science), Ramkhamhaeng University; B.A. (Communication Arts) Bangkok University. Research Associate (TARC Project)

YAOWARET JANTAKAT, M. Sc. (Transportation Engineering), Asian Institute of Technology,

Thailand; M.Sc.(Forestry), Kasetsart University, Thailand. Research Associate (TARC Project)

11.3 Completed Grant and Sponsored Research

Road Safety Audit Along the Chalong Rat and Burpha Withi Expressways

Project Description: This project, financed by the Expressway and Rapid Transit Authority of Thailand (ETA), is aimed to prevent the occurrences of accidents or reduce the severity of accidents taking place along the Chalong Rat and Burapha Withi Expressways by applying the concept of road safety audit which is a proactive tool for solving road accident problems.

Duration: 22 Aug 2005 to 30 Nov 2006
Investigator: Prof Yordphol Tanaboriboon, Dr. Shinya Hanaoka

Sponsor: The Expressway and Rapid Transit Authority of Thailand (ETA)
Total Contracted Amount: B 1,000,000

Road Safety Training

Duration: 1 June 2006 to 31 August 2006
Project Description: A training course on road safety-related topics will be provided to 14 participants from the Road Safety Network of Ho Chi Minh City, Vietnam

Project Investigator: Dr. Shinya Hanaoka
Sponsors: Handicap International in Vietnam

Total Contracted Amount (Baht): 302,974

Fatigue and Sleep Deprivation on Driving Performance

Duration: 1 April 2006 to 30 Nov 2006
Project Investigator: Prof. Yordphol Tanaboriboon, Dr. Kunawee Kanitpong

Sponsors: Department of Land Transport, Thailand

Total Contracted Amount (Baht): 600,000

11.4 Ongoing / In Progress Grant and Sponsored Research

Logistics Management at the Intermodal Terminals

Project Description: This project aims to find and determine the requirements for logistics management and to verify an optimum solution of performance at the intermodal freight terminal. It also intends to develop a framework for evaluating the logistics performance of mode choice. The research proposes fuzziness measurements which

address the real situation of human judgment with mathematical formulation. Fuzzy set theory is applied to develop a set of performance as basic indicators. Once the patterns of freight mode choice are determined, optimization model can find the optimal solution to maximize the performance indicator. Sensitivity analysis shows the changes which can influence the shift of mode choice. The results give insight in the relation with constraints of various parameters.

Duration: 1 Nov 2005 to 28 Feb 2007

Investigator: Dr Shinya Hanaoka

Sponsor: Royal Thai Government (RTG)

Total Contracted Amount: Baht 876,000

Thailand Accident Research Center

Project Description: The establishment of TARC is to conduct in-depth study in road safety. The task involves the at-scene investigation of the traffic accidents and database development for statistical analysis. Moreover, it focuses on the accident reconstruction to describe the events in sequences and the factors involved in these events. It aims to address to the road safety issues to promote the awareness of safety in the societies.

Duration: 1 July 2005 to 30 June 2007

Investigator: Dr. Kunawee Kanitpong

Sponsor: Department of Highways

Total Contracted Amount: B 14,000,000

11.5 Publications

Refereed Journals

Kanitpong, K., Cho, Dong-Woo, and Bahia, H.U. (2006), "Effect of Additives on Dynamic Modulus and Rutting Performance of Asphalt Mixtures," the International of Construction Materials, Vol. 159, issue 3, 2006, pp. 103-110

Kanitpong, K. and Bahia, H.U. (2006), "Evaluation of HMA Moisture Damage in Wisconsin as it Related to Pavement Performance," the International Journal of Pavement Engineering, (in press)

Conference Proceedings

Kanitpong, K., "Accident In-Depth Analysis: Accident Investigation and Reconstruction," the International Conference on Injury Prevention and Safe Community Development, Hanoi, Vietnam, October 2006

Kanitpong, K. and Bahia, H.U., "Evaluation and Correlation of Tensile Strength Ratio (TSR) and Performance of Asphalt Pavements in Wisconsin," The 10th International Conference on Asphalt Pavements, Quebec City, Canada, August 2006

Kanitpong, K. and Bahia, H.U., "Evaluation of HMA Moisture Damage in Wisconsin as it Related to Pavement Performance," The 85th Annual Meeting of the Transportation Research Board, Washington, D.C., January 2006

- Hanaoka, S.** and Husnain, T. (2006) "Evaluating the effectiveness of energy savings in intermodal freight transport in Thailand", Proceedings of the 11th International Conference of Hong Kong Society for Transportation Studies, pp.595-604.
- Qadir, F. M. and **Hanaoka, S.** (2006) "Determination of bus transit service quality in Bangkok from passengers' perspective", Proceedings of the 22nd ARRB Group Conference, Australian Road Research Board, CD-ROM.
- Qadir, F. M. and **Hanaoka, S.** (2006) "Bangkok bus users' expectations for an automatic vehicle location system", 13th ITS World Congress 2006, London.
- Hanaoka, S.**, Boontaveeyuwat, P. and Ishiguro, K. (2006) "Analysis of recent transition in port choice of post-panamax containerships in Asia", Proceedings of the International Association of Maritime Economists 2006 Conference, CD-ROM.
- Ishiguro, K., **Hanaoka, S.** and Inamura, H. (2006) "The impact of increase in containership size on the inter-regional and intra-regional trade", Proceedings of the International Association of Maritime Economists 2006 Conference, CD-ROM.
- Hanaoka, S.** and Husnain, T. (2006) "Measurement of energy savings effect by intermodal freight transport", Proceedings of Infrastructure Planning, No.33.
- Hanaoka, S.** (2006) "Evaluation of air traffic distribution in multiple airport region: Case of Osaka, Japan", 10th Air Transport Research Society World Conference 2006, Nagoya
- Kunadhamraks, P. and **Hanaoka, S.** (2006) "Evaluation of logistics performance for freight mode choice at an intermodal terminal", In Taniguchi, E. and Thompson, R.G. (eds.) Recent Advances in City Logistics: Proceedings of the 4th International Conference on City Logistics, pp.191-205, Elsevier.
- Qureshi, A.G. and **Hanaoka, S.** (2006) "Analysis of the effects of a cooperative delivery system in Bangkok", In Taniguchi, E. and Thompson, R.G. (eds.) Recent Advances in City Logistics: Proceedings of the 4th International Conference on City Logistics, pp.293-306, Elsevier.
- Kanitpong, K.**, Cho, Dong-Woo, and Bahia, H.U., "Evaluation of Effect of Additives on Performance of Asphalt Binders and Mixtures in Laboratory," The 2006 T&DI Airfield and Highway Pavements Conference, Atlanta, Georgia, April 2006 (under review)

Other Publications

- Nitivattananon, V. and **Hanaoka, S.** (2006) Sustainable infrastructure development, First Policy Consultation Forum of the Seoul Initiative on Green Growth: Promoting Sustainable Infrastructure Development, Seoul Initiative Network on Green Growth, pp.1-30.

Technical Reports

- Kanitpong, K.**, Schmitt, R., Bahia, H.U., Russell, J., and Crovetti, J., "Effect of Pavement Thickness on Superpave

- Mix Permeability and Density," WHRP 0092-02-14C, Wisconsin Highway Research Program (WHRP), Wisconsin Department of Transportation
- Kanitpong, K.** and Bahia, H.U., "Evaluation of the Extent of HMA Moisture Damage in Wisconsin as it Relates to Pavement Performance," WHRP 0092-01-03, Wisconsin Highway Research Program (WHRP), Wisconsin Department of Transportation

11.6 Doctoral Students' Dissertation

- Development of the GIS-based Traffic Accident Information System Integrating Police and Medical Data: A Case Study in Khon Kaen, Thailand*
By: Wichuda Kowtanapanich
Supervisor: Prof. Yordphol Tanaboriboon
- Computerized Work Zone Management System: A Decision Support Tool for Work Zone Planning and Safety Design in Thailand*
By: Suebpong Paisalwattana
Supervisor: Prof. Yordphol Tanaboriboon
- Evacuation Behavioral Analysis for Tsunami Disaster: Transportation Disaster Response*
By: Thai Charnkol
Supervisor: Dr. Shinya Hanaoka

11.7 Masters Students' Theses

- Evaluation of Rheological and Creep and Recovery Properties of AC 60/70 based Hydrated Lime and SBS Polymer Modified Asphalts to Rutting and Stripping Attributes of Asphalt Pavements in Cameroon*
By: Tebid Joshua Atud
Supervisor: Dr. Kunnawee Kanitpong
- Application of Data Mining in Road Safety*
By: Moinul Hossain
Supervisor: Prof. Yordphol Tanaboriboon
- Evaluating the Effectiveness of Energy Savings of the Intermodal Freight Transport in Thailand*
By: Taqsim Husnain
Supervisor: Dr. Shinya Hanaoka

- Correlation of the Resistance of HMA to Moisture Damage Measured by using Ultrasonic Test and Performance Related Test*

By: Md. Abu Hena Mostofa Kamal
Supervisor: Dr. Kunnawee Kanitpong

- Development of User Interface for Employee Busing Problem in Bangkok*
By: R.K. Jayanth Kumar
Supervisor: Dr. Shinya Hanaoka

- An Approach of Environmental Awareness for Travel Behavior Change: A Case Study of the Bangkok Bus Rapid Transit System*
By: Zeenara Najam
Supervisor: Dr. Shinya Hanaoka

- Determination of Passengers Perceptions and Effects of Bus Holding Strategy using an Automatic Vehicle Location System in Bangkok*

Fy: Sayyaz Mahmood Qadir
Supervisor: Dr. Shinya Hanaoka

- Impact of Traffic-Flow Control Policy on Air Quality: A System Dynamic Approach*
By: Mohammad Solim Ullah
Supervisor: Prof. Yordphol Tanaboriboon

- Analysis of Motorcycle Accidents in Khon Kaen*

By: Sukanya Havichit
Supervisor: Prof. Yordphol Tanaboriboon

- Application of Satellite Imagery Map for Black Spot Identification Along the Expressway Network in Bangkok*

By: Yaowaret Jantakat
Supervisor: Prof. Yordphol Tanaboriboon

- The Impact of Fatigue and Sleep Deprivation on Driving Performance*
By: Nantawan Tippayanate
Supervisor: Prof. Yordphol Tanaboriboon

- Development of Accident Database Management System for the Highway Police in Thailand*

By: Suriyan Winijmontree

Chapter 12: SET – WATER ENGINEERING AND MANAGEMENT FIELD OF STUDY

12.1 Introduction

Today's major challenges for water engineers and managers include securing water for people and for food production; protecting vital ecosystems; and dealing with variability and uncertainty of water in space and time.

The Water Engineering and Management (WEM) field imparts education and training toward an understanding of the complexity of water cycle utilization and management. It offers a balanced curriculum, covering both engineering and management aspects of water resources. Students are trained to acquire knowledge and hands-on practice in tools and techniques to come up with viable and sustainable solutions within the framework of the integrated water resources management at the river basin scale.

The WEM field of study covers five focal areas: *Agricultural Water*, *Coastal Water*, *Urban Water*, *Water Resources*, and *Extreme Events and Risk Management*. The courses are designed in such a way that students can specialize according to their interests. Courses on Watershed Hydrology, Hydrodynamics, Water Resources Systems, and Concepts in Water Modeling provide the solid foundation to the advanced courses. The curriculum emphasizes tools and techniques in water resources planning and management.

Agricultural Water courses impart knowledge and skills necessary for the development and management of water resources for agriculture. They address various multi-disciplinary issues in the planning, design, implementation, operation and maintenance of irrigation and drainage projects and land and water conservation programs. Current researches in the area

include irrigation and drainage system management, cropping systems, erosion and water quality problems, soil conservation and land-use, and watershed management.

The management and design of sound engineering works for the control and effective use of coastal zones require in-depth knowledge of hydrodynamics and the understanding of coastal zone phenomena. Coursework and research in Coastal Water cover studies of wave characteristics and their action on beaches, coastal sedimentation, estuarine hydraulics and the applied aspects of coastal zone engineering and management.

Urban Water courses relate to water supply and sanitation, storm water, and domestic wastewater and urban drainage for sustainable management of urban areas. The research in relation to urban water focuses on application of state-of-the-art theory in water demand forecasting and management, design and management of water distribution systems in urban and rural areas, real-time hydrological information systems for urban flooding and drainage.

Given the ever-growing importance of water quality, an integrated water quantity-quality approach is essential. Courses in Water Resources focus on techniques to assess the occurrence and availability of surface and groundwater. Students acquire a sound understanding of basic principles in river engineering and modeling, water resources planning, conjunctive use of surface and groundwater; integrated water resources management and social and environmental impact assessment of water resources projects. In-depth knowledge and hands-on practice on mathematical modeling of water resources systems is provided.

Flooding is a natural phenomenon and various human activities as well as climatic changes have aggravated the problem causing economic losses. Students are exposed to an understanding of the behavior of rivers, and to design appropriate structural and non-structural alternatives for the effective management of rivers and waterways. Research in the area of Extreme Events and Risk Management includes river flow analysis, and flood control and mitigation, flood modeling and forecasting, flood plain development and management.

12.2 Faculty and Research Staff

Full-time Faculty

ASHIM DAS GUPTA, BEng, Gauhati Univ, India; MEng, DEng, AIT, Thailand.

Professor

(Integrated Water Resources Management; Groundwater Development and management; Modeling and monitoring)

TAWATCHAI TINGSANCHALI, BEng, Chulalongkorn Univ, Thailand; MEng, DEng, AIT, Thailand.

Professor

[Flood Control Engineering and Management; Flood Forecasting, Warning and Flood Disaster Management; River Engineering and Hydropower; Water Resources Project System Optimization]

MUKAND S BABEL, BEng, Rajasthan Agr Univ, India; MEng, DEng, AIT.

Associate Professor

[From hydrologic and water resources modeling to integrated water resources management; particularly in watershed modeling and management; drought

analysis, forecasting and management; water resources allocation and management at river basin level; and water resources and socio-economic development; Research related to groundwater resources management and water supply system and management]

ROBERTO CLEMENTE, BSAE, Univ of the Philippines at Los Baños; MSc, AIT, Thailand; PhD, McGill Univ, Canada.
Associate Professor
[Focal areas related to irrigation/ drainage, and land and water resource assessment and management; Studies on the impacts of fertigation on water quality, modeling surface/subsurface transport of water and solutes, performance evaluation of irrigation and drainage systems, and assessment of soil erosion hazard and soil quality dynamics in agricultural watersheds; Joint research on water harvesting and management and soil hydraulic characterization in sloping agricultural lands; Future research focuses on evaluation and optimization of soil, water, chemical and crop management schemes to enhance agricultural productivity without jeopardizing environmental quality]

Visiting Faculty

HIROKAZU IKEDA, BEng, Dibrugarh Univ, India; MEng, AIT, Thailand; PhD, Univ of Tokyo, Japan.
Visiting Associate Professor

Affiliated Faculty

SUTAT WEESAKUL, DEng, MEng, Asian Institute of Technology; BEng, Chulalongkorn University, Thailand
[Numerical computation in sea and coastal area including flood propagation using developed computer

programs; Application in solving urban drainage problem using both engineering and management approaches; By collaboration with Dr. Ole Mark from DHI, the on-line urban flood warning system at Sukumvit , Bangkok , Thailand providing useful information in daily life during rainy season are disseminated in <http://www.wap.ait.ac.th>; Improvement of hydraulic design using physical hydraulic model test in hydropower; hydropower development projects in Lao and Myanmar and improvement in design of intake, diversion tunnel, riparian outlet, energy dissipater, spillway and head pond]

12.3 Completed Grant and Sponsored Research

12th Congress of the Asia and Pacific Division of IAHR

Project Description: The Water Engineering and Management (WEM) Field of Study of the School of Engineering and Technology (SET) serve as the secretariat of the APD-IAHR and from time to time organize congresses and conferences for the Asia and Pacific Region.

Duration: 13 Nov 2000 to 30 June 2006

Investigators: Prof Ashim Das Gupta
Dr Mukand Singh Babel

Sponsor: IAHR

Total Contracted Amount: Baht 2,579,383

An Assessment of Groundwater Vulnerability to Contamination and Estimation of Potential Areas Contributing Risk and Hazard to Groundwater in Chao Phraya River Basin by Numerical Modeling

Project Description: The scientific purposes of the project are to identify areas vulnerable to groundwater contamination, estimation of areas contributing risk and hazard to identified vulnerable areas. Pilot study is carried out for land and groundwater planning and management using integrated numerical modeling, characterization of the Chao Phraya Basin geological system and its effects on contamination transport.

Duration: 1 Oct 2004 to 31 March 2006

Investigator: Prof Ashim Das Gupta
Sponsor: Royal Thai Government
Total Contracted Amount: Baht 999,000

Collaborative Research in Water Resources and Environment Modeling

Project Description: The project involves the conduct of research activities in the area of water resources and environmental modeling by AIT in collaboration with UNU. The results of the research are disseminated through seminars and workshops. The specific areas for research involve: the development of methodologies and tools for water allocation in trans-boundary river basin; analyses of links between water resources management and socio-economic changes; development of appropriate methodologies for socio-economic vulnerability assessment for urban flood disaster risk management; and study of soil erosion and sediment transport in a large river basin. Under the project, UNU, through grants, supports a number of selected graduate students' research in above areas.

Duration: 1 Sept 2004 to 31 Aug 2006

Investigators: Dr Mukand Singh Babel
Prof Ashim Das Gupta
Sponsor: United Nation University, Tokyo, Japan

Total Contracted Amount: Baht 500,000

Hydraulic Model Study of Diversion Tunnel Nam Ngum 2 Hydroelectric

Project Description: The scope of the services consists of furnishing labor, equipment and materials as well as technical expertise for the physical model construction and hydraulic model tests of the diversion tunnels. The Hydraulic Model Tests will focus on study of the hydraulic conditions in the tunnel for the sub-critical and supercritical flow alternatives, study of overall diversion operation with emphasis in investigating the occurrence of waves at the surface, occlusion of air pockets and the critical transient state between both operation modes, study of tunnel inlet for free surface flow and pressure flow modes including the introduction of sill at the inlet and study of tunnel outlet under submerged operation due to backwater of Nam Ngum 1 and the variation of discharges to cover the non- submergence case.

Duration: 1 Sept 2005 to 31 Dec 2006

Investigator: Dr Sutat Weesakul
Sponsor: Team Engineering Consulting and Management Co.,Ltd.

Total Contracted Amount: B 3,132,193

Review and Investigation in Flood Drainage around Suwanna Bhumi Airport

Project Description: The research project involves the study on project feasibility study, design and implementation of flood drainage in the surrounding area of the Suwanna Bhumi International Airport (Second

Bangkok International Airport). The study also takes into account aspects on socio-economic impact assessment of the project and mitigation measures to the affected people and communities. Started since 2004, the project is required to continue its responsibility for the detail design and any further design modification as needed during the project construction until it is complete. The study is jointly carried out by three institutions namely AIT, Kasetsart University and Thammasat University in which AIT serves as the project team leader.

Duration: 1 Sept 2003 to 30 Sept 2006
Investigators: Prof Tawatchai Tingsanchali
Dr Noppadol Phien-wej

Sponsor: Royal Irrigation Department,
Thailand

Total Contracted Amount: B 2,727,250

The Study of Water Resources Management Review

Project Description: To review the present management of three river basins and to propose a new management tool using mathematical model and investigate the indice for WRE.

Duration: Jan 2006 to Dec 2006
Investigator: Dr Sutat Weesakul
Sponsor: Hydro and Agro Informatics
Institute

Total Contracted Amount: Baht 1,120,000

Water Quality Modeling in Tachin River

Project Description: The object of the project is to carry out real time water quality modeling of Tachin River and to have preliminary study of modeling of non-point source pollutant.

Duration: 1 June 2005 to May 2006
Investigator: Dr Sutat Weesakul
Sponsor: Hydro and Agro on
Formatics Institute

Total Contracted Amount: Baht 1,140,000

Water SPS, WRU/Vietnam Consultant for Course curriculum development on Irrigation Management at the Bachelors and Masteral Degrees levels

Contribution: 1 man month

Consultant: Dr. Roberto S. Clemente
Sponsor: Water Resource University (WRU),
Vietnam

JFK Integrated Disaster Mitigation

Project Description: The intensive program on "Integrated Disaster Mitigation" seeks to assist Thailand and other Asian countries recently affected by the devastating tsunami disaster in training their highly qualified human resources in how to prepare for and manage similar catastrophes when they occur in the future. The goal is to ensure that through training and education, this group of individuals gain better understanding of the breadth of issues related to natural

disaster mitigation and management.

Duration: 15 June 2006 to 31
December 2006

Investigator: Prof. Tawatchai
Tingsanchali

Sponsors : John F. Kennedy Foundation of
Thailand

Total Contracted Amount: Baht 500,000

12.4 Ongoing / In Progress Grant and Sponsored Research

Sustainable Water Management Policy under the Freshwater Resources Management Project

Project Description: The objective of the project is to propose integrated policy designs for sustainable water resources management with emphasis on groundwater resources in Bangkok and its vicinity. Groundwater use trends are analyzed and policies/measures for the sustainable management of groundwater resources in the study area are developed based on analysis of relevant secondary data on groundwater availability and use, piezometric levels, and land subsidence, which are obtained from concerned government agencies and various past studies/project reports. The input from groundwater users and managers, especially with respect to the recommendations for suitable policies and measures for improved groundwater management is obtained through the meetings with the stakeholders.

Duration: 1 Sept 2004 to 30 Sept 2007
Investigator: Dr Mukand Singh Babel
Sponsor: Institute for Global
Environmental Strategies,
Japan

Total Contracted Amount: Baht 1,700,000

UNEP Water Vulnerability Assessment in South and South East Asia

Project Description The objective of the project is to satisfy the needs of assessing water vulnerability to environmental change in key river and water basins in Asia, and to generate scientifically credible information to support sound decision and policy-making at local and national levels, with special attention to the needs of achieving relevant MDGs. The study will focus on water stress, water scarcity and water budget.

Duration 1 January 2006 to 31 July 2007
Investigator Prof. Ashim Das Gupta
Sponsors UNEP ROAP

Total Contracted Amount (Baht) 3,600,000

MTERM Conference

Project Description MTERM (Modeling Tools for Environment and Resources Management) International Conference was organized by Water Engineering and Management (WEM) Field of Study of School Of Engineering and Technology at AIT. The conference activities on

"Governance of Transboundary Waters", keynote addresses, oral presentations, poster presentations and industrial exhibitions. The main technical themes of the conference include, "Integrated Water Resources Management", "Modeling of Water Resources", "Water Quality Management and Modeling" and "Air Pollution Modeling".

Duration: January 2005 to December 2007

Investigators: Dr Mukand Singh Babel
Prof Ashim Das Gupta

Sponsor: MTERM Conference Participants

Total Contracted Amount: Baht 664,255

Development of Operation Flood Forecasting System Case Study: Chao Phraya River Basin

Project Description: The objective of the project is to develop a mathematical model for flood forecasting including rainfall forecasting and decision support system. The study area is Chao Phraya River Basin. On line data communication system will be installed at 3 locations along the river and linked with server at AIT.

Duration: 1 June 2004 to 7 June 2007

Investigator: Dr Sutat Weesakul

Sponsor: National Electronic and
Computer Technology Center
(NECTEC)

Total Contracted Amount: Baht 5,027,400

Experimental Investigation of Hyper-Concentrated Tsunami Run-up

Project Description: The project will involve an experiment of a new study of hyper-concentrated tsunami run-up. The result of experiment at Khao Luk, Phang-ga will be used to investigate how Tsunami have impacted to infrastructure on land and determine the preliminary measure to alleviate its impact.

Duration: 1 Nov 2005 to 30 June 2007

Investigator: Dr Sutat Weesakul
Sponsor: Royal Thai Government

Total Contracted Amount: Baht 875,000

Hydraulic Model Study on overflow Spillway for Nam Ngum 2 Hydroelectric: Spillway

Project Description: The scope of the services consists of furnishing labor, equipment and materials as well as technical expertise for the physical model construction and hydraulic model tests of the overflow spillway. The Hydraulic Model Tests will focus on studying the hydraulic condition of the ogee crest, chute, flow over flip bucket and capacity of weir (uncontrolled and controlled with the radial gates), suitable operation of both aerators and study downstream erosion in order to optimize the splitter design.

Duration: February 2006 to April 2007

Investigator: Dr Sutat Weesakul
Sponsor: Team Engineering Consulting and Management Co, Ltd
Total Contracted Amount: Baht 6,300,000

Development of river basin flood management system by optimal reservoir operation and real time flood forecasting and warning: A case study of Pasak River basin

Project Description To develop a river basin flood management system by optimal reservoir operation and real time flood forecasting and warning. The Pasak river basin in Thailand is selected as a case study for implementation. The results of the study would provide an optimal guideline for real time reservoir operation given forecast of rainfall and forecast of inflow into the Pasak reservoir. The software of computer system for operation of the Pasak reservoir will be checked and upgraded, additional software will be added to increase the efficiency and accuracy of the reservoir operation.

Duration: 1 August 2006 to 31 October 2007
Investigator: Prof. Tawatchai Tingsanchali
Sponsors: National Research Council of Thailand
Total Contracted Amount: Baht 2,000,000

An ecological approach to water and sanitation assessment and management in Panglao Island, Philippines

Project Description This research project will be conducted in Panglao Island, Bohol Province Philippines in collaboration with UP Diliman. The objective is to identify local practices that influence sanitation habits, preferences, and environmental impacts and then analyze and propose measures that can help alleviate poor health conditions and environmental degradation through improvement in water quality and sanitation.

Duration: 1 October 2006 to 31 July 2007
Investigator: Dr. Roberto S. Clemente
Sponsors: SEA-UEMA/CIDA
Total Contracted Amount: 15,000 \$

E-Learning Programme on Integrated Water Resource Management for Self Pay Student

Project Description The United Nations University Network on Water, Environment and Health (UNU-INWEH), in collaboration with the United Nations Department of Economic and Social Affairs (UNDESA) has developed a distance education programme on Integrated Water Resources Management (WEM) field of study of AIT. Under this programme, the self-pay students interested in learning IWRM will sponsor the tuition fee of the programme. International travel, accommodation and other related expenses will be borne by the students.

Duration: 1 Sept 2006 to 31 August 2008
Investigator: Dr. Mukand S. Babel
Sponsors: Self-pay students
Total Contracted Amount (Baht): 190,000

Workshop on Sediment Management in South and Southeast Asia

Project Description The workshop is organized within the framework of the International Sediment Initiative (ISI), UNESCO's International Hydrological Programme in association with AIT, IUCN Asia Water, UNESCO Jakarta Office, UNU, Mekong River Commission, and IRTCES. The discussions focus on watershed and channel processes and the socio-economic, environmental impacts of sedimentation in the region. The selected output of this workshop will be presented as a chapter on Sediment Management in Asia in the 3rd edition of the World Water Development Report (WWDR 3).

Duration: 1 April 2006 to 30 June 2007
Investigator: Dr. Mukand Singh Babel
Sponsors: UNESCO
Total Contracted Amount (Baht): 1,002,000

Hydraulic and Leakage Investigations in Pipe Networks for Water Supply Distribution in Bangkok

Project Description: The research project involves the investigation of leakage of water flow in pipes and the ways to reduce the amount of leakage in the water supply distribution network of Metropolitan Waterworks Authority of Bangkok and its suburban areas. The study involves the determination of flow and pressure distribution in the pipe networks by using field measurement and simulation models. Locations of possible pipe leakage and causes are identified and measures to stop or minimize leakage are recommended. The project is working in collaboration with other contractors that are employed by MWA to install pressure meters, flow meters and to replace old or leaking pipes and their connectors. The project is expected to provide improvement in the water supply distribution of Bangkok with significant reduction in water leakages.

Duration: 1 April 2005 to 31 July 2007
Investigator: Prof Tawatchai Tingsanchali
Sponsor: ISONET Co, Ltd, Thailand
Total Contracted Amount: B 1,400,002.71

Regional Network for Center of Excellence for Integrated River Basin Management in Asian Monsoon Region

Project Description: The regional network office is established in June 2005 at WEM in accordance to MOU between AIT and the University of Yamanashi (UY), Japan. The purpose of the center regional office is to coordinate and facilitate project collaboration between UY, AIT and

other local partners such as the Thai Government agencies. The center will focus its collaboration on integrated river basin management in the Asian Monsoon Region. Other activities of the center include exchange of faculty, staff and students. The center also provides scholarships for higher studies for doctoral programs at University of Yamanashi. The regional network office starts in June 2005 for an initial period of 1 year and has been extended for a period of 3 years.

Duration: 15 June 2005 to 31 March 2008
Investigator: Prof Tawatchai Tingsanchali
Sponsor: Yamanashi University
Total Contracted Amount: Baht 347,500

WVLC e-Learning Program on IWRM

Project Description The United Nations University Network on Water, Environment and Health (UNU-INWEH), in collaboration with the United Nations Department of Economic and Social Affairs (UNDESA) has developed a distance education programme on Integrated Water Resources Management (IWRM). A Regional Centre (RC) of The United Nations Water Virtual Learning Centre (WVLC) in South East Asia will be established at AIT under this programme. The principal purpose of WVLC RC is to improve water resource management and water services in developing countries and improve training and education in the water sector. The RC will offer the distance based curriculum in IWRM, identify regional and country needs in order to customize the curriculum, establish regional networks and train students, trainers and decision-makers. During the pilot phase, the WVLC RC will focus on the South East Asian region. The programme offers graduates an academic Diploma from the United Nations University.

Duration: January 2005 to October 2007
Investigators: Dr Mukand Singh Babel
Prof Ashim Das Gupta
Short-term Consultant: Dr Roberto Clemente
Sponsor: UNU-INWEH, Canada
Total Contracted Amount: US\$ 68,900

E-Learning Programme on Integrated Water Resource Management for UCC - Water

Project Description The United Nations University Network on Water, Environment and Health (UNU-INWEH), in collaboration with the United Nations Department of Economic and Social Affairs (UNDESA) has developed a distance education

programme on Integrated Water Resources Management (WEM) field of study of AIT. Under this programme, the Unep-Collaboration Center on Water and Environment (UCC-Water), Denmark, is sponsoring 5 participants from 4 different Southeast Asian countries in learning IWRM will sponsor the tuition fee of the programme. International travel, accommodation and other related expenses.

Duration 1 Sept 2006 to 31 August 2008

Investigator Dr. Mukand S. Babel

Sponsors UCC-Water

Total Contracted Amount (Baht) 1,242,500

12.5 Publications

Refereed Journals

- Desalegn, Ch. E., **M. S. Babel, A. Das Gupta**, B. A. Seleshi, and D. Merry (2006). "Farmers' Perception on Water Management under Drought Conditions in Awash River Basin, Ethiopia", *International Journal of Water Resources Development*, Vol. 22, No. 4, pp.589-602.
- Shrestha, S., M. S. Babel, A. Das Gupta, and F. Kazama (2006). "Evaluation of AnnAGNPS Model for a Watershed in the Siwalik Hills of Nepal", *Environmental Modeling and Software Journal*, Vol. 21, Issue 7, pp. 961-975.
- Ines, A., K. Honda, A. Das Gupta, P. Droogers, and R. Clemente (2006). Combining Remote Sensing – Simulation Modeling and Genetic Algorithm Optimization to Explore Water Management Options in Irrigated Agriculture. *Agricultural Water Management Journal*, Vol. 83, Issue 3, pp. 221-232.
- Babel, M.S., A. Das Gupta**, and P. Pradhan (2006). "Analysis of Domestic Water Use in Kathmandu Valley, Nepal, Accepted for publication in *Water Resources Management Journal* (in press)
- Babel, M. S., A. Das Gupta** and N. D. F. Sto. Domingo (2006). Land Subsidence: A Consequence of Groundwater Over-exploitation in Bangkok, Thailand, *International Review for Environmental Strategies*, Vol. 6, No. 2, pp. 307-328.
- Babel, M. S., A. Das Gupta** and N. D. F. Sto. Domingo (2006). Policy Analysis and Options for Improved Groundwater Resources Management in Bangkok, Thailand, *Regional Development Dialogue*, Vol. 27 (1), 108-129.
- Desalegn, Ch. E., **M. S. Babel, A. Das Gupta**, B. A. Seleshi, and D. Merry (2005). Farmers' Perception on Water Management Under Drought Conditions in Awash River Basin, Ethiopia, *International Journal of Water Resources Development*, 22 (4), 589-602.
- Halim, R., **Clemente**, R. Routray, J., and Shrestha, R. Integration of biophysical and socio-economic factors to assess soil erosion hazard in upper Kaligarang watershed, Indonesia. *Journal of Land Degradation and Development*, Published online July, 2006.
- S. Wahid, **M.S. Babel, A. Das Gupta and R. S. Clemente**. Spatial assessment of groundwater use potential for irrigation in Teesta Barrage Project in Bangladesh. Paper accepted for publication in *Hydrogeology Journal* Dec. 2006
- Rivas, A., **Clemente, R.**, Ranamukhaarachchi, S.L., **Das Gupta**, A., Zoebisch, M., Thevachandran, S., and De Silva M. Soil Hydraulic characterization Under Different Cropping Patterns in Sloping Agricultural Lands in the Highlands of Sri Lanka. Paper accepted for publication in *APJORD Journal* June 18, 2006
- KARIM, M.F. and **TINGSANCHALI, T.** (2006) A Nonlinear Coupled Numerical Model for the Investigation on Hydraulic Characteristics of a Composite Seawall, *Ocean Engineering*, Vol.33, Issue 5-6, pp. 773-787, Elsevier Publishing, Netherlands.
- TINGSANCHALI, T.** and BOONYASIRIKUL, T. (2006) "Stochastic Dynamic Programming with Risk Consideration for Transbasin Diversion System." *Journal of Water Resources Planning and Management*, ASCE, Vol.132, Issue 2, pp.111-121, New York, U.S.A.
- WANDEE, P., SCHULTZ, B. AND **TINGSANCHALI, T.** (2006) "Optimization of Water Management in Urban Polders Case Studies of the Netherlands and Thailand", *International Journal of Lowland Technology*, Vol.8, Issue 1, Japan, June, pp.11-20.

Referred Books/Chapters

- TINGSANCHALI, T.**, REWTRAKULPAIBOON, L. and SUPHARATID, S. (2006) "Institutional Arrangement for Flood Disaster Management in Thailand", a Chapter, Wan-Chuchat Memorial Book, published by Alumni Association of Irrigation Development Institute, Royal Irrigation Department, Thailand, pp.29-45 (in Thai).
- KARIM, M. F., **TINGSANCHALI, T.** and JENG, D. S. (in press 2006) Wave Transformation in Porous Structure and Hydraulic Performances of a Composite Seawall, a Chapter, *Ocean Engineering Research Advances*, Edited by F. Columbus, Nova Science Publishers, Inc., New York, U.S.A.

Conference Proceedings

- Das Gupta, A.** (2006), "Implication of Environmental Flows in River Basin Management", Proceedings, International Workshop on Integrated River Basin Management under a Changing World, Kyoto University, Kyoto, Japan, March 27.
- Das Gupta, A** (2006), "Urban Water Management: Issues, Challenges and Opportunities", Proceedings, 7th

International Conference on Hydroinformatics 2006, Acropolis, Nice, France, September 4-8.

Sharma, D., **A. Das Gupta, and M.S. Babel** (2006), "Trends in Extreme Rainfall and Temperature Indices for Two River Basins of Thailand", Proceedings, 3rd Asia and Pacific Hydrology and Water Resources Conference, Bangkok, Thailand, October 16-18.

Wahid, S. Md., **M.S. Babel, A. Das Gupta and R. S. Clemente** (2006). From Flood Control to Sustainable Development: Fifty Years of Water Resources Planning in Bangladesh, Proceedings of the International Conference on Hydrology in Asia, Guangzhou, China, 08-10 June.

Pinthong P., **Das Gupta A., and Weesakul S.** (2006) "Integrated Genetic-Neurofuzzy Modeling for Daily Reservoir Inflow forecasting" 11th National Convention on Civil Engineering, Phuket, April

Chonwattana S., **Weesakul S.** and Vongvisessomjai S. (2006) "3D Numerical Modeling of Morphological Change between Fishtail groins", 30th International Conference on Coastal Engineering, San Diego

Weesakul S., Weesakul U., Padugsorn C. and Thaicharoen C. (2006) "Study of Shoreline Change in Southern Thailand", Workshop on Sediment Management in South and Southeast Asia, AIT, 24-25 April, 9p.

Weesakul U., **Weesakul S.** and Samapithak S. (2006) "Time Distribution Pattern of Rainfall in 1 day in Bangkok Area", 11th National Convention on Civil Engineering, Phuket, April

Pinthong P., **Das Gupta A., and Weesakul S.** (2006) "Integrated Genetic-Neurofuzzy Modeling for Daily Reservoir Inflow forecasting" 11th National Convention on Civil Engineering, Phuket, April

TINGSANCHALI, T. (2006) "Impacts of 2004 Tsunami on Water Disaster Management", Proceedings, *Tsunami Seminar on The Potential Impacts of Tsunami to Industries along South Coast of Java and West Coast of Sumatra*, University of Indonesia, Jakarta, Indonesia, January, 29p.

TINGSANCHALI, T., KHAMGLUD, C. and PRAJAMWONG, S. (2006) "Process in Solving Flood Problems Due to Second Bangkok International Airport and Its Impacts on Way of Life of People in a Community", *International Conference on Urban Flood: Experiences for Sustainable Development*, Center for Urban and Community Development, Vietnam National University, Ho Chi Minh City, Vietnam, pp.39-50, March.

TINGSANCHALI, T., and VONGVISESSOMJAI, N. (2006) "Computation of flow hydraulics in Samut Prakarn waste

- water collecting system, Thailand" Proceedings, 7th International Conference on Urban Drainage Modeling and Water Sensitive Urban Design 2006, Melbourne, Australia, April, 8p.
- TINGSANCHALI, T.** and DINH C.S. (2006) "Channel Forming Discharge and Channel morphology of the Lower Mekong River, Vietnam", Proceedings, UNESCO-AIT Workshop on Sediment Management in South and South-east Asia, Asian Institute of Technology, Pathumthani, Thailand, April, 7p.
- UZAIR, M.** and **TINGSANCHALI, T.** (2006) "Experimental investigation of GSTAR3 in Open Channel" Proceedings, UNESCO-AIT Workshop on Sediment Management in South and South-east Asia, Asian Institute of Technology, Pathumthani, Thailand, April, 10p.
- BANCHUEN, S., TINGSANCHALI, T.,** and **CHINNARASRI, C.,** (2006) "Comparison between GSTARS 2.1 and HEC 6 River Morphological Models", Proceedings, 7th International Conference on Hydroinformatics, HIC 2006, Nice, France, September, 8p.
- TINGSANCHALI, T.** and **NOOR M.H.,** (2006) "Prediction of flooding and economical losses due to assumed breaching of raised Mangla dam, Pakistan" Proceedings, International Symposium on Lowland Technology, ISLT 2006, Saga, Japan, September, pp.427-432.
- TINGSANCHALI, T.,** **KHAMEGLUD, C.** and **PRAJAMWONG, S.** (2006) "Process in Solving Flood Problems Due to Second Bangkok International Airport and Its Impacts on Way of Life of People in a Community", Proceedings, International Conference On Urban Flood: Experiences For Sustainable Development, Ho Chi Minh City, Vietnam, March, 11p.
- TINGSANCHALI, T.** and **VONGVISSESOMJAI, N.** (2006) Computation of flow hydraulics in Samut Prakarn waste water collecting system, Thailand, Proceedings, International Conference on Urban Drainage Modeling, Melbourne, Australia, April, 8p (in CD ROM).
- TINGSANCHALI, T.** and **Nguyen, S.H.** (2006) Development of Flood Simulation and Inundation Model for Vu Gia-Thu Bon River Basin, Central Vietnam , Proceedings, 3rd APHW Conference on Wise Water Resources Management Towards Sustainable Growth and Poverty Reduction, Bangkok, Thailand , October, 8p (in CD ROM).
- TINGSANCHALI, T.** and **Nguyen, T.P.M.** (2006) Parameter Estimation and Calibration of Two Conceptual Hydrological Models in Upper La Nga Basin, Vietnam, Proceedings, 3rd APHW Conference on Wise Water Resources Management Towards Sustainable Growth and Poverty Reduction, Bangkok, Thailand , October, 8p (in CD ROM).
- TINGSANCHALI, T.** and **QING, X** (2006) **Simulation of Flow and River Cross-Sectional Changes of Mekong River at Nong Khai, Thailand, International Conference on Mekong Research for the People of the Mekong, Chiang Rai, Thailand, October, pp.191-198.**
- TINGSANCHALI, T.** and **KHAN, N.M.** (2006) Combating Reservoir Sedimentation: A Challenge for Sustainability, IHP-UNESCO International Symposium on Managing Water Supply for Growing Demand, Bangkok, October, pp.169-178.
- TINGSANCHALI, T.** and **KEOKHUMCHENG, Y.** (2006) Flood Damage Functions for Surrounding Area of Second Bangkok International Airport, Proceedings, International Symposium on Urban Safety of Mega Cities in Asia, Phuket, Thailand, November, pp. 291-300.
- TINGSANCHALI, T.** (2006) Floods and Their Social and Environmental Impacts in the Surrounding Area of the Suvarnabhumi-Second Bangkok International Airport", Proceedings, 8th International Symposium Towards Harmonious Coexistence within Human and Ecological Community on this Planet, Organized by University of Kyoto, Held at Bangkok, Thailand, November, pp.68-71.
- Halim, R., Clemente, R.** Routray, J. and Shrestha, R. 2006 Development of an Erosion Hazard Index for upper Kaligarang Watershed, Indonesia, based on Biophysical and Socio-economic Indicators. Proceedings 3rd APHW Conference, Oct. 16-18, 2006 Bangkok Thailand.
- R.S. Clemente** and **Wahid, S.** Simulation of surface/subsurface transport of water and solutes under different agroecological conditions and practices. Paper accepted for PSAE Conference, Butuan City Philippines April 17-21, 2006
- Other Publication**
- TINGSANCHALI, T.** (2006) "Hydraulic and Leakage Investigation in Pipe Network for Water Supply Distribution in Bangkok", Progress Reports 1-6, Submitted to ISONET Co. Ltd., Thailand
- TINGSANCHALI, T.** (2006) Development of River Basin Flood Management System by Optimal Reservoir Operation and Real Time Flood Forecasting and Warning: A Case Study of Pasak River Basin, Progress Reports 1 and 2 , submitted to National Research Council of Thailand.
- TINGSANCHALI, T.** and **HONDA, K.** (2006) JFK Training Course on Integrated Disaster Management, Draft Final Report, to be submitted to the JFK Foundation, Bangkok, Thailand.
- TINGSANCHALI, T.** (2006) "Management of Hydropower", Lecture Note, for Course CE74.83, School of Engineering and Technology, Asian Institute of Technology, Thailand.
- TINGSANCHALI, T.** (2006) "Evaluation and Comment on the Achievement by DPRI Kyoto University's 21st COE Program on Natural Disaster Science and International Disaster Reduction Initiatives", submitted to DPRI University of Kyoto, Japan, December.

12.6 Doctoral Students' Dissertation

Somchai Chonwattana

Morphological Modeling of Seashore with the Existence of Fishtail Groins
Prof. Ashim Das Gupta/Dr. Sutat Weesakul

Watchara Suiadee

An Integrated Approach for Real-time Weekly Optimal Water Operation of an Irrigation Project: A Case Study for Nam Oon Irrigation Project, Thailand
Prof. Tawatthai Tingsanchali

12.7 Masters Students' Theses and Research Studies

Hydrologic Prediction in Selected Un-Gauged Basins

By Jakkrit Miyai

Supervisor: Dr. Mukand Singh Babel

Prof. Ashim Das Gupta (co-chair)

Daily Forecasting of Flood Conditions in Pasak River Basin, Thailand

By Nuttapon Sittikarn

Supervisor: Prof. Tawatthai Tingsanchali

Flood Modeling for the Va Gia-Thu Bon River Central Vietnam

By Nguyen Hoang Son

Supervisor: Prof. Tawatthai Tingsanchali

Assessment of Water Resources

Namanagement From Socio-Economic

Perspective: A Case Study of Bangladesh

By Sudip Kumar Pal

Supervisor: Dr. Mukand Singh Babel

Prof. Ashim Das Gupta

Optimizing Water Use and Benefit in Song Chu Irrigation Project, Vietnam

By Nguyen Huu Ha

Supervisor: Prof. Tawatthai Tingsanchali

Dr. Roterto Clemente

Effect of District Meeting Area on Residual

Chloride: A Case Study in Bangkok Noi

Water Supply System

By Krit Laohapibooirattana

Supervisor: Prof. Tawatthai

Tingsanchali

Application of Regionalization Method in

Transferring Parameters from Gauged to

Ungauged Basin, Vietnam

By Nguyen Thi Phuong Mai

Supervisor: Prof. Tawatthai Tingsanchali

Assessment of Flood Control Alternatives
for Dong Thap Muoi Region, South
Vietnam
By Ngo Van Quang
Supervisor: Prof. Ashim Das Gupta
Dr. Mukand Singh Babel

Application of a Local Area Model for
Rainfall Forecasting in Bhutan
By Thinley Choden
Supervisor: Dr. Mukand Singh Babel
Prof. Ashim Das Gupta

A Study on Flow Hydraulics and Sediment
Transport of the Proposed Kra Navigation
Cannal Connecting the Andaman Sea
and the Gulf of Thailand
By Chadin Chutachinadadate
Supervisor: Prof Tawatchai Tingsanchali

Analysis of Rainfall Pattern for Urban
Drainage Design
By Wiwat Charoensukrungruang
Supervisor: Dr. Roterto Clemente
Dr. Sutat Weesakul

Environmental and Economic Perspective
of Lower Chao Phraya River Basin
By Niranjan Man Tamrakar
Supervisor: Prof. Ashim Das Gupta
Dr. Mukand Singh Babel

Analysis of the Flow Regime of The Mekong
River and Its Environmental Consequences
By Mylevaganam Sivarajah
Supervisor: Prof. Ashim Das Gupta
Dr. Mukand Singh Babel

Modeling and Management of Watershed
Quality: Bangmati River Basin, Nepal
By Nisha Budhathoki
Supervisor: Dr. Mukand Singh Babel
Prof. Ashim Das Gupta

Study of The Existing Water Supply System
of Kathmundo Valley, Nepal
By Anil Acharya
Supervisor: Dr. Mukand Singh Babel

Chapter 13: SET- INFORMATION AND COMMUNICATIONS TECHNOLOGIES AREA OF STUDY

13.1 Introduction

Information and Communications Technologies field is a newly established area of study in response to the needs for the offering of a curriculum selectively drawn from the curricula of Telecommunications (TC), Computer Science, and Information Management (CSIM). With strong emphasis on communications aspects - rather than on the aggregation of hardware, software, networks, equipment and related industries - ICT recognizes the important role of information services and applications in the creation of a complete ICT infrastructure.

13.2 Research Facilities and Laboratories

There is a rapidly growing and constantly evolving interest in ICT throughout the academia and society. To support this, the evolution and the benefits of ICT in our lives, the ICT field of study at AIT continues to research and develop of ICT. The field of study covers a wide variety of research supported by the body of faculty consisting of a multi-professional team of international experts in telecommunication, computer science, educational technology and related fields.

The faculty has a strong academic background ranging from wireless and optical networks, through hardware and software, to web education and other e-services.

Research subjects include those on ICT applications (e-services such as e-learning, e-health, e-governance, rural development, knowledge creation and knowledge dissemination); on the information technologies (e.g. operating systems, programming languages, information storage and retrieval); on the communication infrastructure (e.g. networks, transmission technologies,

switching and routing). Research specializations are in adaptive technologies; computer-supported collaboration; Home networking; ICT security; Online communities; and voice over IP.

The ICT area of study shares the research facilities and laboratories of the Telecommunications field of study.

13.3 Faculty and Research Staff

The ICT Field of Study draws from the faculty and research staff of the Computer Science, Information Management, Remote Sensing & Geographic Information Systems, and Telecommunications Fields of Study.

Faculty Members

From Telecommunications Field of Study

A B SHARMA
BSc, Univ of Newcastle-upon Tyne, UK; LicTech, DTech, Helsinki Univ of Tech, Finland.

KAZI MOHIUDDIN AHMED
Professor. MSc, Inst of Communications, Leningrad, USSR; PhD, Univ of Newcastle, Australia.

R M A P RAJATHEVA
Associate Professor BSc, Moratuwa Univ, Sri Lanka; MSc, PhD, Univ of Manitoba, Canada.
ICT-Joint Coordinator

TEERAPAT SANGUANKOTCHAKORN
Associate Professor, BEng, Chulalongkorn Univ, Thailand; MEng, DEng, Tokyo Institute of Technology, Japan.

POOMPAT SAENGUDOMLERT
Assistant Professor, BSE, Princeton Univ; MS, PhD, Massachusetts Inst of Tech, USA

From ICT Field of Study

ERKE TAPIO
Associate Professor, M.Eng., Helsinki University of Technology, Finland

KURHILA JAAKO
Assistant Professor, Ph.D., M.Sc., Helsinki, Finland

KOVALAINEN, MIKKO
Ph.D., M.Econ., University of Jyväskylä, Finland

From Computer Science, Information Management Field of Study

DUNG, PHAN MINH
Professor, Ph.D., M.Sc., University of Technology, Germany

HADDAWY, PETER
Professor. Ph.D., M.Sc., University of Illinois-Urbana

KANCHANASUT, KANCHANA
Professor, Ph.D., M.Sc., University of Melbourne

WUWONGSE, VILAS
Professor, D.Eng., M.Eng., Tokyo Institute of Technology

GUHA, SUMANTA
Associate Professor & Joint Coordinator, Ph.D., Indian Statistical Institute, M.Sc., Ph.D., University of Michigan, M.Sc., University of Calcutta
ICT-Joint Coordinator

ESICHAIKUL, VATCHARAPORN
Associate Professor, Ph.D., Kent State University, M.B.A., Oklahoma State University

JANECECEK, PAUL
Assistant Professor, Ph.D., Swiss Federal Institute of

Technology, Advanced
M.Sc., Queen Mary and
Westfield College, University
of London

*Beamforming using Tapped Delay Line
Filters for Broadband CDMA Systems*
By: Md. Anwar Hossain
Supervisor: Dr. Poompat Saengudomlert

*Research Study:
Wireless Sensor Network for Forest
Resources Protection: A Case Study of
Bago Yoma, Myanmar*
By: Kyaw Kyaw Tun
Supervisor: Prof. Kazi Mohiudin
Ahmed

DAILEY, MATTHEW N.
Assistant Professor, Ph.D.,
University of California, San
Diego
M.Sc., North Carolina State
University

*A Collaborative Intrusion Detection
System for Mobile Ad Hoc Networks using
Bayesian Method*
By: Abul Hasanat Md. Rezaul Karim

Supervisor: Dr. R.M.A.P. Rajatheva

*Group Management Mechanisms for the
E-Learning Design using Peer-to-Peer
Technologies*
By: Surya Bahadur Kathayat
Supervisor: Dr. R.M.A.P. Rajatheva

**From Remote Sensing &
Geographic Information Systems
Field of Study**

NITIN KUMAR TRIPATHI
Assistant Professor, BTech,
National Institute of
Technology, Warangal, India;
MTech, IIT; PhD, IIT, Kanpur,
India.

*Research Study:
Security System for Health Care Network
Built on WIMAX Technology*
By: Yadanar Kyaw
Supervisor: Prof. Kazi Mohiudin Ahmed

*Research Study:
Strategies for E-Learning Infrastructure in
Developing Countries: A Case Study in
Shan State Myanmar*
By: Thazin Lwin
Supervisor: Prof. Kazi Mohiudin Ahmed

XIAOYONG CHEN
Associate Professor BS, MS,
PhD, Wuhan Technical Univ of
Survey and Mapping,
People's Republic of China.
ICT-Joint Coordinator

*Cascade of Distributed and Cooperating
Firewalls in Multiple Entry Environment*
By: Mayank Mudgal
Supervisor: Dr. R.M.A.P. Rajatheva

*Using Knowledge Structures to Analyze
and Communicate Dynamic Web
Contents*
By: Cheryl Medianero Natividad
Supervisor: Dr. Paul Janecek

KIYOSHI HONDA
Associate Professor BAg,
DEng, Tokyo Univ, Japan

*Call Admission Control for High Speed
Downlink Packet Access (HSDPA)*
By: Umesh Phuyal
Supervisor: Prof. Kazi Mohiudin Ahmed

Research Staff

Manzul Kumar Hazarika,
Senior Research and
Training Specialist
Mikko Kovalainen, Visiting
Senior Researcher
Surat Lertlum, Research
Scientist
Lal Samarakoon, Visiting
Senior Scientist
Marc Souris, Visiting
Research Scientist

*The Design and Implementation of QoS
Aware Web Server*
By: Wuttiphong Preechapanyakul
Supervisor: Prof. Kanchana Kanchanasut

*A TD-SCDMA MAC Protocol for Wireless
Sensor Network for Mitigation of Hazards in
Riverine Transport System*
By: Md. Abdur Rahman
Supervisor: Prof. Kazi Mohiudin Ahmed

*A Framework for Learning Object
Management using Semantic Blogs*
By: Sachit Rajbhandari
Supervisor: Prof. Vilas Wuwongse

**13.4 Masters Students'
Theses and
Research Studies**

*Developing an On-Line Community for
(ACCOLADE): Motivating Contribution
and Participation*
By: Valia Ganeste
Supervisor: Dr. Jaakko Kurkhila

*Research Study:
Integrating GIS Data and Documents in
Plone CMS: A Case Study with APDIP
Projects*
By: Nipat Rojratavanavich
Supervisor: Dr. Paul Janecek

IPv4 & IPv6 Integration: Tunnel Broker
By: Thomas Riche
Supervisor: Prof. Kanchana Kanchanasut
*Trust Management for Electronic
Commerce*
By: Sangya Amatya
Supervisor: Prof. Phan Minh Dung

*A Semantic Blogging Framework for Better
Utilization of Information*
By: Aman Shakya
Supervisor: Prof. Vilas Wuwongse

*Interactive Graph Visualization for
Accessing Web Content*
By: Bhavana Sherchand
Supervisor: Dr. Paul Janecek

Chapter 14: SCHOOL OF ENVIRONMENT, RESOURCES AND DEVELOPMENT

14.1 Mission, Vision, and Core Values

SERD Mission

The School of Environment, Resources and Development is committed to excellence in graduate education as well as research and outreach activities. Through its academic programs and outreach units, SERD has been working towards capacity building and human resource development in the areas of resource management, development studies, and energy and environmental management.

SERD responds to regional needs by mobilizing and enhancing capacities for socially, economically and environmentally sound development in partnerships with public and private sectors. The School's interdisciplinary approach integrates technological, natural and social sciences.

SERD Vision

SERD will continue its leadership role in offering excellent academic programs relevant to regional needs.

SERD research will be concentrated toward focal areas and are to be conducted by core teams.

SERD outreach will be community service-oriented.

SERD Programs will be consolidated and financially viable. The School activities including the students, staff, faculty and curricula, will be subject to quality assessment.

SERD Core Values

Interdisciplinarity
Innovativeness
Excellence
Responsiveness

14.2 Fields of Study and Multidisciplinary Programs

Fields of Study

- Agricultural Systems and Engineering
- Aquaculture and Aquatic Resources Management
- Energy
- Environmental Engineering and Management
- Food Engineering and Bioprocess Technology
- Gender and Development Studies
- Natural Resources Management
- Pulp and Paper Technology
- Regional and Rural Development Planning
- Urban Environmental Management

Inter-university Program

Environmental Toxicology, Technology and Management

Interdisciplinary Programs

Cleaner Production Integrated Tropical Coastal Zone Management Sustainable

Development

Disaster Prevention, Mitigation and Management

14.3 Research Facilities and Laboratories

SERD Laboratories and Computer/Information Technology Facilities

SERD provides laboratory, computer and information technology (IT) facilities for education and learning for graduate students, and research activities of graduate students, faculty, and sponsored and contracted projects.

SERD has six research laboratories in Agricultural Systems and Engineering, Aquaculture and Aquatic Resources Management, Food Engineering and Bio-process Technology, Environmental Engineering and Management, Energy, and Pulp and Paper Technology, and each laboratory is unique with modern equipments, excellent guidance and assistance, and provides safe working facilities and environments to carry out experimental studies and research.

IT facilities are provided for everyone to attend their academic and research related activities. There are three computer centers maintained by the SERD at the SERD Main building (two computer laboratories), Agriculture and Food Engineering building and Energy Building which provides convenient working environment, with all the necessary facilities. These are open twenty four hours a day for use by students, staff and faculty. Full internet access is available to these PCs through a high speed network backbone which connects all academic buildings including the residence halls. A large number of PC software packages for applications such as word-processing, spreadsheets, network communications, multimedia and file transfer utilities are available. High quality laser

printers, scanning and CD writing facilities are available for students' uses.

Furthermore, laboratories also have computer facilities, which enhance the productivity of the teaching and research activities of the school.

14.4 School Governance

Dean of School

SIVANAPPAN KUMAR, BE, Univ of Madras, India; MEng, AIT, Thailand; PhD, Inst Natl Polytechnique, Toulouse, France.

Professor

[Solar Energy (Radiation, Thermal and Photovoltaics); Green house gas mitigation and climate change, Cleaner Production; energy and sustainable development]

Associate Dean

KYOKO KUSAKABE, BA, Sophia Univ, Tokyo, Japan; MSc, PhD, AIT, Thailand.

Associate Professor

[Women's employment under macro-economic changes; Gender issues in trade and migration; Women and micro-vendors/ informal sector; Borderland studies, Gender issues in organizations, Gender and development policy and planning;

Chapter 15: SERD – AGRICULTURAL SYSTEMS AND ENGINEERING FIELD OF STUDY

15.1 Introduction

This field of study emphasizes on sustainable agricultural and related technologies development through holistic approach for efficient food production from small holder agriculture.

15.2 Research Facilities and Laboratories

Agricultural Systems and Engineering (ASE) Laboratory caters to researchers, which address sustainability in agricultural production. The facilities are capable for implementing excellent agronomic and engineering researches on soils, water and plant, such as, plant growth, soil fertility and management, integrated pest management, plant water requirement, etc. Facilities to conduct researches on terramechanics, ergonomics and tillage are also available. The engineering aspects of agricultural production are dealt with through innovations and development of machines and equipment to enhance productivity and reduce human drudgery. These innovations are constructed at the ASE workshop.

Major laboratory equipment include a Soil bin carriage system; Porometer; Sony CXC-390 1/3" 3 CCD Camera; Spider 8; data logger; Dynamic strain amplifier; and an SC-900 Soil compaction meter.

The SERD Computer Lab III in the Agricultural and Food Engineering Building has various kinds of software packages for system analysis and simulation, including DSSAT (Decision Support System for Agro-technology Transfer), ArcView etc. A Computer-Aided Design (CAD) workstation is also available for training the design of agricultural equipment. There

is a machine workshop with facilities for fabricating various types of laboratory and experimental apparatus and models. Consultation and fabrication of different types of transducers can be provided. About 20 high-end PCs connected to the campus-wide Ethernet and ATM network and a high quality laser printer, scanning and CD writing facilities are available for students' uses.

15.3 Faculty and Research Staff

Full-time Faculty

VILAS M SALOKHE, BTech, Mahatma Phule Agricultural Univ., India; MEng, Univ of Sukhdia, India; DEng, AIT, Thailand.

Professor (*Agricultural Machinery; Ergonomics; Protected Cultivation & Greenhouse Technology; Terramechanics, Agricultural Systems Analysis*)

In 2006, he developed unified Bachelor-Masters program with Shivaji University, India; and developed unified Bachelor-Masters program with Singhania University, India

[Terramechanics, Tillage and Traction; Design and Development of Agricultural Machines, Ergonomics, Applied Instrumentation; Controlled Environment Agriculture; Biomimetics; Agricultural Automation and Mechanized Farming; Low-cost Site-specific Technology]

S L RANAMUKHAARACHCHI, BSc, Univ of Peradeniya, Sri Lanka; MSc, PhD, Pennsylvania State Univ, USA.

Associate Professor (*Agronomy; Crop Ecophysiology; Cropping*

Systems; Farming Systems; Pest Management; Soil Fertility Management; Agricultural Systems; Weed Science and Management)

[Cropping Systems Research & development; Farming Systems Research & development; Crop Physiology; Stress Physiology; Agronomic Research - weed science, soil fertility management; Integrated Pest Management; Organic Farming; Watershed Development Management Research]

GANESH P SHIVAKOTI, BS, MS, Udaipur Univ, India; PhD, Michigan State Univ, USA.

Associate Professor (*agricultural economics; resource development; farming systems*)

HEMANTHA P W JAYASURIYA, BScEng, Univ of Peradeniya, Sri Lanka; MEng, DEng, AIT, Thailand.

Assistant Professor (*Agricultural Systems Analysis; Design and Development of Agricultural and Processing Equipment; Instrumentation and data acquisition systems; Power and Energy in Agriculture; Precision Agriculture; Controlled Environment Agriculture; Soil-Tool Interactions; Terramechanics; Agricultural Engineering; Measurement Techniques*) [Design and Development of Agricultural and Processing Equipment; Precision Agriculture; Controlled Environment Agriculture; Power and Energy in Agriculture; Agricultural Systems Analysis; Soil-Tool Interactions; Terramechanics]

Visiting Faculty

PETER AUN-CHUAN OOI, PhD
Adjunct Lecturer (*crop protection, integrated pest management; agricultural systems*)

Research Staff

EMMANUEL C CANILLAS, DEng
Senior Laboratory Supervisor (*supervises instrumentation and data acquisition; calibration and testing of agricultural equipment; soil testing and other laboratory sessions*)

WATTANAPORN MESKUNTAVON, DTechSc
Senior Laboratory Supervisor (*manages researches on farm and crop management and other laboratory sessions including soil analysis*)

JOHANNES MAX, Dip-Ing
Project staff (*plant nutrition, root-research, protected cultivation, horticulture*)

PRABHAT KUMAR, Dip-Ing
Project staff (*entomology and integrated pest management*)

LIANG HENGTONG, MEng
Project staff (*food and bioprocess engineering*)

15.4 Completed Grant and Sponsored Research

Asian Irrigation Institutions and Systems (AIIS) Dynamics study and Database Management
Duration: Sept 2003 to Dec 2006
Investigators: Wai Fung Lam
Dr Ganesh Shivakoti
Sponsor: Government of Hong Kong Grant to University of Hong Kong
Total Contracted Amount: US \$ 110,000

Development, Land Use Change, and Forest Conservation in Tua Thien Hue Province, Vietnam
Duration: June 2003 to December 2006
Investigators: Dr Edward Webb
Ganesh Shivakoti
Sponsor: MacArthur Grant
Total Contracted Amount: US \$ 230,000

Professional enhancement and curriculum development to strengthen its new Master's degree program in integrated natural resources management and development

Duration: August 2003 to December 2006
Investigator: Dr Ganesh Shivakoti
Sponsor: Ford Foundation Grant to

Andalas University, Indonesia

Total Contracted Amount: US \$ 180,000
(a sub-contract of US \$ 50,000 to AIT for doctoral training program of Andalas faculty and support for AIT faculty to teach graduate level courses at Andalas)

15.5 Ongoing / In Progress Grant and Sponsored Research

Protected Cultivation – An Approach to Sustainable Vegetable Production in the Humid Tropics- Phase II

Duration: 2004-2007
Investigator: Prof Vilas M Salokhe
Sponsor: German Research Grant - DFG
Total Contracted Amount: Baht 10,000,000

Hannover-AIT Greenhouse Project – Phase-II

Duration: 2004-2007
Investigator: Prof Vilas M Salokhe
Sponsor: German Research Grant - DGF
Total Contracted Amount: Baht 15,550,000

Upgrading of Green House Facility

Duration: 2004-2007
Investigator: Prof. V. M. Salokhe
Sponsor: Hanover University, Germany
Total Contracted Amount: Baht 986,995

Collaboration in Integrated Natural Resource Management in Indonesia: Decentralization, Local people and Resources

Duration: Feb 2005 to Dec 2008
Investigator: Dr Ganesh Shivakoti
Sponsor: Ford Foundation Grant to AIT and Andalas University
Total Contracted Amount: US \$ 225,000 [\$ 100,000 to AIT and \$ 125,000 to Andalas University, Indonesia] *(a sub-contract of US \$ 100,000 to AIT for five doctoral training program of Andalas faculty and three best Masters graduates in INRM from Andalas)*

Professional enhancement and curriculum development to strengthen its new Master's degree program in integrated natural resources management and development

Duration: August 2003 to December 2006
Investigator: Dr Ganesh Shivakoti

Sponsor: Ford Foundation Grant to Andalas University, Indonesia

Total Contracted Amount: US \$ 180,000
(a sub-contract of US \$ 50,000 to AIT for doctoral training program of Andalas faculty and support for AIT faculty to teach graduate level courses at Andalas)

Increasing Water Use Efficiency by Using Mulch Under SRI (System of Rice Intensification) Management Practices in Northeast Thailand

Duration: 1 January 2006 to 30 June 2007
Project Description: The project aims to validate and upscale SRI/ mulching techniques with rice farmers and NGO partners using Participatory Action Research (PAR) in two selected villages of Northeast Thailand. It aims to create knowledge base and understanding of these techniques for the rice farmers, NGOs and government organizations.

Project Investigator: Prof. Vilas Salokhe
Sponsors: International Water Management Institute

Total Contracted Amount (Baht) 2,925,000

Training on and transfer of efficient EU Technologies in the Sugar sector of Thailand

Principal Investigators: Dr. H. P. W. Jayasuriya, Dr. Mithulananthan, Dr. Weerakorn Ongsakul, Dr. Animesh Dutta
Project Duration: Jan 2006 – March 2007
Sponsor: EU-Thailand Economic Cooperation (Small projects facility)
Amount: 9,500,000 Baht

15.6 Publications

Refereed Books / Chapters

Ranamukhaarachchi, S.L. and Wickramasinghe, S. 2006. Golden apple snails around the world: Impact and control measures; Chapter in *Global Advances in Ecology and Management of Golden Apple Snails*, eds. Ravindra C. Joshi and Leocadio S. Sebastian, Publ. Philippine Rice Research Institute (PhilRice), The Philippines. ISBN 978-971-9081-31-9, 2006.
Greenhouse Technology and Applications – V. M. Salokhe and A. K. Sharma, Agrotech Publishing Academy, India, ISBN: 81-8321-057-0, 2006

Journal Papers

Harmanto, Tantau, H. J. and **V. M. Salokhe** (2006). Microclimate and air exchange rates in greenhouses covered with different nets in the humid tropics. *Biosystems Engineering*, 94(2):239-253.
Kumar, V. J. F., Divaker D. C. and **V. M. Salokhe** (2006). Energetics of a manually operated backpack sprayer. *International Agricultural Engineering Journal*, 15(1):17-23.

- Zhang, M. Xiao, R. and **V. M. Salokhe** (2006). Preservation of strawberries by modified atmospheric packages with other treatments. *Packaging Technology and Science*, 19(4):183-191.
- Soni, P. and **V. M. Salokhe** (2006). Influence of Dimensions of UHMW-PE Protuberances on Sliding Resistance and Normal Adhesion of Biomimetic Plates in Bangkok Clay Soil. *Journal of Bionic Engineering*, 3(2):63-71.
- Tangwongkit, R., **Salokhe, V. M. and H. Jayasuriya** (2006). Development of a Real-time, Variable Rate Herbicide Applicator Using Machine Vision for Between-row Weeding of Sugarcane Fields. *Agricultural Engineering International: the CIGR E-journal*. Manuscript PM 06 009. Vol. VIII. June.
- Soni, P. and **V. M. Salokhe** (2006). Theoretical Analysis of Microscopic Forces at Soil-tool Interface: A Review. *Agricultural Engineering International: the CIGR E-journal*. Manuscript PM 06 010. Vol. VIII. June.
- Vejasit, A. and **V. M. Salokhe** (2006). Machine-Crop Parameters Affecting Performance of an Axial-Flow Soya Bean Thresher. *Agricultural Mechanization in Asia, Africa and Latin America*, 37(3):32-38.
- Harmanto, Tantau, H. J. and **V. M. Salokhe** (2006). Optimization of ventilation opening area of a naturally ventilated net greenhouse in a humid tropical environment. *Acta Horticulturae*, 719:165-171.
- Jha, M. K., **V. M. Salokhe** and S. K. Jain (2006). Role of Computers in Eco-Friendly and Sustainable Agriculture of the 21st Century. *Agricultural Mechanization in Asia, Africa and Latin America*, 37(3):85-92.
- Chamsing, A., **Salokhe, V. M.** and G. Singh (2006). Energy Consumption Analysis for Selected Crops in Different Regions of Thailand. *Agricultural Engineering International: the CIGR E-journal*. Manuscript EE 06 013. Vol. VIII. November, 2006.
- Ogunlana, E., **Salokhe, V. M.** and R. Lund (2006). Alley farming: A sustainable technology for crops and livestock production. *Journal of Sustainable Agriculture*, 29(1):131-144.
- Mishra, A., Whitten, M., Ketelaar, J. W. and **V. M. Salokhe** (2006). The system of rice intensification (SRI): a challenge for science, and opportunity for farmer empowerment towards sustainable agriculture. *International Journal of Agricultural Sustainability*, 4(3):1-20.
- Soekarno, S. and **V. M. Salokhe**. Performance of cage wheel with opposing circumferential lugs and normal cage wheel in wet clay soil. *Agricultural Mechanization in Asia, Africa and Latin America* (in press).
- Thai Thi Minh, Senaratne **L. Ranamukhaarachchi and H.P.W. Jayasuriya** 2006 Linear programming-based optimization of the productivity and sustainability of crop-livestock-compost manure integrated farming systems in midlands of Vietnam. (Accepted for publication in *ScienceAsia* Journal on 21 Aug 2006).
- Supawan Kianmatee and **S.L. Ranamukhaarachchi** 2006. The pest repellent plants for management of insect pests of Chinese kale. *International Journal of Agriculture and Biology* (Accepted for publication on 19 Aug 2006)
- Rahman, M.M., **A. Yakupitiyage and S.L. Ranamukhaarachchi** 2006. Fertilizer requirements of morning glory (*Ipomoea reptans* L) for its higher production in the Asian region". *Asia Pacific Journal of Rural Development*, Vol. XVI, No. 2.
- Rivas, A.A., R. S. Clemente, **S. L. Ranamukhaarachchi**, A. Das Gupta, M. A. Zoebisch, S. Thevachandran, and M.S.D.L. de Silva. 2006. Soil hydraulic characterization under different cropping patterns in sloping agricultural lands in the highlands of Sri Lanka. *Asia Pacific Journal of Rural Development* (Accepted on 18 June 2006 for publication).
- Md. Mainul Hasan and **S.L. Ranamukhaarachchi**. 2006. Characterization and implication of land productivity under different cropping systems. *International Journal of Ecology, Environment and Conservation* (Accepted on 20 May 2006).
- Lwin Myint and **S.L. Ranamukhaarachchi**. 2006. Development of biological control of *Ralstonia solanacearum* through antagonistic microbial populations. *International Journal of Agriculture and Biology*, 8 (5): 657-660.
- Mitiku Tesso Jebessa and **S.L. Ranamukhaarachchi**. 2006. Attempts to biologically control anthracnose disease in chilli peppers. *Tropical Science (UK)* 46(2):74-77.
- Ranamukhaarachchi, S.L.** and W. M. Ratnayake 2006. Straw and stubble management and potassium application on grain yield of rice in rice-rice cropping systems in the mid-country wet zone of Sri Lanka. *ScienceAsia*, Vol 32: 151-158
- Ratana Tangwongkit, **V. M. Salokhe, and H. P. W. Jayasuriya** (2006). "Development of a tractor mounted, real-time, variable rate herbicide applicator for sugarcane". *CIGR Ejournal* (Manuscript PM 06 009 - online).
- Kishore C. Swain, and **H. P. W. Jayasuriya** (2006). "Land-use suitability evaluation criteria for Precision Agriculture adoption in a moderately yielding soybean cropping area in Thailand". *Asia Pacific Journal of Rural Development* 16(1); (Accepted in 2006 - In press).
- Sornpoon, W., and **H. P. W. Jayasuriya** (2006). "Effect of different tillage and residue management practices on growth and yield of corn in Thailand". *CIGR Ejournal* (Accepted for publication with minor revisions in 2006).
- Lav R. Khot, **Vilas M. Salokhe and H. P. W. Jayasuriya** (2006). Simulation of Dynamic Wheel-Soil Interaction by Distinct Element Method (DEM). *Journal of Biosystems Engineering*, (Under review - Submitted after revisions).
- H. P. W. Jayasuriya**, Kiattisak Sangpradit and Khot Lav Ramachandra, (2006). Dynamic Performance and Ride Comfort Evaluation of the Seat Suspension System in Small Agricultural Tractors to Attenuate Low-Frequency Vibration Transmission. *CIGR Ejournal* (Under review).

Conference Proceedings

- Mihindukulasuriya S. D. F., and **H. P. W. Jayasuriya** (2006). Experimental study and mathematical modelling of drying characteristics of chilli in hot-air and fluidized bed dryers. Presentation and in Proceedings of the International Conference on Food and Biotechnology, 12-14, December, Bangkok, Thailand.
- Kishore C. Swain and **H. P.W. Jayasuriya** (2006). Prospects of Low-altitude RS in Mapping of Agricultural Attributes for the Conditions of Developing Countries. Presentation and in Proceedings of the MapAsia 2006 international conference, 29 Aug. - 1 Sept 2006, Bangkok, Thailand.
- Abu Ahmed Mokammel Haque, and **H. P.W. Jayasuriya** (2006). Soil fertility and inorganic fertilizer management by GIS for higher yield goal: A precision agriculture approach for irrigated rice production in Bangladesh. .Presentation and in Proceedings of the MapAsia 2006 international conference, 29 Aug. - 1 Sept 2006, Bangkok, Thailand.
- March 9-11, 2006: International Engineering Research Conference 2006", University of San Carlos, Talamban, Cebu City, The Philippines. Topic: "Computational techniques for the analysis of soil-tool, soil-wheel interactions". **H. P.W. Jayasuriya** August 29 -September , 2006: MapAsia 2006; 5th International Conference on GIS and Applications, Queen Sirikit Convention Centre, Bangkok, Thailand. - Session Chair, Precision Agriculture, **H. P.W. Jayasuriya** December 12-14, 2006: International Conference on Innovations in Food and Bioprocess Technologies, Asian Institute of Technology, Bangkok, Thailand. - Session Chair, Naval Technologies in Food Handling, Processing and Transport. **H. P.W. Jayasuriya** "Key Opportunities and Constraints in Asia SLM: Lowland and Upland Agriculture", an invited presentation delivered at the Asia Workshops on Sustainable Land Management and National Capacity Self-Assessment November 20-23, 2006, at Asian Institute of Technology, Bangkok, held during Nov 23-25 at the Asian Institute of Technology, organized jointly by UNDP, GEF, UNEP and AIT. **S.L. Ranamukhaarachchi**

15.7 Doctoral Students' Dissertation

- Biological Control of Bacterial Wilt Disease through Antagonistic Microbial Populations*
By: Myint Lwin
Supervisor: Dr. S.L. Ranamukhaarachchi
- Sustainable Livelihood: An Analysis of the Rice-based Farming System in Southern Thailand*
By: Tatsanee Muangkaew

Supervisor: Dr. Ganesh P. Shivakoti

Driving Forces and Limiting Factors of Crop-livestock Integration in Tambon Pong Talong, Lamphra Phloeng Watershed

By: Sharon Basada Singzon
Supervisor: Dr. Ganesh P. Shivakoti

Bionic Macro-Morphologic Surface Modification of Mouldboard Plough Using UHMW-PE Convex Protuberances

By: Peeyush Soni
Supervisor: Prof. Vilas M. Salokhe

Development of a Tractor Mounted Site-Specific Herbicide Applicator for Sugarcane Fields

By: Ratana Tangwongkit
Supervisors: Prof. Vilas M. Salokhe/Dr. Hemantha P.W. Jayasuriya

15.8 Masters Students' Theses

Effect of UV-Blocking Cladding Materials on Greenhouse Microclimate with Tomato in Humid Tropics

By: Samant Shradha Achyut
Supervisor: Prof. Vilas M. Salokhe

On-farm Application of GLYCIM/GUICS Soybean Model in Humid Tropics

By: Lokhande Suresh Bajirao
Supervisor: Prof. Vilas M. Salokhe

Management-zone Based Soil Moisture Conservation Practice and Irrigation Scheduling for Precision Agriculture using GIS

By: Dnyandeo Madhukar Kulal
Supervisor: Dr. Hemantha P. W. Jayasuriya

Development of a Rotary Tea Dryer with Combined Fin-coil and Infrared Heating

By: Prayoon Lasuttha
Supervisors: Dr. Hemantha P. W. Jayasuriya

Effect of Natural Ventilation and Evaporative Cooling on Greenhouse-Microclimate with Tomato Crop Inside

By: Mst. Meherunnahar
Supervisor: Prof. Vilas M. Salokhe

Status and Prospects of Agricultural Mechanization in Cambodia: A Case Study of Three Selected Provinces

By: Chao Sinh
Supervisor: Prof. Vilas M. Salokhe

Assessment of the Potentiality of Establishing Small and Medium Agro-industries in Kompong Cham Province, Cambodia

By: Ek Sopheap
Supervisor: Dr. Hemantha P. W. Jayasuriya

Agricultural Mechanization Potential in Rwanda: A Multi-location Spatial Approach by GIS Techniques

By: Mwumvaneza Valens
Supervisor: Dr. Hemantha P. W. Jayasuriya

*The Influence of Resting Period and Pruning Intensity on Asparagus (*Asparagus officinalis* L.) Performance*

By: Suwimon Boonchuay
Supervisor: Dr. S.L. Ranamukhaarachchi

Biological Management of Fusarium Wilt Disease in Tomato

By: Zin Min Htwe
Supervisor: Dr. S.L. Ranamukhaarachchi

*Assessment and Utilization of Biologically Fixed Nitrogen by Duckweed (*Lemna* sp.) for Hydroponic Lettuce Production*

By: Kirijah Jeyakumar

Supervisor: Dr. S.L. Ranamukhaarachchi

Development of a Multi-purpose Cultivator for Sugarcane

By: Ammaraporn Limraluk
Supervisor: Prof. Vilas M. Salokhe

*The Role of Biological Control in Crucifer Production: A Case Study of (*Bacillus thuringiensis*) Usage in Crucifer Pest Management of Diamond Back Moth in the Da Lat City Area, Lam Dong Province, Vietnam*

By: La Thi Nga
Supervisor: Dr. Ganesh P. Shivakoti

Dry Matter Production and Partitioning in Rice under Different Nutrient and Water Management Practices

By: Luong Van Nga
Supervisor: Dr. S.L. Ranamukhaarachchi

Optimization of Sugarcane Supply System for Improved Productivity by GIS and LP Approach: A Case Study in Buriram Province, Thailand

By: Jutanut Prechavuttipong

Supervisor: Dr. Hemantha P.W. Jayasuriya

Assessment of Variation in Soil Quality and Land Productivity in Coconut-Pineapple Under-storey Cropping Systems in Sri Lanka

By: Willoram Mudiyanseelage Ratnayake
Supervisor: Dr. S.L. Ranamukhaarachchi

Propsects for a Disseminating System for Rice Intensification (SRI) in Cambodia: A Case Study in Takeo and Kampot Provinces

By: Kem Sothorn
Supervisor: Dr. Ganesh P. Shivakoti

Sustainable Soil Fertility Management for Low Land Rice Cultivation in Delta Region of Myanmar by using GIS Application

By: Hla Myo Thwe
Supervisor: Dr. Ganesh P. Shivakoti

Comparative Assessment of Biodegradation of Household Foodwaste and Compost Quality

By: Nguyen Xuan Hoa
Supervisor: Dr. S.L. Ranamukhaarachchi

Analysis of Yield Gap for Enhancing Rice Yield in the Minor Irrigation Schemes in the North-Central Province of Sri Lanka

By: B. Upul Jayanath Kaluhetti
Supervisor: Dr. S.L. Ranamukhaarachchi

Nitrogen Supplementation and Weed Management Using Duckweed in Lowland Rice

By: Dinh Thi Nha Truc
Supervisor: Dr. S.L. Ranamukhaarachchi

Chapter 16: SERD – AQUACULTURE AND AQUATIC RESOURCES MANAGEMENT FIELD OF STUDY

16.1 Introduction

AARM promotes development through aquaculture and small-scale capture fisheries. The Field of Study has a wide spectrum of activities enabling it to address poverty, constraints facing the promotion of sustainable management and utilization of aquatic resources. The central theme is capacity building: the advancement of individuals and institutions creating indigenous capacity in education, research and development within the region.

16.2 Research Facilities and Laboratories

Aquaculture Laboratory serves the academic and research programs of aquaculture and aquatic resources management (AARM) field of study. It is equipped with modern equipment to analyze water quality, nutrients in food and feedstuffs, and soil classification and their problems identification. Some of its major laboratory equipment include a Distillation Unit; Extraction Unit; Incubator; UV/Vis Spectrophotometer; and a Flame Photometer

The SERD Computer Lab III in the Agricultural and Food Engineering Building has various kinds of software packages for system analysis and simulation, including DSSAT (Decision Support System for Agro-technology Transfer), ArcView etc. A Computer-Aided Design (CAD) workstation is also available for training the design of agricultural equipment. There is a machine workshop with facilities for fabricating various types of laboratory and experimental apparatus and models. Consultation and fabrication of different types of transducers can be provided. About 20 high-end PCs connected to the campus-wide Ethernet and ATM network and a high quality laser printer,

scanning and CD writing facilities are available for students' uses.

16.3 Faculty and Research Staff

Full-time Faculty

AMRIT BART, BA, Earlham College, USA; MA, MS, PhD, Auburn Univ, USA

Associate Professor

(Aquatic Resource Management; Cryopreservation; Reproductive Physiology; Seed Production)

AMARARATNE YAKUPITIYAGE, BSc, Univ of Kelaniya, Sri Lanka; MSc, AIT, Thailand; PhD, Univ of Stirling, Scotland.

Associate Professor

(Aquaculture; Bio-energetics; Database Systems Development; Fish Nutrition)

[Aquaculture: in particular Animal Feed Resources Development, Feed/Fish Processing Technology, Fish Nutrition and Energetics; Data-base Development; Curriculum Development - Research into Education Technology]

YANG YI, BSc, Sichuan Univ, PRC; MSc, DTechSc, AIT, Thailand.

Associate Professor

(Aquaculture; Integrated Systems; Modeling; Pond Dynamics; Water Quality)
[Aquaculture Production Systems; Aquaculture Wastewater Treatment and Environmental Integration; Water Quality in Aquaculture; Fish Sex Control Modeling]

WENRESTI G GALLARDO, PhD, MSc, Nagasaki University, Japan; Master of Aquaculture, University of the Philippines in the Visayas; BSc, University of the Philippines, Diliman, Philippines.

Assistant Professor

(Aquaculture; Aquatic Resources Management)
(Aquatic seed production; Coastal resources management; Farming systems and ecology; Marine protected areas; Stock enhancement]

KO IKEJIMA, BSc, Univ of

Agriculture and Tech; MSc, PhD, Univ of Tokyo, Japan.

Assistant Professor *(Coastal Aquaculture; Coastal Ecology and management; Fisheries Biology and Ecology; Molecular Phylogeny)*

[Ecology of Aquatic organisms; Restoration of aquatic habitats; Integrated Coastal zone management; Coastal and Inland fisheries; Environmentally low impact aquaculture system]

RAM C. BHUJEL, BSc, Institute of Agriculture and Animal Sciences, IAAS, Chitwan, Nepal; MSc and PhD, AIT, Thailand;

Affiliated Faculty

(Bio-statistics and Research Design, Curriculum Development, Women in Aquaculture, Broodstock Nutrition/Management and Fry Production, Technology Transfer/ Extension)

16.4 Completed Grant and Sponsored Research

Development of Marine and Coastal Resources Database of Thailand

Project Description: The objectives of this project is to support the Thai Department of Marine and Coastal Resources (DMCR) in developing the fundamental of GIS database for key components of marine and coastal resources of Thailand, which would eventually improve coastal resources conservation and management.

Duration: August 2005 to March 2006

Investigators: Dr Kou Ikejima
Dr Nitin Tripathi

Sponsor: UNEP

Total Contracted Amount: 2,460,000 Baht

Production in Aquatic Peri-Urban Systems in Southeast Asia

Project Description: The project objective is to provide a detailed, holistic situation analysis of peri-urban aquatic food production at 4 sites in Southeast Asia (Vietnam, Cambodia, Thailand) followed by pilot studies in each that will test improved strategies and monitor impacts on the systems, producers, consumers and institutions involved. Knowledge generated will contribute to a better understanding of the value of Peri-urban Aquatic Food Production Systems to poor communities and permit balanced and rational urban planning and development, whilst enhanced management strategies will safeguard the benefits associated with the systems to stakeholders.

Duration: March 2003 to February 2006
Investigator: Dr Amaratne Yakupitiyage
Collaborators: Durham University, UK
 RIA-1 & UAF, Vietnam
 RUA, Cambodia
 KU, Thailand
Sponsor: European Union (EU)
Total Contracted Amount: 4,720,800 Baht

Regional Studies of Aquaculture Systems and Impacts in South East Asia, and management considerations for non-traditional aquaculture systems in Vietnam

Project Description: To evaluate the regional differences in aquaculture, provide CRSP advice to developing aquaculture programs in other countries, and evaluate environmental impacts of wide spread shrimp culture systems in the region.

Duration: August 2001 to May 2006
Investigators: Dr Yang Yi
 Dr Amrit Bart
Sponsor: CRSP
Total Contracted Amount: 25,866,100 Baht

Survey of Tilapia-Shrimp Polycultures in Vietnam and Thailand; Stock Density for Tilapia-Shrimp Polyculture in Thailand

Project Description: The objective is to document the existing tilapia-shrimp polyculture in Thailand and the apparent lack in Vietnam, determine the extent of current and potential applications and determine which techniques are most successful at this point. Producers in Vietnam and Thailand are desperate to supply the EU market, which require strict environmentally sensitive culture techniques be used. An important

question will be why the Viet farmers have not adopted the polyculture. Another objective is to determine optimal conditions for stocking and rearing tilapia and shrimp in a polyculture system. At AIT, relatively extensive techniques will be tested. Most applicable to small farmers or community ponds with minimal inputs. Replicate to model conditions of areas impacted by salinization.

Duration: January 2002 to May 2006
Investigator: Dr Yang Yi
Sponsor: CRSP
Total Contracted Amount: 575,288 Baht

16.5 Ongoing / In Progress Grant and Sponsored Research

Post-Tsunami Sustainable Coastal Livelihoods Program

Project Description: As part of the US government response to December 26, 2004 Tsunami disaster to define medium and long term rehabilitation programs. The program will implement a rehabilitation effort in 4 villages along the Andaman coast in the Suk Samran Sub-District of Ranong Province, as models for other communities and nations in the region. The components involved : 1. Facilitate consensus and create a unified vision for action, 2. Rebuild Sustainable livelihood, 3. Infrastructure rehabilitation, 4. Capacity building, 5. Knowledge management and communication. AIT is sub-contracted by the Coastal Resources Center/University of Rhode Island, (CRC/UK) in the program implementation, will also collaborate with the University of Hawaii at Hilo.

Duration: March 2005 to March 2008
Investigator: Dr Amrit Bart
Collaborator: University of Hawaii
Sponsor: USAID
Total Contracted Amount: B 12,760,605

Improving Master's Degree level education in Aquaculture and Aquatic Resources Management in Cambodia, Nepal and Vietnam

Project Description: The aim of the project is to introduce innovative approaches to Master's degree level education in aquaculture and aquatic resources management in Cambodia, Nepal and Vietnam to accelerate the contribution of aquaculture to sustainable development. The immediate target groups are university

teacher and researchers in four key institutions. Through improvement of access to knowledge and appropriate teaching materials, students and ultimately the millions of farm families deriving at least part of their livelihood from aquaculture will benefit. Activities will consist of inception workshop and curriculum development workshop at the Asian Institute of Technology (AIT). This will be followed by an in-service development phase with extensive support from AIT and European partners leading to integrated packages and a workshop for finalization, dissemination and promotion of materials / modules.

Duration: September 2005 to 31 August 2008
Investigator: Dr Amrit Bart
Collaborators: University of Stirling, UK;
 University of Aveiro, Portugal; Royal University of Agriculture, Cambodia; Institute of Agriculture & Animal Science, Nepal; RIA 1, Vietnam; University of Agriculture & Forestry, HCM, Vietnam
Sponsor: European Union (EU)
Total Contract Amount: 14,425,150 Baht

Impact Study on Wooden Trail Construction in Mangroves Eco-system

Duration: 1 May 2006 to 31 December 2007
Project Description: A wooden trail construction in Sikao district mangrove area, in the province of Trang, Thailand, will be studied in coordination with Rajamangala University of Technology. The study will include preliminary surveys, structure, material and site selection, construction activities monitoring, and environmental impact analysis including water quality analysis and fish samplings.
Project Investigator: Dr. Kou Ikejima
Sponsors: The University of Tokyo, Japan
Total Contracted Amount (Baht): 264,880

Study Tour for Shrimp Farming in Thailand

Duration: 11 Nov 2006 to 17 Nov 2006
Project Description: Study Tour for RIA-3 master students to Shrimp Farms in Chachoengsao, Rayong, Chantaburi and wrap up in AIT.
Project Investigator: Dr. Yang Yi
Sponsors: Research Institute for Aquaculture No. 3, Vietnam

Total Contracted Amount (Baht) 72,324

Capacity Building of small-scale shrimp farmers on adaptation of best management practices (BMPs) to promote Thai Shrimp export to the EU.

Duration 1 Sept 2006 to 31 Jan 2008
Project Description Capacity building of small scale Thai shrimp farmers to produce quality shrimp for EU market through trainings to improve access of information and best management practices (BMPs). Study of policy, institutional and technical problems faced by Thai shrimp farmers, develop adaptation strategies, participatory problem solving, identify appropriate policy measures to comply with EU standards.

Project Investigator Dr. Dharendra Prasad
Sponsors European Commission (EC)
Total Contracted Amount (Baht) 8,225,082

Capacity Building of coastal communities on coastal mitigation

Duration 1 Nov 2006 to 30 April 2007
Project Description This project is on capacity building of coastal communities on coastal mitigation. The major activity will be to conduct a training-workshop with the purpose of building the capacity of local government and community leaders in southern Thailand to understand the principles of integrated coastal zone management and to ensure that they understand their role in coastal zone management.

Project Investigator Dr. Wenresti G. Gallardo
 Dr. Animesh Dutta
 Dr. Kou Ikejima
 Dr. Mokbul Morshed Ahmad
 Prof. Dennes T. Bergado

Improving Master's Degree level education in Aquaculture and Aquatic Resources Management in Cambodia, Nepal and Vietnam

Project Description: The aim of the project is to introduce innovative approaches to Master's degree level education in aquaculture and aquatic resources management in Cambodia, Nepal and Vietnam to accelerate the contribution of aquaculture to sustainable development. The immediate target groups are university teachers and researchers in four key institutions. Through improvement of access to knowledge and appropriate teaching materials, students and ultimately the millions of farm families deriving at least part of their livelihood from aquaculture will benefit. Activities will consist of an inception workshop and curriculum development

workshop at the Asian Institute of Technology (AIT). This will be followed by an in-service development phase with extensive support from AIT and EU partners leading to integrated packages and a workshop for finalisation, dissemination and promotion of materials/modules. The project duration is thirty-six months

Duration: 1 Sept 2005 to 31 August 2008
Investigator: Dr Amrit Bart and Dr. Ram C. Bhujel
Collaborators: University of Stirling, UK, Universidade de Aveiro, Portugal, Tribhuvan University, IAAS, Nepal, Royal University of Agriculture, Cambodia, Research Institute for Aquaculture (RIA) No. 1, Hanoi and University of Agriculture & Forestry, Ho Chi Minh City, Vietnam

Sponsor: EU
Total Contracted Amount: 386.957 EURO

Development of release strategies for stock enhancement of the tropical abalone *Haliotis asinina*

Project Description: This research is aimed to determine the optimum abalone size, release season, habitat, and stocking density that would result in high survival, growth and reproduction of the commercially-important gastropod species *Haliotis asinina*. Experimental releases have been conducted in Sagay Marine Reserve in Negros Occidental, Philippines and the released stocks are being monitored to determine the optimum release strategies. This project has been started in October 2003 when the investigator was still working in the Aquaculture Department of the Southeast Asian Fisheries Development Center (SEAFDEC AQD) in Iloilo, Philippines.

Duration: 1 October 2005 to 31 December 2007
Investigator: Dr Wenresti G Gallardo
Sponsor: International Foundation for Science (IFS, Sweden)
Total Contracted Amount: Baht 239,663

16.6 Publications

Refereed Journals

Bart, A. N., S. Chasouk and D.Thakur. 2006. Cryopreservation of shrimp, *Penaeus monodon* spermatophores. *Aquaculture Research*. 37: 523-528

Karapanagiotidis, I. T, M.V. Bell, D.C. Little, A. **Yakupitiyage** and S. K. Rakshit (2006) Polyunsaturated Fatty Acid Content of Wild and Farmed Tilapias in Thailand: Effect of Aquaculture Practices and Implications for Human Nutrition, *J. Agric. Food, Chem*, 54, 4304-4310.

Methee Kaewner & **A. Yakupitiyage** (2006) Shrimp and mollusc culture in Bandon Bay in Thailand: A situation analysis, *Journal of Asian Fisheries Society*, Vol 20 (2) (In Press)

A.Yakupitiyage, S. L. Ranamukhaarachchi, Yang Yi and Rahman Mizanur (2007) Nutrient accumulation in Tilapia pond sediment and its agricultural uses in Fish Ponds in Farming Systems, A.J. van der Zijpp, J.A.J. Verreth, Le Quang Tri, M.E.F. van Mensvoort, R.H. Bosma and M.C.M. Beveridge (eds) 312 pp Wageningen Academic Publishers

Sikawa, D. C. Sikawa, and **A Yakupitiyage** (2007) The hydroponic production of lettuce (*Lactuca sativa* L) by using hybrid catfish (*Clarias macrocephalus* x *C. gariepinus*) pond water: potentials and constraints, *Aquaculture* (In press)

Karapanagiotidis, I. T, M.V. Bell, D.C. Little, and **A. Yakupitiyage** (2007) The Effect of Linseed Oil on Growth and Lipid Composition of the Muscle Tissue of Tilapia (*Oreochromis niloticus*), *Lipids* (In Press: Just submitted the reviewers comments)

Ling Cao, W. Wang, C. **Yang, Y.Yi**, J Diana, **A. Yakupitiyage**, Zhi Luo and D. Li (2007) Application of microbial phytase in fish feed, *Enzyme and Microbial Technology*, 40(4): ???-???, 2007 (in press)

Rahman M.D and **A. Yakupitiyage** (2006) Use of fishpond sediment for sustainable Aquaculture-Agriculture Farming, *International Journal of Sustainable Development and Planning* — Paper no. SDP-19

Gallardo WG, Hagiwara A, Hara K, Soyano K. 2006. Growth hormone-like substance in the rotifer *Brachionus plicatilis*. *Fisheries Science* 72:781-786.

Gao, Z.X., W.M. Wang, **Yang Yi**, K. Abbas, D.P. Li, G.W. Zou and J. S. Diana, 2007. Morphological studies of peripheral blood cells of the Chinese sturgeon, *Acipenser sinensis*. *Fish Physiology and Biochemistry*, (in press) (<http://dx.doi.org/10.1007/s10695-007-9133-x>).

Cao, L., W.M. Wang, C.T. Yang, **Yang Yi**, J.S. Diana, **A. Yakupitiyage**, Z. Luo, and D.P. Li, 2007. Application of microbial phytase in fish feed. *Enzyme and Microbial Technology*, 40(4): 497- 507.

Wan, H., B.Y. Song, **Y. Yi**, Z.H. Ni, W.M. Wang and B.X. Xiong, 2006. Biological treatment technique of wastewater from aquaculture and its application. *Fisheries Science and Technology Information*, 33(3): 99 - 102 (in Chinese).

Chowdhury, M.A.K., **Yang Yi**, C. K. Lin and E.R. El-Haroun, 2006. Effect of salinity on carrying capacity of adult Nile tilapia *Oreochromis niloticus* L. in recirculating systems. *Aquaculture Research*, 37(16): 1627 - 1635.

Yang Yi, A. Wahab and J.S. Diana, 2006. On-station trials of different fertilization regimes used in Bangladesh. *Journal of Aquaculture in the Tropics*, 21(1), 45-57.

- Holmer M, Pedersen O & **Ikejima K.** (2006) Sulfur cycling and sulfide intrusion in mixed SE-Asian tropical seagrass meadows. *Botanica Marina* 49:91-102. 0
- Pedersen O, Andersen T, **Ikejima K**, Hossain MZ & Andersen F Ø. A (2006) Multidisciplinary approach to understand recent and historical occurrence of *Littorella uniflora*. *Freshwater Biology* 51: 865-876.
- Wada M, Kamiya A, Uchiyama N, Yoshizawa S, Kita-Tsukamoto **K, Ikejima K**, Yu R, Imada C, Karatani H, Mizuno N, Suzuki Y, Nishida M, Kogure K. (2006) LuxA gene of light organ symbionts of the bioluminescent fish *Acropoma japonicum* (Acropomatidae) and *Siphamia versicolor* (Apogonidae) forms a lineage closely related to that of *Photobacterium leiognathi* subsp. *Mandapamensis*. *FEMS Microbiology Letters* 260: 186-192
- Begum S, **Ikejima K**, Ara H, Islam M Z. (2006) Solar drying as an option for shrimp processing biowaste in Khulna district – Southwest Bangladesh. *Journal of Applied Science* 6: 1302-1306
- Begum S, **Ikejima K**, Ara H, Islam M Z. (2006) Solar drying as an option for shrimp processing biowaste in Khulna district – Southwest Bangladesh. *Journal of Applied Science* 6: 1307-1313
- Ikejima K**, Rnoquillo J D, Corre JR V L, Dureza V A. (2006) Fish assemblages in abandoned ponds and waterways surrounding brackish water aquaculture ponds in Panay Island, the Philippines. *Asian Fisheries Science* 19:267-278
- D.V. Trung and **Amrit Bart**. (2006) A Preliminary Study on the Maturation and Reproduction of *Spinibarbus denticulatus* (Oshima, 1926), an Indigenous Species of the North Vietnam. *Asian Fisheries Science* 19: 349-362.
- Refereed Books / Chapters**
- Yakupitiyage, A., S.L. Ranamukhaarachchi, Yang Yi** and R. Mizanur, 2007. Nutrient accumulation in tilapia pond sediment and its agricultural uses. In: A.J. van der Zijpp, J.A.J. Verreth, Le Quang Tri, M.E.F. van Mensvoort, R.H. Bosma and M.C.M. Beveridge (eds.), *Fishponds in Farming Systems*, Wageningen Academic Publishers, pp.89-96.
- Yang Yi**, L.M. Lan and C. K. Lin, 2006. Using effluents from an intensive catfish (*Clarias macrocephalus* X *C. gariepinus*) culture pond to irrigate rice crop. In: S. Ohgaki, K Fukushi, H. Katayama, S. Takizawa, C. Polprasert (eds.), *Southeast Asian Water Environment I - Biodiversity and Water Environment*. International Water Association, IWA Publishing, London, UK, pp. 181-188.
- Watanabe, W.O., K. Fitzsimmons and **Yang Yi**, 2006. Farming Tilapia in Saline Waters. In: C. Lim and C.D. Webster (eds.), *Tilapia: Biology, Culture, and Nutrition*. The Haworth Press Inc., NY, USA, pp. 347-447.
- Yang Yi**, 2006. Water quality parameters. *Aquaculture Compendium - CAB International*. (<http://www.cabi.org/compendia/ac/index.asp>)
- Yang Yi*** and Z.W. Wu, 2006. Rice-crab culture in China. *Aquaculture Compendium - CAB International*. (<http://www.cabi.org/compendia/ac/index.asp>)
- Yang Yi*** and Z.W. Wu, 2006. Rice-fish culture in China. *Aquaculture Compendium - CAB International*. (<http://www.cabi.org/compendia/ac/index.asp>)
- Other Publications**
- Schwantes, V., J.S. Diana and **Yang Yi**, 2007. Freshwater prawn farming in Thailand – Cooperation keeps intensive production profitable. *Global Aquaculture Advocate*, 10(1):70-73.
- Md. Asaduzzaman, M.S., M.A. Wahab, **Yang Yi**, J.S. Diana and C. K. Lin, 2006. Bangladesh prawn-farming survey reports industry evolution. *Global Aquaculture Advocate*, 9(6):40-43.
- Yuan, D.R., **Yang Yi** and J.S. Diana, 2006. Walking catfish production in Thailand – hybrid species helped fuel culture boom. *Global Aquaculture Advocate*, 9(3):59-61.
- 16.7 Doctoral Students' Dissertation**
- The Sustainability Assessment of Shrimp Farming: A Case Study on Present Farming Systems in Bangladesh*
By: Md. Arif Chowdhury
Supervisor: Dr. Ganesh P. Shivakoti
- Assessment of Tilapia Pond Sediment Properties and Its Efficacy to Improve Soil Fertility*
By: Md. Mizanur Rahman
Supervisor: Dr. Amaratne Yakupitiyage
- Seawater Irrigation System: An Initiative Water Management System for Marine Shrimp Farming in Nakhon Si Thammarat, Southern Thailand*
By: Pornpimon Chuaduanguai
Supervisor: Dr. Kou Ikejima/Dr. Amaratne Yakupitiyage
- Stress Response of Goldfish (Carassius auratus, Linnaeus 1758) Cultured with Sucker-mouth Catfish (Hypostomus spp.)*
By: Sawitree Chamsai
Supervisors: Dr. Amaratne Yakupitiyage/ Dr. Amrit N. Bart
- Assessment and Recommendations for Sustainable Development of Shrimp Farming in the Mekong Delta: A Case Study of Bac Lieu Province, Vietnam*
By: Duong Tri Dung
Supervisor: Dr. Kou Ikejima/Dr. Wenresti Gallardo
- The Effect of Chitosan and Hydroxycitric Acid on the Body Lipid Content of Striped Catfish (Pangasius hypophthalmus)*
By: Aye Mya Mya
Supervisor: Dr. Amaratne Yakupitiyage/ Dr. Yang Yi
- Phosphorus Fertilization Requirement of Supplemental Feed-fed Nile Tilapia (Oreochromis niloticus) Ponds*
By: Moe Thidar Oo
Supervisor: Dr. Amaratne Yakupitiyage
- Use of Rice Straw as a Substrate for Periphyton-based Aquaculture System*
By: A.M. Shahabuddin
Supervisor: Dr. Amaratne Yakupitiyage
- Effects of Pure Oxygen Injection on Water Quality and Growth Performance of Shrimp (Litopenaeus vannamei) in Intensive Culture System*
By: Maheeni Samarakoon Singappuli
Supervisor: Dr. Yang Yi
- Assessment of Perceptions and Attitude Changes of a Post-Tsunami Community on the use of Aquatic Resources*
By: Hep Sokhannaro
Supervisor: Dr. Amrit Bart
- Effect of Stocking Density and Shelters Surface Area on Growth and Survival of the Tropical Abalone (Haliotis asinina) in a Semi-flow through System*
By: Tippawan Tantawanich
Supervisor: Dr. Wenresti Gallardo/Dr. Kou Ikejima
- An Evaluation of Management of Semi-intensive and Intensive Culture of Black Tiger Shrimp (Penaeus monodon) in Soc Trang Province, Mekong Delta, Vietnam*
By: Tran Van Viet
Supervisor: Dr. Kou Ikejima/Dr. Yang Yi
- Sustainable Management of Penaeid Shrimps in Mangrove Areas: A Case Study at Welu Estuary, Khlung District, Chantaburi Province, Thailand*
By: Jutamas Gunthong
Supervisor: Dr. Kou Ikejima
- An Assessment on Cage/Pen Culture in the Tonle Sap Lake: Case Study in Siem Reap Province, Cambodia*
By: Thak Kuntheang
Supervisor: Dr. Amaratne Yakupitiyage
- Establishing an Effective Promotion, Communication and Business Development for SDC (Savannakhet Development Consultants) in Savannakhet Province, Lao PDR*
By: William Murray
Supervisor: Dr. Amaratne Yakupitiyage

Chapter 17: SERD – ENERGY FIELD OF STUDY

17.1 Introduction

Energy related academic program at AIT was established in 1979. So far over 800 students have graduated in the Energy related studies. As of March 2007, about hundred students are enrolled in Energy Field of Study. About thirty percent of the current students are at doctoral level. Apart from regular teaching and student research, Faculty at Energy FoS carry out a larger number of regional research projects. Some of the current research focuses of Energy FoS are Energy, environment and climate change, Energy for sustainable development, Renewable Energy and Energy efficiency, Electric power system management, and Energy economics planning.

Student admitted to Energy FoS can specialize in one of the three areas.

- Electric Power System Management (EPSM)
- Energy Technology (ET)
- Energy Economics and Planning (EEP)

17.2 Research Facilities and Laboratories

Energy Laboratory serves as a facility for course experiments, research, testing and hands-on training in the Energy Field of Study. Laboratory functions are focused mainly on solar thermal energy, photovoltaics, biomass energy, energy management, thermodynamics and heat transfer, and electrical measurement and analysis. The laboratory facilities include two indoor laboratories, an energy park and a meteorological station. The indoor laboratories are equipped with experiment setups, testing apparatus and measuring equipment for thermal and electrical management studies, thermodynamics, fluid mechanics and heat transfer, and electrical power supply management. Energy Park covers 3980-m² outdoor research and

demonstration facility equipped with photovoltaic systems, solar thermal (air and water) systems, biomass research and daylighting setups. The meteorological station measures and records different solar radiation and other meteorological data. Energy laboratory continues to carry out testing services such as fuel quality tests, gas composition tests, tests for heating value of fuels, solar thermal collector performance tests, solar water heater system performance tests and stove efficiency tests.

Among its major equipment include a Gas Analyzer; Campbell data logger; Ultrasonic flow-meter; Bomb calorimeter; and a Gas chromatography.

The SERD Computer Lab IV in the Energy Building has a large number of computer modeling software for energy planning and policy analysis. These include Model for Analysis of Energy Demand and Environmental Impacts (MAED, MEDEE-S/ENV, LEAP), Electricity System Planning (WASP-III Plus, ENPEP, DECPAC), Energy-Environmental Flow Optimization Model (EFOM-ENV), Wood Energy Planning Models, Energy-Environmental Models for estimation of impacts of energy externalities, air pollution emission and dispersion and climate change (CO₂ DB, RAINS, TEMIC, ECOSENS, ISC) and Energy-Environmental Database Management Software (DBA-VOID). An energy-environment database for Asia is maintained in this computer lab. About 20 high-end PCs connected to the campus-wide Ethernet and ATM network and a high quality laser printer, scanning and CD writing facilities are available for students' uses.

17.3 Faculty

Full-time Faculty

SURAPONG CHIRARATTANANON, BEng, Univ of New South

Wales; MEng, Monash Univ; Ph. D., Newcastle. Australia.

Professor (*Electrical Energy Management; Energy Conservation in Buildings*) [*Energy Conservation in Buildings; Efficient Lighting and Daylighting; Electrical Energy Management*].

SIVANAPPAN KUMAR, BE, Univ of Madras, India; MEng, AIT, Thailand; PhD, Inst Natl Polytechnique, Toulouse, France.

Professor (*Cleaner Production; Rational Use of Energy; Solar Energy*) [*Solar Energy (Radiation, Thermal and Photovoltaics); Cleaner Production; Heat Pumps*]

RAM M SHRESTHA, BE, Univ of Baroda; LL Tribhuvan Univ, Nepal; MEng, DEng, AIT, Thailand.

Professor (*Energy and Environmental Policy; Energy Economics*) [*Energy and Environmental Policy; Electricity Economics and Planning; Energy, Economic and Environmental Modelling; Energy Pricing*]

WEERAKORN ONGSAKUL, BEng, Chulalongkorn Univ, Thailand; MS, PhD, Texas A&M Univ, USA.

Associate Professor (*Artificial Intelligence Applications to Power Systems; Parallel Processing Applications; Power System Operation & Control; Power System Restructuring*)

ANIMESH DUTTA, PhD, Dalhousie University, Canada; MEng, Asian Institute of Technology, Thailand; BSc(Eng), Bangladesh University of Engineering and Technology, Bangladesh.

Assistant Professor (*Biomass Energy*)

Boiler Design; Emission Control Technologies; Heat Transfer; Thermo/ Fluids)
[Clean energy technology; Energy conservation, Gasification/ combined cycle power generation, CO2 management, Heat transfer augmentation and energy management]

MITHULANANTHAN NADARAJAH,
BScEng, MEng, Univ of Peradeniya, Sri Lanka; PhD, Univ of Waterloo, Canada.

Assistant Professor
(Application of FACTS controllers; Controller Interactions; Power System Oscillation; Voltage Stability)

17.4 Completed Grant and Sponsored Research

Collection of Environmental Technology Data in Thailand and One Country in South Asia.

Duration 1 Jan 2006 to 30 Nov 2006

Project Description: Activities of this project include collection of key data on environmental technologies and emissions related to various sectors in Thailand and one of the countries in South Asia based on available statistical reports and publications.

Project Investigator: Prof. Ram Shrestha
Sponsors: Environmental Research Center Co., Ltd., Japan

Total Contracted Amount: (Baht) 331,000

Assessment of Cost Effectiveness and Insulation.

Duration 1 Feb 2006 to 31 Dec 2006

Project Description: The project aims to develop methodology on testing and evaluation of cost-effectiveness of insulation and to conduct physical experiment utilizing the methodology on motor car and on two experimental houses.

Project Investigator: Prof. Surapong Chirattananon
Sponsors: Siam Fiberglass Co., Ltd

Total Contracted Amount (Baht) 700,000

Analysis of Energy and Air Pollutant Database in ASEAN and South Asian Countries.

Duration 20 Nov 2005 to 30 Nov 2006

Project Description: The project objectives are: 1) collection of temporal and spatial energy and air pollutant data of selected ASEAN and South Asian countries; and 2) analysis of collected data for the energy systems development and mitigation options of greenhouse gas and other local

pollutants in selected ASEAN and South Asian countries.

Project Investigator: Prof. Ram Shrestha
Sponsors: Mizuho Information and Research Institute, Inc., Japan

Total Contracted Amount (Baht) 1,821,050

Asian Regional Research Program in Energy, Environment and Climate, Phase III.

Duration: January 2002 – January 2006

Project Description: The proposed phase III of ARRPEEC (ARRPEEC – III) consists of four regional research projects involving twenty five collaborating NRIs from China, India, Indonesia, Malaysia, Philippines, Sri Lanka, Thailand and Vietnam. The research themes of vital importance related to EEC issues in the region to be addressed by ARRPEEC-III during 2002-2004 are: (i) Greenhouse gas (GHGs) mitigation and pollution prevention in small and medium scale industries, (ii) GHGs and other harmful emissions mitigation in the power sector, (iii) GHG and other harmful emission mitigation in the urban transportation sector, and (iv) Emissions mitigation through biomass energy. ARRPEEC-III facilitates carrying out research on energy environment and climate issues in the four themes with the objective of capacity mobilisation and enhancement at the NRIs, establishing linkage of project level activities in the participating countries with national, regional and global initiatives for reducing emissions. ARRPEEC III will study and analyse various issues relevant to implementation of the selected promising technological options in each of the four themes in the participating countries.

ARRPEEC-III will provide further opportunity to the NRIs from different countries to work together and in partnership with AIT on a number of common issues, to jointly develop research methodology, to gain professionally through sharing of experience and research results, and to assess important national GHG mitigation options.

Project Investigator(s): Prof. S.C. Bhattacharya, Prof. R.M. Shrestha, Prof. C. Visvanathan and Dr. S. Kumar

Sponsor(s): Sida, Sweden

Total Contracted Amount: Baht 48,380,738

An Improved Lagrangian Relaxation for Generation Scheduling in Day-Ahead Electricity Market.

Duration: May 2002 – December 2006

Project Description: To determine the optimal day-ahead scheduling by an improved Lagrangian Relaxation in a Competitive market.

Investigator(s): Ms. Nit Petcharaks and Dr. Weerakorn Ongsakul

Sponsor(s): Energy Policy and Planning Office (EPPO), Thailand

Total Contracted Amount: (Baht) 82,000

Analysis of Energy and Air Pollutant Database in ASEAN and South Asian Countries.

Duration: 20 November 2005 to 30 November 2006

Project Description: The project objectives are: 1) collection of temporal and spatial energy and air pollutant data of selected ASEAN and South Asian countries; and 2) analysis of collected data for the energy systems development and mitigation options of greenhouse gas and other local pollutants in selected ASEAN and South Asian countries.

Investigator: Prof. Ram Shrestha
Sponsors: Mizuho Information and Research Institute, Inc., Japan

Total Contracted Amount: B 1,821,050

Assessment of Cost Effectiveness of Insulation.

Duration: February 2006 – December 2006

Project Description: This project aims to develop methodology on testing and evaluation of cost-effectiveness of insulation and to conduct physical experiment utilizing the methodology on motor car and on two experimental houses.

Investigator(s): Prof. Surapong C.
Sponsor(s): Siam Fiberglass Co., Ltd.

Total Contracted Amount: (Baht) 700,000

Collection of environmental technology data in Thailand and at least one country in South Asia.

Duration: 1 Jan 2006 – 30 Nov 2006

Project Description: Activities of this project include collection of key data on environmental technologies and emissions related to various sectors in Thailand and one of the countries in South in Asia based on available statistical reports and publications.

Investigator(s): Prof. Ram M. Shrestha
Sponsor(s): Environmental Research Center Co., Ltd.

Total Contracted Amount: (Baht) 331,100

Capacity Building in Formulating Harmonized Policy Instruments for the Promotion of Renewable Energy (RE) and Energy Efficiency (EE) in the ASEAN Member Countries (EC-ASEAN Energy Facility 62-2003).

Duration: January 2005 to January 2006

Project Description: The main objective of this project is to establish National Associations for disseminating cogeneration and distributed system projects in individual ASEAN countries as a means to achieve an increase in awareness of cogeneration projects and implementing such projects which lead to adoption energy efficient technologies for providing the need existing in electricity sector in the ASEAN countries. The countries which have a well-defined and structured energy efficiency plans and also those countries geared towards embracing renewable energy and alternative energy resources and technology are identified as the most ready countries for setting up these National Association for Cogeneration and Distributed Systems.

Investigator(s): Dr. N. Mithulanathan and Dr. Weerakorn O.

Sponsor(s): EC

Total Contracted Amount: B 7,969,800.00

Capacity Development for the Clean Development Mechanism (CDM) –Phase 2.

Duration: April 2003 to March 2006

Project Description The project aims at generating in participating developing countries a broad understanding of the opportunities offered by the Clean Development Mechanism, and developing necessary institutional and human capabilities that allows them to formulate and implement projects under the CDM. The project will help to establish green house gas emission reduction projects that are consistent with national sustainable development goals and will help develop national capabilities in analysing the technical and financial merits of Clean Development Mechanism project proposals.

Investigator(s): Prof. S.C. Bhattacharya, Prof. R. M. Shrestha and Prof. S. Kumar

Sponsor(s): UNEP Collaborating Centre on Energy and Environment, Denmark UCCEE

Total Contracted Amount: B 8,400,000

Capacity Development Activities for the Clean Development Mechanism.

Duration: April 2003 to March 2006

Project Description: This activity is one of the four regional workshops to be organized by AIT in the framework of the project "Capacity Development for the Clean Development Mechanism". The main objective of the regional workshops is to establish cross-country links in three Asian countries: Cambodia, Philippines, and Vietnam. The workshops will help to provide the conditions for a synergistic interaction through: (1) greater understanding of country commonalities on approaching CDM issues; (2) identifying shared needs on technical assistance and support; and (3) sharing training activities, methods and materials to be developed in the project context. In short, building synergies, avoiding duplication of effort, and carrying out joint coordinated implementation of national activities are the objectives of the workshops.

Investigator(s): Prof. S.C. Bhattacharya, Prof. R. M. Shrestha and Prof. S. Kumar

Sponsor(s): URC, Denmark

Total Contracted Amount: B 2,956,875

Electricity Supply Industry International Conference 2006.

Duration: January 2006 – January 2006

Project Description: Review of structures of international electricity supply industry. The international review and the review of the past and present situation of the electricity supply industry in Thailand will form a basis for recommendation for the reform of the electricity supply industry in Thailand. The study will also recommend the steps for implementation of the reform and of privatization of the present state enterprises.

Investigator: Prof. Surapong C.

Sponsor(s): Minimum 100 Participants, Academics, Officials, Private

Companies, International Organizations

Total Contracted Amount: B1,650,000

Energy Code for New Buildings.

Duration: October 2005 – December 2006

Project Description: This project aims to develop requirements on efficiency of hot water generation and absorption chillers and to incorporate the results in whole building energy compliance in the Building Energy Code. The project also aims to develop procedure and tools, that include a computer code, to assist in the implementation of Building Energy Code on large buildings on a mandatory basis.

Investigator(s): Prof. Surapong Chiraratananon

Sponsor(s): Able Consultant Co.,Ltd.

Total Contracted Amount: (Baht) 2,000,000

Global Environmental Outlook – 4.

Duration: January 2005 - January 2006

Investigator(s): Prof. Ram M. Shrestha
Sponsor(s): United Nations Environment Programme (UNEP) Regional Office for Asia and the Pacific (ROAP)

Total Contracted Amount: (Baht) 585,000

Integrated Assessment Model for Developing Countries (IAMDC) and Analysis of Mitigation Options and Sustainable Development Opportunities.

Duration: October 2003 to March 2006

Project Description "Integrated Assessment Model for Developing Countries (IAMDC) and assessment of mitigation options and sustainable development opportunities" is a proposal jointly developed by three institutions of excellence in the Asian-Pacific region – the Indian Institute of Management, Ahmadabad India (IIMA), Energy Research Institute, Beijing China (ERI) and Asian Institute of Technology, Bangkok, Thailand (AIT). The project aims to develop an Integrated Model from a developing country perspective for assessment of potential climate change mitigation and options in the context of national sustainable development priorities and policies.

Investigator(s): Prof. Ram M. Shrestha, Prof. S. Kumar

Sponsor(s): Asia Pacific Network for Global Change Research

Total Contracted Amount: (Baht) 1,665,300

Setting Up of National Associations for Cogeneration and Distributed Systems in ASEAN (EC-ASEAN Energy Facility 61-2003).

Duration: January 2005 to January 2006

Project Description The main objective of this project is to establish National Associations for disseminating cogeneration and distributed system projects in individual ASEAN countries as a means to achieve an increase in awareness of cogeneration projects and implementing such projects which lead to adoption energy efficient technologies for providing the need existing in electricity sector in the ASEAN countries. The countries which have a well-dedined and structured

energy efficiency plans and also those countries geared towards embracing renewable energy and alternative energy resources and technology are identified as the most ready countries for setting up these National Association for Cogeneration and Distributed Systems in ASEAN countries.

Investigator(s): Dr. Weerakorn O. and Dr. N. Mithulananthan

Sponsor(s): EC

Total Contracted Amount: B 7,875,843.65

Strategic Database of Energy and Air Pollution in ASEAN and South Asian Countries.

Duration: April 2005 to August 2006

Project Description: The objectives of the project are: (i) to collect data on energy consumption and air pollutant emissions by fuel type and by sector of selected ASEAN and South Asian countries from the available statistical publications and available research publication, and (ii) to assess the potential of different policies and measures to mitigate emissions of green house gases and local/regional level pollutants in selected ASEAN and South Asian countries.

Investigator(s): Prof. Ram M. Shrestha

Sponsor(s): Mizuho Information and Research Institution, Inc.

Total Contracted Amount: B 3,650,000

Workshop on Mainstream Policies and Investment on Low Carbon.

Duration: August 2006 to November 2006

Project Description Workshop on Mainstreaming Policies and Investment in Low Carbon: Opportunities for new approaches to investment and flexible mechanisms. The workshop aims to strengthen the national and regional capacity policies in promoting a lower carbon economy and to provide regional forum to define critical regional requirements for enhancing investment into regional and national level adaption, low carbon economies and to exploration of flexible market-based mechanisms (including CDM) and their regional application.

Investigator(s): Dr. N. Mithulananthan and Prof. Ram M. Shrestha

Sponsor(s): UN ESCAP

Total Contracted Amount: B 2,489,000

17.5 On-going Grant and Sponsored Research

The Potential for Transferring and Implementing Sustainable Energy Technologies Through the Clean Development Mechanism of the Kyoto Protocol.

Duration: 1 February 2006 to 31 January 2008

Project Description: The project mainly studies and analyzes the potential of transferring and implementing sustainable energy technologies for GHG emission reduction through the Clean Development Mechanism of the Kyoto Protocol in few countries. There are seven partners participating in this project from all over the world. AIT's

involvement is mainly related to Thailand, mainly in CDM status and potential, technology transfer case study and dissemination workshop.

Project Investigators: Dr. Nadarajah Mithulananthan and Dr. Animesh Dutta

Sponsors: European Commission

Total Contracted Amount: B 2,237,200

Transfer of EU Knowledge and Technology for Development of Wind Energy Technology in Thailand.

Duration: 1 January 2006 to 28 February 2006

Project Description: The overall objective of the project is to help Thailand to develop the wind energy sector with the transfer of knowledge and technology from the EU and to support the Thai government move towards greater energy security, energy diversity and energy dependence. The objective is coupled with the promotion of EU wind energy technology in Thailand. This will enhance the long standing relationship between EU and Thailand by mutual cooperation in the wind energy sector

Project Investigator: Dr. N. Mithulananthan, Dr. Weerakon Ongsakul and Dr. Animesh Dutta

Sponsors: Small Projects Facility, European Commission

Total Contracted Amount: B 6,575,000

Training of Trainors and Transfer of Efficient EU Technologies in the Sugar Sector of Thailand.

Duration: 1 Jan 2006 to 31 Jan 2007

Project Description: The project promotes clean and efficient EU technologies associated with the sugar sector and EU sources of financing among the sugar millers in Thailand while simultaneously building their capacity in energy project development and financing (through trainings, seminars and site visits).

Project Investigator: Dr. N. Mithulananthan, Dr. N. Mithulananthan, Dr. Weerakon Ongsakul, Dr. Animesh Dutta, Prof. Surapong Chirarattananon

Sponsors: Small Projects Facility, European Commission

Total Contracted Amount: B 9,500,000

Urban and Peri-Urban Energy Access Phase 1.

Duration: 14 July 2006 to 14 January 2007

Project Description: The Urban and Peri-Urban Energy Access project builds on the work carried out by the Energy Access Working Group during previous research phases. The objective is this new research theme is to analyze the challenges faced by the poor in urban and peri-urban areas in respect of their lack of access to modern forms of energy. The impact of past and planned energy reforms on these areas will be analyzed and opportunities for actions to enhance energy access in these areas will be identified.

Project Investigator: Prof. Ram Shrestha and Prof. Sivanappan Kumar

Sponsors: Global Network for Energy and Sustainable Development

Total Contracted Amount: (Baht) 281,250

Analyses of Energy related Environment Emissions in ASEAN and South Asian Countries.

Duration: 20 Sept 2006 to 31 Dec 2007

Project Description: The objectives of the project are: (i) Collection of temporal and spatial energy and emissions related data of selected ASEAN and South Asian countries; and (ii) analyses of collected data for the energy systems development and mitigation options of greenhouse gas and other local pollutant emissions in selected ASEAN and South Asian countries.

Project Investigator: Prof. Ram M Shrestha

Sponsors: Mizuho Information and Research Institution, Inc.

Total Contracted Amount: B 1,950,000

Asian Regional Research Programme in Energy Environment and Climate Phase III – Extension.

Duration: 1 Jan 2006 to 31 March 2007

Project Description: The aim of the project is to prepare a proposal on climate change mitigation research programme in selected Asian countries. This would entail, for example: organization of workshops with the participation from AIT investigators, resource persons, stakeholders, NGOs and researchers from national, regional and international agencies, and discussion with stakeholders.

Project Investigator: Prof. S. Kumar, Prof. Ram M. Shrestha, Prof. C. Visvanathan

Sponsors: Swedish International Development Cooperation Agency (Sida)

Total Contracted Amount: B 6,038,761

Renewable Energy Technology in Asia Phase III – Extension.

Duration: 1 Sept 2005 to 31 March 2007

Project Description: The aim of the project is to prepare a proposal on climate change mitigation research programme in selected Asian countries. This would entail, for example: organization of workshops with the participation from AIT investigators, resource persons, stakeholders, NGOs and researchers from national, regional and international agencies, and discussion with stakeholders.

Project Investigator: Prof. S. Kumar, Prof. Ram M. Shrestha, Prof. C. Visvanathan

Sponsors: Swedish International Development Cooperation Agency (Sida)

Total Contracted Amount: B 7,976,756.26

Technical Officer Training.

Duration: 1-Nov-06 to 28-Feb-07

Project Description: As part of this project, 3 technical officers from University of Moratuwa, Sri Lanka will come to AIT for a month to get training in Energy field of study and Food Engineering and Bioprocess Technology field of study. They will be spending two weeks each in the two mentioned field of studies.

Project Investigator: Dr. N Mithulananthan

Sponsors: University of Moratuwa, Sri Lanka

Total Contracted Amount: B 125,400.00

Targeted Capacity Development on CDM in Thailand.

Duration: 15 April 2006 to 30 January 2007

Project Description: The project aims to enable Thailand to actively participate in the global carbon market through having a market and regulatory environment that is conducive for the Clean Development Mechanism (CDM) project preparation, assessment, approval and implementation. The project will comprise a series of events – i) four national workshops, ii) two executive brief meetings and iii) two study tours. These activities would develop capacities for CDM project development, as well as capacities that are able to secure a smooth and effective project assessment and approval procedure by the Designated National Authority (DNA).

Project Investigator: Prof. Ram M. Shrestha, Prof. Sivanappan Kumar

Sponsors: UNEP Risoe Center, Denmark

Total Contracted Amount: B 2,452,450

Promotion of Biofuels for Sustainable Development in South and Southeast Asia.

Duration: 25 May 2006 to 30 June 2007

Project Description: The overall objective of the project is to promote the use of biofuels in India and some nearby countries of South and Southeast Asia. The barriers to the use of biofuels are still substantial, as there is no policy framework, financing mechanisms are not in place, the awareness in the transportation sector of this clean technology is low, and the best technologies are not always available. On the biomass supply side, the agricultural sector has a lengthy experience with biomass production, and increasing the demand for biofuels would have positive economic implications for this sector. However there are policy barriers to be overcome as well. In order to meet the objective mentioned above, this project aims to raise awareness and develop adequate capacity in India and the neighbouring countries to increase use of biofuels in order to improve local environmental conditions and promote sustainable investment. Cooperation between India and European Union is a specific aim of the project as it would encourage both technology transfer and investment flows.

Project Investigator: Dr. Animesh Dutta, Prof. S. Kumar, Prof. R. Shrestha

Sponsor: Winrock International India

Total Contracted Amount: (Baht) 608,580

17.6 Publications

Refereed Journals

Abdul Salam P. and S.C. Bhattacharya, "A Comparative hydrodynamic study of two types of spouted bed reactor

- designs", *Chemical Engineering Science*, Vol. 61, pp. 1946-1957, 2006.
- Abdul Salam P. and S.C. Bhattacharya, "A Comparative Study of Charcoal Gasification in Two Types of Spouted Bed Reactors", *Energy*, Vol. 31, pp. 228-243, 2006.
- Animesh Dutta, Shantanu Dutta and Prabir Basu, "Techno-Economic Evaluation of Revamping of Coal-Fired Power Plants in India" *International Journal Global Energy Issues*, pp. 6-42, Vol. 26, No. 1/2, 2006.
- Arthit Sode-Yome, N. Mithulananthan and Kwang Y. Lee "A Maximum Loading Margin Method for Static Voltage Stability in Power Systems" *IEEE Transactions on Power Systems*, Vol. 21, No. 2, pp. 799-808, May 2006.
- Arthit Sode-Yome and N. Mithulananthan "An Economical Generation Direction for Power System Static Voltage Stability" *Electric Power Systems Research*, Vol.76, No. 12, pp. 1075 - 1083, August 2006.
- Augustus Leon M. and S. Kumar "Mathematical Modeling and Thermal Performance Analysis of Unglazed Transpired Solar Collectors" *Solar Energy*, Vol. xxx No. xx pp. xxx-xxx, June 2006.
- Durga Gautam and Nadarajah Mithulananthan "Optimal DG Placement in Deregulated Electricity Market" *Electric Power Systems Research*, Vol. xxx pp. xxx-xxx, 2006.
- Govinda R. Timilsina and Ram M. Shrestha "General equilibrium effects of a supply side GHG mitigation option under the clean development mechanism", *Journal of Environmental Management*, Vol. 80, pp. 327-341.
- Lidula, N.W.A., N. Mithulananthan, W. Ongsakul, C. Widjaya and R. Henson "ASEAN Towards Clean and Sustainable Energy: Potentials, Utilization and Barriers" *Renewable Energy*, Vol. x (xxx) pp. xxx-xxx, 2006.
- Naresh Acharya and N. Mithulananthan, "Locating Series FACTS Devices for Congestion Management in Deregulated Electricity Markets", *Electric Power Systems Research*, Vol. xxx, pp. xxx - xxx, 2006.
- Nadarajah Mithulananthan and Naresh Acharya, "A Proposal for Investment Recovery of FACTS Devices in Deregulated Electricity Markets", *Electric Power Systems Research*, Vol. xxx, pp. 1 - 9, 2006.
- Naresh Acharya, Pukar Mahat and N. Mithulananthan "An Analytical Approach for DG Allocation in Primary Distribution Network" *Electrical Power & Energy Systems*, Vol. x No. xx, pp. xxx-xxx, February 2006.
- N. Phuangpornpitak and S. Kumar "PV Hybrid Systems for Rural Electrification in Thailand" *Renewable & Sustainable Energy Reviews*, Vol. x (xxx) pp. xxx-xxx, 14 pages, 2006.
- Naresh Acharya and Nadarajah Mithulananthan "Influence of TCSC on Congestion and Spot Price in Electricity Market with Bilateral Contract" *Electric Power Systems Research*, Vol. xxx, xxx-xxx, 14 pages, 2006.
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- Pornrapeepat Bhasaputra and W. Ongsakul "Multi-Objective Optimal Placement with Multi-type FACTS Devices by Hybrid TS/SA Approach", *International Journal Energy Technology and Policy (IJETP)*, Special Issue on Present and Future of Flexible AC Transmission Systems Controllers in Power Systems, Vol. 4, Nos. 3/4, pp. 294-319, 2006.
- Prapapong Vangtook and Surapong Chirarattananon, "An experimental investigation of application of radiant cooling in hot humid climate" *Energy and Buildings*, Volume 38, Issue 4, pp. 273-285, April 2006.
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- Rui Zhang, Animesh Dutta and Prabir Basu, "Heat Transfer to the Ceiling of the Riser of a Circulating Fluidized Bed", *Chemical Engineering Science*, Vol. 61, pp. 5907-5911, 2006.
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- Surapong Chirarattananon, P. Rukkwanusuk, P., Chaiwiwatworakul and P. Pakdeepol "Evaluation of Vertical Illuminance and Irradiance Models against Data from North Bangkok", submitted to *Building and Environment*, 2006.
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- Vu Ngoc Dieu and W. Ongsakul, "Enhanced Augmented Lagrangian Hopfield Network for Unit Commitment", provisionally accepted for publication in *IEE Proceedings - Generation, Transmission & Distribution*, April 2006.
- Zhang, R., A Dutta and P. Basu, "Heat Transfer to the Ceiling of the Riser of Circulating Fluidized Bed", *Journal of Chemical Engineer Science*, in press, online May 2006.
- "Govinda R. Timilsina and Ram M. Shrestha, 2007, *Alternative tax instruments for CO2 emission reduction and effects of revenue recycling schemes*, Energy Studies Review, Vol. 15 (accepted for publication)

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- Bhattacharya, S.C., and P. Abdul Salam, "A Review of Selected Biomass Energy Technologies: Gasification, Combustion, Carbonization and Densification" ISBN 974-8257-14-2, April 2006.
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- Arthit Sode- Yome, N. Mithulananthan and Kwang Y. Lee, "Voltage Stability Assessment and Enhancement of Thailand Power Systems," *IFAC Symposium on Power Plants and Power Systems Control*, Kananaskis, Canada, June 25-28, 2006.
- Arthit Sode- Yome, N. Mithulananthan and Kwang Y. Lee, "Economic Generation Direction for Power System Static Voltage Stability," *IEEE GM 2006*,

- Montreal, Qubec, Canada, June 18-22, 2006.
- Arthit Sode- Yome and N. Mithulanathan, "Static Voltage Stability Study Using MATLAB Symbolic and Optimization Toolboxes," *ESD2006*, Phuket, Thailand, March 1-3, 2006.
- Boonchiam, P. and N. Mithulanathan, "Diode-clamped Voltage Source Converter for Medium Voltage Dynamic Voltage Restorer," *ESD2006*, Phuket, Thailand, March 1-3, 2006.
- Boonchiam, P. and N. Mithulanathan, "Dynamic Control Strategy in Medium Voltage DVR for Mitigating Voltage Sag/Swell", *PowerCON2006*, Chongqing, China, 2006.
- Boonchiam, P. and N. Mithulanathan, "Optimizing Energy Storage for Medium Voltage Dynamic Voltage Restorer using Genetic Algorithm", *ECON29*, Pattaya, Chonburi, 2006.
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- Boonchiam, P. and N. Mithulanathan, "Voltage Sag Mitigation using DSTATCOM based on Multilevel VSC,EMSES, Kyoto, Japan, 2006.
- Durga Gautam and N. Mithulanathan, "Optimal DG placement in LMP based Electricity Market for Social Welfare Maximization," *ESD2006*, Phuket, Thailand, March 1-3, 2006.
- Dutta, A., P. Basu, and A Ghosh, "Waste to Energy-A Techno Economic Study", in the *Proceedings of Energy for Sustainable Development: Issues and Prospects*, Energy Field of Study, AIT, Phuket, Thailand, 2006.
- S. Jarungthammachote and A. Dutta, "Thermodynamic Equilibrium Model of a Downdraft Waste Gasifier", in the *Proceedings of 2nd Joint International Conference on Sustainable Energy and Environment: Technology and Policy Innovations (SEE 2006) at the JGSEE and Kyoto University*.
- Jutamane and A. Dutta, "Productive Uses of Energy for Rural Application to Achieve Sustainable Development: A Case Study for Thailand", in the *Proceedings of 2nd Joint International Conference on Sustainable Energy Environment: Technology and Policy Innovations (SEE 2006) at the JGSEE and Kyoto University*.
- Naresh Acharya and N. Mithulanathan, "Effect of TCSC on Spot Price and Congestion Management in Deregulated Electricity Markets," *ESD2006*, Phuket, Thailand, March 1-3, 2006.
- Pukar Mahat, Weerakorn Ongsakul and N. Mithulanathan, "Optimal placement of Wind Turbine DG in Primary Distribution System for Real Power Loss Reduction," *Proceeding of Energy for Sustainable Development: Prospects and Issues for Asia*, Phuket, Thailand, March 1-3, 2006.
- Surapong Chirarattananon and K. Kubaha, "Potential Energy and Power Demand Savings from Application of New Building Energy Code in Thailand", *Proceedings of a conference on Energy for Sustainable Development: Prospects and Issues for Asia*, Phuket, Thailand, 1-3 March 2006.
- Surapong Chirarattananon, Nyi Nyi Htan, Rizwan Ahmed Menon, and Prapapong Vangtook "Thermal Comfort Assessment in Two Tropical Regions and Radiant Cooling as a Passive Cooling Option", *Proceedings of an international conference on Comfort and Energy Use in Buildings*, Cumberland Lodge, Winsor, United Kingdom, 27-30 April 2006.
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- Japanya, K. and W. Ongsakul, "Optimal Bidding Strategy in Competitive Market Using Genetic Algorithm" *Proceedings of Energy for Sustainable Development: Prospects and Issues for Asia*, Phuket, March 1-3, 2006.
- Keerati Chayakulkeeree and W. Ongsakul, "Optimal Power Flow Considering Non-Linear Fuzzy Network and Generator Ramp Rate Constraints", *Proceedings of Energy for Sustainable Development: Prospects and Issues for Asia*, Phuket, March 1-3, 2006.
- Pornrapeepat Bhasaputra and W. Ongsakul, "Multi-Objective Optimal Placement with Multi-Type FACTS Devices for Thailand Power System", *Proceedings of Energy for Sustainable Development: Prospects and Issues for Asia*, Phuket, March 1-3, 2006.
- Purka Mahat, W. Ongsakul, and M. Nadarajah, "Optimal Placement of Wind Turbine DG in Primary Distribution Systems for Loss Reduction", *Proceedings of Energy for Sustainable Development: Prospects and Issues for Asia*, Phuket, March 1-3, 2006.
- Thawatch Kerdchuen and W. Ongsakul, "Optimal Measurement Placement for Power System State Estimation Using Hybrid Genetic Algorithm and Simulated Annealing", *Proceedings of International Conference on Power System Technology (POWERCON2006)*, Chongqing, China, Oct. 22-26, 2006.
- Vu Ngoc Dieu and W. Ongsakul, "Augmented Lagrange Hopfield network for multiobjective fuel constrained economic dispatch", *Proceedings of Energy for Sustainable Development: Prospects and Issues for Asia*, Phuket, March 1-3, 2006.
- Vu Ngoc Dieu and W. Ongsakul, "Augmented Lagrange Hopfield Network for Combined Heat and Power Economic Dispatch," *Proceedings of Energy for Sustainable Development: Prospects and Issues for Asia*, Phuket, March 1-3, 2006.
- Vu Ngoc Dieu and W. Ongsakul, "Enhanced augmented Lagrange Hopfield network for constrained economic dispatch with prohibited operating zones," *Proceedings of Energy for Sustainable Development: Prospects and Issues for Asia*, Phuket, March 1-3, 2006.
- Vu Ngoc Dieu and W. Ongsakul, "Enhanced augmented Lagrange Hopfield network for economic dispatch with piecewise quadratic cost functions", *Proceedings of Energy for Sustainable Development: Prospects and Issues for Asia*, Phuket, March 1-3, 2006.
- Vu Ngoc Dieu, W. Ongsakul, and W. Kuersuk, "Enhanced Merit Order and Augmented Lagrange Hopfield Network for Transmission Constrained Unit Commitment", *accepted for presentation at Australian Universities Power Engineering Conference 2006 (AUPEC 06)*, Victoria University, Melbourne, Australia, December 10-13, 2006.
- Weerakorn Ongsakul and T. Kerdcheun, "Optimal Measurement Placement with Single Measurement Loss Contingency for Power System State Estimation Using Refined Genetic Algorithm", *Proceedings of Energy for Sustainable Development: Prospects and Issues for Asia*, Phuket, March 1-3, 2006.
- Weerakorn Ongsakul and P. Jirapong, "Optimal Placement of Multi-type FACTS Devices for Total Transfer Capability Enhancement Using Improved Evolutionary Programming", *Proceedings of Energy for Sustainable Development: Prospects and Issues for Asia*, Phuket, March 1-3, 2006.
- Weerakorn Ongsakul and N. Petcharak, "Unit Commitment by Hybrid Lagrangian Relaxation and Quadratic Programming", *Proceedings of Energy for Sustainable Development: Prospects and Issues for Asia*, Phuket, March 1-3, 2006.
- Wichit Kuersuk and W. Ongsakul, "Optimal Placement of Distributed Generation Using Particle Swarm Optimization", *accepted for presentation at Australian Universities Power Engineering Conference 2006 (AUPEC 06)*, Victoria University, Melbourne, Australia, December 10-13, 2006.

17.7 Doctoral Students' Dissertation

An Enhanced Lagrangian Relaxation Program for Constrained Hydrothermal Generation Scheduling

By: Nit Petcharak

Supervisor: Dr. Weerakorn Ongsakul (Chairperson), Prof. Surapong Chirarattananon and Prof. John C. S. Tang
External Examiner: Professor S. A. Khaparde

17.8 Masters Students' Theses and Research Studies

Transmission Network Explaining Planning for Lao PDR System.

By: Ms. Sengamphone Phanavanh (Laos)
Supervisor: Dr. Weerakorn O., Prof. Surapong C. and Dr. N. Mithulanathan

An Assessment on the use of Biomass Cooking Stove in Cambodia: Case Study in Battambang Province.

By: Mr. Thourk Mony (Cambodia)
Supervisor: Prof. S. Kumar, Prof. Surapong C. and Dr. A. Dutta

Upgrading and Planning of the Electricity Distribution System in Battambang Province, Cambodia

By: Mr. Meng Sok Kheng (Cambodia)
Supervisor: Dr. N. Mithulanathan, Dr. Weerakorn O. and Prof. Surapong C.

Solar/Biomass/Rock-bed Storage for Continuous Drying

By: Mr. Rut Korsakul (Thailand)
Supervisor: Prof. S. Kumar, Prof. Surapong C. and Dr. A. Dutta

Heat Island and Electrical Energy Consumption in Urban Area.

By: Ms. Pathathai Tonsuwonnont (Thailand)
Supervisor: Prof. S. Kumar, Prof. Surapong C., Dr. Junichi Susaki and Dr. L.A.S. Ranjith Perera

Optimal Bidding Strategy in a Competitive Market Using Genetic Algorithm.

By: Mr. Kritsada Japanya (Thailand)
Supervisor: Dr. Weerakorn O., Prof. Surapong C. and Dr. N. Mithulanathan

Socio- Economic Impact of Rural Electrification in Bhutan

By: Mr. Om Bhandari (Bhutan)
Supervisor: Prof. R.M. Shrestha, Prof. S. Kumar and Dr. N. Mithulanathan

Long Term Energy System Development and the Environment: The Role of Nuclear Power in Vietnam.

By: Ms. Pham Thi Thuy Trang (Vietnam)
Supervisor: Prof. R.M. Shrestha, Prof. S. Kumar and Dr. A. Dutta

Electricity Demand Forecasting: A Case Study in Vietnam.

By: Ms. Nguyen Thi Ngoc Bich (Vietnam)
Supervisor: Prof. R.M. Shrestha, Dr. Weerakorn O. and Dr. N. Mithulanathan

Developing a Regional Energy System for Selected ASEAN Countries: Energy Resource and Environment Implications

By: Mr. Nguyen Ngoc Hung (Vietnam)
Supervisor: Prof. R.M. Shrestha, Prof. S. Kumar and Dr. A. Dutta

Power Interconnection Study of Vietnam and South China.

By: Mr. Nguyen Xuan Phuong (Vietnam)
Supervisor: Dr. N. Mithulanathan, Dr. Weerakorn O. and Prof. Surapong C.

Improvement of Reliability for Load Customer Units in Vietnam.

By: Mr. Bui Thanh Trung (Vietnam)
Supervisor: Prof. Surapong C., Dr. Weerakorn O. and Dr. N. Mithulanathan

Voltage Drop Reduction in Electric Power Distribution System using Distributed Generation.

By: Mr. Huynh Huy Giap (Vietnam)
Supervisor: Dr. N. Mithulanathan, Prof. Surapong C. and Dr. Weerakorn O.

Optimal Placement of TCSC to Maximize Load ability Power System Using Genetic Algorithm: A Case of 500 KV Vietnamese Systems.

By: Mr. Nguyen Hai Ha (Vietnam)
Supervisor: Dr. Weerakorn O., Dr. N. Mithulanathan and Prof. Surapong C.

Performance Assessment of Single and Double Effect solar Solid Adsorption Chemical Heat Pump Systems.

By: Mr. Kamrujjaman Khan (Bangladesh)
Supervisor: Prof. S. Kumar, Prof. Surapong C. and Dr. A. Dutta

A Study on Air Movement and the Effect of Heated Stack for Ventilation on a Model House.

By: Mr. Huynh Tan Khiem (Vietnam)
Supervisor: Prof. Surapong C., Prof. S. Kumar and Dr. A. Dutta

A Study of Air Distributor System for Fluidizer Boilers

By: Mr. Md. Mahbube Khoda Siddiki (Bangladesh)
Supervisor: Dr. A. Dutta, Prof. S. Kumar and Prof. Surapong C.

Influence of Wind Farms on Power Static Voltage Stability.

By: Ms. Lidula N. W. Arachchige (Sri Lanka)
Supervisor: Dr. N. Mithulanathan, Prof. Surapong C. and Dr. Weerakorn O.

Analytical Study of Factors Affecting to Electromechanical Oscillations in Power Systems.

By: Mr. A.M.C.J. Angamma (Sri Lanka)
Supervisors: Dr. Weerakorn O., Prof. Surapong C. and Dr. N. Mithulanathan

A Techno-Economic Study of Coal-Fired Power Plant in Vietnam.

By: Ms. Le Thu Ha (Vietnam)
Supervisors: Prof. Surapong C., Dr. N. Mithulanathan and Dr. A. Dutta

Design of a Robust Power System Stabilizer Using an Integrated Genetic Algorithm, Simulated Annealing and TABU Search.

By: Mr. Vo Hoang Anh Tuan (Vietnam)
Supervisors: Dr. Weerakorn O., Dr. N. Mithulanathan, Prof. Surapong C. and Dr. Issarachai N.

Construction of Fuel Cost Curve and Self Schedule for Combined Cycle Gas Turbine (CCGT) Units at Phu My Power Plant.

By: Mr. Au Nguyen Dinh Thao (Vietnam)
Supervisors: Dr. N. Mithulanathan, Dr. Weerakorn O. and Prof. Surapong C.

Improving the Performances of Gas Turbines at Cantho Thermal Power Plant by Reducing the Temperature of Compressor inlet Air.

By: Mr. Le Quoc Vu (Vietnam)
Supervisors: Dr. N. Mithulanathan, Dr. B. Mohanty, Prof. Surapong C. and Dr. Animesh Dutta

Optimal Placement of Distributed Generation Using Particle swarm Optimization.

By: Wichit Krueasak (Thailand)
Supervisors: Dr. Weerakorn O., Prof. Surapong C. and Dr. N. Mithulanathan

Security Constrained Unit Commitment in a Single Buyer Power Market: A Case of Vietpool.

By: Tran Thi Ngoc Chau (Vietnam)
Supervisors: Dr. Weerakorn O., Dr. N. Mithulanathan, Prof. Surapong C. and Prof. Ram M. Shrestha

Lighting Efficiency and Daylighting for Commercial Building: A Proposed DSM Program for EDC.

By: Sok Pal (Cambodia)
Supervisors: Prof. Surapong C., Dr. N. Mithulanathan and Dr. A. Dutta

Research Study

Efficiency Estimation of Electricity distribution Utilities in Vietnamese : A Data Envelopment Analysis.

By: Ms. Mai Luong Van (Vietnam)
Supervisor: Prof. R.M. Shrestha, Dr. N. Mithulanathan and Dr. Do Ba Khang

Fuel conversion for Thu Duc Thermal Power Station.

By: Mr. Nguyen Bao Long (Vietnam)
Supervisor: Prof. Surapong C., Dr. N. Mithulanathan and Dr. A. Dutta

Financial Analysis of Selected Wind Power Projects in Vietnam under the Clean Development Mechanism.

By: Mr. Trinh Quang Toan (Vietnam)
Supervisor: Prof. R.M. Shrestha, Prof. S. Kumar and Dr. A. Dutta

Financial Analysis of Selected Municipal Solid Waste Based CDM Power Generation Projects in Thailand.

By: Mr. Suwat Sahapiyapan (Thailand)
Supervisors: Prof. R. M. Shrestha, Prof. S. Kumar and Dr. A. Dutta

Chapter 18: SERD – ENVIRONMENTAL ENGINEERING AND MANAGEMENT FIELD OF STUDY

18.1 Introduction

Environmental Engineering at AIT began in 1964 with the need for sanitary engineering to address the problems of providing adequate water supplies and sanitation facilities. This pioneering environmental engineering program has grown into a range of fields needed to tackle the environmental issues facing Asia today.

Environmental Engineering and Management Field of Study is part of the School of Environment, Resources and Development. The overall program looks for solutions to environmental problems, water supply and sanitation, wastewater treatment and disposal systems, air pollution, solid and hazardous wastes, waste minimization, and life cycle assessment, environmental impact assessment and management and environmental toxicology. The three major focal areas are Environmental Technology and Management, Environmental Toxicology, Technology and Management, and Water and Wastewater Engineering.

18.2 Research Facilities and Laboratories

The Environmental Engineering (EE) Laboratory is housed with facilities to handle a wide range of knowledge and skills in problem solving for industrial needs and analytical works for physical, chemical, microbiological, and environmental parameters such as water and wastewater quality, air pollutants and noise level, and solid waste. For teaching, training and research purposes, the EE laboratory is categorized into three sub-laboratories namely, research, ambient, and environmental research station. The research laboratory is equipped with many sophisticated instruments such as

GC-IRD-MSD, HPLC, UV-Vis spectrophotometers, atomic absorption analyzer with flame, graphite and cold vapor operations, and gas and liquid chromatographs. For lab and pilot scale testing purposes, the ambient laboratory has furnished with facility to conduct experiments for treating sludge, sewage and industrial wastes. It is also housed with advanced water and wastewater treatment units such different membrane bioreactors, and high rate anaerobic treatment processes with methane gas recovery. The Environmental Research Station consists of pilot scale aerobic and anaerobic biological wastewater treatment units, constructed wetlands, waste stabilization ponds, a lysimeters for solid waste treatment, a hazardous wastewater treatment plant and ambient air monitoring station.

Among its major equipment include Gas Chromatograph; High Performance Liquid Chromatograph; Atomic Absorption Spectrometer; Total Organic Carbon Analyzer; Ion Chromatograph, Induced Couple Plasma, UV Spectrophotometer; Supercritical Fluid Extractor; Microwave Digestion System ; Primus Thermal Cyclers ; Universal Mutation Detection System; Microscope; Microbalance; Microcentrifuge.

18.3 Faculty and Research Staff

Full-time Faculty

AJIT P ANNACHHATRE, BTech, PhD, Indian Inst of Tech, Kanpur, India.

Professor (*Anaerobic Wastewater Treatment; Biofilm Processes; Environmental Biotechnology; Environmental Impact Assessment; Mathematical Modeling*)
[Anaerobic and Aerobic Wastewater Treatment;

Biofilm Processes for waste water treatment; Environmental Impact Assessment]

CHONGRAK POLPRASERT, BEng, Chulalongkorn Univ, Thailand; MEng, AIT, Thailand; PhD, Univ of Washington, USA.

Professor (*Hazardous Waste Engineering; Resources Recovery; Sanitation*)
[Sanitation; Waste Recycling; Hazardous Wastes]

CHETTIYAPPAN VISVANATHAN, BTech, IIT, Madras, India; MEng, AIT, Thailand; PhD, Inst Natl Polytech, Toulouse, France.

Professor (*Cleaner production; Industrial Environment Management; Membrane Technology for Water and Wastewater Treatment and , Solid Waste Management*)

NGUYEN THI KIM OANH, DipEng, Odessa Hydrometeorology Inst, Ukraine; MEng, DEng, AIT, Thailand.

Associate Professor (*Air Pollution Engineering and Management, Trans-boundary pollution, Air Pollution and Climate Interaction, Environmental Monitoring and Modelling, Exposure Assessment, Integrated Industrial Environment Management*)

[Particulate matter: ambient levels of coarse, fine and ultrafine particles, particle composition, source apportionment and climate forcing properties; Emission source characterization (diesel, biomass burning); Urban and regional scale modeling for photochemical smog and secondary particle formation in tropical urban areas; Integrated

management for open agroresidue burning; Rural – urban air pollution interaction; Air pollution meteorology; POP and toxic air pollutants in air and exchange fluxes between environmental media; Industrial air pollution control: cleaner combustion, auditing, workplace air quality, control devices; Co-fueling of POP in industrial combustion: POP destruction efficiency]	<i>and Management; Environmental Health and Sanitation)</i> [strategic environmental sanitation; natural treatment systems; ecological systems for waste management, decentralized waste/ wastewater management, and resource recovery]	<i>Research Institutions involved in the project, performs other duties as assigned)</i>
PREEDA PARKPIAN, BSc, Kasetsart Univ, Thailand; MSc, Mississippi State Univ; PhD, Texas A&M Univ, USA. Associate Professor <i>(Ecotoxicology; Heavy Metals; Micronutrient Chemistry)</i> [Micronutrient Chemistry; Heavy Metals; Ecotoxicology; Plant Nutrition; Environmental Pollution; Nutrient Recycling; Chemistry of Toxic Metals and Toxic Organics in Soils, Sediments, and Plants]	Visiting Faculty NGUYEN CONG THANH, BSc, DSc, Laval Univ, Canada. Visiting Professor <i>(Environmental impact assessment; Industrial pollution control; Wastewater management; Water supply)</i>	TENZIN NORBU, MSc Senior Research Associate <i>(Project Coordination and Management, handling technical reports, networking with research partners)</i> AUNG ZAW NAING LIN, MSc Research Associate <i>(Actively involve in Asian Regional Research Programme on Environmental Technology Program (ARRPET) research activities).</i>
OLEG V SHIPIN, MSc, Univ of Saratov; PhD, Inst of Biochemistry and Physiology of Microorganisms, Moscow, Russia. Associate Professor <i>Anaerobic and Aerobic Wastewater Treatment; Environmental Impact Assessment (Biophysical Environment); Microbial biotechnology (production of commercially important metabolites); Natural systems (ponds and wetlands) as Wastewater treatment systems; Microbial aspects of Environmental Engineering; Molecular Microbiology, Health Risk assessment and water -born pathogens</i>	SHINICHI OKAMOTO, BEng, MEng, DEng, Waseda Univ, Japan Visiting Professor <i>(Environmental Engineering)</i> Research Staff SALAYA PHUNSIRI, MSc Senior Laboratory Supervisor <i>(administrative for Environmental Engineering Laboratory as well as supervise for experimental and research projects on water, wastewater, air pollution, and solid wastes analysis)</i>	DANUTAWAT TIPAYAROM, MEng Research Associate <i>(manages researches on ambient air quality analysis especially agro-residue burning)</i> JEANGER P. JUANGA, MEng Research Associate <i>(Manages research projects, prepares technical reports and presentations)</i> PREM ANANTH ANIYARANGAN, MEng Research Associate <i>(Manages research projects, prepares technical reports and presentations)</i>
THAMMARAT KOOTATEP, BEng, Chiangmai Univ; MEng, DEng, AIT, Thailand. Assistant Professor <i>(Decentralized Waste and Wastewater Treatment Systems; Eco-engineering Technology for Waste and Wastewater Treatment</i>	MAUNG TIN WIN, MEng Research Laboratory Supervisor <i>(supervises instrumentation and data acquisition, calibration and maintenance of analytical instruments, assistant to senior laboratory supervisor for such as teaching, lab management, etc.,)</i> RAQUEL P. PEDRAJAS, MEng Senior Research Associate <i>(Assists in project coordination, prepares project reports, prepares project budgets and manages project finances, assists in maintenance of project websites, organizes international workshops, a conference, training programs and seminars, prepares project brochures, posters, etc., assists formulation of research proposal, co-edits project newsletters, assists evaluation of reports from National</i>	RADHA ADHIKARI, MSc Research Associate <i>(Report writing and project management)</i> SUKON HADSOI, MSc Research Associate <i>(Laboratory operating and sample analysis, report writing, project management and collaborating with research partners)</i> SUPATTRA JIAWKOK, MSc Research associate <i>(Manages research projects, prepares technical reports and presentations)</i> VO THI QUYNH TRUC, MSc Research Associate <i>(studying air pollution, effects of air pollution on human health, doing laboratory experiments, using models to analysing data)</i> WORRARAT THIANSAITHIT, MEng Research Associate <i>(Manages researches on diesel particulate matter</i>

and other air pollutants analysis)

Chaiyaporn Imsapsangworn, BSc
Laboratory Technician II
(Manages chemical and lab preparation for laboratory courses; assist students in laboratory experimental work and experimental set-up; data collection and fieldwork assistance to students and research staff)

WIJITRA SANSUD, BSc
Laboratory Technician II
(manages laboratory chemical and equipment inventory; issue chemical and equipments for students; conduct water analysis; assist in organizing laboratory sessions)

ORATHAI KLUBBARNKOH, BSc
Laboratory Technician II
(chemistry and environmental analysis for environmental samples as well as prepare for chemical and glassware for laboratory courses and research projects)

Panupong Boonyanun, BSc
Laboratory Technician II
(repair and maintenance of lab equipment and facilities; assists students in laboratory experimental work and experimental set-up)

Narongkorn Waew-ngam, BTech (Mech)
Lab Technician I (assists students in laboratory experimental work and experimental set-up)

EVELYN C. MARTEL, BSc
Project Assistant (assisting in research and administrative work)

HTIN AUNG KYAW, MCSE
Research Assistant (Project website and Computer trouble shooter.

SOMCHAI AREMSUM-ANG, B. Sc.
Research Assistant
(wastewater and soil analysis, field survey and data collection, testing and other laboratory sessions)

SUSAN JACOB, BTech
Research Assistant
(Manage finance and assist the team in its regular activities)

Walaiporn Siriratwatthana, B.S.

Research Assistant
(Laboratory operating and sample analysis, prepares technical reports and presentations, collaborating with research partners)

18.4 Completed Grant and Sponsored Research

Development of an International Long Distance Internet-Based Master Course on Environmental Technology and Management

Duration: October 2003 to September 2006
Investigator: Prof C Visvanathan
Sponsor: Asia-Link; European Commission
Total Contracted Amount: 2,621,843 Baht

Development of Microbial Characterization Techniques for Biological Wastewater Treatment in Developing Countries" under Center for Sustainable Urban Regeneration (cSUR) project

Project Description: The research conducted by AIT, focuses on the investigation of microbial groups in wastewater treatment process to find out their diversity and community profile and to develop the microbial characterization techniques for biological wastewater treatment in developing countries.
Duration: 1 Jan 2006 to 31 Dec 2006
Investigators: Prof Ajit P Annachhatre, Dr Toshiya Aramaki, UT
Sponsor: Center for Sustainable Urban Regeneration (cSUR), The University of Tokyo (UT)
Total Contracted Amount: 90,000 Baht

Development of Teaching and Training Modules for Higher Education in the Waste Management Sector (TETRAWAMA)

Project Description: The objective of this project is to establish a co-operation on curricula development and performance in the field of environmental education for higher education institutions. Sophisticated teaching modules shall combine presence, distant and multimedia learning considering the different cultural and economical background. The waste management sector was selected as a model case due to its multi-faceted issues and since it is very often overlooked during economic development.
Duration: April 2003 to September 2006
Investigator: Prof C Visvanathan
Sponsor: Asia-Link; European Commission

Total Contracted Amount: 1,374,912 Baht

Development of Toxic Industrial wastewater Treatment Technology Based on Advanced Oxidation Processes & Membrane Bioreactor

Project Description: The aim of this project is to determine the possibility of removing pentachlorobenzene and hexachlorobenzene contaminated wastewater by a combination of advanced oxidation processes and membrane bioreactor process. This proposed treatment system is one of the most promising strategies that are able to handle such toxic wastes effectively. In addition, the degradation mechanisms as well as the economical viability will also investigate.

Duration: Nov 2005 to Nov 2006
Investigator: Prof C Visvanathan
Sponsor: Royal Thai Government
Total Contracted Amount: 1,000,000 Baht

Dissolved Oxygen Control System for Upgrading Conventional Activated Sludge Process for Seafood Industrial Wastewater

Project Description: This study will investigate the possibility of using the oxidation-reduction potential (ORP) value as the parameter for aeration control system in the simultaneous nitrification-denitrification system. The ORP is strongly correlated with the aeration flow rate and nitrogen transformation, as does the DO concentration. The result from this study will lead to an innovative aeration control system for operators and engineers.
Duration: Sept 1, 2004 to May 31, 2006
Investigators: Prof Ajit P Annachhatre, Dr Panalee Chevavidagarn, PSU
Collaborator: Prince of Songkhla University
Sponsor: Royal Thai Government
Total Contracted Amount: 975,000 Baht

Feasibility Study of Eco-Industrial Clusters Located in Urban-Fringe Areas as a Strategic Approach for Integrated Environmental and Economic Planning

Project Description: Feasibility study of eco-industrial clusters located in urban-fringe areas as a strategic approach for integrated environmental and economic planning
Duration: January 2006 to 31 March 2006
Investigator: Prof C Visvanathan
Sponsor: IGES, Japan

Total Contracted Amount: 242,497 Baht

Feasibility Study on Refuse Derived Fuel Potentials in Municipal Solid Waste in Thailand for Co-Processing in Cement Kilns

Project Description: The objective of this project is to determine the suitability of municipal solid waste (MSW) from several areas in Thailand (Saraburi province, Nonthaburi province, and Bangkok Municipality) for co-processing in cement kilns. Samples collected were delivered to AIT and subjected to several physical and chemical analyses. These results were used to determine whether this MSW has potential for co-processing based disposal.

Duration: Nov 2005 to Dec 2006
Investigator: Prof C Visvanathan
Sponsor: Blackwood Ventures (Thailand) Co., Ltd.

Total Contracted Amount: 374,500 Baht

Joint AIT-Japanese survey of the surface water and ponds.

Duration: 1 Jan 2005 to 28 Feb 2006
Investigator: Oleg Shipin
Sponsor: Public Works Research Institute (Tsukuba) and University of Tokyo

Total Contracted Amount: 563,240 Baht

Training of Trainers (ToT) Workshop: Distance Learning Course on Urban Air Quality Management for Asian Cities

Duration: 1 Feb 2005 to 31 March 2006
Project Description: Provide a forum for participants to discuss issues, challenges and barriers faced in delivering the course on urban air quality management. To facilitate a working environment for the participants to improve both their training skills and their course proposals that are critical to the effective delivery of the course in this respective country.

Project Investigator: Dr. Nguyen Thi Kim Oanh
Sponsors: World Bank Institute

Total Contracted Amount: 245,700 Baht

Training on "Ambient Air Monitoring with Emphasis on Equipment Operation, Data Management and Receptor Modeling"

Duration: 1 July 2006 to 30 September 2006

Project Description: The training program is designed to equip participants with the fundamentals and advanced knowledge in the field of ambient air quality monitoring. With this knowledge, participants will be able to maintain the air monitoring equipment, manage the database

properly using softwares and to design receptor modeling program to improve air quality and the environmental quality.

Project Investigator: Dr. Nguyen Thi Kim Oanh
Sponsors: Department of Environment, Bangladesh

Total Contracted Amount: 239,400 Baht

18.5 Ongoing / In Progress Grant and Sponsored Research

Aerosol Emission from Diesel-Powered Vehicles and Open Biomass Burning, and Effects on Air Quality and Climate

Duration: 1 July 2006 to June 2007
Project description: This research aims at producing an emission database for heavy-duty diesel trucks/buses in developing countries using the chassis dynamometer. The pollutants monitored include PM, PM composition (BC, ions, elements and PAH), and gases including VOCs to produce emission factors and source emission profiles.

Project Investigator: Dr. Nguyen Thi Kim Oanh
Sponsors: University of Illinois at Urbana-Champaign

Total Contracted Amount: 245,560 Baht

Annual Review Workshops under ARRPE II

Project Description: The progress of the programme is assessed through Annual Review Workshops which is held every year and attended by all NRIs, Swedish Resource Persons as well as Sida officials. AIT is responsible for the organization of these workshops.

Investigator: Prof Ajit P Annachhatre
Total Contracted Amount: SEK 1,765,445

Application of filtration technologies for piggery and industrial wastewater treatment/ reuse and resource recovery under tropical conditions

Duration: 1 Nov 2003 to 30 Jan 2008
Investigator: Oleg Shipin
Sponsor: Kumoh National Institute of Technology, Korea and Environmental Management Corporation, Incheon

Total Contracted Amount: 1,827,081 Baht

ARRPET Coordination under ARRPE II

Project Description: AIT coordinates all the activities of 18 National Research Institutions under ARRPE II. AIT prepares research reports as well as financial reports for submission to Sida.

Coordinator: Prof Ajit P Annachhatre

Total Contracted Amount: SEK 1,799,947

Asian Regional Research Programme on Environmental Technology Phase II (ARRPET Phase II)

Project Description: Asian Regional Research Programme on Environmental Technology (ARRPET) was initiated to conduct research on environmental issues relevant to Asia. ARRPE II is a network of institutions, which is dedicated to undertake research on environmental issues relevant to Asia for achieving the goal of sustainable development in the region. ARRPE Phase II is a natural continuation of ARRPE Phase I. Coordinated by AIT and funded by Swedish International Development Cooperation Agency (Sida), ARRPE Phase II involved 18 National Research Institutions (NRIs) from 8 Asian countries. Countries involved were China, India, Indonesia, Malaysia, Philippines, Sri Lanka, Thailand, and Vietnam. Research themes under ARRPE II include Industrial and Hazardous Waste Treatment and Management; Sustainable Solid Waste Landfill Management in Asia; Improving Air Quality in Asian Developing Countries; and Wastewater Treatment and Management. The major objectives of ARRPE Phase II include: 1) Good quality research relevant to Asian region with focus on hard science and technology; 2) Mobilise and strengthen the competence and capacity in National Research Institutions (NRIs) participating in the Programme for conducting research into national and regional initiatives for policy plans, controlling urban and environmental pollution; and 3) Disseminate the results of the Programme among policy makers with a view to have an impact on policy plans.

Duration: 1 Jan 2004 to 31 Dec 2007

Projects under ARRPE II: ARRPE II programme is composed of the following sub-projects:

Biowaste Reuse in Southeast Asian Cities

Duration: 30 Nov 2006 – 31 Mar 2007
Investigator: Dr Thammarat Koottatep
Sponsor: European Commission (Asia Pro Eco Program)
Total Contracted Amount: B915,123.10

Capacity Strengthening on Hazardous Chemicals Management

Duration: 1 Jan 2007 to 31 Dec 2009
Project description: This research aims to contribute to eradicate health and environmental risk posed by improper hazardous chemicals management and unintentional emissions of Persistent Organic Pollutants (POPs) and bring about positive benefits for environment, health, economic growth and sustainable development. The overall objective is to raise the awareness and strengthen capacity in the field of sound management and treatment of hazardous chemicals by

providing training and demonstration activities.

Project Investigator: Prof. Chongrak Polprasert,

Dr. Nguyen Thi Kim Oanh

Sponsors: The Norwegian Ministry of Foreign Affairs

Total Contracted Amount: B 23,732,686

Center for Sustainable Urban Regeneration, The University of Tokyo Japan

Duration: 1 Feb 2006 to 30 April 2006

Project Description: The objective of the project is to collect basic information on the feasibility of the rehabilitation of urban canals and watercourses in the Bangkok Metropolitan Region.

Project Investigator: Dr. Toshiya Aramaki

Sponsors: University of Tokyo, Japan

Total Contracted Amount: 280,000 B

Determination and Mitigation Measures of Pollution Controls in the Upper Gulf of Thailand

Duration: 1 Mar 2006 to 31 July 2007

Project Description: The project will study and propose the mitigation measures for control of pollution due to point and non-point sources into the upper Gulf of Thailand. The project activities include field investigations, review of secondary information, and modeling of coastal water quality. The project will also install a pilot plant for water quality improvement of a heavily-polluted canal using appropriate technology.

Project Investigator: Dr. Thammarat Kootatep, Dr. Preeda Parkpian, Prof. Chongrak Polprasert

Sponsors: Pollution Control Department, Ministry of Natural Resources and Environment, Thailand

Total Contracted Amount: B 1,664,064

Development of an International Long Distance Internet Based Masters Course on Environmental Technology and Management

Project Description: This project aims to establish a co-operation on curricula development and implementation for distance education in the field of sustainable development. Environmental aspects are very often overlooked in Asia due to the lack of educated civil servants and engineers. On the other hand European experts are not sufficiently prepared to handle the basic demands of the region. A distinct master course for postgraduate students with a specialization will provide a broad spectrum of the multi-faceted environmental issues addressing both technology and management within the European and Asian context. The main activities within the 3-year-project are the joint elaboration, adjustment, improvement and testing of course materials on a modular basis for e-learning. After completion and successful testing, the Asian partner

will serve as a hub for distributing the course to affiliated institutions of higher education.

Duration: April 2003 to 31 May 2007

Investigator: Prof C Visvanathan

Sponsor: Asia-Link; European

Commission

Total Contracted Amount: B 2,621,843

Health Effects of Traffic Air Pollution in Hanoi

Duration: 1 April 2006 to 31 Mar 2007

Project Description: The study focuses on the relationship between vehicular traffic and ambient air quality at selected locations in Hanoi, Vietnam. Modeling tools will be used for scenario study and to quantitatively assess the impacts of different management strategies on air quality traffic areas and the associated potential health effects.

Project Investigator: Dr. Nguyen Thi Kim Oanh

Sponsors: CIDA (through the SEA-UEMA Project)

Total Contracted Amount: 345,150 B

Improving Air Quality in Asian Developing Countries project

Project Description: AIRPET, an air pollution research network coordinated by AIT, involves research institutions (NRIs) from 6 countries, namely: China, India, Indonesia, Philippines, Thailand and Vietnam. The research is focused on pressing air pollution issues relevant to the Asian developing countries with the goal to improve the air quality in the region. Of the research works undergoing in several air pollution issues, contribution of paddy field burning to the potential air pollution problems is the one being conducted by AIT team.

Investigators: Dr Nguyen Thi Kim

Oanh

Prof Chongrak Polprasert

Collaborating Institutes: Research

Centre for Eco-Environmental

Sciences, Chinese Academy of

Sciences, University of Science and

Technology of China, Beijing, China

Indian Institute of Technology,

Madras, India

Institute of Technology of Bandung,

Indonesia

Manila Observatory, Philippines

Hanoi University of Sciences, Vietnam

Total Contracted Amount: SEK 7,589,944

Industrial and Hazardous Waste Treatment and Management project

Project Description: IHWTM project is engaged in research on industrial and hazardous waste-related issues relevant to Asia based on a concept of networking. A network of National Research Institutions (NRIs) from 5 Asian countries from India, Indonesia, Malaysia, Philippines and Sri Lanka has been established so that industrial and hazardous waste-related issues could be tackled in a regional perspective. Issues dealt under this project include removal of toxic and hazardous compounds from industrial discharges. The research particularly focuses on removal of AOX from pulp and paper

industries, removal of heavy metals from industrial wastewaters and removal of PCBs. Besides carrying out quality research on industrial and hazardous waste issues relevant to Asia, IHWTM also aimed at mobilizing and strengthening the competence of NRIs with a view to develop policy guidelines for management of industrial and hazardous wastes. Research on IHWTM also aims at application of research results at pilot scale.

Investigator: Prof Ajit P

Annachhatre

Collaborating Institutes: Agharkar

Research Institute, Indi

Center for Pulp and Paper, Indonesia

Universiti Kebangsaan Malaysia,

Malaysia

De la Salle University, Manila,

Philippines

University of Moratuwa, Sri Lanka

Total Contracted Amount: SEK 7,764,006

Integrated Study on Treatment of Shrimp Aquaculture Wastewater Based on Membrane Bioreactor and Development of a Membrane Technology Curriculum

Project Description: This project is focused on the mainly of two objectives: short term research and long term inter university collaboration. Research on treatment of shrimp aquaculture wastewater focuses on experimental studies to determine the possibility of hydrogenotrophic denitrification of shrimp aquaculture wastewater using membrane technology. The latter objective aims to build a course curriculum on membrane technology development and applications and to create a link between Asian institute of Technology and Prince Songkla University on developing membrane technologies and form a network between state universities in Thailand.

Investigators: Prof. C. Visvanathan

Sponsor: Royal Thai Government

(RTG)

Total Contracted amount: 1,000,000 Baht

Investigation on The Impacts of Urban-Rural Air Pollution on Air Quality and Climate in Southeast Asia

Duration: 1 Dec 2006 to 31 Dec 2008

Project description: This research aims to start measurements of selected important region. Important physical-chemical properties of aerosols (size-distribution, hygroscopicity, etc) to study effects on human health and climate change will be also measured. By utilizing these data, the contribution of various rural-urban air pollution sources to the ambient air quality in the urban and suburban areas is studied.

Project Investigator: Dr. Nguyen Thi Kim Oanh

Sponsors: Asia Pacific Network for Global Change Research

Total Contracted Amount: 2,134,800 Baht

IWA Specialist Group Conference on Waste Stabilization Ponds

Duration: 15 Sept 2005 to 31 Mar 2007

Investigator: Dr Thammarat Koottatep, Prof. Chongrak Polprasert

Sponsor: IWA, United Kingdom

Total Contracted Amount: 1,130,978.83 B

National Center of Competence in Research North-South: WP3: Health and Environmental Sanitation

Duration: Sept 2002 – Dec 2009

Investigator: Dr Thammarat Koottatep

Sponsor: EAWAG, Switzerland

Total Contracted Amount: 14,668,452.64 Baht

Quality Assurance for the Curriculum and Course Materials Development for the Major Courses of Undergraduate Environmental Science Program at the Royal University of Phnom Penh (RUPP)

Duration: 1 April 2003 to 30 Dec 2006

Investigator: Dr Thammarat Koottatep

Sponsor: Danida

Total Contracted Amount: 2,297,400 Baht

Researchers Inventory Profiling

Project Description: Creating profile inventory of 3R related researchers who belongs to organization located in the Asia-Pacific Region.

Duration: 1 March to 30 September, 2007

Project Investigator: Prof. C. Visvanathan

Sponsors: Mitsubishi Research Institute Inc., Japan

Total Contracted Amount: 888,600 Baht

3R Knowledge Hub

Duration: 10 Oct 2006 to 9 Oct 2008

Project Description: The principle of Reducing waste, Recycling resources and products is often called the "3R". This principle has been in use in different countries worldwide for many years but not at an active pace able to catch up with rapid urbanization in the past decades. Many knowledge and success cases on 3R exist in countries in Asia and the Pacific but regional exchange is currently not very effective and scattered. Some countries have developed many good practices on 3R and have advanced waste management in place where as some countries are still struggle with solid waste collection and disposal. To develop proactive facilitation for 3R implementation, a knowledge hub on 3R should be established. This knowledge hub would facilitate exchange and dissemination of 3R knowledge among countries, subregions,

and regions in order to lead to active implementation of 3R at all levels for sustainable use of resources.

Project Investigator: Prof. C. Visvanathan

Sponsors: Asian Development Bank (ADB)

Total Contracted Amount: 4,500,000 Baht

Sai Noi Dumpsite Rehabilitation and Its Potential for Refuse Derived Fuel Recovery

Duration: 1 Jan 2006 to 31 Mar 2007

Project Description: The overall objective is to facilitate dumpsite rehabilitation and resources recovery from the mined waste. Different separation techniques to recover combustible fractions for RDF production, to verify different RDF production methods, and to verify the calorific value of RDF produced from mined waste will be investigated. Sai Noi dumpsite in Nonthaburi province, west of Bangkok, Thailand is the dumpsite to be studied.

Project Investigator: Prof. C. Visvanathan

Sponsors: CIDA through the SEA-UEMA Project

Total Contracted Amount: 395,650 Baht

Septage Treatment in Constructed Wetlands and Attached-Growth Waste Stabilisation Ponds

Duration: 1 Sept 1996 to 31 Dec 2008

Investigator: Dr Thammarat Koottatep

Sponsor: EAWAG, Switzerland

Total Contracted Amount: 7,555,556.52 B

Sustainable Solid Waste Landfill Management in Asia project

Project Description: The research on "Sustainable Solid Waste Landfill (SWLF) Management in Asia" has been carried out in four (China, India, Thailand and Sri Lanka) National Research Institutes under the ARRPE network, which mainly focuses on enhancing solid waste disposal practices and landfill technology for efficient and effective solid waste management in the region. The key technical issues is being addressed and closely related to real condition's application: pretreatment of solid waste prior to landfilling by aerobic and/or anaerobic processes as well as the management of pretreated waste; implementation and testing of a bioreactor landfill concept with biological cover soil; intensified in-situ degradation comprising an integrated leachate recirculation concept; optimization of leachate treatment from young and old landfills using either single stage or the combination of various

wastewater treatment processes, lysimeter studies on various wastes among others mined waste from dumpsites to gather auxiliary information on leachate and gas generation under ambient conditions; enhancement of methane oxidation in the cover soil reducing the greenhouse gas potential of final disposal sites.

Investigator:

Prof C Visvanathan
Collaborating Institutes: Anna University, Chennai, India
Kasetsart University, Thailand
University of Peradeniya, Sri Lanka
Tongji University, China

Total Contracted Amount: SEK 5, 751, 479

Swedish Resource Persons under ARRPE II

Project Description: The research progress of the entire programme is monitored by the Swedish Resource Persons of each project. The Swedish Resource Persons' involvement in ARRPE includes participation in the annual review workshops held at AIT.

Investigator:

Prof Ajit P Annachatre

Total Contracted Amount: SEK 681,000

SWOP Analysis of Eco-Industrial Clusters in Thailand, India and Vietnam

Duration: 1 April 2006 to 31 March 2007

Project Description: As part of the SWOP analysis, the project will undertake techno-policy analysis by reviewing the records and documents of eco-industrial cluster formation, interview key persons and institutions, and undertake observation during working hours. Project partner meetings will also be organized to identify at least three eco-industrial clusters in each study country for further SWOP analysis.

Project Investigator: Prof. C. Visvanathan

Sponsors: IGES, Japan

Total Contracted Amount: 918,917 Baht

Technical Training-Cum-Study Visits on Sustainable Sanitation Systems and Constructed Wetlands

Duration: 15 May 2006 to 30 April 2007

Project Description: The project is to arrange a technical training cum study visit for government officers of Sri Lanka. Activities consist of lecture/seminars in Colombo City, study visits in Thailand and a planning workshop in Cambodia.

Project Investigator: Dr. Thammarat Koottatep

Sponsors: UNICEF, Sri Lanka

Total Contracted Amount: 1,440,791.50 B

The Fourth International Symposium on Southeast Asian Water Environment

Duration: 16 May 2006 to 31 March 2007
Project Description: The Symposium will be a forum for discussion and exchange among researchers and practitioners in Environmental Technology and Management and related areas from the Asian region, Asian-Pacific countries, the United States, etc. Through the Symposium, a strong network or partnership with active local change agents will be established.

Project Investigator: Prof. C. Visvanathan, Prof. Chongrak Polprasert, Dr. Toshiya Aramaki

Sponsors: The University of Tokyo, Japan
Total Contracted Amount: 311,875 Baht

Velux Foundation

Duration: 25 April 2006 to 30 June 2009
Investigator: Dr Thammarat Koottatep
Sponsor: EAWAG/SANDEC
Total Contracted Amount: 809,599.24 B

Wastewater Treatment and Management project

Project Description: WWTM project has been engaged in research on wastewater-related issues relevant to Asia. The research under WWTM is being conducted on a concept of networking involving networks at regional as well as national level. The WWTM network includes NRIs from India, Malaysia, Thailand and Vietnam. The issues dealt under this project include treatment and management of domestic and agro-based industrial wastewaters. Besides carrying out quality research on wastewater issues relevant to Asia, the project also aimed at mobilizing and strengthening the competence of National Research Institutions (NRIs) with a view to develop policy guidelines for management of domestic and agro-based industrial wastewaters. Research on WWTM also aims at application of research results at pilot scale.

Investigator: Prof Ajit P Annachhatre
Collaborating Institutes: Indian Institute of Technology, Kanpur, India
 Indian Institute of Technology, Bombay, India
 Center for Environmental Technology and Management, Vanlang University, Vietnam
 King Mongkut University of Technology Thonburi, Bangkok, Thailand

Total Contracted Amount: SEK 6,648,179

WHO collaborating Centre for Water Supply and Waste disposal: International symposium on water treatment, research projects and training programs in health-related environmental engineering

Duration: 1 Jan 2005 to 1 Dec 2007
Investigator: Dr Oleg Shipin
Sponsor: WHO Geneva
Total Contracted Amount: 1,236,609 Baht

Workshop on Asian Regional Programme on Persistent Organic Pollutants (ARRPOPs)

Project Description: The Workshop on Asian Regional Programme on Persistent Organic Pollutants (ARRPOPs) aims at:

1. Identifying existing gaps in management of POPs in Asian countries through stakeholders participation in POPs workshop
2. Fine-tuning of the POPs proposal for submission to Sida based on the gaps identified during the workshop

Duration: August 2005 – April 2007
Sponsor Swedish International Development Agency (Sida)
Investigator: Prof Ajit P Annachhatre
Total Contracted Amount: SEK 530,000

Asian Institute of Technology – United Nations University (AIT-UNU) Brainstorming Workshop

Project Description: The workshop is a venue for signing a Memorandum of Understanding (MoU) between AIT and UNU for recognizing AIT as UNU affiliated institute. The workshop also aims at identifying and developing potential collaborative activities and planning in procuring resources in joint activities. The workshop is scheduled for 27-28 March 2007 at AIT.

Duration: November 2006 – May 2007
Investigator: Prof Ajit P Annachhatre
Sponsor AIT
Total Contracted Amount: THB 117,600

18.6 Publications

Refereed Journals

Kim Oanh N. T., Upadhyay N., Zhuang Y-H., Hao Z-P., Murthy D.V.S., Lestari P., Villarin J.T., Chengchua K., H. X. Co., Dung N. T., Lindgren E. S. (2006). Particulate Air Pollution in Six Asian Cities: Spatial and Temporal Distributions, and Associated Sources. *Atmospheric Environment*, 40, 3367-3380. IF: 2.724

Pongkiatkul P. and N. T. Kim Oanh (2006), "Assessment of Potential Long-Range Transport of Particulate Air Pollution Using Trajectory Modeling and Monitoring Data". In press, *Journal of Atmospheric Research*.

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W Amondham, P Parkpian, C Polprasert, RD DeLaune and A Jugsujinda (2006), Paraquat Adsorption, Degradation and Remobilization in Tropical Soils of Thailand, *J. Environ. Science and Health*, Part B, B41(5), 485-507

V Sawaitayothin and C Polprasert (2006), Kinetic and Mass Balance Analysis of Constructed Wetlands Treating Landfill Leachate, *Environmental Technology*, 27(11), 1303-1308

C Nuengjamnong, J Cho, C Polprasert and KH Ahn (2006), Extracellular Polymeric Substances Influence on Membrane Fouling and Cleaning During Microfiltration Process, *Water Science*

and Technology: *Water Supply*, 6(1), 141-148

T Koottatep, C Polprasert and S Hadsoi (2006), Integrated Fecal Sludge Treatment and Recycling through Constructed Wetlands and Sunflower Plant Irrigation, *Water Science and Technology*, 54(11-12), 155-164

B. F. A Basnayake, C. Chiemchaisri and C. Visvanathan, "Wastelands: Clearing up after the tsunami in Sri Lanka and Thailand" *Waste Management World*, March/April, pp 31-38, 2006.

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T. Tri, C. Visvanathan and V. Jegatheesan "Biological Treatment of Oily Wastewater from Gas Stations by Membrane Bioreactor", *J. of Environmental Engineering and Science*, Vol: 5, No: 4, pp:309-316, 2006.

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C. Visvanathan, Mukesh Kumar Choudhary, Melissa T. Montalbo and V. Jegatheesan, "Landfill Leachate Treatment using Thermophilic Membrane Bioreactor", *J. of Desalination*, Vol: 204, pp:8-16, 2006

N.P. Dan, C. Visvanathan and R. Ben Aim and V. Jegatheesan, "Comparative Study on Performance of Yeast and Bacterial Membrane Bioreactor for High Salinity Wastewater Treatment", *J. of Environmental Technology & Management*, Vol: 6, No:6, pp: 612-630, 2006.

Basnayake, B.F.A., Visvanathan, C., Wimalaweera, R.M., and Mannapperuma, N.R.C. "Microbial Reaction Kinetics for Correlating First Phase Anaerobic Reactions in Laboratory and Pilot Scale Digesters", *Asian Journal of Microbiology, Biotechnology & Environmental Sciences*, Vol. 8, No. 3, PP. 405-411, 2006

J. Tränkler, C. Visvanathan and W. Schöll (2006). Mechanical-Biological Pre-treatment of Solid Waste Prior to Landfill: Some Experiences from Europe and Thailand. *Journal of Research in Engineering and Technology*. In a Special Issue in Solid Waste Management Technology in Asia. A Publication of Faculty of Engineering, Kasetsart University, Thailand. Vol. 3, No. 3 (July-September 2006), PP. 173-190. ISSN: 1686-1590.

C. Chiemchaisri, B. Charnnok, T. Norbu and C. Visvanathan (2006). Characterization of Mined Solid Wastes from Dumpsite and Determination of its Reuse Potential as Refuse Derived Fuel. *Journal of Research in Engineering and Technology*. In a Special Issue in Solid Waste Management Technology in Asia. A Publication of Faculty of Engineering, Kasetsart University, Thailand. Vol. 3, No. 3 (July-September 2006), PP. 191-202. ISSN: 1686-1590.

M. Montalbo, S.M.S.M.K. Samarakorn, C. Visvanathan, K. Fukushi and K. Yamamoto, (2006). "Development of an Integrated Decentralized Sanitation System using Aerobic Membrane Bioreactor" Accepted for publication

- in IWA special issue on "Southeast Asian Water Environment".
- A. Yajima and T. **Koottatep** (2006), "A Comparative Assessment of the Infection Risk of *Salmonella* spp. associated with Fecal Sludge Management Practices in Thailand", *Water and Health* (in press), IWA Publishing, United Kingdom.
- Liamleam, W and **Annachatre, A.P** (2006). "Treating Industrial Discharges by Thermophilic Sulfate Reduction Process with Molasses as Electron Donor" *Environmental Technology*, (in press)
- Ho, T.T.H., Liamleam, W., and **Annachatre, A.P.** (2006). Lead Removal through Biological Sulfate Reduction Process. *Bioresource Technology* (in press).
- Sinha, B. and **Annachatre, A. P.** (2006). Partial nitrification – operational parameters and microorganisms involved. *Rev. Environ. Sci. Biotechnol.* (in press).
- Sinha, B. and **Annachatre, A. P** (2006). Assessment of microbial population shift during start-up of partial nitrification reactor using quinone profile, FISH and SEM. *Bioresource Technology* (in press).
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- C. **Polprasert** (2006), Design and Operation of Constructed Wetlands for Wastewater Treatment and Reuses, in *Municipal Wastewater Management in Developing Countries*, editors: Z Ujung and M Henze, IWA Publishing, London
- S. Ohgaki, K. Fukushi, H. Katayama, S. Takizawa and C. **Polprasert** (2006), editors, *Southeast Asian Water Environment 1*, IWA Publishing, London
- C. **Polprasert** and K Sharma (2006), Southeast Asian Water Environment Scenario at Present and the Future Perspective, in *Southeast Asian Water Environment 1*, S Ohgaki et al. (editors), IWA Publishing, London, pp. xi-xvi
- Watana Luanratana & C. **Visvanathan**, "Sustainable Waste Management: A Case Study of the Bangkok Metropolitan Authority", chapter in the book "Sustainable Development Policy and Administration", by: Mudacumura, Mebratu and Shamsul Haques, Page : 353- 372, Taylor & Francis Publishers, USA, 2006
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- Kim Oanh N. T.**, Prapat P., Darunat P., and Aung Siri K. (2006). Study long-range transport of air pollution using monitoring data at a remote site and the trajectory analysis. Proceedings of the Annual Conference AWMA, New Orleans, USA, June 20-24, 2006.
- Nguyen Thi Kim Oanh**, Danutawat Tipayarom and Nguyen Lu Phuong (2006). Use of satellite information for large scale monitoring of air pollution emission from open rice straw burning. Proceedings of the 2nd Asia-Pacific International Seminar on Geomatics. AIT, Bangkok, Feb 14-15, 2006.
- Nguyen Thi Kim Oanh**, Dinh Thi Hai Van and Le Hoang Nghiem (2006). Air pollution and ecosystem: Assessment of effects of ground level ozone on agricultural crops in Asia. *Greater Mekong Subregion (GMS), Core Environment Program – Biodiversity Conservation Corridors Initiative (BCI)* Symposium proceedings (organized by ADB), April 27-28, 2006, Bangkok, Thailand.
- J. Juanga and C. **Visvanathan**, (2006). "Thermophilic Anaerobic Digestion of Municipal Solid Waste in Combined Process and Sequential Staging", *The 6th International Symposium on - Global Renaissance by Green Energy Revolution, Nagaoka, Japan, 26-27 January, 2006*
- C. **Visvanathan** and C. Chiemchaisri (2006). "Management of Agricultural Wastes and Residues in Thailand: Wastes to Energy Approach", *International Conference on Agricultural Wastes, 21-23 March, Putrajaya, Malaysia, Key Note Lecture*
- C. **Visvanathan** and K. Joseph (2006), "Proposal for Development of Regional Guidelines for Managing Municipal Solid Waste in Asia", *Seminar on "Regional Guidelines for Sustainable Management of Municipal Solid Wastes in Asia"* 12 June, 2006, Colombo, Sri Lanka
- C. **Visvanathan** & Tenzin Norbu, "Reduce, Reuse and Recycle: The 3Rs in South Asia" 3R Waste Management South Asia Expert Workshop, 30 August – 1 September, Kathmandu, Nepal, 2006.
- C. **Visvanathan** & Ulrich Glawe, "Domestic Solid Waste Management in South Asian Countries" 3R Waste Management South Asia Expert Workshop, 30 August – 1 September, Kathmandu, Nepal, 2006.
- C. **Visvanathan** & Radha Adhikari, "Healthcare Waste Management in South Asia" 3R Waste Management South Asia Expert Workshop, 30 August – 1 September, Kathmandu, Nepal, 2006.
- R Adhikari, J.P Juanga, and C. **Visvanathan**, "Anaerobic Digestion of Municipal Solid Waste in Thermophilic Sequential Batch Process" ORBIT – 2006 International Conference on Biological Waste Management, 13-15 September, 2006, Weimar, Germany
- C. **Visvanathan**, J. Kandasamy and S. Vigneswaran, "Rainwater Collection and Storage in Thailand; Design, Practices and Operational Issues", Rainwater harvesting and Management – 2nd International Workshop, IWA 5th World Water Congress, 11 September, 2006, Beijing, China.
- C. Chiemchaisri, W. Chiemchaisri, J. Junsod, S. Threedeach, T. **Koottatep** and C. **Visvanathan** (2006), Treatment performance and bacterial populations in subsurface horizontal flow constructed wetland system treating young and stabilized waste leachate", *IWA – Specialist Conference on Waste Stabilization Ponds*, 25-27 September, 2006, Bangkok, Thailand.
- C. **Visvanathan**, "Techno-policy Analysis of Rice based Eco-Industrial Cluster Network in Thailand", Business and the Environment - International workshop on "Eco-Industrial Clusters Leading to Sustainable Local Development of Asia", IGES Kansai Research Centre, 26 October, 2006, Kobe, Japan.
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- C. **Visvanathan**, "Asian Regional Research Program on Sustainable Solid Waste Landfill Management in Asia" The 2nd Expert Meeting on Solid Waste Management in Asia and Pacific Island, 23-24 November, 2006, Kitakyushu, Japan
- C. **Visvanathan** and P. Shapkota, "Wastewater Reuse Potentials in Thailand", Regional Conference on Urban Water and Sanitation in Southeast Asian Cities, 22-24 November, 2006, Vientiane, Lao PDR.
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- T. **Koottatep** and T. Chaosakul (2006), "Life Cycle Assessments of Wastewater Treatment Systems in Bangkok City", *Proceedings of the 2nd and 3rd International Symposium on Southeast Asian Water Environment*, IWA Publishing, United Kingdom.
- A. Panuvatvanich, N. Surinkul and T. **Koottatep** (2006), "Decentralized Wastewater Treatment Systems for Small-scale Communities", *Proceedings of the 2nd and 3rd International Symposium on Southeast Asian Water Environment*, IWA Publishing, United Kingdom.
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- T. **Koottatep, C. Popsert** and S. Hadsoi (2006), "Integrated Fecal Sludge Treatment and Recycling through Constructed Wetlands and Sunflower Plant Irrigation", *Proc. of 5th World Water Congress*, 11 – 15 September 2006, Beijing, China.
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T. Koottatep, N. Surinkul, S. Hadsai, A. Panuvatvanich and V.M. Hai. (2006), "Septage Treatment in Constructed Wetlands and Attached-Growth Waste Stabilisation Ponds", Phase 5 Extension, Final Report, submitted to the Swiss Federal Institute for Environmental Science and Technology (Eawag), Switzerland, 70 p.

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T. Koottatep and S. Hadsai (2006), "Activities Reports 1 – 6: Biowaste Reuse in Southeast Asian Cities", submitted to Wageningen University, The Netherlands, 205 p.

T. Koottatep, P. Parkpian and C. Polprasert (2006), "Determination and mitigation measures of pollution control for the upper gulf of Thailand", Progress Reports, submitted to the Pollution Control Department, Ministry of Natural Resources and Environment, Thailand, 85 p.

Other publications

Kim Oanh N. T., Aungsiri K., Prapat P and Darunat P. **Levels and Composition of Aerosols, and Gaseous Pollutants Collected at a Remote Mountainous Site in Tropical Region**". IGAC/CAGP/ WMO joint conference, Cape Town, 17-23 September 2006.

Kim Oanh N. T., Open Agro-residue burning in Asia and potential effects on air quality, health and climate, Better air quality (BAQ) 2006, 13-15 December 2006, Yogyakarta, Indonesia

Kim Oanh, N. T. (2006). "Assessment of Effects of Ground Level Ozone on Agricultural Crops in Asia Using Field Experiments and Modeling Tools". Invited speech at the 2nd Air pollution Crop Effect Network (APCEN) Workshop of the project Assessing Air Pollution Impacts on Agriculture, Regional Air Pollution in Developing Countries (RAPIDC), Stellenbosch, South Africa, 19th to 22nd September 2006.

Kim Oanh N. T. (2006). Ozone and Acid Deposition in GMS: What Do We Know? Presented at the Sub-workshop 2 "Impacts of Air pollution and Climate Change on Agriculture, Biodiversity, Food Security and Water Resources", BAQ06.

18.7 Doctoral Students' Dissertation

Stabilization of Landfill Leachate by an Integrated Electrochemical and Natural System
By: Variga Sawaitayotin

Supervisor: Prof. Chongrak Polprasert

Exposure Assessment of Benzene: DNA Repair Capacity and Influence of Genetic Polymorphisms in Workers
By: Sirirat Chanvaivit
Supervisor: Dr. Khunying Mathuros Richirawat

Effects of Gamma-Radiation on DNA Damage, DNA Repair and Cytogenetic Changes
By: Wanwisa Sudprasert
Supervisor: Dr. Khunying Mathuros Richirawat

Development of Hybrid Receptor Model for Air Pollution Source Apportionment Study
By: Prapat Pongkiatkul
Supervisor: Dr. Nguyen Thi Kim Oanh

Exposure to Genotoxic Compound Polycyclic Aromatic Hydrocarbons (PAHs) in Schoolchildren Bangkok Thailand, and Biomarkers
By: Jantamas Tuntawiroon
Supervisor: Dr. Khunying Mathuros Richirawat

Development of Nitrifier Biosensor for Toxicity Monitoring
By: Jaruwat Tantsut
Supervisor: Dr. Preeda Parkpian

18.8 Masters Students' Theses and Research Studies

Sulfur Recovery from Biological Sulfide Oxidation Process under Oxygen Limited Condition
By: Wilawan Khanitthaidecha
Supervisor: Prof. Ajit P. Annachhatre

Treatment and Management of Wastewater from an Acrylic Fiber Industry
By: Bhaskar Ray
Supervisor: Prof. Ajit P. Annachhatre

Modeling of Nitrite Inhibition in the Anammox Process
By: Tharmalingam Suthakar
Supervisor: Prof. Ajit P. Annachhatre

Evaluation the Anammox Process in the Gas-Lift Reactor
By: Mayuree Tonkham
Supervisor: Prof. Ajit P. Annachhatre

Evaluation of Compost and Landfill to Treat Municipal Solid Waste in Hanoi, Vietnam
By: Tran Manh Hung
Supervisor: Dr. T. Aramaki

Environmental Burdens and Health Implications Analyses of Water Supply and Sanitation Systems in Dhaka, Bangladesh
By: Kabirul A. Mollah
Supervisor: Dr. T. Aramaki

Hospital Waste Management in Yangon City, Myanmar
By: Yin Lai Yee Oo
Supervisor: Dr. T. Aramaki

Water Quality Assessment in the Saigon River by Mathematical Model
By: Pham Thi Mai Thao
Supervisor: Dr. T. Aramaki

Analysis of Recycling System for Plastic Wastes in Yangon City, Myanmar
By: Nyan Khine Soe
Supervisor: Dr. T. Aramaki

Material Flow Analysis as a Tool for Environmental Sanitation Planning in Haiphong City, Vietnam
By: Nguyen Thi Thu Thuy
Supervisor: Dr. T. Aramaki

Potentials and Limitations of Existing Technical Alternatives on Human Excreta and Domestic Wastewater Management in Haiphong City, Vietnam
By: Pham Ngoc Bao
Supervisor: Dr. Thammarat Koottatep

Assessing the Environmental Sanitation Improvement in Urban Communities in Vientiane City, Lao PDR
By: Somchaivang Dethoudom
Supervisor: Dr. Thammarat Koottatep

Assessment of On-Site Sanitation Systems in Peri-Urban Communities by Using Selected Sustainability Indicators
By: Supattra Jiawkok
Supervisor: Dr. Thammarat Koottatep

Reuse of Biosolids from Constructed Wetland Treating Septage for Sunflower Plantation
By: Vu Minh Hai
Supervisor: Dr. Thammarat Koottatep

Development of Database on Fecal Sludge Collection, Treatment and Disposal in Thachin, Chaopraya and Bangpakong River Basins, Thailand
By: Supapan Petchrat
Supervisor: Dr. Thammarat Koottatep

Quantitative Microbial Risk Assessment of Organic Waste Management Practices in a Peri-Urban Community
By: Aung Kyaw Swar
Supervisor: Dr. Thammarat Koottatep

Daytime and Nighttime Fluctuation of Particulate Matter Levels and Compositions in Association with the source Contributions: A Case Study of the Bangkok Metropolitan Region (BMR) during Wet Season
By: Tisanin Apibuunyopas
Supervisor: Dr. Nguyen Thi Kim Oanh

Atmospheric Deposition Fluxes of Air Pollutants onto the Earth Surface in a Tropical Climate
By: Dang Thi Ngoc Ha
Supervisor: Dr. Nguyen Thi Kim Oanh

Relationship between Indoor and Outdoor Levels of Pyrethroid Pesticides and Selected Persistent Organic Pollutants (POPs)
By: Nuntakan Kanaratanadilok
Supervisor: Dr. Nguyen Thi Kim Oanh

Quality Assurance and Quality Control for Ambient Air Pollution Data Produced by Automatic Monitoring Network in Hanoi, Vietnam
By: Pham Hoang Long
Supervisor: Dr. Nguyen Thi Kim Oanh

Particulate Matter Air Pollution at Suburban Site in Bangkok Metropolitan Region during the Dry Season: Levels, Compositions, and Associated Sources
By: Pongsakorn Pavanavivat
Supervisor: Dr. Nguyen Thi Kim Oanh

Modelling Impact of Open Rice-Straw Burning Emission on Ozone Air Quality in the Bangkok Metropolitan Region
By: Nguyen Lu Phuong
Supervisor: Dr. Nguyen Thi Kim Oanh

Relationship Between Indoor and Outdoor Air Pollution in Public Buildings in Thailand
By: Kasama Srimongkol
Supervisor: Dr. Nguyen Thi Kim Oanh

Characterization of Aerosol Emission from Rice Straw Open Burning in the Bangkok Metropolitan Region
By: Ly Bich Thuy
Supervisor: Dr. Nguyen Thi Kim Oanh

Cadmium Remobilization from Contaminated Soil: A Case Study in Maesot District, Tak Province, Thailand
By: Chatinai Chusai
Supervisor: Dr. Preeda Parkpian

Offshore Risks, Safety Climate & Safety Management Practice in Offshore Environments
By: M. Shafiqul Islam
Supervisor: Dr. Preeda Parkpian

Remediation Technology of Boron and Fluoride by Using Green Plants
By: Areerat Jaksakul
Supervisor: Dr. Preeda Parkpian

Phytoremediation of Cadmium in Contaminated Soil
By: Ariyawat Prabamroong
Supervisor: Dr. Preeda Parkpian

Hazard Assessment of the Digested Sludge Composting Plant: A Case Study of Bangkok Metropolitan Administration in Thailand
By: Nittaya Sruntammagun
Supervisor: Dr. Preeda Parkpian

Environmental Impact Assessment of a Nuclear Power Plant in Vietnam: A Review for On Site Application
By: Nguyen The Vinh
Supervisor: Dr. Preeda Parkpian

Particulate Bound Polycyclic Aromatic Hydrocarbons Emitted from Incense Sticks and Assessment of Health Risk in Temple Workers
By: Ohnmar May Tin Hlaing
Supervisor: Dr. Khunying Mathuros Ruchirawat

Determination of the Level of Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) Inside and Outside of the Petroleum Refinery Industrial Environment
By: Rahman Faizur Rafique
Supervisor: Dr. Khunying Mathuros Ruchirawat

Medicinal Plants as a Possible Source of Toxic Chemical Exposure
By: Maneerat Khemkhao
Supervisor: Dr. Jutamaad Satayavivad

Analysis of Nutrients and Metals in Organic Fertilizers
By: Norratouch Prachom
Supervisor: Dr. Jutamaad Satayavivad

Evaluation of the Local Arsenic Biosand Filter for As and Fe Removal as a Household Water Treatment Intervention: Case Study in Cambodia
By: Ul Kamal
Supervisor: Dr. Oleg Shipin

Nitrogen Removal from Nitrogen-Rich Piggery Wastewater by the Process of Nitrification-Denitrification
By: Duong Hoang Long
Supervisor: Dr. Oleg Shipin

Improving a Household Drinking Water Intervention through Mitigation of High Water Turbidity in Myanmar
By: Win Maw
Supervisor: Dr. Oleg Shipin
 Mitigation of Cumulative Environmental Impacts in Coastal Ecosystem: Case Studies in Thailand and India
By: Satya Swarup Nanda
Supervisor: Dr. Oleg Shipin

Occurrence and Fate of Microbial Pathogens in Polluted Surface Water Bodies and Wastewater
By: Dang Diep Yen Nga
Supervisor: Dr. Oleg Shipin

Microbial Communities of Thermophilic Wastewater Treatment in the Sequencing Batch and Membrane Reactors
By: Nani Raut
Supervisor: Dr. Oleg Shipin

Improvement of Microbial Water Quality with NaDCC Tablets (Aquatabs) at the Low Income Household Level in Dhaka, Bangladesh
By: Tanveer F. Saeed
Supervisor: Dr. Oleg Shipin

Microbiological Aspects of the Management and Treatment of Nitrogenous Compounds in Piggery Wastes
By: Dona W.D. Subasinghe
Supervisor: Dr. Oleg Shipin

Copper Resistant Mechanism in Agrobacterium Tumefaciens NTL4
By: Anchalee Charoenwuttitum
Supervisor: Dr. Paiboon Vattanaviboon

Sequential Batch and Continuous Anaerobic Digestion of Municipal Solid Waste in Pilot Scale Digesters
By: Radha Adhikari
Supervisor: Prof. C. Visvanathan

Thermophilic-Aerobic Treatment of High Strength Wastewater in Sequencing Batch Reactor and Membrane Bioreactor
By: H.R.L.W. Halgahawaththa
Supervisor: Prof. C. Visvanathan

Hydrogenotrophic Denitrification of Aquaculture Wastewater Using Hollow Fiber Membrane Bioreactor
By: Nguyen Quang Hung
Supervisor: Prof. C. Visvanathan

Electrical and Electronic Waste Inventory and Management Strategies for Bangkok, Thailand
By: Chinagarn Kunacheva
Supervisor: Prof. C. Visvanathan

Treatment of High-Strength Organic Wastewater using an Aerobic Granular System with Baffled Membrane Bioreactor
By: Nguyen Duc Minh
Supervisor: Prof. C. Visvanathan

Decentralized Wastewater Treatment and Reclamation using Membrane Bioreactor
By: Nguyen Hoai Nam
Supervisor: Prof. C. Visvanathan

Development of Environmental Sustainability Concepts for the Asian Institute of Technology (AIT) Campus
By: Vongdeuane Soulalay
Supervisor: Prof. C. Visvanathan

Sustainable Landfill Operation by Combining Open Cell and Water Management Strategies
By: Wiyada Wisiterakul
Supervisor: Prof. C. Visvanathan

Chapter 19: SERD – FOOD ENGINEERING AND BIOPROCESS TECHNOLOGY FIELD OF STUDY

19.1 Introduction

This field of study is focused on the application of bioconversion in various sectors of industry and agriculture. These include food processing, aquaculture, environmental engineering, paper and textile manufacturing, cosmetics and health care. BPT focuses on the application of microorganism and enzymes to meet the demands of the developing countries of the region. FE focuses on the systems for handling, processing and storage of both durable and perishable food products in developing aof small- scale food processing technologies.

Emphasis is also placed on the determination of material properties; design and development of new processes and related equipment; and computer modeling and simulation of postharvest and food processing operations.

19.2 Research Facilities and Laboratories

Food Processing Laboratory deals with both durable and perishable food products and the development of small-scale food processing technologies. It emphasizes on the determination of material properties; design and development of new processes and related equipment; computer modeling of food processing operations; thermal processing; biotechnology for added-value processing; and employing emerging technologies, namely, image processing, electronic-nose applications, and acoustic testing for food quality evaluations. The laboratory is equipped with instruments such as food texture analyzer, color meter, whiteness meter, viscometer and a variety of other instrument including drying equipment, temperature and relative humidity sensors and computer assisted data logging systems. Equipments are also available for grain and starch

processing, fruits and vegetables handling and storage technology, juice processing and oil extraction. The laboratory is open to cater industry needs for food quality evaluation and testing. The performance evaluation of commercial processing equipment may be undertaken along with development of food processing equipment as well as small-scale food processing technologies. Among its major equipment include a Food Texture Analyzer; UV-VIS spectrophotometer; Rota Vapor; Electronic Nose; and a Climatic chamber

Bioprocess Technology (BPT) Laboratory is well equipped to provide services to a broad spectrum of modern biotechnologies, namely, the analysis of biological components, application of bacteria and fungi, systems for bioprocessing and bioconversion, application of unit operations and bioreactor operation. It is also capable of conducting studies on the growth, application and analysis of microorganism and enzymes and their products. It has many state of the art equipment, such as high pressure liquid chromatography, gas liquid chromatography, UV-vis computerized spectrophotometer, rapid visco-analyzer, microprocessor controlled bioreactors, solid state fermentation unit, refrigerated centrifuges, vacuum dryer, cyclic incubators, electrophoresis apparatus, gel filtration unit, PCR machine, pilot facilities for biowaste treatment and chitin/chitosan production. Among its major include a PCR work station; Rapid Viscosity Analyzer (RVA); High Performance Liquid Chromatography; Gas Chromatograph; Freeze Drying System; and a Refrigerated Incubator Shaker.

19.3 Faculty and Research Staff

Full-time Faculty

ATHAPOL NOOMHORM, BSc, Kasetsart Univ, Thailand; MEng, Lamar Univ, Texas; PhD, Louisiana State Univ, USA.

Professor (*Agro-Industrial Development Food Process Technology Post Harvest Technology*) [Postharvest of Cereals; Postharvest of Fruits and Vegetable; Food Process Engineering; Food Bioprocess Technology; Agro-Industry System Development]

SUDIP KUMAR RAKSHIT, BSc, Loyola College; BTech, Jadavpur Univ, India; MTech, PhD, Indian Inst of Tech, India.

Professor (*Biochemical Engineering and Biotechnology; Biopolymers and Lipid Biotechnology; Fermentation and Enzyme Technology; Food Biotechnology; Functional Foods*)

[Production of Useful Chemicals by Bioroutes; use of byproducts; Food safety and rapid detection methods : including PCR based methods; Functional foods and nutraceuticals : Pre- and Probiotics, PUFA, antioxidants, antimicrobials, etc.; Food Biotechnology : Enzyme applications, thermostable enzymes; Bioreactor Design and Analysis :Optimal Control of Bioreactors]

19.4 Completed Grant and Sponsored Research

Development of Standard Methods for Evaluating Thai Rice Quality by Near Infrared Spectroscopy

Project Description: Factors affecting to the eating quality of final cooked rice was investigated to develop effective predictor in evaluating rice quality. Near Infrared spectroscopy technique was adopted to replace conventional method.

Duration: 1 Sept 2004 to 30 April 2006

Investigators: Prof Vinod K Jindal
Prof Athapol Noomhorm

Collaborator: Dr Anupun Terdwongworakul, Kasetsart University, Thailand

Sponsor: Royal Thai Government
Total Contracted Amount: Baht 950,000

Quality and safety of fish

Duration: Jan 2005 to Decr 2006

Investigator: Prof S K Rakshit

Sponsor: L'organization internationale de la Francophone (AUF)

Total Contracted Amount: 25,000 EUR

BPT Laboratory Testing

Duration: 1 June 2006 to 31 August 2006
Project Description: The project will include testing of samples, training for visiting researchers, and providing other laboratory-related services to different clients

Project Investigator: Dr. Shrinivas Rao Mukku, Prof. Athapol Noomhorm

Sponsors: Multi-donors
Total Contracted Amount (Baht): 40,000

19.5 Ongoing / In Progress Grant and Sponsored Research

Development of Integrated Process for Urokinase production

Duration: Jan 2005 to Jan 2008

Investigator: Prof S K Rakshit

Sponsor: SIDA Research
Total Contracted Amount: B 450,000

Development of Rapid Methods for the Detection of Pathogens in Aquatic Food

Duration: 1 Feb 2006 to 31 Jan 2007

Project Description: Rapid detection methods using new

biotechnology will be developed for pathogens in food. This will overcome the problems involved in the conventional methods use. The two approaches planned are 1) multiplex PCR method and 2) enzyme linked immunological method – these will be used to detect different types of *Vibrio* spp. which are considered important in the aquatic food industry.

Project Investigator: Prof. Sudip K Rakshit
Sponsors: Royal Thai Government
Total Contracted Amount (Baht): 830,000

Training Workshop on Food Safety Assessment of Agriculture-Related GMOs

Duration: 01 Sept 2006 to 31 May 2007

Project Description: The laboratory workshop will consist of lecture presentations and laboratory training ranging from General Food Microbiology to GM Food, Food Safety aspects, etc. (ADB TA 6214-REG: Strengthening Capacity and Regional Cooperation in Advanced Agricultural Science and Technology in the GMS Project)

Project Investigator: Prof. Sudip K. Rakshit
Sponsors: Asian Development Bank
Total Contracted Amount (Baht): 942,750

Regional Workshop on "Integrated Policies for Bio-Innovations in Agriculture and Health in Asia"

Duration: 1 Oct 2006 to 1 Oct 2007

Project Description: The two-day workshop will take place from 13th to 14th November 2006 at the AIT Conference Center. It will bring together researchers, non-governmental organizations (NGOs) and community based organizations (CBOs) representatives as well as policy-makers from Asian countries, including those in the Greater Mekong Sub-region (GMS), to critically examine existing policies on bio-innovations in the region, identify existing research gaps and recommend a strategy for information sharing, learning across borders and partnering in the region. One such partnering strategy that the workshop will consider is a regional network covering selected Asian countries.

Through the proposed network, research in support of effective and integrated policies for bio-innovations in agriculture and health would be carried out. The network would bring together institutions in countries that have significant science and technology (S&T) capabilities (e.g. China and India) with those that are still building such capacities, for example, Thailand, Indonesia, Philippines, Vietnam, Cambodia and Lao PDR.

Project Investigator: Prof. Sudip K. Rakshit

Sponsors: IDRC and the Rockefeller Foundation
Total Contracted Amount: B 1,555,936.90

Evaluation of rice filth on rice grading

Duration: December 2006 – May 2007

Project Description: Evaluate rice impurity from different varieties after harvesting

Project investigator: Prof. Athapol Noomhorm

Sponsor: Dept. of Internal Trade, Ministry of Commerce, Thailand

Total Contracted Amount (Baht): 650,000

Evaluation of milling yield for Thai rice on 2005-2006 production

Duration: September 2005 – January 2006

Project Description: Evaluate rice milling yield

Project investigator: Prof. Athapol Noomhorm

Sponsor: Dept. of Internal Trade, Ministry of Commerce, Thailand

Total Contracted Amount (Baht): 600,000

International Conference on Innovations in Food and Bioprocess Technologies

Duration: 1 June 2006 to 31 July 2007

Project Investigator: Prof. Sudip Kumar Rakshit, Prof. Athapol

Noomhorm, Dr. Binod Yadav

Sponsors: Participants/ registration fees

Total Contracted Amount (Baht): 570,000

19.6 Publications

Refereed Journals

Chutintrasri B and **A. Noomhorm** (2006) Thermal inactivation of polyphenoxidase in pineapple puree, " *LWT Journal* vol 39 pp 492-495

Sirisoontaralak P. and **A. Noomhorm** (2006) Changes of physical chemical and sensory properties of irradiated rice during storage" *Journal of stored products research*. Volume 42, Issue 3, Pages 241-394

Ganiyal G, M. A. Hanna, P. Supprung, **A. Noomhorm** and D. Jones (2006) Modeling selected properties of extruded rice flour and rice starch by neural networks and statistics: *Cereal Chemistry*: 83(3), 223-227.

Chutintrasri B and **A. Noomhorm** (2007) Color degradation kinetics of pineapple puree during thermal processing" *LWT Journal* Volume 40, Issue 2, March 2007, Pages 300-306

Homdok, R and **A. Noomhorm** (2007) ; Hydrothermal treatments of rice starch for improvements of rice noodle quality *LWT Journal* (In press)

The Polyunsaturated Fatty Acid Content of Wild and Farmed Tilapias in Thailand - Effect of Aquaculture Practices and Implications for Human Nutrition, Ioannis T. Karapanagiotidis, Michael V. bell, David C. Little, Amaratne Yakupitiyage and **Sudip K. Rakshit**, *Journal of Agricultural and Food Chemistry (American Chemical Society)*, Volume 54, Number 12, pages 4304-4310, 2006.

Microbial and Processing Criteria for Production of Probiotics: A Review. Bussarin Kosin and **Sudip Kumar Rakshit**, Food Technol. Biotechnol. 44 (3), 371-379 (2006)

Optimum production and characterization of thermostable amylolytic enzymes from *B. stearothermophilus* GRE1. Hossain, S.M.Z, Haki, G.D and **Rakshit, S.K.** Can. J of Chemical Engineering, Volume 84, June 2006.

Effect of Microwave heating on solubility and digestibility of proteins and reduction of anti-nutrients of selected common beans (*Phaseoleus vulgaris L.*) varieties grown in Ethiopia. E. Shimelis and **S.K.Rakshit**, Ital. J. of Food Science, no.4, Volume 17, pp. 407-418, 2006

Refereed Books/Chapters

Athapol Noomhorm, Imran Ahmad and Pornpip Sirisoontarak (2007): Part 3: Food Processing Operation Systems and Machinery Design; Chapter 9. Grain Processing Engineering : Handbook of Farm, Dairy, and Food Machinery; Pg 215-242: William Andrew Publishing Norwich, N.Y. U.S.A., Edited by Myer Kutz.

Conference Proceedings

Noomhorm, A (2006) : Food safety systems in Thailand *Book of Abstracts* for Alliance for Global Sustainability Internal partnership (AGS) Annual Meeting 2006, in Parallel workshop Programme March 19-22, 2006, Bangkok Thailand pp37.

Siriprapa Soothiboon and **Athapol Noomhorm**: (2006) Study of germinated brown rice for production Gamma-Aminobutyric Acid (GABA) Proceedings of the International Conference on " Innovations in Food and Bioprocess Technologies" 12-14 December 2006, AIT, Bangkok

P. Sirisoontarak, I. Ahmad and **A. Noomorm** (2006) Use of pressurized carbon dioxide to control infested insects in milled rice; Proceedings of the International Conference on " Innovations in Food and Bioprocess Technologies" 12-14 December 2006

C. Benjadumrongkit, P. Sirisoontarak and **A. Noomhorm** (2006) Carbon dioxide fumigation at elevated temperature and pressure to control insect in milled rice: Proceedings of the International Conference on " Innovations in Food and Bioprocess Technologies" 12-14 December 2006

"Food Safety and Producer Quality Issues in Supply Chains" Asian Productivity Institute (APO) Training Course on Supply Chain Management for Agribusiness SMEs in Mekong Region, 22-26 November 2006 Bangkok Thailand by: **Prof. Sudip K. Rakshit**

"The Driving Forces behind Modern Biotechnology" Training Workshop on Food Safety Assessment of Agriculture-Related GMOs 18-22 September 2006, Thailand Science Park, an Asian Development Bank Sponsored Project by: **Prof. Sudip K. Rakshit**

"Conventional and Rapid Methods of Detection of Food Pathogens" Training Workshop on Food Safety Assessment of Agriculture-Related GMOs 18-22 September 2006,

Thailand Science Park, an Asian Development Bank Sponsored Project by: **Prof. Sudip K. Rakshit**

"Use of Recombinant Organisms for Food/ Industrial Fermentations" Training Workshop on Food Safety Assessment of Agriculture-Related GMOs 18-22 September 2006, Thailand Science Park, an Asian Development Bank Sponsored Project by: **Prof. Sudip K. Rakshit**

"Principles and Practices of Genetically Modified (GM) Food Safety and Detection Methods" Training Workshop on Food Safety Assessment of Agriculture-Related GMOs 18-22 September 2006, Thailand Science Park, an Asian Development Bank Sponsored Project by: **Prof. Sudip K. Rakshit**

"Food Safety and Producer Quality Issues in Supply Chains" Asian Productivity Institute (APO) Training Course on Supply Chain Management for Agribusiness, September 2006 Manila, Philippines by: **Prof. Sudip K. Rakshit**

19.7 Masters Students' Theses

The Study of Optimum Rice Cooking Methods Developed for Aseptic Cooked Rice
By: Kamolrat Sakullertpasuk
Supervisor: Prof. Athapol Noomhorm

Identification of a Mixture in a Thai Aromatic Rice (KhaoDawk Mali 105)
By: Jiraporn Sripinyowanich
Supervisor: Prof. Athapol Noomhorm

The Influence of Temperature, Controlled Atmosphere and Pressure on the Survival of Maize Weevil (Sitophilus zeamais) in Milled Rice
By: Chankit Benjadumrongkit
Supervisor: Prof. Athapol Noomhorm

Evaluation of an Electronic Nose for Monitoring Roasting of Cashew Kernels
By: Punyatoya Mohapatra
Supervisor: Prof. Athapol Noomhorm/Prof. Vinod K. Jindal

Developing a High-Quality, Ready-to-Eat, Shelf-Stable Retort Pouch Shrimp Product
By: Panicha Nasueb
Supervisor: Prof. Athapol Noomhorm

The Development of a Drum Dryer using the Infrared Technique in Okara Powder
By: Nahathai Puntigo
Supervisor: Prof. Athapol Noomhorm

Microbial and Enzyme Treatment for Rapid Production of Fish Sauce
By: Chuon Mony Roth
Supervisor: Prof. Sudip K. Rakshit

Production of Carboxyl Methyl Cellulose from Rice Straw for Food Applications
By: Suranya Triakarabenjakul
Supervisor: Prof. Athapol Noomhorm

Effect of Drying on Non-enzymatic Browning and Quality in Chilli Powder during Storage
By: Siriwadee Angkapichit
Supervisor: Prof. Athapol Noomhorm

Effect of Modified Atmosphere Packaging on the Shelf Life of Asparagus (Asparagus officinalis, L.)
By: Laksamee Dachanuraknukul
Supervisor: Prof. Athapol Noomhorm

Increased Sensitivity of DTD-PCR Based Detection of Food Pathogens by Metal Hydroxide Immobilization
By: Do Thi Thu Huong
Supervisor: Prof. Sudip K. Rakshit

Antioxidant Fortification of Soya Milk using Extracted Isoflavones
By: Atcharaporn Khoomtong
Supervisor: Prof. Sudip K. Rakshit

Enzyme Immobilization on Glass Surfaces for the Development of Biosensor
By: Farhana Sharmin
Supervisor: Prof. Sudip K. Rakshit

A Study of the Properties of Germinated Brown Rice and Its Products
By: Siriprapa Soothiboon
Supervisor: Prof. Athapol Noomhorm

The Effect of Impingement and Spiral Freezing Method on the Quality of Ready Meal (Cooked Rice and Panang Curry with Shrimp)
By: Sasiwimon Tabyam
Supervisor: Prof. Athapol Noomhorm

Application of Chitosan Beads as a Probiotic Carrier in Fruit Juice
By: Latchaporn Thamteerasathian
Supervisor: Prof. Sudip K. Rakshit

Use of Irradiation to Extend the Shelf Life of Steamed Sticky Rice, Roasted Chicken and Papaya Salad
By: Tumawadee Theamhong
Supervisor: Prof. Athapol Noomhorm

Chapter 20: SERD – GENDER AND DEVELOPMENT STUDIES FIELD OF STUDY

20.1 Introduction

A small project, Women in Development was initiated in the Human Settlements Development Division at AIT in the late 1980s. This grew into the Gender and Development Studies unit in 1991, with financial support from CIDA, NORAD, the Dutch Development Cooperation and the Japanese Government.

Gender and Development Studies (GDS) is a center for graduate studies, research and outreach in the School of Environment, Resources and Development. Within the overall gender specific framework, GDS highlights both the need for specialized academic degree awarding studies in gender and development, and the integration of gender analysis and a gender relations perspectives in AIT's other fields of study.

20.2 Faculty and Research Staff

Full-time Faculty

PHILIPPE DONEYS, B.A., University of Toronto, Canada; MA, University of London, UK; PhD, *Institut d'Etudes Politiques de Paris*, France.

Assistant Professor (*Gender, HIV/AIDS in Southeast Asia, Migration, Globalization, Gender, Politics and Civil Society*)

[Gender politics and civil society, HIV/AIDS in Southeast Asia, the role of technologies in gender and development, transnational issues such as migration, global activism and globalization]

BARBARA EARTH, BA, MS, University of Cincinnati; MA, PhD, Ohio University, USA.

Assistant Professor (*Environmental/occupational health; Gender and health social science; Gender and human rights; Gender and Water; HIV/AIDS; Qualitative*

research; Social aspects of technology change.)

[Gender and health development, especially sexual and reproductive health; Health issues arising from globalization; Education for social transformation.]

KYOKO KUSAKABE, BA, Sophia University, Tokyo, Japan; MSc, PhD, AIT, Thailand.

Associate Professor (*Women's employment under macro-economic changes; Gender issues in trade and migration; Women and micro-vendors/informal sector; Borderland studies, Gender issues in organizations, Gender and development policy and planning; Gender issues in fisheries/aquaculture.*)

[Impact of economic globalization on gender relations especially focusing on women's work; Gender issues in aquaculture and fisheries; Women's access to technology, women's role in trade chain, and the relationship with women's mobility; Informal economy and social security; Border, market and state: ways women in the borderlands negotiate with markets and states; Gender analysis of organizations and gender mainstreaming]

BERNADETTE RESURRECCION, BSc, Assumption College, Philippines; MA, PhD, Inst of Social Studies, the Hague, the Netherlands.

Assistant Professor (*Gender, environment and natural resource management; Discourses and practices of gender mainstreaming; Participation and governance in natural resource management; Gender and migration in Asia; Policy processes in environment and development*)

[Gender relations, livelihoods and environmental change; Discourses and practices of gender mainstreaming, participation and

governance in natural resource management; Gender and migration in Asia; Policy processes in environment and development]

Visiting Faculty

MARI OSAWA, BA, MA, PhD, University of Tokyo, JAPAN

Professor, Institute of Social Science, University of Tokyo, Japan and co-editor of the international refereed journal *Gender, Technology and Development*. (*Economic development, social policies and gender relations*)

[Gender, policy and the economic crisis, gender mainstreaming in policy making, gender analysis of social policy and feminization of the labor market]

YAYOI SUGIHASHI, BA, MA, Hosiie University Graduate School, PhD University of Manchester, UK

Lecturer, Ochanomizu University, Japan (*Gender and economic development; Gender statistics; and Gender issues in employment*)

Research Staff

JULAIKHA BENTE HOSSAIN, MSc in University of Dhaka, Bangladesh; MSc. in Asian Institute of Technology, Thailand; PhD Candidate, Asian Institute of Technology, Thailand.

Project Researcher, Gender and Development Studies, AIT, Thailand (*Gender issues in Employment; organizational management; Migration; Gender, Development and Public Policy; Gender mainstreaming*)

[Gender and development policy and planning, human rights, organizational management, gender budget, labor market issues, and gender mainstreaming in policy making]

KITTIMA LEERURUTTANAWISUT, MS in Urban and Regional Planning, Chulalongkorn University, Thailand
Research Associate, Gender and Development Studies, AIT, Thailand (Research on Policy processes in Biotechnology and Bio safety measures in Shrimp Farming in Thailand under IDRC on Knowledge System)

NAW EH MWEE, MSc. in Asian Institute of Technology, Thailand

Project Researcher, Gender and Development Studies, AIT, Thailand (Gender, Cross-border Migrant Workers and Citizenship: A case study of the Burmese-Thai border) [Women as an Internally Displaced Persons, Women Human Rights, Labour and Migration, Trafficking in women and children, Gender and Culture, Community Development]

SAN SITHILERTPRASIT, MSc. in Center of Development Studies, University of Wales, Swansea, UK.

Project Researcher, Gender and Development Studies, AIT, Thailand (Gender, Cross-border Migrant Workers and Citizenship: A case study of the Burmese-Thai border) [Gender and Migration, Health and Gender, Gender, Gay and Lesbian, Attitude about gender in difference culture, Gender Budgeting, Civil Society Management, Social Marketing]

20.3 Completed Grant and Sponsored Research

Asia Link: Gender, Development and Public Policy Studies in the Asian Context

Duration: 2002 to 2005
 Investigators: Dr Bernadette Resurreccion, Dr Kyoko Kusakabe
 Sponsor: European Commission
 Total Contracted Amount: THB 14,393,760

Strengthening Gender Mainstreaming Capabilities in IFAD Projects in Cambodia & Vietnam

Duration: 2004 to 2006
 Investigator: Dr Bernadette Resurreccion and Dr Kyoko Kusakabe
 Sponsor: IFAD/UNIFEM
 Total Contracted Amount: THB 3,705,000

Participatory Urban Infrastructure Project, Vientiane, Lao PDR

Duration: 2004 to 2006
 Investigator: Dr Bernadette Resurreccion
 Sponsor: UN Habitat/ UMP & ADB
 Total Contracted Amount: THB 3,120,000

The Impact of State Power in Ethnic Conflict Areas

Duration: 2005 to 2006
 Investigator: Dr Kyoko Kusakabe
 Sponsor: OSI Development Foundation, Switzerland
 Total Contracted Amount: THB 989,625

Women's Oral History Project in Northern Karen State

Duration: 2004 to 2005
 Investigator: Dr Kyoko Kusakabe
 Sponsor: OSI Development Foundation, Switzerland
 Total Contracted Amount: Baht 705,051

Women's oral history project in Northern Sayaboury Province, Lao PDR

Duration: 2004 to 2005
 Investigator: Dr Kyoko Kusakabe
 Sponsor: OSI Development Foundation, Switzerland
 Total Contracted Amount: Baht 312,000

Understanding Policy Processes in Biotechnology & Bio-safety Measures in Thailand and China

Duration: 2005 to 2006
 Investigator: Dr Bernadette Resurreccion
 Sponsor: IDRC, Canada
 Total Contracted Amount: THB 5,007,583

Gender and Governance: Capacity-building of Local Women Executives in the Philippines

Duration: 2004 to 2005
 Investigator: Dr Bernadette Resurreccion
 Sponsor: UN Habitat/UMP & UNESCAP
 Total Contracted Amount: THB 780,000

Workshop on the Assessment of Gender Mainstreaming Practices in Thailand: Identifying Factors of Successes and Failures

Duration: 2006
 Project Investigator: Dr. Kyoko Kusakabe
 Sponsors: Government of Japan
 Total Contracted Amount (Baht): 795,662

20.4 Ongoing / In Progress Grant and Sponsored Research

An edited volume on Gender, Environment and Natural Resource Management

Duration: 2005 to 2007
 Investigator: Dr Bernadette Resurreccion
 Sponsor: IDRC, Canada
 Total Contracted Amount: THB 495,000

Gender Mainstreaming Programme in Lao PDR

Duration: 2004 to 2007
 Investigator: Dr Kyoko Kusakabe
 Sponsor: IFAD Asia Division
 Total Contracted Amount: THB 3,510,000

Post-Graduate Education: Gender and Social Analysis in Environment & Development

Duration: 2005 to 2008
 Investigator: Dr Bernadette Resurreccion
 Sponsor: IDRC, Canada
 Total Contracted Amount: THB 8,778,000

NORAD-GDS 2006-2009

Duration: 2006 to 2009
 Investigator: Dr. Bernadette Resurreccion
 Sponsor: NORAD
 Total: THB20,781,377

Understanding Policy Processes in Biotechnology and Bio-safety Measures in Thailand & China

Duration: 2005-2007
 Investigator: Dr. Bernadette Resurreccion
 Sponsor: IDRC
 Total: THB 5,007,383

IDRC Publication on Gender and Natural Resource Management in Asia

Duration: 2005-2007
 Investigator: Dr. Bernadette Resurreccion
 Sponsor: IDRC
 Total: THB 372,520

Japanese Government – Gender and Development

Duration: 2007
 Investigator: Dr. Kyoko Kusakabe
 Sponsor: Japanese Government
 Total: THB 1,120,000

Gender, Cross-border Migrant Workers and Citizenship – A Case Study of the Burmese-Thai Border

Duration: 2006-2009
 Investigator: Dr. Kyoko Kusakabe
 Sponsor: IDRC
 Total: THB 10,559,630

The Impact of State Power in Ethnic Conflict Areas

Duration: 2005-2007
 Investigator: Dr. Kyoko Kusakabe
 Sponsor: OSI Development
 Total: THB 1,038,301

Training Workshop for the Students from Ochanomizu University, Japan

Duration: 2007
 Investigator: Dr. Kyoko Kusakabe
 Sponsor: Japanese Government
 Total: THB 1,050,000

20.5 Publications

Refereed Journals

Elmhirst, Rebecca and Resurreccion, Bernadette (2006) "Introduction," Special Issue on Gender and Environmental Governance, Vol 10 No 1, Gender, Technology & Development (Sage Publications).

Resurreccion, Bernadette (2006, in press/accepted). "Reproducing Gender. Female Rural-Urban Migration in the Red River Delta," Population, Space and Place, (Wiley Publishers).

Resurreccion, Bernadette (2006). "Edging Women Out?" Gender, Agency and Identity in Philippine Upland Development," Development and Change, Vol 37 No. 2 (Blackwell Publications).

Resurreccion, Bernadette (2006). 'Rules, Roles and Rights: Gender, Participation and Community Fisheries Management in Cambodia's Tonle Sap Region, International Journal of Water Resources Development Vol 22 No 3. (Taylor & Francis Publishers).

Resurreccion, Bernadette, (2005). "Women in-between. Transnational and Rural-urban Migration in the Mekong Region," Gender, Technology & Development, Vol 9 No 1. (Sage Publications).

Resurreccion Bernadette (2005) "Rules, Roles and Rights: Gender, Participation and Community Fisheries Management in Cambodia's Tonle Sap Region", *International Journal of Water Resources Development* Vol 21 No 4.

Barbara Earth, "Globalization and Human Rights as Gendered Ideologies: Case of Phoenix Pulp Mill, N.E. Thailand with a Strategy for Visibilizing Gender." *Gender, Technology and Development* 9(1). Jan.-April (2005).

Kyoko Kusakabe, "Gender Mainstreaming in Government Offices in Thailand, Cambodia and Laos: Perspectives from Below", Gender and Development, OXFAM Journal, Vol.13, No.2, July 2005.

Kyoko Kusakabe, "Crisis of masculinities?: A case of retrenched male workers in Bangladesh" (co-authored with Md. Mozammel Haque), Gender, Technology and Development, Vol. 9, No.2, August 2005, pp.185-208.

Kyoko Kusakabe, "Sex segregation in construction organizations in Bangladesh and Thailand" (co-authored with Julaikha Bente Hossain, Construction management and economics, Vol23, No.6, July 2005, pp.609-619.

Kyoko Kusakabe "Relational places of Burman women migrants in the border town of Tachilek, Myanmar" (co-authored with Zin Mar Oo), *Singapore Journal of Tropical Geography*, (forthcoming)

Kyoko Kusakabe "The Thai Vernacular Press and Female Politician: Stereotypical Reporting and Innovative Response" (co-authored with Ra Rattima Mukda-

anan and Rosechongporn Komolsevin), *Asian Journal of Communication*, Vol. 16, No.2, June 2006, pp.152-168.

Books

Resurreccion, Bernadette and Elmhirst, Rebecca, eds. (forthcoming). Gender and Natural Resource Management in Asia: Livelihoods, Mobility and Interventions

Refereed Book Chapters

Barbara Earth & Tran Tuan Anh (2005). Gender and Participation in a Water Supply and Sanitation Project: Mekong Delta, Vietnam. In Kuntala Lahiri-Dutt (ed.) Fluid bonds: Views on gender and water. National Institute for Environment, Australian National University and Stree. 23 pp.

Kyoko Kusakabe "Women dispatched workers after the economic crisis in Thailand: Social exclusion and erosion of workers' rights" In final project report of 'Globalization of Economy and the Structural Change of Gender Relations in Asia', head investigator: Prof. Nobuko Yokota.

Conference Proceedings

Resurreccion, Bernadette 'Gender Mainstreaming in the Tonle Sap Region: Three Myths,' International Conference on the Modern Myths on the Mekong, organized by Helsinki University of Technology and National University of Laos, Vientiane, 3-4 February 2006.

Resurreccion, Bernadette 'A Sense of Rights. Dao Women and Land Rights in Northern Vietnam,' International Conference on Land Rights, Institute of Social Studies, The Hague, 12-13 January 2006.

Resurreccion, Bernadette and Felma Joy Tadios, 'Destabilizing Zones of Comfort. The Case of Japanese Retirees in Davao City, Southern Philippines,' Asian Research Institute, National University of Singapore, 7-8 January 2006.

Resurreccion, Bernadette and Ha Thi Van Khanh, 'Able to Come and Go. Rural-urban Migration of Women in Nam Dinh Province, The Red River Delta.' Conference on Migration and Those Left Behind, Organized by the Asian MetaCentre, National University of Singapore in Hanoi, 10-11 March 2005.

Barbara Earth (2005). "Gender, Health and Human Rights: New Configurations around a Pulp Mill in Northeast Thailand" presented at the 10th International Women and Health Meeting (IWHM), 21-26 September, Delhi.

Barbara Earth (2005). "Development of a Gender-Sensitive HIV/AIDS City Action Plan: Phnom Penh, Cambodia" presented at the International Forum for Social Sciences and Health World Congress: Health Challenges of the Third Millennium, August 2005, Istanbul.

Barbara Earth (2005). "New Technologies, Gender and Socio-Cultural Change in Village-Based Silk Production, Northeast Thailand" presented at the AIT Seminar on RTG Joint Research Projects, 8 August 2005.

Barbara Earth (2005). "Clarifying Sub-Populations in Municipal HIV/AIDS Prevention and Care Programs." World Mayors' Conference. 2-4 April, Cochin, Kerala, India.

Bernadette Resurreccion and Ha Thi Van Khanh (2005), 'Able to Come and Go. Rural-urban Migration of Women in Nam Dinh Province, The Red River Delta.' Conference on Migration and Those Left Behind, Organized by the Asian MetaCentre, National University of Singapore in Hanoi, 10-11 March.

Kyoko Kusakabe (2005) Proceedings of the workshop for junior practitioners and scholars - "Place" of development from gender perspectives for collaboration. Ochanomizu University, Tokyo, Japan, 29-30 January 2005. Ochanomizu University The 21st Century COE Program, Frontiers of Gender Studies, F-GENS Publication Series 10

Kyoko Kusakabe, "Gender situation in Urban Environmental Management in the sub-region", Presented at the Sub-regional dissemination meeting on gender equality in UEM 6 December 2005, Surabaya, East Java, Indonesia.

Kyoko Kusakabe, "Operationalizing gender at the field level", Presented at The 10th AWID International Forum on Women's Rights and Development "How does change happen?" in panel "Changes from inside: Rethinking contradictions in gender mainstreaming strategies", 27-30 October 2005, Bangkok, Thailand

Kyoko Kusakabe, "Women in fish border trade: Case of fish trade between Cambodia and Thailand" with Prak Sereyvat, Ubolratana Suntornratana, Napaporn Sriputinibondh, presented at the Conference on Transborder issues in Greater Mekong Sub-region, Ubon Ratchathani, Thailand. 30 June - 2 July 2005

Kyoko Kusakabe, "Gendered effect of financial crisis on employment in Thailand", presented at the 9th International Interdisciplinary Congress on Women, Seoul, Korea, June 19-24, 2005

Kyoko Kusakabe, "Border trade between Cambodia and Thailand: State and the gendered experience in micro-trading of fish" Presented at IAFFE Annual Conference, 6-9 July 2006, Sydney, Australia

Kyoko Kusakabe, "Women dispatched workers after the economic crisis in Thailand: Social exclusion and erosion of workers' rights" Presented at IAFFE Annual Conference, 6-9 July 2006, Sydney, Australia

economic crisis in Thailand", Co-authored with Jyotsna Maskay, UMP-Asia Occasional Paper No.66, December 2005

Kyoko Kusakabe, Gender situation in urban environment management in Southeast Asia Compiled by Kyoko Kusakabe, Md. Mozammel Haque, Rajani Rajbandari Under the Southeast Asia Urban Environmental Management Application Project (forthcoming)

Kyoko Kusakabe, Gender mainstreaming in IFAD supported projects in Cambodia With Ministry of Women's Affairs, Ministry of Agriculture, Forestry and Fisheries, Ministry of Rural Development, Cambodia. With support of UNIFEM-IFAD. 2006

Kyoko Kusakabe, Policy issues in street vending: Overview of studies in Thailand, Cambodia and Mongolia Informal economy, poverty and employment International Labour Organization, 2006

Kyoko Kusakabe, On the borders of legality: A review of studies on street vending in Phnom Penh, Cambodia Informal economy, poverty and employment. Cambodia Series No. 4, International Labour Organization, International Labour Office Bangkok, 2006.

Kyoko Kusakabe, Reconciling work and family: Issues and policies in Thailand Conditions of work and employment series No. 14, Conditions of work and employment programme, International Labour Organization, Geneva, 2006

Kyoko Kusakabe, Gender and fisheries in Lower Mekong Region (Compiler. Authored by Gender/women in fisheries network) Forthcoming from Mekong River Commission.

Kyoko Kusakabe, Assessment of gender mainstreaming practices in Thailand: Identifying factors for successes and failures With Yumiko Tanaka, Kuniko Takamatsu and Yuko Kume Seminar report, 23-24 March 2006 Embassy of Japan and AIT.

The Participation of Women in Integrated Grassland Management: A Case Study of Inner Mongolia in China

By: Zhai Fan
Supervisor: Dr. Bernadette Resurreccion

Women's Place in Local Development

NGOs in Yangon, Myanmar
By: Aye Aye Hlaing
Supervisor: Dr. Barbara Earth

Rural-Urban Migration and Uses of Social Capital from a Gender Perspective: A Case Study of Tinthana VDC, Kathmandu, Nepal

By: Seema Luitel
Supervisor: Dr. Bernadette P. Resurreccion

Economic Policy Change and Women's Employment in Township and Village Enterprises (TVE): Case Study in Shanxi Province, China

By: Tian Min
Supervisor: Dr. Kyoko Kusakabe

Changing Gender Roles and Relations among the Internally Displaced People: A Case Study of Karens in Mitta Commune, Tenasserim Division, Myanmar

By: Naw Eh Mwee
Supervisor: Dr. Kyoko Kusakabe

The Identity of the Buddhist Myanmar Women Who Suffered Hysterectomy

By: Khin Zar Naing
Supervisor: Dr. Barbara Earth

Impact of Aquaculture Development on Women: A Case Study of the Greater Noakhali Aquaculture Extension Project (GNAEP) in Bangladesh

By: Nurunnaher
Supervisor: Dr. Kyoko Kusakabe

Gendered Health Effects of Family Wage Labour: A Study on Stone Crushers of West Bengal, India

By: Chandreyee Roy
Supervisor: Dr. Kyoko Kusakabe

Young Rural Women's Migration into Vientiane City

By: Khampho Sanatem
Supervisor: Dr. Bernadette P. Resurreccion

Research Study: Women Weaving Workers in a Small Enterprise: A Case Study of Xaybouathong District

Khammuane Province, Lao PDR
By: Deuandara Sayakoummane
Supervisor: Dr. Kyoko Kusakabe

Unemployment and Men's Sense of Masculinities in Poipet, Cambodia

By: Phann Sophon
Supervisor: Dr. Kyoko Kusakabe

Creating Zones of Comfort: The Experiences of Japanese Retirees on the Move

By: Felma Joy I. Tadios
Supervisor: Dr. Bernadette P. Resurreccion

Effects of Rubber Production Promotion on Intrahousehold Gender Relations: A Case Study of Katus in Thua Thien Hue Province, Vietnam

By: Ngo Thi Thuan
Supervisor: Dr. Kyoko Kusakabe

Gender Perceptions on Pesticides and Health: Taung Inn Village, Pwint Phyu Township, Magway Division, Myanmar

By: Nilar Tun

Supervisor: Dr. Barbara Earth

Gender, Environment and Health Issues in Seafood Processing: Comparison between Foreigner and Local Managed Factories Workers in Yangon

By: Cho Cho Latt Tun
Supervisor: Dr. Barbara Earth

Research Study: Adolescent Sexuality, Changing Norm and HIV Risk in Vientiane Lao PDR

By: Khanthida Vongsakhamphou
Supervisor: Dr. Barbara Earth

Land Rights of Khmu Women: A Case Study on Numsing Village, Vieng Phukha District, Laung Namtha Province, Lao PDR

By: Vanthida Meungkhampeng
Supervisor: Dr. Bernadette P. Resurreccion

Migration, Gender and HIV in Lao PDR: Lao Migrants Returning to Savannakhet Province with HIV Contracted in Thailand

By: Sommay Mounsourisack
Supervisor: Dr. Barbara Earth

Changing Gender Roles and Rituals among Hindus in Holy River Bagmati at Pashupatinath Temple, Kathmandu, Nepal

By: Vineeta Thapa
Supervisor: Dr. Bernadette P. Resurreccion

20.6 Masters Students' Theses and Research Studies

The Gendered Dimensions of Conflict: Psychosocial Impact on Family Members of Enforcedly Disappeared People, Kathmandu District, Nepal
By: Suvechha Adhikari
Supervisor: Dr. Barbara Earth

Living as a Minority Group in Bangladesh: Tradition and Identity among the Khasis
By: Aneeqa Rashid Ahmad
Supervisor: Dr. Bernadette P. Resurreccion

Transition of Sexual Subcultures, Gender and Related Health Risks among Bhutanese Secondary Schools Girls
By: Karma Dema
Supervisor: Dr. Barbara Earth

The Socio-Economic Impacts of Remittances on Families of Myanmar Female Migrant Workers in China Myanmar Border
By: Kaythi Min Din
Supervisor: Dr. Bernadette P. Resurreccion

Chapter 21: SERD – NATURAL RESOURCES MANAGEMENT FIELD OF STUDY

21.1 Introduction

This field of study emphasizes natural resources, including land, forest and wild animal, and environmental conservation concerns. It addresses the problems of deforestation, land and coastal ecosystem degradation, biodiversity depletion, diminishing water supply, and other environmental pressures and threats on local, national, regional and global ecosystems.

21.2 Faculty and Research Staff

Full-time Faculty

DIETRICH SCHMIDT-VOGT, BSc, Freiburg University, Germany; MSc, University of Saskatoon, Canada; PhD, Heidelberg University, Germany.

Associate Professor

(Landscape Ecology; Integrated Land Use Systems; Sustainable Forest Management; and Human Impact on Vegetation]

EDWARD L WEBB, BA, Occidental College, Los Angeles; PhD, Univ of Miami, USA.

Associate Professor

[Tropical Forest Ecology; Community-based natural resources management, and Forestry]

GANESH P SHIVAKOTI, BS, MS, Udaipur Univ, India; PhD, Michigan State Univ, USA.

Associate Professor [Natural Resources Economics; Common Property Resources; NRM Policy Analysis; and Watershed Management]

RAJENDRA P SHRESTHA, BSc, Haryana Agri. Univ, India; MSc, DTechSc, AIT, Thailand.

Assistant Professor

[Sustainable Land Management; Natural Resources Degradation

and Environmental indicators; GIS/ RS applications and Geoinformation for Decision making]

Visiting Faculty

AMBIKA PRASAD GAUTAM, MSc, PhD, AIT, Thailand.

Visiting Lecturer [Integrated Use of Biological; RS/GIS Technologies; Social Research Methods]

21.3 Completed Grant and Sponsored Research

Asian Irrigation Institutions and Systems (AIIS) Dynamics study and Database Management

Duration: Sept 2003 to Dec 2006

Investigators: Wai Fung Lam

Dr Ganesh Shivakoti

Sponsor: Government of Hong Kong Grant to University of Hong Kong

Total Contracted Amount: US \$ 110,000

Development, land use change and forest conservation in central Vietnam

Duration: June 2003 to Dec 2006

Investigators: Dr Edward Webb

Dr Ganesh Shivakoti

Sponsor: MacArthur Foundation

Total Contracted Amount: \$230,000

Professional enhancement and curriculum development to strengthen its new Master's degree program in integrated natural resources management and development

Duration: Aug 2003 to Dec 2006

Investigator: Dr Ganesh Shivakoti

Sponsor: Ford Foundation Grant to Andalas University, Indonesia

Total Contracted Amount: US \$ 180,000 (a sub-contract of US \$ 50,000 to AIT for doctoral training program of Andalas faculty and support for AIT faculty to teach graduate level courses at Andalas)

21.4 Ongoing / In Progress Grant and Sponsored Research

Collaboration in Integrated Natural Resource Management in Indonesia: Decentralization, Local people and Resources

Duration: Feb 2005 to Dec 2008

Investigator: Dr Ganesh Shivakoti

Sponsor: Ford Foundation Grant

Total Contracted Amount: US \$ 225,000 (\$ 100,000 to AIT and 125,000 to Andalas University, Indonesia; a sub-contract of US \$ 100,000 to AIT for five doctoral training program of Andalas faculty and three best Masters graduates in INRM from Andalas)

Training cum Internship on "Asian Governance and Leadership Training and Internship

Duration: January-February 2006

Investigator: Dr Ganesh Shivakoti

Sponsor: SungKyunKwan University, South Korea

Total Contracted Amount: US \$ 22000

MSU-AIT Study Abroad Program

Duration: January – April 2006

Investigator: Dr Ganesh Shivakoti

Sponsor: Michigan State University

Total Contracted Amount: US \$ 16500

Monitoring and conserving forest diversity in Nam Dong district, Thua Thien, Hue province, Vietnam

Duration: June 2006 to March 2009

Investigator: Dr Edward Webb

Sponsor: MacArthur Foundation

Total Contracted Amount: \$326,000

Regional workshop on sustainable land management

Duration: October 2006 to April 2007

Project Description: Conduct a regional workshop on sustainable land management (SLM) at AIT to review SLM project development, launch and implementation issues and to take stock of new opportunities on technologies, finance for mainstreaming SLM, National Action Plan development and financing. The workshop was participated by representatives of 20 countries

Project Investigator: Dr. Rajendra Shrestha
Sponsors: United Nations Office for Project Services

Total Contracted Amount (Baht): 1,591,362

AIT Support to National University of Laos (NUOL)

Duration Sept 2006 to June 2007

Project Description AIT is requested to support NUOL during a year in enhancing its capacity. The objectives are to assist NUOL in the financial arrangement of the Sida supported programs and to initiate discussion with NUOL on the improvement of existing and new academic programs.

Project Investigator Dr. Dietrich Schmidt-Vogt

Sponsors Sida

Total Contracted Amount B 2,080,000.00

21.5 Publications

Refereed Journals

- Kabir, Md. E. and Webb, E.L. 2006. Saving a forest: the composition and structure of a deciduous forest under community management in northeast Thailand. *Natural History Bulletin of the Siam Society* 54(2): 63-84.
- Bista, S. and Webb, E.L. 2006. Collection and marketing of non-timber forest products in the Far Western Hills of Nepal. *Environmental Conservation* 33(3): 244-255.
- Dorji, L., Webb, E.L., and Shivakoti, G. 2006. Property rights, incentives and forest management in Bhutan. *Environmental Conservation*. 33(2): 141-147.
- Webb, E.L., Bult, M. van de, Chutipong, W., and Kabir, Md. E. 2006. Composition and structure of lowland rainforest tree communities on Ta'u, American Samoa. *Pacific Science* 60(3): 333-354.
- Shivakoti Ganesh P. and R.C. Bastakoti . 2006 . "The robustness of Montane Irrigation Systems of Thailand in a dynamic human-water resources interface." *Journal of Institutional Economics*. 2(2):227-247.
- Dorji, Lam, E. Webb and G. P. Shivakoti. 2006 "Forest Property Rights under Nationalized Forest Management in Bhutan." *Environmental Conservation*. 33(2):141-147.
- Singzon, Sharon and Ganesh P. Shivakoti. 2006. "Participation in Integrated Watershed Development and Management: Role of Informal Intermediaries in Lamphra Phloeng Watershed Development in Northeast Thailand. *Asian Profile*. 34(2).
- Maraseni, T.N.,G. P. Shivakoti, G. Cockfield and A. Apan. 2006. "Nepalese Non-timber Forest Products: An Analysis of the Equitability of Profit Distribution across a Supply Chain to India." *Small-scale Forest Economics, Management and Policy*. 5(2):191-206.
- Das, Romy and Ganesh P. Shivakoti. 2006 "Livestock Carrying Capacity Evaluation of Land Resources in Integrated Farming System: A Case Study from Mid Hills of Nepal." *The International Journal of Sustainable Development and World Ecology*.13(3):153-163.
- Chowdhury, M.A., Ganesh P. Shivakoti and M. Salequzzaman 2006. "A Conceptual Framework for Sustainability Assessment Procedures of the Shrimp Aquaculture Industry in Coastal Bangladesh." *International Journal of Agricultural Resources, Governance and Ecology*. 5(2/3):162-184.

- Shrestha, R.P. 2006. Relating Soil Electrical Conductivity to Remote Sensing and Other Soil Properties for Assessing soil salinity in northeast Thailand. *Land Degradation and Development*. 17(6):677-689.

Conference Proceedings

- Schmidt-Vogt, D. 2006. The regional role of the Asian Institute of Technology. In: Bach, N.L., Syers, K, Hemptarasuwan (eds.): Proceedings of a technical seminar on "Innovative approaches to natural resources and environmental management (NREM): spatial technologies' perspectives for Thailand and the GMS", May 23-24, pp. 30-37. Mae Fah Luang University, Chiang Rai, Thailand.
- Shivakoti, Ganesh. 2006. "Policies, Institutions and Governance Challenges of Irrigation in Twenty-First Century." Paper presented at the Eleventh Biennial Conference "Survival of the Commons: Mounting Challenges and New realities" of the International Association for the Study of Common Property (IASCP) held in Bali, Indonesia during June 19-23, 2006.
- Shivakoti, Ganesh 2006. "Coping Policies, Institutions and Governance Challenges of Irrigation in Twenty-First Century." Key note Paper presented at Fourth International Seminar on "Irrigation in Transition: Interacting with Internal and External Factors and Setting the Strategic Actions" organized by Farmer Managed Irrigation Systems Promotion Trust held at Kathmandu, Nepal during 6-7 November, 2006.
- Shivakoti, Ganesh and R.C. Bastakoti. 2006. "Understanding institutional dynamics and performance of irrigation systems: Some methodological considerations" Paper presented at Fourth International Seminar on "Irrigation in Transition: Interacting with Internal and External Factors and Setting the Strategic Actions" organized by Farmer Managed Irrigation Systems Promotion Trust held at Kathmandu, Nepal during 6-7 November, 2006.
- Shivakoti, Ganesh P. and S.G. Shrestha. 2006. "Farmer Managed Irrigation Systems of Nepal: Balancing Water Uses and Environmental Conservation for Sustaining Livelihood." In Ohgaki, S., K.Fukushi, H. Katayama, S. Takizawa and C. Polprasert (eds). *Southeast Asian Water Environment 1*. London: IWA Publishing. Pp.68-74.

- Shrestha, R.P., Pensuk, A., and K. Roy, 2006. Land degradation assessment in the Lower Mekong Basin. *Proc. International Conference on the Mekong Research for the People of the Mekong*, 18-21 October 2006, Chiangrai, Thailand.
- Shrestha, R.P., 2006. An investigation on the relation between the remote sensing data and soil salinity. *Proc. 27th Asian Conference on Remote Sensing*, 9-13 October 2006, Ulaanbaatar, Mongolia.

- Shrestha, R.P., 2006. Geo-information development for environmental management in the Greater Mekong Subregion Countries. *17th United Nations Regional Cartographic Conference for Asia and the Pacific*,

18-22 September 2006, Bangkok, Thailand.

Other Publications

- Schmidt-Vogt, D. 2006. "Kanak Mani Dixit, Ramachandran Shastri (eds.): State of Nepal. Kathmandu 2002." In: Internationales Asienforum (International Quarterly for Asian Studies), 37 (1-2), pp. 162-164.
- Schmidt-Vogt, D. 2006. Comment on „Gernot Brodnig: Biodiversity Conservation and the MDGs". In: *Regional Development Dialogue*, 27 (1), pp. 9-11.
- Werner, W., Schmidt-Vogt, D. 2006. Nachruf: Prof. Dr. Ulrich Schweinfurth (6.2.1925-8.4.2005). In: HGG-Journal (Journal of the Heidelberg Geographical Society) 19+20, pp. 178-180.
- Schmidt-Vogt, D. and Shrestha, R.P., 2006. Role of Geospatial Technologies in Training for Sustainable Natural Resources Management in Asia, *GIS Development Weekly*. Vol. 2, Issue 19. pp 1-3.
- Shrestha, R.P., 2006. Proceedings of Asia workshop on Sustainable Land Management and National Capacity Self-Assessment, 20-23 November 2006, Asian Institute of Technology, Bangkok.
- Shrestha, R.P., 2006. Soil erosion assessment in mainland southeast Asia for developing better soil conservation strategies. An exchange researcher's report submitted to Regional Research Institute for Agricultural Production, College of Bioresource Sciences, Nihon University, Fujisawa, Japan (June 2006).
- Shrestha, R.P., 2006 Environmental data and its management. Paper presented at AIT-UNEP training program on "Environmental Management Tools for SAARC Member Countries" 27-31 March 2006, AIT.

21.6 Doctoral Student Dissertations

Development of a Methodology for Soil Erosion Hazard Assessment in Upper Kaligarang Watershed, Indonesia
By: Rohlini
Supervisor: Dr. Roberto S. Clemente

21.7 Masters Students' Theses

Social Forestry in the Matamuhuri Reserve Forests of the Chittagong Hill Tract, Bangladesh: Impacts and Implications
By: Mohammed Ruhul Amin
Supervisor: Dr. Rajendra Prasad Shrestha

Land Evaluation for Sustainable Agricultural Development in Da Nhim Watershed, Vietnam: An Application of the Parametric Method in GIS Environment
By: Tran Thi Hoang Anh
Supervisor: Dr. Rajendra Prasad Shrestha

Assessment of Contribution of the Flooded Forest to the Livelihoods of Rural Families in Cambodia: A Case Study on the Community Fishery in Aek Phnom District, Battambang Province
By: Rous Chanthuy
Supervisor: Dr. Ganesh Prasad Shivakoti

- Productivity of Local Farmer's Eucalyptus Plantations and their Livelihood in Khanthabouly District, Savannakhet Province, Lao People's Democratic Republic*
By: Khamsay Diengsady
Supervisor: Dr. Edward L. Webb
- Harvesting Technique and Market Analysis of Selected Non Timber Forest Products in Bolikham District, Bolikhamxay Province, Lao PDR*
By: Sisavath Homdara
Supervisor: Dr. Edward L. Webb
- GIS Approach to Investigate the Potential Areas for Irrigation Development in Nam Mae Mok Subbasin, Northern Thailand*
By: Jitsuda Intumarn
Supervisor: Dr. Rajendra Prasad Shrestha/
Dr. Ganesh Prasad Shivakoti
- Factors Influencing Soil Conservation Practices in Sivalik-Terai Region: A Case Study of the Badhari Sub Watershed of Dhanusha District, Nepal*
By: Bipin Kumar Jha
Supervisor: Dr. Rajendra Prasad Shrestha
- Economic Importance of Wetland Resources and Community Participation: A Case Study in Tanguar Haor, Bangladesh*
By: Md. Humayun Kabir
Supervisor: Dr. Ganesh P. Shivakoti
- Socio-Economic Assessment of Community Fisheries: A Case Study of Chong Kneas Community Fisheries, Siem Reap Province, Cambodia*
By: Sok Long
Supervisor: Dr. Edward L. Webb
- Productivity and Revenue of Plantations in Cox's Bazaar, Bangladesh*
By: S.M. Golam Mowla
Supervisor: Dr. Edward L. Webb
- Impact of Community Forest Establishment : A Case Study of Nyaung Shwe Township, Southern Shan State, Myanmar*
By: Kyaw Oo
Supervisor: Dr. Ganesh P. Shivakoti
- Collaborative Forest Management in Parsa District, Nepal: A Study on Stakeholders' Perception and Participation*
By: Krishna Prasad Osti
Supervisor: Dr. Rajendra Prasad Shrestha/
Dr. Edward L. Webb
- Protected Area Management and Local Communities: The Case Study of Phou Khao Khouay NBCA, Thaphabath District, Bolikhamxay Province, Lao PDR*
By: Thavy Phimminith
Supervisor: Dr. Dietrich Schmidt-Vogt
- Institutional Analysis of Integrated Water Resources Management in Prachin Buri Sub-Watershed, Prachin Buri Province, Central Thailand*
By: Charurin Pholhinkong
Supervisor: Dr. Dietrich Schmidt-Vogt
- Impact of Hills Leasehold Forestry and Forage Development Program in the Siwalik: A Case Study of Makwanpur District in Nepal*
By: Devi Chandra Pokhrel
Supervisor: Dr. Ganesh P. Shivakoti
- Impact Assessment of Social Forestry Projects on the Government Forestland in Bangladesh: A Case Study of Vannava and Jathila Forest Community Groups in Dhaka Forest Division*
By: Ahmed Niamur Rahman
Supervisor: Dr. Ganesh P. Shivakoti
- Impacts of Participatory Social Forestry Practiced in Madhupur Sal Forests, Bangladesh*
By: Molla Mohammad Mizanur Rahman
Supervisor: Dr. Edward L. Webb
- Community-Based Fisheries Management: A Case Study of Doun L'a and Spean Krong Community Fisheries in Kampong Thom Province, Cambodia*
By: Mom Sitha
Supervisor: Dr. Rajendra Prasad Shrestha/
Dr. Edward L. Webb
- People's Perception of and Participation in Decentralized Fisheries Policies in Cambodia: A Case Study of Phneat-Kohpongsat Community Fishery, Banteay Meanchey Province*
By: Norng Sivouthan
Supervisor: Dr. Dietrich Schmidt-Vogt
- Assessment of Agro-biodiversity in a Changing Shifting Cultivation Landscape: A Case Study of Bhumlingchowk VDC, Gorkha District, Nepal*
By: Rojee Suwal
Supervisor: Dr. Dietrich Schmidt-Vogt
- An application of Geographic information system for assessment of drought risk area in Savanna Khet Province of Lao PDR*
By: Kaisorn Thanthathep
Supervisor: Dr. Rajendra Prasad Shrestha
- Participatory Fisheries Management: A Case Study of Boeung Chunlen Reservoir Community Fishery, Kandal Province, Cambodia*
By: Cheav Vichak
Supervisor: Dr. Rajendra Prasad Shrestha
- People's Participation in a Community-based Forest Management Project: A Case Study of the Sino-German Forest Project in Wuding County, Yunan Province, China*
By: Zhou Rong
Supervisor: Dr. Dietrich Schmidt-Vogt
- Scope and Limitation of Community Based Conservation Practices in Cambodia: Case Study of Prek Toal Core Area Tonle Sap Biosphere Reserve*
By: Ou Chouly
Supervisor: Dr. Dietrich Schmidt-Vogt/
Dr. Edward L. Webb
- Environmental Awareness and Farming Behavior of Farmers in Inle Lake Nyaung Shwe Township, Myanmar*
By: Bo Bo Lwin
Supervisor: Dr. Edward L. Webb
- Community Based Forestry Management for Livelihood Improvement in Lao PDR: A Case Study in Sangthong District, Vientiane Municipality*
By: Sinthone Phoumkanouane
Supervisor: Dr. Ganesh P. Shivakoti

Chapter 22: SERD – PULP AND PAPER TECHNOLOGY

FIELD OF STUDY

22.1 Introduction

This field of study strives for finding basic solutions for the immediate technical problems facing the local pulp and paper industry. Research activities in PPT are focused on optimising pulping, bleaching and papermaking processes with emphasis on the reduction of their negative impact on environment. The quality of the product is also emphasized to maintain competitive edge of local pulp and paper industry in the global market. Modification of existing processes to suit local raw material is another challenging area of research.

22.2 Research Facilities and Laboratories

The Pulp and Paper Laboratory was established to provide the need for research and high level education for this specific field. The laboratory is equipped with all basic facilities for teaching and research purposes in the field of pulp and paper technology. Several sophisticated equipment have been constantly furnished to extend the services for advance research and special studies likewise. The facilities are provided for activities in pulping, paper testing, printing and coating, as well as for wood component analysis. The equipment is standardized according to ISO, TAPPI, and Scandinavian Standards. The programmable six-vessel autoclave digester makes cooking study in research level possible in the most convenient setting. Other major equipment in Pulp and Paper Laboratory include the single batch digester, bleaching reactor, sheet formers, fiber length analyzer, formation tester, deinking flotation cell, and spectrophotometer with ERIC option. In addition to provide assistance and research facilities needs for students, faculty, the laboratory also provides

professional services for pulp and paper industry internationally. Among its major equipment include a 6-bomb autoclaved digester, CRS Engineering; Bleaching reactor; PFI mill; Fiber length analyzer FS-200, Kajaani; Spectrophotometer with ERIC option, Technidyne; and a Beta formation tester, Ambetec.

22.3 Faculty and Research Staff

Full-time Faculty

RAIMO O MALINEN, MSc, LicTech, DTech, Helsinki Univ. of Tech., Finland.

Associate Professor

[Wood and Fibre Chemistry in general; Pulping Technology; Fibre Technology; the use of different fibre raw materials in pulping papermaking; Environmental Technology; Project Management, Basic Engineering and Feasibility Studies]

MOUSA M NAZHAD, BSc, Univ of Tehran, Iran; MSc, Univ of Concordia, Montreal; PhD, Univ of British Columbia, Vancouver, Canada.

Associate Professor (Fiber structure; Stock

preparation; Papermaking; Pulp processing; Recycling)

[Formation or fines influence on paper properties; Upgrading of secondary fibers; Refining compared with surface treatment of fibers; Papermaking quality of frayed fibers]

HEIKKI E K KOLEHMAINEN, MSc, Helsinki Univ of Tech, Finland.

Instructor

Visiting Faculty

ESA KALEVI LEHTINEN, MSc, Lic Sc, Helsinki Univ of Technology, Finland

Visiting Lecturer

AKI VILPPONEN

Visiting Lecturer

22.4 On-going Sponsored Research

Hercules US Study

Duration 15 July 2006 to 14 July 2007

Project Description The purpose of the joint project between Hercules Incorporated and AIT is to develop novel technology in the pulp mill areas. Particular emphasis will be placed on opportunities in Asia Pacific. The technology or methods developed should leverage Hercules' technical and market strengths, and AIT technical expertise, available equipment and resources. The project consists of several R&D programs, each of variable duration.

Project Investigator Dr. Raimo Malinen

Sponsors Hercules Incorporated, U.S.A.

Total Contracted Amount (Baht) 1,140,000

22.5 Publications

Refereed Journals

Malinen, R., Pisuttipiched, S., Kolehmainen, H., Kusuma, F. Potential of Acacia Species as Pulpwood in Thailand, *Appita Journal*, 59(3):190-196, May 2006.

Sridach, W., Retulainen, E., Nazhad, M.M., Kuusipalo J. And Parkpian, P., 'Biodegradable barrier coating on paperboard; Effects on biodegradation, recycling and incineration,' *Paperi Ja Puu – Paper and Timber* 88(1): 1 (2006).

Nazhad, M. M., Sridach, W., Retulainen, E., Kuusipalo, J. and Parkpian, P., 'Biodegradation of some barrier coated boards at different soil environment', *J. Appl. Poly. Sc.*, in press (2006).

Conference Proceedings

Phoung, D. T. and Nazhad, M. M., 'Effect of swelling or surface agents on strength of old corrugated containers (OCC),' 60th Appita annual conference and exhibition, Melbourne, Australia, 3-5 April (2006).

- Wibowo, A. and Nazhad, M. M., 'Printability of Acacia pulp compared to Birch or eucalyptus,' 60th Appita annual conference and exhibition, Melbourne, Australia, 3-5 April (2006).
Comparison of Eucalyptus Camaldulensis Bleaching Results between O-Q-(OP)-Z-Q-(PO) and O-Q-(OP)-Paa-Q-(PO)
By: Sun Beisong
Supervisor: Dr. Raimo O. Malinen
- Yumiao, Z. and Mousa Nazhad, M. M., 'Influence of anionic trash on retention and sizing,' 5th INWFPPC and the 3rd ISETPP, November 8-10 (2006).
Influence of Water Hardness and Silicate on Performance of Deinking Process and their Scaling Potention
By: Le Tien Dung
Supervisor: Dr. Mousa M. Nazhad
- Yun, J. and Nazhad, M. M., 'Quality of some local Asian old newspaper (LONP) as a raw material for news print,' 5th INWFPPC and the 3rd ISETPP, November 8-10 (2006).
How to Minimize Ink Residual of Local Newsprint
By: Nguyen Minh Hoang
Supervisor: Dr. Mousa M. Nazhad
- Li, Yun and Nazhad, M.M., 'Separate or mix refining of Acacia for production of fine paper,' 5th INWFPPC and the 3rd ISETPP, November 8-10 (2006).
Using Nanoparticles in Enhancing the Strength Properties of Old Corrugated Container
By: Fanny Landrea
Supervisor: Dr. Mousa M. Nazhad
- Minro, F., Yuan, G. and Nazhad, M. M., 'Characterization of some local Asian old corrugated containers (LOCC) pulp,' 5th INWFPPC and the 3rd ISETPP, November 8-10 (2006).
The Effects of Pigment Particle Size and CMC on Coated Paper Properties
By: Ngo Tien Luan
Supervisor: Dr. Esa Kalevi Lehtinen
- Tao, L. and Nazhad, M. M., 'Effect of chemical pulp fines on filler retention and paper properties,' 5th INWFPPC and the 3rd ISETPP, November 8-10 (2006).
Effects of Ozone Delignification on Lab Cooked Acacia Pulp
By: Chen Qing Qiang
Supervisor: Dr. Raimo O. Malinen
- Malinen, R., Saha, A.M. 'Formation and degradation of hexenuronic acid in kraft cooking of some wood species, 60th Appita Annual Conference and Exhibition, Melbourne, Australia, 3-5 April 2006. p. 277-282.
Influence of Hexenuronic Acid of Eucalyptus Camaldulensis on Pulp and Paper Making Properties
By: Yutthapon Sittiwatjana
Supervisor: Dr. Raimo O. Malinen
- Malinen, R., Nhan, D.T.T. 'Control of hexenuronic acid content in bleached pulp and its effects on optical properties of pulp, 60th Appita Annual Conference and Exhibition, Melbourne, Australia, 3-5 April 2006. p. 289-296.
The Effect of Recycling on Paper Properties
By: Erik Rusdi Sutjipto
Supervisor: Dr. Mousa M. Nazhad
- Karim, M.R., Malinen, R. 'Suitability of the combined use of chlorine dioxide and ozone in prebleaching of *Eucalyptus camaldulensis* kraft pulp, 60th Appita Annual Conference and Exhibition, Melbourne, Australia, 3-5 April 2006. p. 305-312.
Effect of Fiber Raw Material and Its Refining on Coated Paper Properties
By: Le Tieu Anh Thu
Supervisor: Dr. Esa Kalevi Lehtinen
- Malinen, R. 'Formation and degradation of hexenuronic acid in kraft cooking and bleaching, Research Progress in Pulping and Papermaking, 3rd ISETPP, Guangzhou, China, 8-10 November 2006. p. 178-184.
The Effects of Washing in DD and DP Final Bleaching
By: Sun Wenbing
Supervisor: Dr. Aki Vilpponen

22.6 Doctoral Student Dissertation

Use of Ozone in ECF Bleaching of Tropical Hardwood (Eucalyptus camaldulensis and Acacia mangium) Kraft Pulp
By: Md. Rezaul Karim
Supervisor: Dr. Raimo O. Malinen

22.7 Masters Students' Theses

A Study on Styrene Maleic Anhydride Imide Resins in Inkjet Paper Coating
By: Xiao Ang
Supervisor: Dr. Esa Kalevi Lehtinen

Comparison of Ammonium Zirconium Carbonate with other Insolubilizers used in Paper Coating
By: Mou Zhengran
Supervisor: Dr. Esa Kalevi Lehtinen

Effects of Latexes on Coating Colors and Surface Properties
By: Zhao Zhisong
Supervisor: Dr. Esa Kalevi Lehtinen

Effect of Particle Charge on the Properties of Coating Colour and Coated Paper
By: Md. Mosharraf Hossain Bhuiyan
Supervisor: Dr. Esa Kalevi Lehtinen

Possibilities to Enhance the Compression Strength of a Kraft Linerboard through the Improvement of its Network Structure
By: Girindra Kumar Mishra
Supervisor: Dr. Mousa M. Nazhad

Effect of Filler Type, Retention Aid Type and Amount of Refining on Filler Retention and Paper Properties
By: Nguyen Dinh Thang
Supervisor: Dr. Esa Kalevi Lehtinen

Chapter 23: SERD – REGIONAL AND RURAL DEVELOPMENT PLANNING FIELD OF STUDY

23.1 Introduction

This field of study focuses on rural poverty, improvement of the quality of life, and social and economic development of rural areas. Practice oriented rural-regional planning is carried out regularly at district and sub-district levels following a participatory and integrated approach, and attention is paid to management of development Institutions, infrastructure and physical resources. Sectoral and spatial planning is equally emphasized along with the management of rural development programs and local development projects to strengthen rural communities for sustainable development.

23.2 Faculty and Research Staff

Full-time Faculty

JAYANT K ROU TRAY, BSc(Hons), MSc, PhD, Utkal Univ; MRP, Indian Inst of Tech, India.
Professor (*Community Forestry; Distric Planning Methods and Techniques; Geographic Information Systems; Rural Transport Development; Rural-Regional Development; Social Impact Assessment*)
 [Rural Regional Development Planning Methodology and Techniques; Decentralized Planning; Evaluation and Impact Study of Rural Development Programs; Rural Urban Relations; Geographic Information Systems; Environmental Planning and Social Impact Assessment; Market Centers and Rural Development; Rural Transport Development and Community Forestry]

GOPAL B THAPA, BSc, Tribhuvan Univ, Nepal; MSc, DTechSc, AIT, Thailand.
Professor (*Natural Resources Management; Sustainable Agricultural Development and Planning; Watershed Management*)
 [Watershed Management; Natural Resources Management; Sustainable Agriculture]

SOPARTH PONGQUAN, BSc, Chiang Mai Univ; MSc, AIT, Thailand; DSc, Univ of Wageningen, The Netherlands.
Associate Professor (*Capacity Building; Community Development and Monitoring and Evaluation of Development Projects; Decentralized Local Government; People's and Community Participation; Rural Development*)
 [Decentralization; Capacity and Institutional Building; Local Governance; Community Participation and Local-level Planning]

MOKBUL MORSHED AHMAD, BSc, MSc, Dhaka Univ, Bangladesh; MSc, AIT, Thailand; PhD, Univ of Durham, UK.
Assistant Professor [Economic geography; regional and rural development planning; community development; Non-Governmental Organizations (NGOs); civil society; globalization etc]

VITON NIL-UBOL, MSc, AIT, Thailand
Field Lab Supervisor, Regional and Rural Development Planning [Rural Regional Planning Workshop]

23.3 Ongoing / In Progress Grant and Sponsored Research

University Support to Environmental Management and Planning – RC/LTA

Duration Nov 2002 to Nov 2007

Investigator: Prof. Gopal B. Thapa

Sponsor: The three Danish partners: Institute of Geography, Copenhagen University, and Department of Environment, Technology and Social Studies and Department of Department of Geography and International Development Studies, both Roskilde University have formed the Danish USEPAM Consortium

Project Description To enhance the capacity of the beneficiary universities to provide research-based environmental education, training, and policy-relevant applied research. The project is a result of earlier cooperation under the Resource Policy Support Initiative of Upland South-East Asia programme (REPSI)

Total Contracted Amount (Baht) 5,936,639

University Support To Environment Management and Planning – Networking

Duration Nov 2002 to 30 Nov 2007

Project Description To enhance the capacity of the beneficiary universities to provide research-based environmental education, training, and policy-relevant applied research. The project is a result of earlier cooperation under the Resource Policy Support Initiative of Upland South-East Asia programme (REPSI)

Project Investigator Prof. Gopal B. Thapa

Sponsors The three Danish partners: Institute of Geography, Copenhagen University, and Department of Environment, Technology and Social Studies and Department of Department of Geography and International Development Studies, both Roskilde University have formed the Danish USEPAM Consortium

Total Contracted Amount (Baht) 4,296,508

University Support To Environment Management and Planning – Workshop

Duration Nov 2002 to 30 Nov 2007

Project Description To enhance the capacity of the beneficiary universities to provide research-based environmental education, training, and policy-relevant applied research. The project is a result of earlier cooperation under the Resource Policy Support Initiative of Upland South-East Asia programme (REPSI)

Project Investigator Prof. Gopal B. Thapa

Sponsors The three Danish partners: Institute of Geography, Copenhagen University, and Department of Environment, Technology and Social Studies and Department of Geography and International Development Studies, both Roskilde University have formed the Danish USEPAM Consortium

Total Contracted Amount (Baht) 6,808,231

University Support To Environment Management and Planning – Regional Experts

Duration Nov 2002 to 30 Nov 2007

Project Description To enhance the capacity of the beneficiary universities to provide research-based environmental education, training, and policy-relevant applied research. The project is a result of earlier cooperation under the Resource Policy Support Initiative of Upland South-East Asia programme (REPSI)

Project Investigator Prof. Gopal B. Thapa

Sponsors The three Danish partners: Institute of Geography, Copenhagen University, and Department of Environment, Technology and Social Studies and Department of Geography and International Development Studies, both Roskilde University have formed the Danish USEPAM Consortium

Total Contracted Amount (Baht) 4,001,366

Training Programme on Environmental Management Tools for SAARC Countries

Duration 1 Jan 2006 to 31 Dec 2007

Project Description The one-week training programme on environmental management will be conducted for SAARC member countries, and will result in a training manual on environmental management tools

Project Investigator Prof. Jayant Routray

Sponsors UNEP ROAP

Total Contracted Amount (Baht) 1,920,000

Participation of urban Poor in Municipal Governance for Delegates from Bangladesh

Duration October 2006 to April 2007

Project Description To provide concepts, practices of good & urban governance in Thailand, and to give orientation, exposure to selected development project which are envisaged for good samples on urban governance, and to exchange views, experience on the applications of urban and municipal governance between Thailand and Bangladesh based on those development projects visited under this program

Project Investigator Dr. Sopart Pongquan

Sponsors Asian Development Bank (ADB)

Total Contracted Amount (Baht) 334,663

Indian Ocean Tsunami Warning Systems (IOTWS)

Duration September 2006 to August 2007

Project Description This project aims to conduct an inquiry into the gap between the national policies at the national level and practices at the local levels in order to make policy makers aware at the national level whether the policies are implemented in the manner envisaged, and what are the gaps and lessons that could be learnt from earlier happenings. The project aims to identify the gaps and will make an effort to suggest the area of improvement in both policies and practices.

Project Investigator Dr. Mokbul Ahmad

Sponsors USAID

Total Contracted Amount (Baht) 869,500

AIT-Norwegian Institution Networking

Duration 1 January

2006 to 31 December 2009

Project Description To strengthen the capacity of institutions of the NMFA-AIT programme countries in Asia to secure sustainable environment, human rights and gender and poverty alleviation. It's objective is then focused on enhancing the capacity building in the NMFA-AIT programme countries of South and Southeast Asia (Afghanistan, Bangladesh, East Timor, Nepal, Pakistan, Sri Lanka and Vietnam), the ekong Region low income countries (Lao PDR and Cambodia), as well as other less developed countries in Asia.

Project Investigator Prof. Jayant Routray

Sponsors The Norwegian Ministry of Foreign Affairs

Total Contracted Amount B 12,178,387.76

23.4 Publications

Refereed Journals

Kannapa Pongponrat, **Soparth Pongquan** and Ganesh P. Shivakoti, Initiation of Participatory Tourism Planning by Local Government: A Case Study of Community Cleaning Day, Koh Samui, Surat Thani Province, Southern of Thailand, **Journal of Hospitality and Tourism**, Volum 4, Number 2, 2006.

Dolly Kyaw and **Jayant K. Routray**, Rural Poverty Assessment with Gender Dimension in Myanmar, *Asia Pacific Journal of Rural development*. Vol. XVI, No. 172, 2006.

Dolly Kyaw and **Jayant K. Routray**, Gender and Rural Poverty in Myanmar: A Micro Level Study in the Dry Zone, *Journal of Agriculture and Rural development in the Tropics and Subtropics*, October 2006.

Rholini, Roberto S. Clemente, **Jayant K. Routray** and Rejendra P. Shrestha, Integration of Biophysical and Socio-Economic Factors to Assess Soil Erosion Hazard in the Upper Kaligarang Watershed, Indonesia, *Land Degradation and Development*, 17:1-17, 2006.

Ahmad, M.M. 2006. The NGO ebate in 'Development': A Review. Behera, M.C. (edt.). *Globalising Rural Development Competing Paradigms and Emerging Realities*. New Delhi: Sage Publications.

Ahmad, M. M. 2006. The Co-operatives in Bangladesh: Problems and Prospects. *The Journal of Social Studies*. No. 110, pp. 20-35.

Ahmad, M.M. 2006. The Biography of Field Workers of NGOs (Non-Governmental Organisations) in Bangladesh. *Journal of Rural Development*. Vol. 25 No. 2 pp. 169-184.

Ahmad, M.M. 2006. The partnership between international NGOs (Non-Governmental Organisations) and Local NGOs in Bangladesh. *Journal of International Development*. Vol. 18 No. 5 pp. 629-638.

Conference Proceedings

Ahmad, M.M., Rural-urban migration in the developing world, Bangkok, The 7th international Conference of the Omternational Society for Third Sector Research (ISTR), Bangkok, Thailand, organized by the University of Tokyo and AIT, 22-23 March, 2006.

Ahmad, M.M., Threat to human security created by the conflict between NGO and Islamic fundamentalists in Bangladesh at the 7th International Conference of the International Society for Third Sector Research (ISTR) at Bangkok, Thailand from 9th-12th July 2006,

Other Publications

Soparth Pongquan, Effective Rural Leadership, a research project on program execution submitted to GMS-Phnom Penh Plan for Development Management, Asian Development Bank, Manila, the Philippines, March 2006.

Soparth Pongquan, Local Integration in Thailand: A Case of Kamphuan Sub-district, Suksamran Minor District Branch, Ranong Province, a report submitted to Post-Tsunami Sustainable Coastal Livelihoods Program, Coastal Resources Center, University of Rhode Island, Asian Institute of Technology and University of Hawaii, Hilo, August, 2006.

Factors Influencing the Adoption of Agricultural Technology by Tribal Farmers in the North of Thailand
By: Mr. Aryuwath Pratumsa, Supervisor: Dr. Soparth Pongquan

Women's Empowerment through Khamaridevi Community Forestry in Nepal
By: Ms. Sarika Rai, Supervisor: Prof. Gopal B. Thapa

Soparth Pongquan, Participation of Urban Poor in Municipal Governance, a report prepared in collaboration with the Center for Development Services (CDS), Bangladesh, submitted to Urban Development Division, South Asia Department, Asian Development Bank (ADB), Manila, the Philippines, December 2006.

23.5 Doctoral Student Dissertation

Rural Poverty Analysis in Myanmar: A Micro Level Study in The Dry Zone
By: Mrs. Dolly Kyaw
Supervisor: Prof. Jayant K. Routray

23.6 Masters Students' Theses

Capacity Development in Decentralized Planning of Local Government in Cambodia: A Case Study of Banteay Mean Chey Province
By: Ms. Mao Sotheary, Supervisor: Dr. Soparth Pongquan

Effects on Vocational Training on Occupational Development in Lao PDR: A Case Study of Champasak Province
By: Ms. Sasana Phanalasy, Supervisor: Dr. Soparth Pongquan

Household Based Livestock Farming for Poverty Alleviation in Cambodia: An Assessment
By: Mr. Pich Peda, Supervisor: Dr. Mokbul Morshed Ahmad

People's Participation Village in Water Supply: A Case Study in Udomxay Province, Lao PDR
By: Mr. Mana Chantharanoth, Supervisor: Dr. Soparth Pongquan

Socio-Economic Impacts of Micro-Credits in Kachin State, The Northern Myanmar
By: Mr. Lahkang Nway Awng, Supervisor: Prof. Gopal B. Thapa

An Evaluation of Du'an Country Resettlement Projects in the People's Republic of China: A Comparative of the old and new Settlement
By: Mr. Huang Quinghai, Supervisor: Prof. Jayant K. Routray

An Evaluation of Socio-Economic Benefit of Rural Road Projects in Lao PDR: A Case Study in Khammouan Province
By: Ms. Somphavanh Nakhavong, Supervisor: Dr. Mokbul Morshed Ahmad

Role of Governmental and Non-Nongovernmental Organizations in Providing Primary Education in Cambodia: A Comparative Study in Siem Reap Province
By: Ms. Hang Chansophea, Supervisor: Dr. Mokbul Morshed Ahmad

Chapter 24: SERD – URBAN ENVIRONMENTAL MANAGEMENT FIELD OF STUDY

24.1 Introduction

Urban Environmental Management (UEM) is an area of academic discourse and professional practice in which urban planning and urban management issues are studied and practiced from an environmental management perspective.

As an academic field, UEM provides opportunities of graduate level education and research at master (MSc) and doctoral (PhD) level. It draws on and integrates theories and perspectives in established disciplines of urban planning, urban and regional development and urban policy and management studies into a distinctive framework of problems, issues and questions concerning the urban environment. It enables students to identify problems; apply appropriate analytic methodologies; design, plan and implement programs and projects; and monitor impacts and challenges within the context of sustainable development in developing societies.

The Field of Study prepares students for professional careers in the public and private sector as well as international development agencies and civil society organizations engaged in urban and environmental management.

24.2 Research Facilities and Laboratories

The FoS has a workshop room which can accommodate about 24 students in four clusters at a time. Each cluster is equipped with a desk top computer with internet facilities. The workshop room also has audio-visual facilities for presentations.

24.3 Faculty and Research Staff

Full-time Faculty

A T M NURUL AMIN, BA (Hons), MA, Univ of Dhaka, Bangladesh; MA, PhD, Univ of Manitoba, Canada.

Professor

NOWARAT COOWANITWONG, BS, Mahidol Univ; MS, Long Island Univ; MS, PhD, Univ of Florida, USA.

Assistant Professor

VILAS NITIVATTANANON, BEng, Chulalongkorn Univ; MA, Thammasat Univ; MEng, AIT, Thailand; PhD, Univ of Pittsburgh, USA.

Assistant Professor

RANJITH PERERA, BSc, MSc, Univ of Moratuwa, Sri Lanka; MSc, PhD, AIT, Thailand.

Assistant Professor

EDSEL SAJOR, BSc, Univ of the Philippines; MA, PhD, ISS, The Hague, The Netherlands.

Assistant Professor

Administrative Staff

VANTANA PATTANAKUL

Administrative Secretary

Project Staff

(South-East Asia Urban Environmental Management Applications Project)

PRITAM KRISHNA SHRESTHA,
Project Manager

MARITESS I CABRERA, Network
Coordinator

Project Associates

BIMALENDU MOHANTY
FARHAT JAHAN
CHOWDHURY
RUTMANEE ONGSAKUL
RAJANI A RAJBHANDARI
LEKHA RATNAYAKE

PRAJAPATI SHAPKOTA

PANUWAT BOONYANAN, Project
Technician

24.4 Ongoing / In Progress Grant and Sponsored Research

SEA-UEMA Project (Southeast Asia Urban Environmental Management Applications)

Project Description: The Canadian International Development Agency (CIDA) and the Asian Institute of Technology (AIT) have entered into a contribution agreement on urban environmental management. This is in the form of Southeast Asia Urban Environmental Management Applications (SEA-UEMA) Project, which aims to improve the Urban Environmental Management (UEM) policies and good practices in the region. CIDA has allocated a total CAN\$9.5 million over 5 years (2003-2008) for developing, managing and implementing this project by AIT. The goal of the project is to contribute to the improvement of urban environmental conditions in Southeast Asia (SEA) region. It seeks to attain improved implementation and sharing of sound urban environmental management policies and practices in the three key urban environmental sub-sectors (water and sanitation, solid waste, and air pollution) in Southeast Asian region with environment and gender equality as the two crosscutting themes. For emphasizing both UEM education and its application, the project has adopted a two-prong funding approach.

Duration: Nov 2003 to Nov 2008

Investigators: Dr Ranjith Perera (Proj. Director)

Prof A T M Nurul Amin
Dr Nowarat Coowanitwong
Dr Kyoko Kusakabe
Dr Vilas Nitivattananon
Dr Edsel Sajor
Sponsor: Canadian International Development Agency (CIDA)

Total Contracted Amount: CAD\$ 9,479,839

Toyo-AIT Workshops

Project Description: The FoS organizes and conducts a summer workshop for undergraduate students of several Japanese Universities. The workshop participations generally come from six universities where there are former faculty of HSD and UEM. The workshop program includes lectures and field visits to some selected communities, NGO's and governmental organizations in Thailand. The workshop explores the urban

development and environmental management issues of Bangkok.

Duration: On going from 2001, once a year

Investigator: Dr Ranjith Perera

Sponsor: Tokyo University

Total Contracted Amount: about Baht 600,000 per year

Research Project on Environmental Situation Investigation of Thailand

Duration 3 April 2006 to 21 April 2006

Project Description The research project is to help understand the environmental situation of Thailand in terms of environmental management, market and technology. The study focuses mainly on water supply, air pollution, municipal solid waste, hazardous and industrial waste and environmental services. It also looks at issues relating to environmental management laws and policies.

Project Investigator Dr. Nowarat Coowanitwong

Sponsors Korea Environment Institute

Total Contracted Amount (Baht) 120,000

Nanotechnology Center of Excellence

Project Description: This is a jointly supported by Thailand's National Nanotechnology Center (NANOTEC) of the National Science and Technology development Agency, Ministry of Science and Technology & AIT.

Duration: 2006-

Members: Dr Joydeep Dutta

Prof worsak Kanoknukulchai

Dr Nowarat Coowanitwong

Dr Oleg Shipin

Dr Mousa Nazhad

Dr Manukid Panichkul

Dr Sundar Venkatesh

Total Contracted Amount (Baht)

UN Water Virtual Learning Center (WVLC)

Project Description: This is a Collaboration Project between United Nations University (UNU) Network on Water, Environment and Health (UNU-INWEH) & AIT

Duration: 2005-

Member: Dr Mukand Sinh Babel

Prof Ashim Das Gupta

Dr Roberto Clemente

Dr Nowarat Coowanitwong

Dr Ko Ikejima

Reduce, Reuse, Recycle (3R) knowledge Hub

Project Description: The principle of Reducing waste, Recycling resources and products is often called the "3R". This principle has been in use in different countries worldwide for many years but not at an active pace able to catch up with rapid urbanization in the past decades. Many knowledge and success cases on 3R exist in countries

in Asia and the Pacific but regional exchange is currently not very effective and scattered. Some countries have developed many good practices on 3R and have advanced waste management in place where as some countries are still struggle with solid waste collection and disposal. To develop proactive facilitation for 3R implementation, a knowledge hub on 3R should be established. This knowledge hub would facilitate exchange and dissemination of 3R knowledge among countries, subregions, and regions in order to lead to active implementation of 3R at all levels for sustainable use of resources.

Duration: 10/10/2006 - 9/10/2008

Project Investigator: Prof C. Visvanathan

Prof S. Kumar

Prof S.K. Rakshit

Dr S.L. Ranamukhaarachchi

Dr Vials Nitivattananon

Dr Animesh Dutta

Sponsors: Asian Development Bank (ADB)

Total Contracted Amount (Baht) 4,500,000

Development", *Regional Development Dialogue*, Vol.27 No.1, pp.85-100.

Books/Chapters

Amin, A.T.M.N., (2006). "Economic and Financial Dimensions", *Promoting Reduce, Reuse and Recycle in South Asia*, Synthesis Report of 3R South Asia Expert Work Shop, Kathmandu, Nepal, 30 August-1 Sept. (Co-published by ADB, UNEP and IGES), pp.82-84.

Amin, A.T.M.N., Ahmad, T.S.; Mansoor, M.S. and Zulqurnane, M. (2006). "Theory and practice of Sustainable Development: An Assessment of Faisalabad Area Upgrading Project (Faisalabad: Department of Development Economics, University of Agriculture, Faisalabad), 69p.

Perera, R., (2006). "Use of Indigenous Knowledge for Environmental Management in Water-based settlements", Nacario, M.ed., *Reader on Mainstreaming Indigenous Knowledge Systems and practices in Local Governance in Asia Pacific Region*, Manila: Local Government Academy, pp.107-160.

Coowanitwong N., Shapkota P., Pradhan P., and Nitivattananon V. Eds; *In Proceedings of International Conference on Integrated Solid Waste Management in Southeast Asia Cities*, 2006, pp.1-269, ISBN 974-8257-34-7.

Coowanitwong N., Shapkota P., Pradhan P., and Hossain M. Eds; *In Proceedings of Regional Conference on urban Water and Sanitation in Southeast Asian Cities*, 2006, pp.1-335.

Coowanitwong N., Pradhan P., and Trung Thien Thu. Txt Dvlpmt Eds; *In proceedings of Policy Dialog on Clean Water Supply in Urban Areas of Ho Chi Minh City, Vietnam*, 2006, pp.1-78.

Coowanitwong N., Pradhan P., and Trung Thien Thu. Txt Dvlpmt Eds; *In Proceedings of Policy Dialog on Measures to Reduce Air Pollution from Point sources in Suburban District in Hanoi, Vietnam*, 2006, pp. 1-154.

Coowanitwong N., Pradhan P., and Permana A. Txt Dvlpmt Eds; *In Proceedings of Policy Dialog on Planning and Management of Small Community Water Supply of Yogyakarta, Indonesia*, 2006, pp.1-65.

Coowanitwong N., and Muenthaisong P. Eds; *In Proceedings of Policy Dialog on Strategic Solid Waste Management in Pathumthani province, Thailand*, 2006, pp.1-74.

Conference Proceedings

Amin, A.T.M.N. (2006). "Changes in Waste Recycling and Composting Practices Associated with the Stages of Economic Development" in *Proceedings International Conference on Integrated Solid Waste Management in Southeast Asian Cities* (Bangkok:UEM/AIT), pp.7-22.

Vin, S., Nitivattananon, V., and **Amin, A.T.M.N.** (2006). "Assessment of Solid Waste Contracted Services: Case Study of Solid Waste collection in

24.5 Publications

Refereed Journals

Chowdhury, F.J. and **Amin, A.T.M.N.** (2006). "Environmental Assessment in Slum Improvement Programs: Some Evidence from a Study on Infrastructure Projects in two Dhaka Slums", *Environmental Impact Assessment Review* (Elsevier), Vol.26, pp.530-552.

Pornchokchai, S., **Perera, R.** & Weber, K.E. (2006). Private Developers in the 1997 Housing Market Crisis in Bangkok, *The Appraisal Journal*, Vol. LXXIV, No.1, pp.77-85.

Virtkapan, V. & **Perera, R.** (2006). Slum Relocation Projects in Bangkok: What has contributed to their Success or Failure, *Habitat International* (Elsevier), 30(2006):157-174.

Charuvichaipong, Chanisada and **Sajor, Edsel** (2006). "Promoting Waste Separation for Recycling and Local Governance in Thailand", *Habitat International* 30. pp. 579-594 (Elsevier).

Charoentrakulpeeti, Wanpen; **Edsel, Sajor**; Zimmermann, Willi, "Middle-Class Travel patterns, predispositions and Attitudes, and Present-day Transport Policy in Bangkok, Thailand", *Transport Reviews*. Vol. 26, No.6 (November 2006), pp.693-712.

Indarto A., Choi J.W., Lee H., Song H.K., and **Coowanitwong N.** (2006) "Discharge Characteristics of a Gliding-Arc Plasma in Chlorinated Methane Diluted in Atmospheric Air", *Plasma Devices and Operation*, 14(1), pp.15-26.

Amin, A.T.M.N., Jarusombut, S.; Thuy, T.T.B., and Thanaprayochask, W. (2006). "Environmental Management Measures for Influencing Human Behaviour Towards Sustainable

- Siem Reap Town, Cambodia" In *Proceedings International Conference on Integrated Solid Waste Management in Southeast Asian Cities* (Bangkok:UEM/AIT), pp.245-260.
- Amin, A.T.M.N.** (2006). "A Sustainable Development Perspective for Overcoming the Productivity and Growth predicament in Agriculture", a paper presented to the International Conference on *Productivity and Growth in Agriculture: Strategies and Interventions*, Faculty of Agricultural Economics and Rural Sociology, university of Faisalabad, Agriculture, Faisalabad (UAF), 6-7 December, 10p.
- Amin, A.T.M.N.** (2006). "What-Why-How of Socio-economic & Financial Considerations and Community participation in Water Supply and Sanitation", a keynote address presented to the Regional Conference on Urban Water and Sanitation in Southeast Asian Cities, November 22-24, Vientiane, Lao PDR, 14p.
- Amin, A.T.M.N.** (2006). "Financing for Sustainable Service Provisioning: the Role of International Financial Institutions", paper prepared for the Second South Asian Conference on Sanitation, Marriott Hotel, Islamabad, 20-21 September, 11p.
- Amin, A.T.M.N.** (2006). *Making use of Poverty Reduction Potentials and Post-Modernist Enlightenment for Sustainable Waste Management*, Key-Note Address delivered to the International Conference on Sustainable Waste Management, kathmandu, Nepal, 11-13 January, 2006, 15p.
- Perera R. & Bhaumick, R.** (2006). Planning Implications of the Emerging Housing Market for Urban Low-Income people in the Bangkok Metropolitan Area, Proceedings of the International Symposium of Urban Planning, national Taiwan University of Technology, Taipei, pp.84-95.
- Perera R. Bhaumick R.** (2006). "Alternative to Home Ownership: Rental Housing Options for Urban Low Income Households in the Bangkok Metropolitan Area", Proceedings of the International Conference on Sustainable Housing, Penang: University Sains Malaysia.
- Ongsakul, R. and Sajor, E.** (2006). "Water Governance in Mixed Land Use: A Case Study of Rangsit Field, Peri-urban Bangkok, paper presented in Regional Conference on Urban Water and Sanitation" organized by the Urban Research Institute (URI) and CIDA-AIT UEMA Project at Vientiane, November 22-24.
- Shapkota P., Coowanitwong N., Visvanathan C., and Traenkler J.** (2006) "Potentials of Recycling Municipal Solid Waste in Asia vis-à-vis a Case Study of Recycle Industry in Thailand", Proceedings of the International Conference on Integrated Solid Waste Management in Southeast Asia cities, pp.195-209.
- Sujaritpong, S. and Nitivattananon, V.** (2006). "An Assessment of Community Wastewater Management Performance", *Proceedings of the Fourth International Symposium on Southeast Asia Water Environment*, 6-8 December 2006, pp.33-40.
- Sa-nguanduan, N. and Nitivattananon, V.** (2006). "Sustainable Urban Water Management System: Review of Status with Focus on Southeast Asian Countries", *Proceedings of Regional Conference on urban Water and Sanitation in Southeast Asian Cities*, 22-24 November 2006, pp.235-249.
- Sujaritpong, S. and Nitivattananon, V.** (2006). "Determination of Environmental Measures for Community Wastewater Management", *Proceedings of Regional Conference on urban Water and Sanitation in Southeast Asian Cities*, 22-24 November 2006, pp.63-74.
- Pruksuriya, A. and Nitivattananon, V.** (2006). "Infrastructure for Disaster Management: Case of Water Supply and Sanitation in Tsunami Affected Communities, Southern Thailand", *Proceedings of 5th International Symposium on New Technology for Urban Safety of Mega Cities in Asia*, 16-17 November 2006, pp.665-674.
- Coowanitwong, N., Shapkota, P., Pradhan, P., and Nitivattananon, V.** (2006). Eds: *Proceedings of International Conference on Integrated Solid Waste Management in Southeast Asia Cities*, pp.1-269, ISBN974-8257-34-7.
- Chan, N.W. and Nitivattananon, V.** (2006). "Gender Perspectives in Water Demand Management: Examples from Malaysia and Thailand". *Proceedings of 3rd Bangi World Conference on Environmental Management*, 5-6 September 2006, Bangi, Malaysia, Bangi: *Environmental Management Programme, Centre for Graduate Studies, Universiti Kebangsaan Malaysia and Environmental Management Society (EMS) of Malaysia*, pp.200-220.
- Chan, N.W. and Nitivattananon, V.** (2006). "Water Demand Management for Sustainable Water Resources Management in Malaysia." *Proceedings of International Conference on Environment (ICENV 2006): Knowledge-based Environmental Management and Sustainable Development*, Penang, 13-15 November 2006, penang: Universiti Sains Malaysia. Published in CD Rom (ISBN983-3391-54-0).
- Chan, N.W. and Nitivattananon, V.** (2006). "Effective Management of Water Resources via Demand Management: Some Examples from Southeast Asia". *Proceedings of IHP International Symposium on Managing Water Supply for Growing Demand, Bangkok, Thailand*, 16-20 October 2006, Jakarta, UNESCO: IHP Technical Documents in Hydrology No.8, pp.23-38.
- in Bangladesh". Prepared under the project, *Community Based Urban Solid Waste Management in Dhaka* of the Sustainable Environment Management Program of the Ministry of Environment and Forest & UNDP (Dhaka: Waste Concern), 18p.
- Edsel, Sajor** (2006), Commentary Article on Amin, N., Jarumsombut, S., Thuy, T., and Thanaprayochask, W., "Environmental Management Measures for Influencing Human Behaviour Towards Sustainable Development", 101-105. *Regional Development Dialogue*. Vol.27, No.1, Spring 2006.
- Coowanitwong N., Pradhan P., and Shapkota P.;** UEM Newsletter, 7(3), December, 2006, pp.1-16.
- Coowanitwong N., Pradhan P., and Shapkota P.;** UEM Newsletter, 7(2), August, pp.1-12.
- Coowanitwong N., Pradhan P., and Shapkota P.** UEM Newsletter, 7(1), April-May 2006, pp.1-16.
- Coowanitwong N., Pradhan P., and Shapkota P.;** UEM Graduate Supplement, 7(1), April-May, 2006.
- Nitivattananon, V.** (2006). Commentary Article on Babel. S.B., Gupta, A.D. and Domingo, N.D.S., "Policy Measures and Options for Improved Groundwater Resource Management in Bangkok, Thailand", *Regional Development Dialogue*, Vol.27, No.1 (Spring), pp.132-134.

24.6 Doctoral Student Dissertation

Travel Patterns, Attitudes and Policies – A Concern for Urban Sprawl: A Case Study of Bangkok

By: Wanpen Charoentakulpeeti
Dr. Willi Zimmermann/Dr. Edsel Sajor

24.7 Masters Students' Theses

Revitalization of an Environmental Infrastructure System for Sustaining Endogenous Multi Habitats in Historical Cities: A Case Study of Malloboro Area in Yogyakarta, Indonesia

By: Asmira Dewi Sitorini Ardani
Supervisor: Dr. L.A.S. Ranjith Perera

Household Perceptions and the Willingness to Pay: A Study of Septage Treatment Provision in a Small Municipality of the Philippines

By: Brian Tecson Carisma
Supervisor: Prof. A. T. M. Nurul Amin

Public-private Partnership (PPP) for Urban Water Supply: A Case Study of Keo-udom Municipality, Vientiane Province, Lao PDR
By: Thongdom Chanthala
Supervisor: Dr. L.A.S. Ranjith Perera

Privatization of Low-income Housing Provisioning in Ho Chi Minh City, Vietnam
By: Nguyen Thi Phuong Chau
Supervisor: Dr. Edsel E. Sajor/Dr. Vilas Nitivattananon

Health Effects of Urban SO₂ from Thermal Power Plants in Gampaha Districts, Sri Lanka
By: Hewawasam G.L.N. Gunawardhana

Supervisor: Dr. Nowarat Coowanitwong

An Environmental Economic Analysis for Addressing the Dilemma between Urban Conservation and Redevelopment: A Case Study of the Ancient Quarter of Hanoi, Vietnam

By: Do Minh Huyen

Supervisor: Dr. L.A.S. Ranjith Perera

Enhancement of Urban Green Spaces through Policy Reform: A Case Study on Chittagong City, Bangladesh.

By: Ahmed Imtiaz Khan

Supervisor: Dr. Nowarat Coowanitwong

Market Development and Marketing of Organic Waste Compost: A Case Study of the Nonthaburi Municipality in Thailand

By: Pranee Muenthaisong

Supervisor: Prof. A.T.M. Nurul Amin

Rental Housing for Urban Low Income Households in Klong Luang District of Pathumthani Province: A Study of Housing Need, Satisfaction and Management

By: Akadiri Peter Oluwole

Supervisor: Dr. L.A.S. Ranjith Perera

Urban Wetland Ecosystem Assessment and Management: Case Study of That Luang Marsh, Vientiane, Lao PDR

By: Phengkhamla Phonvisai

Supervisor: Dr. Nowarat Coowanitwong

Water Supply and Sanitation for Disaster Management: Case of Tsunami Affected Communities in Phang-Nga Province, Thailand

By: Aim-on Pruksuriya

Supervisor: Dr. Vilas Nitivattananon

Recycling of Garment Factory Waste: A Case Study of Kongkear Phos Community in Phnom Penh, Cambodia

By: Chou Putheany

Supervisor: Prof. A.T.M. Nurul Amin

An Analysis of Cost Recovery for Improving Water Supply in Rajshahi City, Bangladesh

By: Md. Abdur Rashid Sarker

Supervisor: Prof. A.T.M. Nurul Amin

Adoption of Low Impact Development (LID) at Site Level for Mitigating Conflict in Flood Prone Area: A Study of the Latkrabang District in Bangkok, Thailand

By: Thanit Satiennam

Supervisor: Prof. A.T.M. Nurul Amin

Settlement Land Use Management Along the Mekong River Bank in Vientiane, Lao PDR

By: Vongvilay Sisoulath

Supervisor: Dr. Edsel E. Sajor

Public-Private and Community Partnership in Land-sharing: A Case Study of Borei Keila Community in Phnom Penh, Cambodia

By: Ouk Sokha

Supervisor: Dr. Edsel E. Sajor

Analysis for Improving Access to Water Supply of Urban Poor in Phnom Penh, Cambodia

By: Va Sophal

Supervisor: Dr. Vilas Nitivattananon/Dr. Nowarat Coowanitwong

Appropriate Technology Options for Community-Based Urban Solid Waste Management in Small Towns, Lao PDR

By: Bounthan Southichack

Supervisor: Dr. Vilas Nitivattananon

Impacts of Urbanization on Cultural Environmental in Heritage Sites: A Case Study of the Amphawa Community, Samut Songkhram Province, Thailand

By: Thip Srisakulchairak

Supervisor: Dr. L.A.S. Ranjith Perera

Factors Influencing the Wastewater Management Performance of Sub-urban Housing Estates in Nonthaburi Province, Thailand

By: Sarunya Sujaritpong

Supervisor: Dr. Vilas Nitivattananon

The Challenge of Urban River Governance in a Transition Economy: A Case Study of Saigon River in Ho Chi Minh City, Vietnam

By: Nguyen Minh Thu

Supervisor: Dr. Edsel E. Sajor

Leadership on Slum Community Development in Bangkok, Thailand

By: Kozue Tomuro

Supervisor: Dr. Edsel E. Sajor

Urban Domestic Wastewater Management: A Case Study of Hanoi City, Vietnam

By: Nguyen Thi Thanh Van

Supervisor: Dr. Nowarat Coowanitwong

Environmental Changes Associated with Land Reclamation Around Boeng Kok Lake in Phnom Penh, Cambodia

By: Mann Yin

Supervisor: Dr. L.A.S. Ranjith Perera

Patterns of Change in the Riverside Kampung Settlements and Their Implications on Urban River Management System in Yogyakarta Municipality

By: Briandara Yossi

Supervisor: Dr. Edsel E. Sajor

Chapter 25: SCHOOL OF MANAGEMENT

25.1 Introduction

The School of Management is Asia's pioneer institution for management development programs in International Business and Management of Technology.

The School was established in October 1987 to meet the growing need for managerial expertise in the Asia - Pacific region. The School strongly believes in the intensive development of corporate leaders for the present and future.

As the world undergoes revolutionary changes on the social, economic, political and technological fronts, various programs of the School offer unique competitive advantage to managers and enterprises by sharing expertise in international business and management of technology.

Perhaps the most important feature of the School of Management is that it offers an amazing cross-cultural experience with:

An international student body.

Students from 30 countries participate in our various programs. They work and live together in a 160-hectare campus north of Bangkok.

A multinational faculty.

A highly qualified and experienced faculty from 15 countries facilitates the participant learning and provides a real multi-cultural touch to management education.

An international approach to management education.

Courses are designed to prepare program participants to become

effective international managers in an increasingly global business environment. The participants are encouraged to take part in international exchange programs with US, European and Asian universities.

25.2 Mission

Mission

"to develop socially responsible global leaders who will enhance organizational performance for the growth and sustainable development of economies and societies in Asia in particular and the world in general"

Vision

"to become the leading creator and disseminator of Asian management knowledge, practices and values"

Positioning

"A global management school which offers knowledge that promotes deep understanding of Asian management practices"

25.4 Center and Research

The School of Management is involved in training and extension activities through the Management Development Programs.

Corporate Relations and Executive Development Services (CREDS) function is established as an integral part of the School of Management (SOM). It is the research, consultancy, and executive development arm of the School. SOM's non-degree academic activities and programs are organized in project format under CREDS, which complement SOM's degree programs and other related activities of SOM. It facilitates the linkage between SOM, AIT and the business community and public sector in Asia.

The objectives of CREDS:

To establish closer links between the business community/public sector and SOM through executive education programs and consulting in the areas of Management of Technology, International Business, Service Marketing and Technology, and International Public Management.

To facilitate the development of research projects which are both of high practical value to the business community/public sector and academically rigorous.

To facilitate research and consulting activities among SOM faculty members.

CREDS activities include:

- Corporate relationship management
- Executive development programs

25.3 School Governance

Dean of School

INDRA M PANDEY, MComm, PhD,
Univ of Delhi, India.
Professor

Organizing executive forums, workshops, seminars, and conferences

Other activities contributing to CREDS and SOM's objectives

25.5 Research Facilities and Laboratories

The School of Management has its own computer laboratory to support management education. For instructional purposes, there is a network of over 60 computers for student's use.

Laboratory consultants are available during office hours to assist with computer related problems that may arise in the lab. The consultants will provide help by answering general questions relating to the lab e.g., how to obtain a computer account, questions related to the PC Proficiency (i.e., class and test schedules and administering tests by appointment), questions about software applications, e-mail, printing etc.

The School of Management has 5 state-of-the-art multimedia classrooms including a large amphitheater for academic use. Each classroom is equipped with a multimedia podium that consists of LCD projectors, audio cassette recorder, VHS player/recorder, slide projectors or visualizer, built-in desktop PC, laptop and wireless internet connection.

The staff can assist the students in setting up the computer projection, orient them on how to use the multimedia equipment and will help in any problems with any equipment in the classroom.

25.6 Faculty and Research Staff

Full-time Faculty

NAZRUL ISLAM, BScEng, BUET, Bangladesh; MEng, DEng, AIT, Thailand.
Professor (Management of Technology; Technology and

Development; Technology Policy; Technology Transfer)

LALIT M JOHRI, BSc(Hons), MSc, MBA, PhD, Univ of Delhi, India.
Professor (International Business; International Joint Ventures; Marketing; Negotiations; Strategic Management)

INDRA M PANDEY, MComm, PhD, Univ of Delhi, India.
Professor (Corporate Finance, Emerging Capital Markets)

HIMANGSHU PAUL, BE, Univ of Gauhati, India; MEng, PhD, AIT, Thailand.
Professor (Manufacturing Supply & Logistics; Manufacturing Strategy; Manufacturing Technology Management; Operations Management; TQM)

JOHN C S TANG, BS, MS, PhD, Univ of Florida, USA.
Professor (Engineering Economy; International Economics; International Operating Environment of Business; Managerial Economics)

BARBARA IGEL, BA, MA, Technical Univ, Berlin; PhD, Freie Univ, Berlin, Germany.
Associate Professor (High-tech Entrepreneurship; Industrial Economics; Knowledge Management; Management of Innovation)

DO BA KHANG, MSc, Eotvos Lorand Univ, Hungary; MSc, DTechSc, AIT, Thailand.
Associate Professor (Management Science; Operations Management; Project Management; Service Management; Small and medium

enterprises (SME) support and management)

TRUONG QUANG, BSc, MSc, Natl Inst of Administration, Vietnam; MPA, Inst of Social Studies, The Hague; PhD, Free Univ, The Netherlands.

Associate Professor (Brand Management; Human Resources Management; International Business; Organizational Behavior; Public Policy)

SUNUNTA SIENGTHAI, BA, Chulalongkorn Univ, Thailand; MA, PhD, Univ of Illinois, USA.

Associate Professor (Labor & Industrial Relations, HRM, Wages & Production)

FREDRIC W SWIERCZEK, BA, Temple Univ, USA; MA, PhD, Univ of Pittsburgh, Pennsylvania, USA.

Associate Professor (Behavioral Science; Organizational Development)

RIAN BEISE-ZEE, Dipl. Ing. (Industrial Engineering), Technical University of Berlin, Dr.oec (Economics & Business), Germany

Assistant Professor (International Marketing, Innovation Marketing, Service Marketing)

NICHOLAS J DIMMITT, BA, MA, San Francisco State Univ; PhD, Univ of Southern California, USA.

Assistant Professor (Business Communication, Business Ethics, Research Methods)

ROY KOUWENBERG, MSc, PhD, Erasmus Univ of Rotterdam, The Netherlands.

Assistant Professor (Finance; Portfolio Management)

DONYAPRUETH KRAIRIT, BS, Thammasat Univ, Thailand; MS, Univ of Colorado at Boulder; PhD, Massachusetts Inst of Tech, Cambridge, USA.

Assistant Professor
(Technology, Policy and
Management)

Visiting Faculty

TAE-HONG JIE, BS, Korean Naval
Academy; MA, Seoul Natl
Univ, Korea; MS, US Naval
PG School, USA; PhD,
Brunel Univ, UK.
Visiting Professor
(Management of
Technology)

ILKKA KAURANEN, MS Engg, Lic
Tech, DTech, Helsinki
University of Technology,
Finland.
Visiting Professor
(Development and
Management in Industry)

SUNDAR VENKATESH, BSc, BL, Univ
of Calcutta; PhD, Indian
Inst of Management,
India.
Visiting Associate
Professor (Finance;
Financial Accounting)

WILLI ZIMMERMANN, PhD, Munich
Univ, Germany.
Adjunct Faculty (Public
Sector Management,
Urban Governance,
Environment
Management)

ROLAND AMOUSSOU-GUENOU,
LLB, National Univ of
Benin, South Africa; LLM,
Univ of Toulouse, France;
PhD, Univ of Paris II,
France.
Visiting Lecturer (Legal
Expert on Legal
Corporation, French
Ministry of Foreign Affairs,
International Business
Law, International
Contracts & Dispute
Resolution, International
Private Law)

**25.7 Completed Grant
and Sponsored
Research**

**Technopreneur Development
Program 2006**

Duration 11 March
2006 to 31 August 2006
Project Description The Technology
Development Program 2006
provides to technologists the
business skills and knowledge

required to develop a
complete business plan for
setting up or expanding their
existing business firms. It also
aims to offer opportunities for
business firms to join the
incubation center of the
Thailand Science Park, thus
strengthening networking
among technology clusters.

Project Investigator Dr. Barbara Igel
Sponsors National Electronics and
Computer Center, Thailand
Total Contracted Amount (Baht) 1,050,000

**The 12th Asia Pacific
Management Conference 2006**

Duration 1 Oct 2006 to 31 Dec 2006
Project Investigator Prof. Nazrul Islam
Sponsors Registration Fee
Total Contracted Amount (Baht) 693,750

**25.8 On-going Grant
and Sponsored
Research**

**Ansell Leadership Development
Programme 2006-07**

Duration 1 Oct 2006 to 30 Sept 2007
Project Description The Programme
involves training for high
potential managers of Ansell
Limited. These managers are
selected by the company's
top management from their
world-wide offices.
Project Investigator Dr. Sundar Venkatesh
Sponsors Ansell Limited
Total Contracted Amount (Baht) 3,948,000

**Key Factors of the market leader
in automatic washing machine
market in Thailand**

Duration September 2006 to April 2007
Project Description Conducting a market
research about the main
preferences of Thai households
for automatic washing
machines. It has to be
addressed what are the
market requirements in
Thailand for a washing
machine that can become the
no. 1 model in the Thai market.
We propose a multi-methods
approach. Students of the
course "International
marketing research" are
designing and conducting
different market research
methods in teams and discuss
their conclusions in the class.
The first part is conducted in
the August semester while the
second part is conducted by
master research students in the
January semester.

Project Investigator Dr. Rian Beise-Zee
Sponsors Thai Samsung Electronics Co.
Ltd.
Total Contracted Amount (Baht) 385,000

25.9 Publications

Refereed Journals

Decha Dechawatanapaisal and Sununta Siengthai (2006) "The Impact of Cognitive Dissonance and HR Practices on Learning Work Behavior", Journal of Workplace Learning, Vol.18, Issue 1, pp. 42-54.

Rashane Sala-Ngarm; Nick Dimmitt; Sununta Siengthai; and John C.S. Tang (2006) "Factors Affecting Knowledge Sharing in Thai SMEs" Kelaniya Journal of Human Resource Management, published by University of Kelaniya, Vol.2, No.1.

Beise, M., Ch. Rammer (2006), Local User-Producer Interaction in Innovation and Export Performance of Firms, Small Business Economics, Vol. 27, No. 2-3, pp. 207-222.

Chairakul, Tanyamai, M. Speece and B. Igel (2006): Satisfaction with interpersonal and Internet interactions In Thai corporate banking, International Journal of Internet and Enterprise Management, INDERSCIENCE, (accepted)

Hoang, D. T., B. Igel and T. Laosirihongthong (2006): The Impact of Total Quality Management on Innovation: Findings from a Developing Country, Intl J. o. Quality and Reliability Management, EMERALD, Vol.23, No.9, pp. 1092-1117,

Siritongthaworn, S., Kairit, D., Dimmitt, N. & Paul, H. (2006) The Study of E-learning Technology Implementation: A Primary Investigation of Universities in Thailand. Education and Information Technologies: The Official Journal of the IFIP Commission on Education, Vol. 11, Issue 2, ISSN:1360-2357 pp. 137-160.

Sala-Ngarm, R., Dimmitt, N., Siengthai, S. and Tang, J. (2006) Factors Affecting Knowledge Sharing in Thai SMEs. Kelaniya Journal of Human Resource Management, published by University of Kelaniya, Vol.2, No.1.

Seppo Hänninen & Ilkka Kauranen. A multi-dimensional product-concept model enhancing cross-functional knowledge creation in the product innovation process: The case of the Suunto t6 training wrist computer. Creativity and Innovation Management, 2006, volume 15, number 4, pages 400 - 409.

Pandey, I. M and Chotigeat, T. "The Capital Structure of Asian Firms", Global Business and Finance Review, vol. 11, no. 1, Spring 2006, pp. 63-78.

Chotigeat, T. and Pandey, I. M., "Theories of Capital Structure: Evidence from an Emerging Market", Studies in Economics and Finance. (Accept)

Qi Chun and John C.S. Tang, "Foreign Direct Investment in China: a Genetic Algorithm Approach", Journal of Socio-Economic Planning Sciences, 40 (2006), 143-155.

Srikrai, S.B. and Tang, John C.S., "Industrial Competitiveness Analysis using the Analytic Hierarchy Process", The Journal of High Technology Management Research, 17 (1), 71-83, 2006

Kantabutra, S. and Tang, John C.S., "Urban-Rural and Size Effects on School Efficiency", Leadership and Policy in Schools, Vol. 5, Issue 4, 2006

Sala-Ngarm, Rashane, Dimmitt N., Siengthai, S. and Tang, John C.S., "Factor Affecting Knowledge Sharing in Thai SMEs", Kelaniya Journal of Human Resource Management,

- published by University of Kelaniya, Vol. 2, No.1, 2006
- Anoté Chanopas, Donyaprueth Krairit, Do Ba Khang: Managing Information technology infrastructure: a new flexibility framework, Management Research News, Vol. 29, No. 10, 2006
- Do Ba Khang and Tun Lin Moe, Success Criteria and Factors for International Development Projects: A Life Cycle-based Framework (Accepted for presentation in a Special Session of the Joint Conference of the International Society of Marketing and Development and the Macromarketing Society, Washington D.C. 2-5 June 2007.)
- Shrestha R.M., Islam N., Oanh N .T. K., Adhikari S., Yedla S., Jiang, K., Siagian U., Tuan N. D., Abrenica J. (2006): Strategies for the promotion of cleaner and energy efficient technologies in the urban transport system in selected Asian cities: International Journal of Environment and Pollution, (accepted for publication)
- Petison, Phallapa and Johri, Lalit M, "Driving Harmony: Philosophy of Toyota Motor Thailand", Strategic Direction, Vol.22, Issue 11, UK, October 2006.
- Sawai Siritongthaworn and Donyaprueth Krairit, "Satisfaction in e-learning: the context of supplementary instruction," Campus-Wide Information Systems, Emerald Group Publishing Limited, Vol. 23 No. 2, 2006.
- Thumanon, P., and Paul, H. "Technology Transfer Induced Technological Dependency in an Electric Power Plant: Effects on Efficiency, Reliability and Flexibility", Global Journal of Flexible Systems Management, Vol. 17, No. 1, 2006.
- Boon-itt, S., and Paul, H. "A study of supply chain integration in Thai automotive industry: a theoretical framework and measurement", Management Research News, Vol. 29, No. 4, 2006.
- Thuy, P.N. and Swierczek, F.W. "Facilitators of Organizational Learning in Design," The Learning Organization Vol.2 Issue 13, 2006.
- Kraisornsuthasinee, S. and Swierczek, F.W. "Interpretations of CSR in Thai Company," Journal of Corporate Citizenship, Summer, Issue 22, 2006.
- Putrasreni, H. and Swierczek, F.W. "Dimensions of Success in International Business Negotiations: A Comparative Study of Thai and International Business Negotiators," Journal of Intercultural Communication Issue 11, April 2006.
- Venkatesh, S. and Puntagdava, A. "Siam Makro", Asian Case Research Journal, Accepted 2006.
- Ngoc, L.T.B., Venkatesh, S. and Thang, N.V. "Getting Bank Financing: A Study of Vietnamese Private firms", Asia Pacific Journal of Management, Accepted 2006.
- Neupane, S. and Venkatesh, S. "Does Ownership Structure affect IPO underpricing? Evidence from Thai IPOs" Journal of Corporate Ownership and Control Vol.3, Issue 2, Winter 2005-06.
- "Getting Bank financing: A study of Vietnamese Private Firms" Le Bich Ngoc, Sundar, Venkatesh and T.Nguyen, Asia Pacific Journal of Management (2006), 23: p209-227.
- "Siam Makro Ltd", Sundar Venkatesh and Ayurzana Puntagdavaa, Asian Case Research Journal (accepted for publication)
- ### Refereed Books/Chapters
- Sununta Siengthai (2006) "HRM in Southeast Asia:Exploratory Notes" in HRM Country Experiences, published by ICFAI University Press
- Ilkka Kauranen & Mikko Mustakallio & Virpi Palmgren. A guidebook for writing a research paper for writers of these papers, in Finnish: the original title is Tutkimus-raportin kirjoittamisen opas opinnäytetyön teki-jöille. Espoo, Finland. Helsinki University of Technology. 2006. 109 pages.
- ### Conference Proceedings
- Igel, B. and Kanjanasanpetch, P. (2006), "A knowledge based view of implementing Enterprise Resource Planning ", 3rd Asia-Pacific International Conference on Knowledge Management (KMAP), 11- 13 December, 2006, The Hong Kong Polytechnic University, Hong Kong
- Leonardo, T. , V. Esichaikul and B Igel (2006): Integrating Knowledge Management in Results Based Management Framework, KICSS 2006 Knowledge, Information and Creativity Support Systems, 1 - 4 August 2006,Thailand, organized by Japan Advanced Institute of Science and Technology (JAIST)
- Seppo Hänninen & Ilkka Kauranen. Product concept as a knowledge-transformation tool: the "four knowledge bases" approach. International Conference on Management of Technology, in Beijing, China, on May 22-26, 2006. International Association for Management of Technology (IAMOT).
- Sirikrai, S.B. and Tang, John C.S., "Competitiveness Analysis: An AHP Approach for the Automotive Components Industry", Proceedings, IGLS 2006, Pre-prints Vol. 3, 293-302, Innsbruck, Austria, February 20-24, 2006
- Sirikrai, S.B. and Tang, John C.S., "Industrial Performance Analysis: A Multi-criteria Model Method", Proceedings (in CD-ROM), PICMET'06, 2342-2352, Istanbul, Turkey, July 9-13, 2006
- Islam, N.; Wu, W.Y. and Agrawal P.R. (Eds); Managing Competitiveness in the Knowledge Economy: Proceedings of the 12th Asia Pacific Management Conference, November 17-19, 2006; School of Management, Asian Institute of Technology.
- Supyuenyong, V. and Islam, N. (2006); Knowledge Management Practices in Thai SMEs: The Cases of Enterprise Resource planning (ERP) Implementation Service Providers: Proceedings of the 12th Asia Pacific Management Conference (APMC-XII) on Managing Competitiveness in Knowledge Economy, November 17-19, pp 653-663, Bangkok, Thailand.
- Sirikrai, S. and Islam, N. (2006); A Conceptual Framework for Assessing the Impact of Information and Communication Technologies (ICT) Adoption on Hotel Productivity; Proceedings of the 12th Asia Pacific Management Conference (APMC-XII) on Managing Competitiveness in Knowledge Economy, November 17-19, pp 1279-1286, Bangkok, Thailand.
- Islam, N. (2006); Winning the Knowledge Transfer Race; International Conference on Technology-based Development: Strategies and Options for Pakistan; Organized by COMSATS Institute of Information Technology, August 22-23, Islamabad, Pakistan.
- Supyuenyong, V. and Islam, N. (2006); Knowledge Management Architecture: Building Blocks and their Relationships; PICMET 2006 Conference, July 8-13, 2006, Istanbul, Turkey.
- ### Other Publications
- Ilkka Kauranen & Raimo Kainulainen. Teaching case on how to commercialize a high technology product which creates a completely new product category . Bangkok, Thailand. Asian Institute of technology, School of Management. 2006. 30 pages.
- Ilkka Kauranen. "To become the European leader in Internet-based appointment reservation systems." A teaching case on raising funding to an internet start-up company . Bangkok, Thailand. Asian Institute of technology, School of Management. 2006. 9 pages.
- Ilkka Kauranen & Raimo Kainulainen. Oy Writia Ltd. Financing of New Technological Ventures. Teaching case. Bangkok, Thailand. Asian Institute of technology, School of Management. 2006. 35 pages.
- Ilkka Kauranen. Super Software Company. Teaching case and accompanying teaching note. Bangkok, Thailand. Asian Institute of technology, School of Management. 2006. 4 pages.
- ## 25.10 Doctoral Students' Dissertation
- ### International Business
- Impact of Total Quality Management on Innovation Performance*
By: Dinh Thai Hoang
Supervisor: Dr. Barbara Igel
- The Relationship between Corporate Governance and Corporate Environmental and Social Performance*
By: Suthisak Kraisornsuthasinee
Supervisor:Dr. Fredric W. Swierczek
- Assessing the Success and Failure of International Business Negotiations*
By: Haruthai Numprasertchai
Supervisor:Dr. Fredric W. Swierczek
- Facilitators of Organizational Learning in Design Organization in Vietnam*
By: Pham Ngoc Thuy
Supervisor:Dr. Fredric W. Swierczek

The Relationship between Education Inputs and the Quality of the Graduates: A Case Study in Vietnam

By: **Truong Quang Duoc**

Supervisor: Dr. Willi Zimmermann/Prof. Christopher Metzger

Total Quality Management Implementation and Leadership Competencies: A Study of Manufacturing Companies in Thailand

By: Anupam Das

Supervisor: Dr. Fredric W. Swierczek/Prof. Himangshu Paul

The Determinants of Capital Structure of Small and Medium Sized Firms in Vietnam

By: Tran Dinh Khoi Nguyen

Supervisor: Dr. Sundar Venkatesh

Society, Environmental and Stakeholder Drivers of Competitive Advantage in International Firms

By: Salil Kumar Sen

Supervisor: Dr. Fredric W. Swierczek

Management of Technology

Relationships between Financial Statement Information and Firm Characteristics: A Study of the Thai Manufacturing Corporate Sector

By: Gour Chandra Saha

Supervisor: Prof. Himangshu Paul

Strategies for Reducing Technological Dependence Relationship in Electrical Industry

By: Thumanoon Paukatong

Supervisor: Prof. Himangshu Paul

Use of Interactions, Student Satisfaction and Perceived Learning in E-learning Supplementary to Classroom Instructions

By: Sawai Siritongthaworn

Supervisor: Dr. Donyaprueth Krairit/Prof. Himangshu Paul

Supply Chain Integration and Firm Competitive Capability: An Empirical Study of the Thai Automobile Industry

By: Sakun Boon-itt

Supervisor: Prof. Himangshu Paul

An Empirical Study of Information Technology Infrastructure Flexibility and Organizational Performance: The Case of Thailand

By: Anote Chanopas

Supervisor: Dr. Donyaprueth Krairit

25.11 Masters Students' Theses, Research Studies and Projects

International Business

Research Study: Human Resource Development of the State-Owned Enterprises in Hanoi, Vietnam

By: Le Viet Anh

Supervisor: Dr. Sununta Siengthai

Research Study: Integrated Marketing Communication in Thailand IT Superstore: A Case Study of a Thai IT Retail Business

By: Napaporn Aramrassamivanich

Supervisor: Dr. Nicholas J. Dimmitt

Research Study: An Analysis of the Problems Faced by the Distribution System of a Dairy Product Manufacturing Unit in Thailand

By: Rhitwick Kumar Boruah

Supervisor: Prof. Himangshu Paul

Supervisor: Research Study: An Analysis of the Export Potential of the Garment Industry in Lao PDR: A Case Study of VM Inter Garment

By: Sengsaden Bounlavong

Supervisor: Dr. Fredric W. Swierczek

Research Study: Assessment of Expectation and Actual Value Delivered in Consumer Perception from Airline Services: A Comparative Case Study of Emirates Airline and Gulf Air

By: Saurajit Chaichanwattanakul

Supervisor: Prof. Lalit M. Johri

Research Study: Study of Supply Chain and Marketing Strategies for Export of Thai Fresh Fruits to China: A Case Study of Crop Integration Business

By: Nattee Chaivanit

Supervisor: Prof. Lalit M. Johri

Research Study: Marketing Communication for a Law Firm in Thailand

By: Kanniga Cheawcharnchuskul

Supervisor: Dr. Nicholas J. Dimmitt

Research Study: Electronic Signature and its Challenges: The Case of Korea as the IT Hub in Asia

By: Sung Joon Choi

Supervisor: Prof. John C.S. Tang

Research Study: Designing Marketing Strategy for Growth: Case Study Confirmed in Cambodia

By: Huot Davoan

Supervisor: Prof. Lalit M. Johri

Research Study: Performance Appraisal: A Case Study of Chhukha Hydro Power Corporation Limited, Bhutan

By: Sonam Dendup

Supervisor: Dr. Sununta Siengthai

Research Study: The Economic Impact of the Developing China on Sino-African Relations: A Case Study of China's Relationship with South Africa, Uganda and Nigeria

By: Amleset Desta

Supervisor: Prof. John C.S. Tang

Research Study: Business Process Outsourcing to India

By: Naorem Indrani Devi

Supervisor: Prof. John C.S. Tang

Research Study: Bhutan's Accession to the WTO: Prospects and Challenges

By: Tshering Dorji

Supervisor: Prof. John C.S. Tang

Research Study: Software Patents: Harmful Effects on Innovations

By: Nicolas Duhay

Supervisor: Dr. Roland Amoussou-Guenou

Research Study: Assessment of Guest Satisfaction at Hanoi Daewoo Hotel in Vietnam

By: Hoang Thi Kim Dung

Supervisor: Dr. Do Ba Khang

Research Study: Socially Responsible Investment in Emerging Markets: A Case Study in Malaysia

By: Gertz Etienne

Supervisor: Dr. Nicholas J. Dimmitt

Research Study: Anti-sweatshop Movements Versus MNCs: How Customer can Change Ethical and Marketing Behaviors of a Firm?

By: Anais Favre

Supervisor: Dr. Nicholas J. Dimmitt

Research Study: The Champagne and Wine Industry in Asia: The Actual Challenges

By: Aurelien

Supervisor: Dr. Fredric W. Swierczek

Research Study: Effective Use of Banking Capital in Risk Management: Focus on New Basle Accord

By: Vickrant Gurung

Supervisor: Prof. John C.S. Tang

Research Study: Modern Mobile Technologies and their Impact on Content Providers

By: Emanuel Hanser-Strecker

Supervisor: Dr. Donyaprueth Krairit

Research Study: Buyer Supplier Strategic Integration as a Tool for Competitive Advantage: A Research Study Based on Siemens Ltd., Thailand

By: Asif Ali Hazarika

Supervisor: Dr. Rian Beise-Zee/Dr. Fredric W. Swierczek

Research Study: Analysis of the Problems and Prospects of the Tourism Industry in Myanmar

By: Soe Thinzar Hlaing

Supervisor: Prof. John C.S. Tang

Research Study: Reaching the Hardcore Poor: Approaches, Challenges and Proposed Model

By: Nusrat Sharmin Huq

Supervisor: Dr. Sundar Venkatesh

Research Study: Forms of Power in Negotiation

By: Lea llawou-Alliot

Supervisor: Prof. Vincent Eurieult/Dr. Willi Zimmermann

Research Study: Effective Training and Development for Productivity Improvement in the Banking Sector: A Case Study of the Himalayan Bank Ltd. in Nepal

By: Sunita Khanal

Supervisor: Dr. Sununta Siengthai

Research Study: Brand Positioning and Consumer Perception: Indian Motorcycle Industry Premium Segment

By: Amit Kumar

Supervisor: Dr. Fredric W. Swierczek

Research Study: Critical Success Factors and Success Criteria for International Development Projects Implemented by International Non-government Organizations (INGOs): An Empirical Study in the Union of Myanmar

By: Khin May Kyawt

Supervisor: Dr. Do Ba Khang

Research Study: Household Savings Pattern in Thailand

By: Ladda Laiwechpittaya

Supervisor: Dr. Roy Kouwenberg

<p><i>Research Study: Innovations for the Indian Health Care Sector: Fostering Exponential Growth</i> By: Shiva Lakshmanan Supervisor: Prof. John C.S. Tang</p>	<p><i>Research Study: Building and Nourishing the Customer Loyalty in Fast Food Industry in Thailand</i> By: Ashish Singh Supervisor: Dr. Sununta Siengthai</p>	<p><i>Research Study: Corporate Strategic Formulation Analysis: A Case Study for Huashuo Exhibition Co., Ltd.</i> By: Xuan Yan Supervisor: Prof. John C.S. Tang</p>
<p><i>Research Study: A Survey of Small and Medium Enterprise Management in Cambodia</i> By: Kouy Leanghok Supervisor: Dr. Fredric W. Swierczek</p>	<p><i>Research Study: Competitive Landscape of Leading Indian IT Companies</i> By: Shweta Sinha Supervisor: Prof. Lalit M. Johri</p>	<p><i>Research Study: Destination Analysis: A Case Study of the Potential for Sustainable Tourism Development in Myanmar</i> By: Ei Cho Zin Supervisor: Dr. Fredric W. Swierczek</p>
<p><i>Research Study: Corporate Dividend Policy Theory and Practice: The Thailand Public Company Experience</i> By: Jaratin Lily Supervisor: Dr. Sundar Venkatesh</p> <p><i>Research Study: Business Strategies of Passenger Cars in China: A Case Study of FAW-Volkswagen Automobile Co., Ltd.</i> By: Haixia Lu Supervisor: Prof. John C.S. Tang</p>	<p><i>Research Study: Human Resource Management in the Formulation and Implementation of Mergers and Acquisitions</i> By: Surabhi Srivastava Supervisor: Dr. Sununta Siengthai</p>	<p>By: Wannuchanad Cheakaew</p> <p><i>Research Study: How E-Commerce Influences Service Consumption: A Case Study of Thai Airways E-Booking for the Thailand-UK Route</i> Supervisor: Dr. Willi Zimmermann</p>
<p><i>Research Study: Sahara India Group: Growth and Future Challenges</i> By: Nishant Mitra Supervisor: Prof. John C.S. Tang</p>	<p><i>Research Study: Asset Seeking Behavior in the Emerging Multinational Corporations (EMNCs): Indian Tigers and Chinese Dragons</i> By: Sudhanshu Supervisor: Dr. Rian Beise-Zee/Prof. I.M. Pandey</p>	<p><i>Research Study: Capital Structure and Corporate Financial Performance of Thai Public Companies Before and After the 1997 Economic Crisis</i> By: Hassaya Bumrungrit Supervisor: Dr. Roy Kouwenberg</p>
<p><i>Research Study: Mergers & Acquisition Strategies and Motives in the Telecom Sector</i> By: Ashish Narayan Supervisor: Dr. Sundar Venkatesh</p>	<p><i>Research Study: Marketing Communications in Small and Medium Enterprises: A Case Study of Mutita Candle Limited Partnership, Ubon Ratchathani, Thailand</i> By: Thumwimon Sukserm Supervisor: Dr. Nicholas J. Dimmitt</p>	<p><i>Research Study: The Decision Making Process of Vietnamese Tourists in Ho Chi Minh City</i> By: Nguyen Thi Hong Chuyen Supervisor: Dr. Fredric W. Swierczek</p>
<p><i>Research Study: HRM Practices and Employee Satisfaction: A Case Study of Kandawgyi Palace Hotel in Myanmar</i> By: Tin Moe Ni Supervisor: Dr. Sununta Siengthai</p>	<p><i>Research Study: A Feasibility Study to Setup an In-house Lens Fabrication Laboratory in Kathmandu, Nepal</i> By: Sohil Man Tuladhar Supervisor: Prof. John C.S. Tang</p>	<p><i>Research Study: The Relation between the Working Capital Requirements and Financial Performance of Thai Companies: Evidence from the Construction Materials and Electrical Products Industries</i> By: Saowanee Eungaree Supervisor: Dr. Roy Kouwenberg</p>
<p><i>Research Study: Recruitment and Selection Practices in Japan</i> By: Dipendra Raj Pahari Supervisor: Dr. Sununta Siengthai</p>	<p><i>Research Study: An Assessment of Human Resources Management in NGOs in Myanmar</i> By: Mar Lar Tun Supervisor: Dr. Fredric W. Swierczek</p>	<p><i>Research Study: A Cross Cultural Study of Materialism among Asian and European Young Professionals</i> By: Sagib Kumar Ghosh Supervisor: Dr. Fredric W. Swierczek</p>
<p><i>Research Study: Family Owned Business in Corporate Governance in Thailand</i> By: Olivier Robert Supervisor: Dr. Barbara Igel</p>	<p><i>Research Study: Organisation Investment in Employee Development, Employee Job Satisfaction, Commitment, and Intent to Leave among National Finance Service Employees, Bhutan</i> By: Tandin Wangdi Supervisor: Dr. Sununta Siengthai</p>	<p><i>Research Study: Insurance Industry in India: Growth, Issues and Challenges</i> By: Nitin Gupta Supervisor: Prof. John C. S. Tang</p>
<p><i>Research Study: Financial and Investment Strategy of Public Sector Versus Private Sector Banks in India</i> By: Sambit Routray Supervisor: Dr. Roy Kouwenberg</p>	<p><i>Research Study: Chinese Outbound Tourism to Europe</i> By: Cheng Wei Supervisor: Prof. John C.S. Tang</p>	<p><i>Research Study: Valuation for Privatization: A Case Study of the Provincial Electricity Authority (PEA) in Thailand</i> By: Monwan Limprasert Supervisor: Dr. Roy Kouwenberg</p>
<p><i>Research Study: Corruption in India: A Case Study of Public Services in 20 States</i> By: Prithika Arati Samuel Supervisor: Prof. John C.S. Tang</p>	<p><i>Research Study: CSR-A Profitable Corporate Policy</i> By: Markus Wernitznig Supervisor: Dr. Nicolas Dimmitt</p>	<p><i>Research Study: An Analysis of the Competitiveness of Leather and Footwear Industry in Vietnam</i> By: ran Thi Viet Phuong Supervisor: Prof. John C. S. Tang</p>
<p><i>Research Study: Social Entrepreneurship in Developing Countries: A Case Study in Nepal</i> By: Shraddha Shah Supervisor: Dr. Sununta Siengthai</p>	<p><i>Research Study: Professional Identities of Woman Entrepreneurs in Asian Countries: Cases of Thailand and Japan</i> By: Joanna Wisniewska Supervisor: Dr. Sununta Siengthai</p>	<p><i>Research Study: Bond Market Development in Cambodia</i> By: Nong Ratana Supervisor: Dr. Sununta Siengthai</p>
<p><i>Research Study: Knowledge Management: A Case Study on Siemens Business Services, Thailand</i> By: Abhishek Shrestha Supervisor: Dr. Barbara Igel</p>	<p><i>Research Study: Economic Cooperation between Korea and South Asia and Southeast Asian Region with Reference to Trade</i> By: Choi Su Woong Supervisor: Prof. John C.S. Tang</p>	<p><i>Research Study: Capacity Development: A Case Study of a Global Toy Company in Thailand</i> By: Lim Rithy Supervisor: Dr. Sununta Siengthai</p>
<p><i>Research Study: Performance Management: A Case Study of Indo-Gulf Fertilizers Limited (IGFL) India</i> By: Nimesh Shukla Supervisor: Dr. Fredric W. Swierczek</p>	<p><i>Research Study: Marketing Strategy for Foreign Language Universities in China: A Case Study of Xi'an International Studies University</i> By: Zheng Yan Supervisor: Prof. John C.S. Tang</p>	<p><i>Research Study: Competitive Advantages and Sustainability of Air India Express: A Case Study</i> By: Kaushik Saha Supervisor: Dr. Fredric W. Swierczek</p>
		<p><i>Research Study: Behavioral Factors Affecting Knowledge Sharing in Thai SMEs</i></p>

By: Rashane Sala-Ngarm
Supervisor: Dr. Prof. John C. S. Tang

Research Study: *Determinants of Chinese Outward Foreign Direct Investment in the West: An Empirical Study of Chinese Knowledge-based Enterprises*
By: Joshua Brandon Sears
Supervisor: Dr. John C. S. Tang

Research Study: *Developing an Entry Strategy in the European Market for Vietnamese Pangasius*
By: Hoang Thi Thuy
Supervisor: Dr. Nicholas J. Dimmitt

Research Study: *Investigating and Proving Cases of Stock Market Manipulation in Thailand*
By: Petcharat Tongseedang
Supervisor: Dr. Sununta Siengthai

Research Study: *Consumers' Perceptions towards 3G Wireless Technology in Thailand*
By: Jitlada Wongseri
Supervisor: Dr. Donyaprueth Krairit

Research Study: *A Development Strategy for the Vietnamese Textile and Garment Industry after WTO Accession*
By: Nguyen Huynh Phuoc An
Supervisor: Dr. Fredric W. Swierczek

Research Study: *Evaluation of the Franchising Industry under Vietnam's Franchise Strategy for Local Companies: The Case of PHO24*
By: Cao Tan Dac
Supervisor: Dr. Fredric W. Swierczek

Research Study: *The MBA Education in China: Opportunities and Challenges*
By: Ma Haiyong
Supervisor: Prof. John C. S. Tang

Research Study: *Financial and Non-Financial Indicators of Default Risk: A Case Study of the Bank for Investment and Development of Vietnam*
By: Nguyen Thi Minh Hang
Supervisor: Dr. Sundar Venkatesh

Research Study: *An Analysis of the Development of Shanghai's Tourism Industry*
By: Wang Hui
Supervisor: Prof. John C. S. Tang

Research Study: *Corporate Strategy Analysis: A Case Study of Saigon Petro in Vietnam*
By: Luu Bao Huong
Supervisor: Dr. Fredric W. Swierczek

Research Study: *Export of Furniture to the EU Market for SMEs in Vietnam*
By: Nguyen Viet Huy
Supervisor: Dr. Sununta Siengthai

Research Study: *Effectiveness of Advertisements using Digital Signage in Retail*
By: Shafquat Kabir
Supervisor: Dr. Rian Beise-Zee

Research Study: *Disaster Preparedness in the Tourism Industry: Building a Post Crises Strategy for the Hotel Sector*
By: Ahmed Iftekhar Khan
Supervisor: Prof. Lalit M. Johri

Research Study: *The Relative Importance of Government Incentives in*

the Development of the Software Sector in Thailand

By: Per Arne Christoffer Larsson
Supervisor: Dr. Sundar Venkatesh

Research Study: *The Effects of Multiple Product Endorsements by Celebrities on Purchase Intentions*
By: Charlie Albert Lasuin
Supervisor: Dr. Rian Beise-Zee

Research Study: *Family Firm and Firm Performance: A Study of Thai Public Companies*
By: Thunyaporn Lerkkasemsan
Supervisor: Dr. Sundar Venkatesh

Research Study: *Service Marketing Strategies of Low Cost Airlines in Thailand: A Case Study of Nok Air*
By: Nunvipa Lertprasertsukoo
Supervisor: Prof. Lalit M. Johri

Research Study: *The Housing Market in China: A Case Study of Guangzhou City*
By: Kong Manling
Supervisor: Prof. John C. S. Tang

Research Study: *A Development Strategy for Vietnamese Handicraft Village Based Tourism: A Case Study of KIM to Village*
By: Dao Thu Nga
Supervisor: Dr. Fredric W. Swierczek

Research Study: *Vietnam's Retail Industry and the Trend of Modern Store Retailers*
By: Hoang Thi Hong Nhung
Supervisor: Prof. John C. S. Tang

Research Study: *Singapore as a Regional Financial Center: A Lesson for Thailand*
By: Ongarj Pichitsurakij
Supervisor: Prof. John C. S. Tang

Research Study: *Reform in Nepal Oil Corporation*
By: Rajib Raj Sharma
Supervisor: Prof. Ilkka Kauranen

Research Study: *Assessment of the Competitiveness of the South East European Region in Attracting Foreign Direct Investments: The Case of Bulgaria*
By: Lyubomir Svetoslavov Uzunski
Supervisor: Prof. John C.S. Tang

Special Study: *Performance Management: Analytical Review of the Performance Appraisal System in Schlumberger Limited*
By: Christina Mortensen
Supervisor: Prof. Himangshu Paul

Special Study: *Bringing the Toyota Production from the Work Floor to the Office*
By: Nicolas Heffinck
Supervisor: Dr. Fredric W. Swierczek

INTERNATIONAL PUBLIC MANAGEMENT

Research Study: *Impact Evaluation of Training in Interpersonal Communication and Behavior Change*
By: Probal Dutta
Supervisor: Dr. Fredric W. Swierczek

Customer-orientation in the Administrative Reform in Ho Chi Minh City Vietnam: The Case of the Department of Justice
By: Lam Quynh Tho

Supervisor: Dr. Willi Zimmermann

Research Study: *Factors Driving the Stock Return of Firms Listed in the Thai Stock Market*
By: Praphop Anantakoon
Supervisor: Dr. Roy Kouwenberg

By: Xayleuxa Phouyavong
Research Study: *Preparation for AFTA: Financial Liberalization in Lao PDR*
Supervisor: Dr. Fredric W. Swierczek

By: Le Thi Hoang Anh
Research Study: *A Review on the Equitization Process in Vietnam: The Case of Vietnam Dairy Products Joint Stock Company (Vinamilk)*
Supervisor: Dr. Willi Zimmermann

By: Nguyen Nam Binh
Research Study: *Implementation of E-Government in the Public Sector: A Case Study of Ho Chi Minh City*
Supervisor: Dr. Willi Zimmermann

By: Zhang Jicheng
Research Study: *The Development Strategy of International NGOs in China: Case Studies of Oxfam Hongkong, Heifer International and the Salvation Army's Work in China*
Supervisor: Prof. John C. S. Tang

By: Ngo Hanh Lien
Research Study: *Total Quality Management in Higher Education: A Case Study of Public and People-Founded Universities in Vietnam*
Supervisor: Dr. Willi Zimmermann

By: Nguyen Thi Kieu Oanh
Research Study: *Roles of International Non-Government Organizations in Poverty Alleviation: The Case of Vietnam*
Supervisor: Dr. Willi Zimmermann

By: Trinh Thi Kim Phuong
Research Study: *Assessing the Service Quality of Street Level Bureaucracy in the Eleventh District Policy Department of Ho Chi Minh City, Vietnam*
Supervisor: Dr. Willi Zimmermann

MANAGEMENT OF TECHNOLOGY

Research Study: *Assessment ERP Strategic Development to Optimize Business Value of Companies in Thailand*
By: Siripetch Baljai
Supervisor: Dr. Donyaprueth Krairit

Research Study: *The Impact of Top Management Commitment on Quality Management Practice: An Exploratory Study of the Thai Garment Industry*
By: Mesbahuddin Chowdhury
Supervisor: Prof. Himangshu Paul

Research Study: *Factors Influencing the Effective Implementation of E-Learning: A Case Study of Sri Lankan Universities*
By: M.M.D.R. Deegahawature
Supervisor: Dr. Donyaprueth Krairit

Research Study: *Comparative Financial Performance Evaluation of Technology Intensive and Other Firms in Thailand*
By: Viroj Jirattijaroen
Supervisor: Dr. Roy Kouwenberg

<p><i>Research Study: Service Quality Assessment of Public Central Hospitals in Lao PDR</i> By: Phokham Phommavong Supervisor: Prof. Himangshu Paul</p>	<p>By: Wannachat Thepsawat Supervisor: Dr. Donyaprueth Krairit</p>	<p><i>Project: Improvement of Cost Management in Vietnam Airline Corporation</i> By: Mai Huu Tho Supervisor: Dr. Fredric W. Swierczek</p>
<p><i>Research Study: Quality Management & Supply Chain Practices: A Study on Indian Auto Components Industry</i> By: Raman Lakshmi Priya Supervisor: Prof. Himangshu Paul</p>	<p>INTERNATIONAL BUSINESS-MANAGEMENT OF TECHNOLOGY</p> <p><i>Project: Sales Force Productivity in Organon Vietnam</i> By: Ton Nu Quynh Anh Supervisor: Dr. Fredric W. Swierczek</p>	<p><i>Project: Human Resources Management in the Vietnam National University - Ho Chi Minh City</i> By: Le Thi Anh Tram Supervisor: Dr. Fredric W. Swierczek</p>
<p><i>Research Study: Evaluation of Technologies used to Preserve Commodities: A Case Study of the National Reserve Department in Vietnam</i> By: Nguyen Van Thuy Supervisor: Prof. Nazrul Islam</p>	<p><i>Project: Risk Management for New Product Development in the Oil and Gas Industry</i> By: Nguyen Phuong Dong Supervisor: Dr. Fredric W. Swierczek</p>	<p><i>Project: Improving Implementation of EVN's Restructuring and Development</i> By: Phan Minh Tuan Supervisor: Dr. Fredric W. Swierczek</p>
<p><i>Research Study: Globally Distributed Software Development using Agile or Traditional Methods</i> By: Gunnar Kristoffer Wold Supervisor: Dr. Donyaprueth Krairit</p>	<p><i>Project: Creating a Franchising Strategy for Petrovietnam Distribution and Processing Company</i> By: Phung Nhu Dung Supervisor: Dr. Fredric W. Swierczek</p>	<p><i>Project: Risks Management Strategies in Petrochemical Projects in Vietnam</i> By: Tran Minh Tuan Supervisor: Dr. Fredric W. Swierczek</p>
<p><i>Research Study: Marketing Strategies of the Mobile Communication Industry in China: A Case Study of CMCC in Xian</i> By: Liu Youzhen Supervisor: Prof. John C.S. Tang</p>	<p><i>Project: Improving Inventory Management Efficiency in Aircraft Maintenance of Vietnam Airlines</i> By: Do Trong Giang Supervisor: Dr. Fredric W. Swierczek</p>	<p><i>Project: Material Management in Electricity of Vietnam: A Case Study</i> By: Vu Thanh Tung Supervisor: Dr. Fredric W. Swierczek</p>
<p><i>Research Study: Fostering the Effective Development of SMEs by Addressing the Barriers Encountered by SME Entrepreneurs in the Manufacturing Sector: Case Study of Myanmar</i> By: Pye Soe Thu Zar Supervisor: Dr. Barbara Igel</p>	<p><i>Project: Developing a Business Plan for Da Lat Ecological Park</i> By: Le Thanh Hang Supervisor: Dr. Fredric W. Swierczek</p>	<p><i>Project: Alternatives for Developing Fuels Distribution Networks in Petrovietnam</i> By: Le Xuan Vinh Supervisor: Dr. Fredric W. Swierczek</p>
<p><i>Research Study: Impact of Information Technologies on Competitiveness of Taiwanese Electronics Manufacturing Services Providers</i> By: Jong-Yih Lin Supervisor: Dr. Donyaprueth Krairit</p>	<p><i>Project: Aircraft Financing Strategies for Vietnam Airlines</i> By: Tran Thanh Hien Supervisor: Dr. Fredric W. Swierczek</p>	<p><i>Project: An Analysis of Japan Bank for International Cooperation (JBIC)-Funded Projects in the Vietnamese Power Sector</i> By: Truong Hoang Vu Supervisor: Dr. Fredric W. Swierczek</p>
<p><i>Research Study: Managing Fresh Food Quality and its Private Label: Case Study of a Modern Retail Company in Thailand</i> By: Phanwadee Oraphan Supervisor: Dr. Sundar Venkatesh</p>	<p><i>Project: Restructuring through Human Resource Development in Western Food Company</i> By: Nguyen Minh Hoang Supervisor: Dr. Fredric W. Swierczek</p>	<p><i>Effectiveness: A Case Study of Montgomery Watson Harza</i> By: Nguyen Hoai An <i>Project: Enhancing Organizational</i> Supervisor: Dr. Fredric W. Swierczek</p>
<p><i>Research Study: Feasibility of a New Battery Technology in the European Powered Orthopedic Devices Market</i> By: Mukesh Sethi Supervisor: Prof. John C. S. Tang</p>	<p><i>Project: Developing a Competitive Strategy for Central Pharmaceutical Company No.1 (CPC)</i> By: Le Quoc Khanh Supervisor: Dr. Fredric W. Swierczek</p>	<p><i>Project: Risk Management in Tax Auditing for the General Department of Taxation in Vietnam</i> By: Le Thu Anh Supervisor: Dr. Fredric W. Swierczek</p>
<p><i>Research Study: Key Criteria for the Successful Deployment of an E-Commerce Site of SME's from the Point of View of the Thai Consumers</i> By: Amar V. Salokhe Supervisor: Dr. Donyaprueth Krairit</p>	<p><i>Project: A Call Center Strategy for Electricity of Vietnam, A Case Study</i> By: Nguyen Minh Khiem Supervisor: Dr. Fredric W. Swierczek</p>	<p><i>Project: Improving the Human Resource Competitive Advantage of Viwaseen Corporation</i> By: Nguyen Tuan Anh Supervisor: Dr. Fredric W. Swierczek</p>
<p><i>Research Study: Critical Success Factors and Success Criteria in Core Banking Application Project in Nepal</i> By: Anuraag Malla Supervisor: Dr. Do Ba Khang</p>	<p><i>Project: Improving the Consulting Services Capability of the Department of Power System Development, Institute of Energy-Electricity of Vietnam</i> By: Dang Thi Hoa Khuong Supervisor: Dr. Fredric W. Swierczek</p>	<p><i>Project: Cost and Supply Characteristics of Steel Scrap in Thailand: Macro Environment and Industry Analysis</i> By: Kasiyane Anusri Supervisor: Dr. Fredric W. Swierczek Prof. Lalit M. Johri</p>
<p><i>Research Study: Supply Chain Integration: A Case Study of Big-C Superstore, Thailand</i> By: Panupong Piyawongsomboon Supervisor: Prof. Himangshu Paul</p>	<p><i>Project: Improving Technology Management in EVN</i> By: Nguyen Trung Kien Supervisor: Dr. Fredric W. Swierczek</p>	<p><i>Project: Road Map for Kangwal Polyester Co. Ltd. in Mid-term (8-10 years) for Success and Survival in the Dynamic & Competitive Man Made Textile Market</i> By: Sanjay Bhatnagar Supervisor: Prof. Lalit M. Johri</p>
<p><i>Research Study: User Satisfaction with the ERP System: An Empirical Study of Cal-Comp Electronics (Thailand) Plc. Co., Ltd.</i> By: Watcharapong Siripoon Supervisor: Dr. Donyaprueth Krairit</p>	<p><i>Project: Equitization of the Bank for Investment and Development of Vietnam</i> By: Duong Thi Phong Lan Supervisor: Dr. Fredric W. Swierczek</p>	<p><i>Project: Development of a New Business: A Case Study of PETROSETCO</i> By: Trinh Thanh Binh Supervisor: Dr. Fredric W. Swierczek</p>
<p><i>Research Study: Critical Success Factors for IT Projects in the Public Sector: A Case Study of EGAT</i></p>	<p><i>Project: Development Strategies for Exxonmobil, Vietnam 2006-2010</i> By: Dang Binh Minh Supervisor: Dr. Fredric W. Swierczek</p>	<p><i>Project: Competitive Strategy in the Vietnamese Market</i> By: Truong Ngoc Vien Chau Supervisor: Dr. Fredric W. Swierczek</p>
	<p><i>Project: Improving the Engineering Consulting Services in the Electricity of Vietnam</i> By: To Thi Ngoc Supervisor: Dr. Fredric W. Swierczek</p>	<p><i>Project: Compensation and Benefits in Equitization</i> By: Nguyen Minh Chinh Supervisor: Dr. Fredric W. Swierczek</p>

Project: Solutions to the Power Shortage: An Action Plan for Vietnam
By: Nguyen Quoc Chinh
Supervisor: Dr. Fredric W. Swierczek

Project: Strengthening the Competitiveness of TYCN in Fastener Products
By: Su Chung-Pei
Supervisor: Prof. Lalit M. Johri

Project: Strategy Development for the Vietnam Motor Industry Corporation
By: Phung Hoa Cuong
Supervisor: Dr. Fredric W. Swierczek

Project: Developing Competitive Marketing Strategies for ELISS Company
By: Nguyen Xuan Duc
Supervisor: Dr. Fredric W. Swierczek

Project: Integrated Process Redesign in Quang Dung Co., Ltd.
By: Vu Viet Duc
Supervisor: Dr. Fredric W. Swierczek

Project: Improving Customer Service to Achieve Competitive Advantage: A Case Study of ICT Co., Ltd.
By: Do Huong Giang
Supervisor: Dr. Fredric W. Swierczek

Project: Strategic Training and Human Resources Development in PetroVietnam Manpower Training College 2006-2016
By: Hoang Thi Thu Ha
Supervisor: Dr. Fredric W. Swierczek

Project: Managing Conflicts: A Case Study of Vietnam International Assurance Company
By: Le Thi Thu Ha
Supervisor: Dr. Fredric W. Swierczek

Project: A Market Entry Strategy for the Mobile Service of EVN Telecom
By: Hoang Minh Hai
Supervisor: Dr. Fredric W. Swierczek

Project: Developing the Power Engineering Consulting Companies for Vietnam
By: Pham Hong Hai
Supervisor: Dr. Fredric W. Swierczek

Project: Enhancing the Organization's Capability: A Case Study of the Vietnam Productivity Centre
By: Nguyen Thu Hien
Supervisor: Dr. Fredric W. Swierczek

Project: Improving Inventory Management in Hanoi Power Company
By: Nguyen Thu Hien
Supervisor: Dr. Fredric W. Swierczek

Project: Improving the Performance of Ho Chi Minh City Securities Trading Center
By: Nguyen Thi Quynh Hoa
Supervisor: Dr. Fredric W. Swierczek

Project: Formulating Business Level Strategy: A Case Study of a Property Development Division under Diversified Group of Companies
By: Sandar Htun
Supervisor: Dr. Do Ba Khang

Project: Developing Citibank's Commercial Banking Group (CBG) in Vietnam
By: Nguyen Phi Hung
Supervisor: Dr. Fredric W. Swierczek
Project: Improving the Distribution Network of BP Petco Company in Vietnam

By: Nguyen Trung Hung
Supervisor: Dr. Fredric W. Swierczek

Project: Facilitating the Commercialization of the Biogas Sector in Vietnam
By: Ho Thi Lan Huong
Supervisor: Dr. Fredric W. Swierczek

Project: Developing TOT Strategy to Dominate in the ADSL Market
By: Kantima Jaruampornpan
Supervisor: Prof. Lalit M. Johri

Project: Cash Card and Prepaid "Enemy or Friend": A Case Study for Siam Commercial Bank
By: Kariya Kachenchai
Supervisor: Prof. Lalit M. Johri

Project: Design Marketing Strategies for a Hospitality College: A Case Study of Dusit Thani College
By: Piyachat Katanyuta
Supervisor: Prof. Lalit M. Johri

Project: Increasing the Audit Efficiency in Vietnam's Auditing Company
By: Tran Thi Kim Khanh
Supervisor: Dr. Fredric W. Swierczek

Project: Improving Inventory Management: A Case Study of Ford Vietnam Limited
By: Tran Duc Kien
Supervisor: Dr. Fredric W. Swierczek

Project: Competitive Human Resource Management: An Analysis of VIETSOVPEIRO
By: Tu Thanh Nghia
Supervisor: Dr. Fredric W. Swierczek

Project: Developing a Consultancy Service: A Case Study of BV International Holding
By: Le Y Nhi
Supervisor: Dr. Fredric W. Swierczek

Project: Improving Customers' Satisfaction on Delivery in Crown Saigon
By: Nguyen Thanh Phong
Supervisor: Dr. Fredric W. Swierczek

Project: A Competitive Strategy for the Mobile Network Segment of Siemens Communication in Vietnam
By: Nguyen Tuan Phong
Supervisor: Dr. Fredric W. Swierczek

Project: Launching of the "Next" Brand in Thailand: A Study of the Retail and Branded Fashion Landscape
By: Sameer Prasad
Supervisor: Prof. Himangshu Paul

Project: Strategic Development in Vietnam Airlines for 2006-2015
By: Nguyen Duy Quoc
Supervisor: Dr. Fredric W. Swierczek

Project: Retention Strategies for a Joint-Stock Bank in Vietnam: A Case Study of Techcombank
By: Hoang Thi Tu Quyen
Supervisor: Dr. Fredric W. Swierczek

Project: TOT Organizational Culture Change to Achieve Performance Excellence
By: Surapeeporn Sukkho
Supervisor: Prof. Lalit M. Johri

Project: Improving the Effectiveness of the VAT Policy in Vietnam

By: Nguyen Huu Tan
Supervisor: Dr. Fredric W. Swierczek

Project: Business Perspective for Plastic Lenses Finished Single Vision (FSV) 1, 5 Index in Essilor International
By: Michael Georges Gustave Terlon
Supervisor: Prof. Lalit M. Johri

Project: Adoption of JIT and Total Quality Management in Supply Chain Processes: A Case Study of Mascot Universal Company Limited
By: Nipat Thanauyaporn
Supervisor: Prof. Himangshu Paul

Project: Changing SEAMEO Retrac's Image
By: Le Minh Thi
Supervisor: Dr. Fredric W. Swierczek

Project: Service Quality of Quality Assurance Function in Nestle, Thailand
By: Thida Thongsuk
Supervisor: Dr. Do Ba Khang

Project: Improving the Competitiveness of FPT Nokia Products
By: Le Xuan Thuy
Supervisor: Dr. Fredric W. Swierczek

Project: Enhancing the Performance of the Ministerial Office - The Case of the Ministry of Finance in Vietnam
By: Nguyen Van Thuy
Supervisor: Dr. Fredric W. Swierczek

Project: Improving Cash Management in Vietnam Airlines
By: Nguyen Xuan Thuy
Supervisor: Dr. Fredric W. Swierczek

Project: An Evaluation of the Hospital Management and Provincial Hospital Support in Bach Mai Hospital
By: Pham Thi Phuong Thuy
Supervisor: Dr. Fredric W. Swierczek

Project: Strategies to Attract and Retain Employees at DHF
By: Ngo Truong Hoang Thy
Supervisor: Dr. Fredric W. Swierczek

Project: Improving the Effectiveness of Procurement
By: To Minh Tien
Supervisor: Dr. Fredric W. Swierczek

Project: Power Market Implementation in the Vietnam's National Load Dispatch Centre
By: Nguyen Tuan Tung
Supervisor: Dr. Fredric W. Swierczek

Project: Customer Contact Management for Direct-Marketing Campaigns in Siam Commercial Bank
By: Dhawatchai Vachiravivat
Supervisor: Prof. Lalit M. Johri

Project: An Analysis of the Clean Water Supply Business in Nam Dinh Province
By: Le Quang Vinh
Supervisor: Dr. Fredric W. Swierczek

Project: Improving the Performance of Projects in a Real Estate Corporation
By: Nguyen The Vinh
Supervisor: Dr. Fredric W. Swierczek

Project: Improving Quality: A Case Study of Ford Vietnam Ltd.
By: Tran Minh Vuong
Supervisor: Dr. Fredric W. Swierczek

Chapter 26: AIT EXTENSION

26.1 Introduction

AIT Extension contributes to the development of the region through continuing professional education, short-course training and consultancy services. We do this by working to develop highly qualified and committed professionals who play a leading role in the sustainable development of the region and its integration into the global economy.

AIT Extension's operating programs:

- Agriculture, Resources and Development (ARD)
- Development Management (DM)
- Education and Information Technology (EIT)

26.2 Mission

AIT Extension identifies and responds to regional opportunities for continuing education, training and consultancy, and thus helps realize AIT's mission to develop highly qualified and committed professionals who will play a leading role in the sustainable development of the region and its integration into the global economy. AIT Extension is an innovative and responsive provider of a broad array of capacity building programs and services.

26.3 Unit Governance

Dr. Jonathan Shaw
Director

26.4 Learning Approach

AIT Extension's learning systems utilize interactive, task-based, web-based, distance mentoring and self-access learning experiences.

Teaching-learning methods used in AIT Extension training course

include lectures, workshops, group discussions, case analyses,

group work, individual exercises, reflective thinking, role plays, project work and study visits. We believe strongly in the value of peer learning, problem-based learning, participatory learning and learner-centeredness and aim to maximize learning in all training by using these approaches appropriately. Participants benefit from close personal attention from accomplished professionals. A typical training course provides five to six hours of workshop sessions every weekday.

In all courses, participants learn relevant applications of computer and information technology. The internet is used as a support tool for sourcing information and to facilitate distance learning and mentoring activities. In most courses desktop computer is provided for exclusive use of each participant for the duration of their training. Dedicated computer and other laboratory facilities are accessible 24 hours/day, including weekends.

All training courses take advantage of our stimulating academic and social environment, which is a multicultural English speaking academic community.

26.5 Training Resources

AIT Extension has a wide pool of academic and professional Resource Persons drawn from AIT's schools, and from leading international and local organization in the region.

Its professional staff are specialists in human resources development, curriculum planning, instructional system design, information technology application development and other specific technological areas.

AIT has incorporated state-of-the-art educational and information technologies into all training facilities on campus.

Extension's training facilities including computing and networking hardware and software are used for various training programs. The training facilities are accessible 24 hours daily. At least one computing station is dedicated for exclusive use of each participant throughout the duration of the program. All training program participants have unlimited use of e-mail and access to the Internet.

25.7 Grant and Sponsored Trainings Initiated in 2006

Standardization of Power Purchase Pricing Policy for Small Hydro Power Producer in Nepal

Duration 30 January 2006 to 04 May 2006
Course Coordinator Mr. Anil Rajbhandari
Sponsors Nepal Electricity Authority
Total Contracted Amount Baht 384,000

Working Capital Management and Financial Restructuring

Duration 27 March 2006 to 07 July 2006
Course Coordinator Mr. Anil Rajbhandari
Sponsors Nepal Electricity Authority, Nepal
Total Contracted Amount Baht 649,040

Logistics Management

Duration 30 January 2006 to 10 May 2006
Course Coordinator Ms. Khin Ma Ma Gyi
Sponsors World Health Organization and Maldives Airport Co., Ltd.
Total Contracted Amount Baht 739,200

Natural Resources and Environmental Planning and Management 2

Duration 16 January 2006 to 28 April 2006
Course Coordinator Mr. Voravate Chonlasin
Sponsors Ministry of Environment, Sri Lanka
Total Contracted Amount Baht 560,000

Rural Agribusiness Development and Management

Duration 22 Feb 2006 to 02 May 2006
Course Coordinator Mr. Wichit Silpamaneephan
Sponsors Danida
Total Contracted Amount Baht 582,660

Gender and Development

Duration 13 February 2006 to 31 July 2006
 Course Coordinator Ms. Worawan Sumroetrum
 Sponsors Northeast Community Restoration and Development Project (NECORD), Sri Lanka
 Total Contracted Amount Baht 1,565,600

Strategic Management of NGOs

Duration 20 Feb 2006 to 03 May 2006
 Course Coordinator Mr. Tanuj Kumar Halder
 Sponsors Multi-donors
 Total Contracted Amount Baht 480,000

Effective Managerial Skills and Techniques

Duration 20 February 2006 to 30 April 2006
 Course Coordinator Mr. Pradeep Kumar Dash
 Sponsors Commercial Bank of Ceylon, Sri Lanka
 Total Contracted Amount Baht 390,000

Development of Database for Statistical Data Management

Duration 27 Feb 2006 to 25 June 2006
 Course Coordinator Mr. Fazle Karim
 Sponsors FAO
 Total Contracted Amount Baht 236,000

Information Technology Application in Project Management

Duration 15 March 2006 to 04 July 2006
 Course Coordinator Mr. Fazle Karim
 Sponsors Multi-donors
 Total Contracted Amount Baht 838,500

Web Page Development and Communications Development

Duration 29 March 2006 to 04 July 2006
 Course Coordinator Mr. Fazle Karim
 Sponsors Danida
 Total Contracted Amount Baht 285,000

Workshop on Needs Verification Planning

Project Description The workshop aims to discuss the context of the institutional linkage project, conduct verification of the established needs and assessment of other relevant needs, develop a plan of activities for implementation of the linkage project, and prepare a draft of MOU scope and contents.
 Duration 3 April 2006 to 5 September 2006
 Course Coordinator Dr. Jonathan Shaw
 Sponsors National Center for Educational Development / Education Secondary Advisory Team
 Total Contracted Amount Baht 387,504

SCCC Training Center Project

Project Description The project covers strategic guidelines for the management of the training center, standard competency-based curriculum design, management/technical training curricula for all functions and plan for training facilities and recommendation for running

the facilities. The project aims to establish an integrated learning center and to conduct training programs for staff to perform their jobs at a level that fulfills the company's staff development needs.

Duration 1 March 2006 to 31 October 2006
 Course Coordinator Mr. Vorawate Chonlasin
 Sponsors Siam City Cement Public Co., Ltd., Thailand
 Total Contracted Amount Baht 1,037,900

Water Environment Monitoring and Management Using Remote Sensing and GIS Technology

Project Description The program provides exposure to the participants on actual application of remote sensing and GIS technology in water environmental monitoring.
 Duration 5 June 2006 to 30 August 2006
 Course Coordinator Ms. Sirinthip Pongsuvainai
 Sponsors CIDA EMIN, CEGIS
 Total Contracted Amount Baht 552,300

3rd SCSV Program on Environment and Natural Resources Planning and Management

Project Description The seminar cum study visit aims to provide exposure to senior participants on organization structure, policy/planning and strategies for natural resources and environment planning and management in the national, regional and local levels.
 Duration 24 April 2006 to 5 August 2006
 Course Coordinator Mr. Vorawate Chonlasin
 Sponsors Ministry of Environment, Sri Lanka
 Total Contracted Amount Baht 600,400

Training of Trainers on Urban Environment Infrastructure and Services

Project Description The course aims to enhance knowledge skills of participants and to enable them to conduct effective training programs to target audiences for improvement of urban environmental infrastructure and services in their respective countries.
 Duration 15 May 2006 to 26 June 2006
 Course Coordinator Mr. Voravate Chonlasin
 Sponsors SEA-UEMA Project, CIDA
 Total Contracted Amount Baht 660,000

Seminar and Study Visit for Public Administration Capacity Building (Batch 1)

Project Description The program aims to provide the participants with exposure to the best practices in public administration capacity building of universities and training institutions with national and international reputation.
 Duration 22 April to 30 July 2006

Course Coordinator Mr. Fazle Karim
 Sponsors Bangladesh Public Administration Training Centre, Government of Bangladesh
 Total Contracted Amount Baht 1,026,000

Professional Development Course on Management of Training Center

Duration 24 April 2006 to 12 August 2006
 Course Coordinator Mr. Reynaldo Calabdan
 Sponsors Ms. Kanlaya Muangsan BPATC, CIDB, Metta Development Foundation, Multiple Cropping Center
 Total Contracted Amount Baht 595,000

5th Fredskorpset Preparatory Course in Asia

Duration 24 April 2006 to 12 August 2006
 Course Coordinator Mr. Reynaldo Calabdan
 Sponsors Ms. Kanlaya Muangsan Fredskorpset, Norway
 Total Contracted Amount Baht 2,040,100

International Management Training Course

Duration 14 May 2006 to 7 September 2006
 Course Coordinator Mr. Reynaldo Calabdan
 Sponsors Ms. Kanlaya Muangsan Secondary Education Sector Improvement Project, Bangladesh
 Total Contracted Amount Baht 2,064,440

IT Applications in Management

Project Description The course aims to enable participants to apply the ICT tools and techniques needed in the planning, scheduling, controlling and implementing management and administrative functions.
 Duration 5 June 2006 to 16 Sept 2006
 Course Coordinator Ms. Thaniya Jirasathitpornpong
 Sponsors Mr. Fazle Karim IRQUE Project, Ministry of Education, Sri Lanka
 Total Contracted Amount Baht 326,844

Network Security

Project Description This course is designed to give the foundation security knowledge to protect networks from attacks, especially from hackers and reduce the chance of security breaches.
 Duration 22 May 2006 to 9 September 2006
 Course Coordinator Ms. Thaniya Jirasathitpornpong, Mr. Fazle Karim
 Sponsors Multi-donor
 Total Contracted Amount Baht 446,400

Selected Advanced Tools for Oracle9i Database Development and Administration

Project Description The training program aims to enhance the knowledge/skills of the participants on mainstream and other selected techniques to design, develop, administer and maintain an information system that supports multi-user access to a client/server database

through a computer network within a unit or an organization. The knowledge/skills enhancement will be on Oracle9i server and client tools.	Project Description The program aims to enhance the skills and capabilities of the participants to monitor and evaluate educational development projects.	the relevant knowledge and develop skills necessary for small-scale livestock development. This includes managing micro-credit facilities for smallholder farmers engaged in poultry, goat, cow and dairy cattle.
Duration 29 May 2006 to 30 September 2006	Duration 29 May 2006 to 30 September 2006	Duration 12 July 2006 to 20 October 2006
Course Coordinator Ms. Maria Socorro Fontanilla, Mr. Fazle Karim	Course Coordinator Ms. Khin Ma Ma Gyi	Course Coordinator Mr. Wichit Silpamaneephan
Sponsors The Bank of Mongolia	Sponsors SEDP, Ministry of Education, Mongolia	Sponsors Palli Karma-Sahayak Foundation
Total Contracted Amount Baht 1,648,350	Total Contracted Amount Baht 997,500	Total Contracted Amount Baht 669,864
Project Management	Project Monitoring and Evaluation	Workshop on Advocacy & Inter-regional Cooperation for ICT / ICM in ARD
Duration 24 April 2006 to 19 August 2006	Project Description The main objectives of the program is improving the project planning, implementation, monitoring and evaluation skills of the project managers, development workers, policy makers and monitoring and evaluation officers.	Project Description One of the recommendations of the GFAR-organized Inter-RAIS workshop in Cairo was to hold a third workshop of RAIS managers and other stakeholders to identify and finalize a common work plan under the framework of the ICM4ARD. Based on the recommendations, the workshop will have 2 components – inter-regional expertise sharing and joint development of tools/ applications for NAIS-RAIS networking. The workshop will identify the role and contributions of regional fora in the global agricultural information system.
Course Coordinator Mr. Pradeep Kumar Dash, Ms. Khin Ma Ma Gyi	Duration 29 May 2006 to 30 September 2006	Duration 3 July 2006 to 1 November 2006
Sponsors Multi-donors	Course Coordinator Mr. Pradeep Kumar Dash, Ms. Purvi Chudasama	Course Coordinator Ms. Niramol Ponvilai
Total Contracted Amount Baht 1,173,744	Sponsors Multi-donors	Sponsors Asia-Pacific Association of Agricultural Research Institutions / Global Forum on Agricultural Research
Project Management (Bhutanese Group)	Total Contracted Amount Baht 1,201,464	Total Contracted Amount Baht 171,750
Project Description The program aims to improve the participants' project planning, managing, implementing and controlling skills.	Local Governance and Decentralization	Public Health Policy, Planning and Financial Administration
Duration 24 April 2006 to 5 August 2006	Project Description The program as a whole aims to enhance the participants' knowledge on principles and practices of local government, administration and decentralized systems in Vietnam and Malaysia.	Project Description The program aims to update knowledge of senior public health officers on public health policies, strategies and management of public health services. It gives exposure to the participants on the hospital management, procurement management and financial
Course Coordinator Ms. Khin Ma Ma Gyi	Duration 12 June 2006 to 23 September 2006	
Sponsors Bhutan National Bank	Course Coordinator Mr. Anil Rajbhandari	
Total Contracted Amount Baht 687,040	Sponsors Asian Development Bank	
Organizational Financial Planning and Cost Control	Total Contracted Amount Baht 814,000	
Project Description The training aims to equip the participants with the practical skills in financial planning, for participants to gain and understand the nature of leadership and team building, as well as plan a financial system for maximizing the organizational performance	Rural Poverty Alleviation	
Duration 1 May 2006 to 31 July 2006	Duration 3 July 2006 to 13 September 2006	
Course Coordinator Ms. Purvi Chudasama	Course Coordinator Ms. Sirinthip Pongsuvinai	
Sponsors Multi-donors	Sponsors Danida / Local Government Engineering Department, Bangladesh	
Total Contracted Amount Baht 1,560,660	Total Contracted Amount Baht 875,520	
Supervisory Skills Development Training for WFP Staff (Batch 2)	Small-Scale Livestock Development and Management	
Project Description The course aims to improve the performance of WFP staff so that they will be able to contribute more effectively in their work. It also aims to upgrade core self management skills as well as people management skills in supervisors, and provide an opportunity to share performance problems among staff and to arrive at solutions.	Project Description The seminar and study visit has been designed to enable the participants to acquire	
Duration 15 May 2006 to 14 December 2006		
Course Coordinator Mr. Anil Rajbhandari		
Sponsors World Food Program		
Total Contracted Amount Baht 990,280		
Marketing Strategies for Asia Today		
Project Description The program aims to enhance knowledge and skills of the participants on the Marketing Strategies in the Asian context. Through forcing local companies to sharpen participants' competitive skills, globalization opens up new vistas for big profits that were unimaginable to firms in protected markets.		
Duration 20 May 2006 to 27 August 2006		
Course Coordinator Mr. Anil Rajbhandari		
Sponsors Commercial Bank of Ceylon, Sri Lanka		
Total Contracted Amount Baht 481,000		
Project Monitoring & Evaluation (Mongolian Group)		

control of public health programs.
 Duration 23 July 2006 to 30 Nov 2006
 Course Coordinator Ms. Worawan Sumroetrum
 Sponsors Training Technology Transfer, Bangladesh
 Total Contracted Amount Baht 569,800

Rural Road Maintenance Management

Project Description The course is designed based on the requirements of GTZ Bangladesh and is aimed at upgrading the knowledge and skills of staff from the Local Government Engineering Department, with regards to road maintenance planning, managing maintenance works and monitoring the repair and improvement of road works.
 Duration 7 Aug 2006 to 30 Nov 2006
 Course Coordinator Ms. Worawan Sumroetrum
 Sponsors GTZ Bangladesh
 Total Contracted Amount Baht 945,300

Seminar and Study Visit for Management Information Systems and IT

Duration 6 Aug 2006 to 30 Nov 2006
 Course Coordinator Ms. Thaniya Jirasathitpornpong, Mr. Fazle Karim
 Sponsors Training Technology Transfer, Bangladesh
 Total Contracted Amount Baht 251,600

Implementing and Troubleshooting PC Networks

Project Description The course is designed to provide participants with skills and capability to set-up, operation and troubleshoot PC networking.
 Duration 17 July 2006 to 30 October 2006
 Course Coordinator Ms. Thaniya Jirasathitpornpong, Mr. Fazle Karim
 Sponsors Multi-donors
 Total Contracted Amount Baht 370,000

Good Governance

Project Description The course is prepared in response to a request from the Office of the Prime Minister and Council of Ministers in Nepal. The course aims to enhance knowledge of the participants in key governance areas, which helps them to plan and implement reform program effectively.
 Duration 3 July 2006 to 16 October 2006
 Course Coordinator Mr. Anil Gopal Rajbhandari
 Sponsors Office of the Prime Minister, Nepal
 Total Contracted Amount Baht 540,800

Knowledge Management and Organizational Learning

Project Description The main objective of this training is to provide orientation on the concepts of strategic information and knowledge management as

well as developing and strengthening participants' skills to analyze information and knowledge management needs in their organization. It also aims to develop and operationalize appropriate KM strategies which foster organizational learning.
 Duration 3 July 2006 to 30 October 2006
 Course Coordinator Mr. Pradeep Kumar Dash
 Sponsors Multi-donors
 Total Contracted Amount Baht 880,600

Small and Medium Scale Enterprise Development

Duration 16 July 2006 to 16 October 2006
 Course Coordinator Ms. Sorat Phutthaphittak
 Sponsors Training Technology Transfer, Bangladesh
 Total Contracted Amount Baht 556,700

Educational Leadership and Management

Project Description The course has been prepared in response to a request from the UNESCO and Ministry of Education of Nepal. The course aims to enhance knowledge of the participants in Educational Leadership and Management areas, which helps them to plan and implement better education system in Nepal.
 Duration 11 Sept 2006 to 11 Dec 2006
 Course Coordinator Mr. Anil Gopal Rajbhandari
 Sponsors UNESCO
 Total Contracted Amount Baht 447,700

Linux Essentials and Server Administration

Project Description The course is designed to provide the participants with knowledge/skills to run Linux as a network operating system. The program stresses intensive hand-on sessions using graphical and command-line interface to: manage and control access to Linux resources; manage jobs and process; use shell features and scripts to automate tasks; administer/tune a Linux server system.
 Duration 17 July 2006 to 20 Nov 2006
 Course Coordinator Ms. Ma. Socorro Fontanilla, Mr. Fazle Karim
 Sponsors Multi-donors
 Total Contracted Amount Baht 740,000

Oracle Database Development and Administration

Project Description The course aims to enhance the knowledge and skills of the participants in designing, developing, administering and maintaining an information system using Oracle. The course will enable the participants to learn a few advanced topics on advanced applications of Oracle9i.
 Duration 21 Aug 2006 to 8 Dec 2006
 Course Coordinator Ms. Ma. Socorro Fontanilla, Mr. Fazle Karim
 Sponsors Multi-donors

Total Contracted Amount Baht 333,000

Seminar cum Study Visit on Mangrove Management in Thailand

Project Description Seminar and Study Visit program to learn Mangrove Management Practices used in Thailand with an emphasis on Nypa Palm (NYPA FRUTICANS) resources.
 Duration 1 September 2006 to 9 September 2006
 Course Coordinator Dr. Sahdev Singh, Niramol Ponvilai
 Sponsors UN Industrial Development Organization
 Total Contracted Amount Baht 370,000.00

ICT Application in Project Management

Project Description This training course aims to facilitate the participants with ICT tools and techniques in managing projects and to enhance the project management skills. The participants will be exposed to the various concepts and applications for managing projects by using information technology.
 Duration 4 Sept 2006 to 22 Sept 2006
 Course Coordinator Fazle Karim, Thaniya Jirasathitpornpong
 Sponsors Multi donors
 Total Contracted Amount Baht 489,880.00

Gender and Development

Project Description The program exposure to the participants on actual application and practice of gender and development.
 Duration 11 Sept 2006 to 22 Sept 2006
 Course Coordinator Sirintip Pongsuvina
 Sponsors LGED/DANIDA
 Total Contracted Amount Baht 399,600

6th Fredskorpset Preparatory Course in Asia

Duration 22 Sept 2006 to 11 Oct 2006
 Course Coordinator Mr. Reynaldo A. Calabdan, Ms. Kanlaya Muangsan
 Sponsors Fredskorpset, Norway
 Total Contracted Amount Baht 1,923,575

Installation and Administration of Windows 2000/2003 Server

Project Description The course is designed to enable participants to administer and manage windows server, networking and system applications
 Duration 18 Sept 2006 to 31 Dec 2006
 Course Coordinator Ms. Maria Socorro Fontanilla, Mr. Fazle Karim
 Sponsors World Bank
 Total Contracted Amount Baht 148,000

Leadership in Public Services

Duration 9 Oct 2006 to 11 Dec 2006
 Course Coordinator Mr. Anil Rajbhandari, Ms. Purvi Chudasama
 Sponsors Ministry of Health, Maldives
 Total Contracted Amount Baht 334,480

Training Program on "Effective Management Skills and Techniques"

Duration 2 Oct 2006 to 11 Dec 2006
Course Coordinator Dr. Pradeep K. Dash
Sponsors Multi-Donors
Total Contracted Amount Baht 866,466

Community Based Disaster Management

Project Description After completing this 5-day training course, the WFP officers will be able to: —

develop management strategies and systems within their work areas for disaster preparedness, prevention/mitigation, response, recovery and reconstruction

utilize risk management principles in the context of their own geographical, socio-economic and cultural situation - identify key implementation issues, including community preparation

Duration 16 Oct 2006 to 11 Dec 2006
Course Coordinator Mr. Voravate Chonlasin

Sponsors WFP Sri Lanka

Total Contracted Amount Baht 704,850

Management and Implementation of Development Projects

Duration 23 Oct 2006 to 10 Feb 2007
Course Coordinator Mr. Anil Rajbhandari
Sponsors Multi-sponsors
Total Contracted Amount Baht 1,565,100

Urban Poverty Alleviation

Project Description The objective of this course is to enhance participants' perspective on strategies and techniques of urban development, particularly in poverty alleviation, income generation and quality of life for urban poor.

Duration 23 Oct 2006 to 31 Jan 2007
Course Coordinator Worawan Sumroetrum
Sponsors GTZ-Nepal
Total Contracted Amount Baht 532,800

Convention on Bio Diversity Workshop

Project Description The UNEP Workshop on Capacity Building for Implementation of the Convention on Biological Diversity will have the following main objectives:

1. to provide technical and scientific information on priority topics within the Programme of Work (PoW) of CBD with particular focus on 2010 Target, Access and Benefit Sharing.
2. B. To strengthen LDC's capacities to ensure meaningful participation at negotiation of Multilateral Environment Agreements.
3. To focus on opportunities with regards to South-South Cooperation and Project development within Payment for Ecosystem Services.

4. To inform LDCs on funding opportunities for biodiversity conservation.
5. To generate better understanding of linkages and synergies among the 5 Biodiversity Related Conventions and how to deal with them efficiently in integrated manner.

Duration 9 Oct 2006 to 12 Dec 2006
Course Coordinator Mr. Voravate Chonlasin

Sponsors UNEP

Total Contracted Amount Baht 1,912,904

Management of Modern Biotechnology

Project Description The objective of this training course is to provide introduction to the current status and future directions of modern biotechnology and relevant technology decision managers and policy makers manage modern biotechnology in a safe manner for maximizing the public goods.

Duration 9 Oct 2006 to 30 Dec 2006
Course Coordinator Worawan Sumroetrum
Sponsors Multi-sponsors

Total Contracted Amount Baht 392,200

Toxic & Hazardous Waste Management

Project Description The aim of this program is to provide participants up to date knowledge on issues concerning hazardous waste management in industrial areas such as engineering aspect, waste collection and treatment technology, policy and regulatory aspect, private sector participation, etc. The participants will also interact and exchange experiences with government officials and industrial estates' staff actual practices in management of industrial waste.

Duration 23 Oct 2006 to 22 Dec 2006
Course Coordinator Mr. Voravate Chonlasin

Sponsors BEPZA Bangladesh

Total Contracted Amount Baht 462,500

Training Course on Intellectual Property Management

Duration 25 Sept 2006 to 28 Dec 2006
Course Coordinator Mr. Reynaldo A. Calabdan

Sponsors Multi-sponsors

Total Contracted Amount Baht 520,405

IT Applications in Management

Duration 6 Nov 2006 to 28 Feb 2007
Course Coordinator Thaniya Jirasathitponpong

Sponsors World Bank/IDA/GoB

Total Contracted Amount Baht 388,800

Education Policy Formulation & Education Quality Assurance

Duration 12 Nov 2006 to 30 March 2007
Course Coordinator Mr. Reynaldo A. Calabdan Ms. Kanlaya Muangsan

Sponsors Multi-sponsors

Total Contracted Amount Baht 486,587

Effective Training Implementation and Management

Project Description The objective of this course is to enhance participants' perspective on strategies and techniques of urban development, particularly in poverty alleviation, income generation and quality of life upgrading for urban poor.

Duration 20 Nov 2006 to 8 March 2007
Course Coordinator Mr. Reynaldo A. Calabdan Ms. Kanlaya Muangsan

Sponsors Multi-sponsors

Total Contracted Amount Baht 2,499,313

Training Program on "Human Resource Management"

Duration 6 Nov 2006 to 17 Jan 2007
Course Coordinator Dr. Pradeep K. Dash
Sponsors Multi-donors
Total Contracted Amount Baht 963,332

Leading Change and Organizational Renewal

Project Description The program offers participants hands-on experience and an integrated set of concepts and tools for leading innovation, change and organizational renewal.

Duration 6 Nov 2006 to 31 Jan 2007
Course Coordinator Khin Ma Ma Gyi
Sponsors Ministry of Health, Maldives
Total Contracted Amount Baht 343,878

Management of Organizational Change

Project Description The program enhance participants' skills to initiate change, manage transition, stabilize change, handle consequent conflicts to achieve a better organization environment fit.

Duration 27 Novr 2006 to 28 Feb 2007
Course Coordinator Wichit Silpamaneephan Khin Ma Ma Gyi

Sponsors BEPZA, Bangladesh

Total Contracted Amount Baht 370, 872

Modern Public Sector Management

Duration 20 Nov 2006 to 5 Feb 2007
Course Coordinator Sorat Phutthaphithak Anil Gopal Rajabhandari Thaniya Jirasathitponpong
Sponsors Sri Lanka Institute of Development Administration
Total Contracted Amount Baht 1,018,082

FTN Training on Agbiodiversity, Agbiotechnology and Food Security for Civil Society Groups in Asia

Duration 27-Nov-06 to 29-Nov-06
Course Coordinator Niramol Ponvilao
Sponsors Gene Campaign
Total Contracted Amount Baht 262,836

Chapter 27: INTERNET EDUCATION AND RESEARCH LABORATORY (IntERLab)

27.1 Introduction

Continual expansion of the Internet is creating greater demand for well-trained human resources to support the infrastructures and applications of the Internet. New computer science and engineering solutions are needed to simply handle the exponential growth in the traffic and bandwidth usage which is putting severe strain on the Internet today. There is urgent need for a new breed of engineers and technologists to respond to the growing demand from this rapid expansion with endless range of new applications.

As the Internet continues to penetrate every corner of society and of the economy, there are other non-technical issues to be addressed along with the advancement of technological progress. There is a definite need for better understanding of the Internet's social, business, economic as well as legal implications in order to promote the standards of behaviour and practices for the community that are appropriate to continued growth and beneficial use of the Internet.

Since December 2003, AIT has set up the Internet Education and Research Laboratory (intERLab), as a multidisciplinary unit, to focus on training people for designing, building and maintaining, and operating Internet and on-line educational services, or for simply using the Internet as a major tool in their everyday life and work. To keep up with the rapid development in the field, intERLab will be organized as a laboratory concentrating on research in three main directions: technical/engineering, e-learning and social/policy/business/legal aspects.

The concept of establishing a fixed location for the internet human resources development has been discussed and endorsed by leading Asia-Pacific Internet

organizations at their AP* Retreat meeting at AIT in year 2000. Several leading research institutions in Asia-Pacific, Europe and the US have indicated their interests in forming up a network of support for intERLab research, training and education.

The core component of the laboratory will be on research activities. This will be achieved by maintaining excellent research facilities and staff, hosting visiting researchers and taking advantage of linkages with research laboratories worldwide. The lab was built upon pre-existing Internetworking Research Laboratory of the School of Advanced Technologies and the Distributed Education Center.

27.2 Mission

To be a center for human resources development for top Internet specialists for the region.

27.3 Unit Governance

Prof. Kanchana Kanchanasut
intERLab Director

27.4 Resources

- VClass royal free e-learning platform
- Custom courseware development; E-learning consultancy; instructional design consultancy; Custom course design
- VClass Trainings for AIT Faculty and Staff
- VClass Hosting Service and Technical Services
- Trainings for Network Infrastructure Engineers (7-8 courses per year)
- Video Conferencing services
- Secretariats for AP* Retreat and APNG organizations

27.5 Research Staff

Prof. Kanchana Kanchanasut

Professor of Computer Science, School of Engineering and Technology
Director of intERLab

Internetworking; distributed computing and Internet for education.

M.Sc and Ph. D. Computer Science, University of Melbourne, Australia.

Graduate Diploma, Computer Science, University of Queensland, Australia.

B. Sc. Mathematics, University of Queensland, Australia. Heterogeneous Networks; Emergency Networks; Mobile Ad Hoc Networks; Streaming Media and Distributed Computing

Dr. Apinun Tunpan

Researcher
Information Retrieval; Multimedia Database; Computer Networking
Ph.D. (Computer Science), University of Maryland College Park, USA;
MS (Computer Science), University of Maryland College Park, USA;

B.Eng. (Computer Engineering) , Chulalongkorn University, Thailand.
Mobile Ad Hoc Network and Multimedia Applications

Mr. Mohammad Abdul Awal

Research Associate
Network Performance Measurement and Analysis; Streaming Media; Emergency Networks
Masters of Science in Computer Science, Asian Institute of Technology, Thailand

Bachelor of Science in Computer Science, American International University, Bangladesh
Mobile and Wireless Mesh Networks; VoIP and SIP; Peer-to-Peer Networks and Digital Divides Elimination

Mr. Andrey Kuprianov

Research Associate
SIP and VoIP; Synchronous e-learning; Web Programming
Master of Science in Computer Science, Asian Institute of Technology, Thailand
Bachelor of Science in Computer Science, Assumption University, Thailand
Voice-over-IP (VoIP) Technologies; 3GPP IMS; Synchronous and Mobile e-learning and Multimedia Applications

Mr. Dwijendra Kumar Das

Research Associate
Wireless Networks; Graphics and animation programming and Image Processing
M.E - Comp Sc. and Engg, Asian Institute of Technology, Thailand
B.E in Computer Science and Engineering, Dibrugarh University, Assam, India
Wireless Networks; Mobile Ad-hoc Networks and Feature extraction and recognition

Visiting Faculty:**Prof. Noel Crespi,**

GET/INT, France
Visiting Professor
SIP; 3G Services; IP Multimedia Subsystem
And Context Awareness
Ing. Dipl (ENST), MSc, PhD.
B3G Core network and Service Architectures

Dr. Yasuo Tsuchimoto

Keio University, Japan
Visiting Assistant Professor
Computer Networks and Internet Education
PhD in Media and Governance, Keio University, Japan
Master of Media and Governance, Keio University, Japan
Bachelor of Arts in Environmental Information from Keio University, Japan
Computer Networks; Internet Education;

Multimedia communication and Overlay network

Adjunct Researchers:**Dr. Panita Pongpaiboon**

Researcher
National Electronics and Computer Technology Center (NECTEC)
Next Generation Internet; IPv6; Traffic classification and Intelligent transport systems
Ph.D. in Electrical and Computer Engineering, Carnegie Mellon University
Master of Science in Electrical Engineering, Stanford University
Bachelor of Science (with University Distinction) in Electrical Engineering, Stanford University
Optical network management; IP-over-optical networking; Survivable and fault-tolerant networks; Network measurement; Traffic classification; IPv6; Mobile IP and Intelligent transport system

Dr. Surat Lertlum

Research Scientist
Chulachomklao Royal Military Academy
Doctor of Technical Science in *Computer Science*, Asian Institute of Technology (AIT), Thailand,
Master of Science in *Computer Science*, The George Washington University, Washington D.C., U.S.A.,
Bachelor of Science in *Computer Science Engineering*, Norwich University, Northfield, Vermont, U.S.A.,
Low-resolution (NOAA AVHRR) forest classification includes thermal band; High-resolution (Landsat TM) forest classification includes thermal band; Multi-resolution forest classification includes thermal band; Object-Oriented data model for multi-resolution / multi-temporal remote sensing and GIS data sets

Affiliates:**Dr. Poompat Saengudomlert**

Assistant Professor
School of Engineering and Technology
Ph.D. in Electrical Engineering and Computer Science, MIT, USA
M.S. in Electrical Engineering and Computer Science, MIT, USA
B.S.E. in Electrical Engineering, Princeton University, USA
Areas of Communication Theory; Optical networks; Resource Allocation Problems and Array Processing

Dr. Teerapat Sanguankotchakorn

Associate Professor
School of Engineering and Technology
D.Eng in Information Processing, Tokyo Institute of Technology, Japan.
M.Eng in Information Processing, Tokyo Institute of Technology, Japan.
Certificate in Japanese Language, Osaka University of Foreign Study, Japan.
B.Eng. in Electrical Engineering, Chulalongkorn University, Thailand.
Digital Signal Processing; Routing Algorithm in the network such as IP and MPLS network; High Speed network and IP-based multimedia applications

27.6 Publications 1999-2006**Refereed Journals**

- T. Tansupasiri, K. Kanchanasut, C. Barakat, and P. Jacquet. Using Active Networks Technology for Dynamic QoS. Accepted for publication in the International Journal of Computer and Telecommunications Networking Computer Networks and ISDN Systems, 50 (11), August 2006.
- H. Asaeda, W. Pokavanich and S. Yamamoto. "Channel Reflector: An Interdomain Channel Directory System", IEICE Transactions on Communication, Vol.E89-B, No. 10, pp. 2860-2867, October 2006.
- H. Inoue, K. Kanchanasut, T. Baba and S. Yamaguchi. "WWW Cache Control Mechanism in the A13 Satellite Network", in Journal of the Institute of Systems, Control and Information Engineers, 13 (2000) 449-457, ISCIE Society, Japan, 2000

Conferences Proceedings

- C. L. G. Laplap, A. V. Kuprianov, R. J. Padilla, K. Kanchanasut, "Design of a Mobile Learning Application: A Pedagogical Approach", in proceedings of International Conference e-learning 2006, Learning Theories VS Technologies, 14-16 December 2006, Bangkok, Thailand.
- N. Kamnoonwatana, A. Kuprianov, P. Saengudomlert, T. Sanguankotchakorn and K. Kanchanasut "DVTS Video Frame Rate Adjustment Based on Motion Detection", 2nd International Conference of Automated Production of Cross Media Content for Multi-channel Distribution, IEEE Computer Society, pp.229-235, Leeds, UK, December, 2006.
- W. Leelapatra, C. Lursinsap and K. Kanchanasut, Transformation and Orthogonal Rotation of BDD Encoded Image in the Proceedings of the International Multi-Conference of Engineers and Computer Scientists 2006, pp.525-530, Hong Kong, May 2006.
- H. Asaeda, M. Rahman, H. Manshaei, and Y. Fukuzawa, "Implementation of Group Member Authentication Protocol in Mobile Ad-hoc Networks", IEEE Wireless Communications & Networking Conference (WCNC), April 2006, Las Vegas, USA.
- H. Asaeda, M. Rahman and Y. Toyama, "Structuring Proactive Secret Sharing in Mobile Ad-hoc Networks", IEEE ISWPC. <<http://www.iswpc.org/2006/>>
- M. A. Awal, K. Kanchanasut and Y. Tsuchimoto, "Multicast Packet Loss Measurement and Analysis over Unidirectional Satellite Network", Asian Internet Engineering Conference (AINTEC) 2005, LNCS 3837, pp 254-268, Springer-Verlag, Bangkok, December 2005.
- A.K.M. Mahtab Hossain, Kanchana Kanchanasut, "A Handover Management Scheme for Mobile IPv6 Networks", 14th International Conference on Computer Communication and Networks (ICCCN) 2005, pp 43-48, IEEE Communication Society, San Diego, California USA, October 17-19, 2005.
- T. Tansupasiri, and K. Kanchanasut. Dynamic Quality of Service on IP Networks", in Selected Papers of the International Conference on Information Networking (ICOIN 2003), Lecture Notes in Computer Science 2662, pp. 573-582, Springer-Verlag, Cheju Island, February 2003. <<http://www.springerlink.com/index/1U4YE4Y2MTX3MJ9>>
- P. Basu, and K. Kanchanasut. "A Reliable Multicast Protocol for Unidirectional Satellite Link", in Proc. SAINT 2003, IEEE Computer Society, Orlando, January 2003
- P. Basu, and K. Kanchanasut. "A Multicast Push Caching System over a UDRL Satellite Link", in SAINT 2003 Satellite Internet Workshop, IEEE Computer Society, Orlando, January 2003
- K. Tientanopajai, and K. Kanchanasut. "Multi-constraint QoS Routing using A Path-Vector Protocol", in Proc. 7th Asian Computing Science Conference (Asian'02), LNCS 2550, pp. 181-194, Springer-Verlag, Hanoi, December 2002.
- M. Ekpanyapong, K. Kanchanasut and C. Lursinsap, A Design of FPGA based Video Compression using Ordered Binary Decision Diagram, in Proceedings of the IEEE International Symposium on Communications and Information Technology (ISCIT), Chiangmai, November 2001.
- H. Tanta-ngai and K. Kanchanasut, Using Binary Decision Diagrams for Optical Character Recognition, Proceedings Image and Visual Computing 2000, pp 292-297, Hamilton, New Zealand, November 2000.
- K. Tientanopajai and K. Kanchanasut, Design of Security Services for Active Networks, in Proceedings of the First International Workshop on Mobile Agents for Telecommunication Applications (MATA'99), pp 95-108, World Scientific, Ottawa, Canada, October 1999.
- K. Kanchanasut, S. Yamaguchi, K. Kiatsirivatana, H. Inoue, A. Suksakorn and P. Tantatsanawong. "The AI3 CacheBone Project", in Proc. IEEE Communication Society Internet Workshop '99, pp. 259-264, IEEE Press, February 1999.
- P. Tantatsanawong, H. N. Phien, and K. Kanchanasut. "Web Server Performance", in Proc. IEEE Communications Society Internet Workshop 1999, IEEE Press, Osaka, February 1999
- J-F Vibert, J-F Bertholon, D. Hasboun, K. Kanchanasut "Le projet Angkor: diffusion de contenu pedagogique tempsivia internet", Conference on Health, Phom Penh, Cambodia, October 2006.
- A.K.M. Mahtab Hossain and K. Kanchanasut, "Cross-over Mobility Anchor Point based Hierarchical Mobility Management Protocol for Mobile IPv6 Network", NAC2005, NSTDA Annual Conference, Bangkok, March 27-30, 2005.
- M. A. Awal, Y. Tsuchimoto and K. Kanchanasut, "An Approach of Peer-Based Packet Recovery using EDBit for Unidirectional Satellite Environment", Workshop on Asia-Pacific Networking Technology and Next Generation Mobile Communication, Bangkok, 26 January 2005.
- K. Kanchanasut, P. Basu and T. Tansupasiri. "IP Broadcasting over Unidirectional Satellite Link", in Asian02 Workshop, Hanoi, December 2002
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- Dwijendra Kumar Das, "Connectivity in Extremely Mobile Networks", interERLab Technical Report, 2006-04, 2006.
- Long Jiaoyan, "P2P Resource Discovery for an Interactive Architecture in Mobile Ad Hoc Networks", interERLab Technical Report, 2006-03, 2006.
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- Dipankaj Gobindra Medhi,, "Virtual Backbone-based Reliable Multicast in Mbole Ad Hoc Network", interERLab Technical Report, 2006-01, 2006.
- Tippiyarat Tansupasiri, "Active Networks Technology and Dynamic QoS", interERLab Technical Report, 2005-08, 2005.
- Andrey V. Kuprianov, "E-Learning and Session Initiation Protocol (SIP)", interERLab Technical Report, 2005-07, 2005.
- Ahmed Waliullah Kazi, "Gateway Selection Based On Gateway Load In Ad Hoc Infrastructured Environment", interERLab Technical Report, 2005-06, 2005.
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- Md. Musfiq Rahman, "A Practical Approach Towards Server-Less Group Member Authentication Protocol For A Mobile Ad Hoc Network", interERLab Technical Report, 2005-03, 2005.
- Sverre Rakkenes, "An Implementation of Wireless Internet Sharing Plug-in for OLSR", interERLab Technical Report, 2005-02, 2005.
- Mohammad Abdul Awal, "IP Packet Loss and Recovery over Unidirectional Satellite Network", interERLab Technical Report, 2005-01, 2005.
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- Wacharapol Pokavanich, "Packet Delivery Scheduling for Reliable Multicasting over Unidirectional Link", interERLab Technical Report, 2000-02, 2000.
- Nuttamon Kanusattayanon, "Reliable Content Delivery over Unidirectional Link using IP Datagrams", interERLab Technical Report, 2000-01, 2000.
- Kongdet Srisamran, "Flow Control for Reliable Multicast over Unidirectional Links", interERLab Technical Report, 1999-01, 1999.
- Hitoshi Asaeda and Wacharapol Pokavanich, "Implementation Specification of Channel

27.7 Research Projects Initiated in 2006

New Generation Internet for Medical Science Remote Classroom

Project Description: The project aims to conduct real-life experiments on remote teaching using next generation Internet technology. The subject domain chosen is medical science. The outcome will be a prototype e-learning system for remote teaching in a heterogeneous network environment.

Duration 1 Jan 2006 to 31 Dec 2007

Course Coordinator:

Prof. Kanchana Kanchanasut

Sponsors: French Ministry of Foreign Affairs, ICT-Asia Program

Total Contracted Amount: Baht 506,000

Vclass SIP-based Mobile Classroom

Project Description The project aims to develop a Vclass SIP-based mobile classroom component for remote teaching: a mobile and wireless network environment and to conduct real-life experiment on remote teaching for cultural studies via mobile and wireless internet.

Duration 1 Feb 2006 to 31 Jan 2008

Course Coordinator Prof. Kanchana Kanchanasut

Sponsors IDRC, Pan Asia ICT R&D Grants Program

Total Contracted Amount Baht 1,200,000

Multimedia Architecture and Application Based on SIP

Project Description Session Initiation Protocol (SIP) is becoming the dominant protocol for real-time multimedia services. SIP provides the mechanisms to enable a wide range of services for instance internet telephony, video, Presence, instant messaging, Push-to-Talk, collaborating applications as well as e-learning applications. The project objective is to set-up a research network between partners having developed in-depth expertise on the key issues that need to be addressed for the deployment of next generation real-time multimedia services based on SIP.

Duration 1 March 2006 to 31 Dec 2007

Course Coordinator: Prof. Kanchana Kanchanasut

Sponsors: French Ministry of Foreign Affairs, ICT-Asia Program

Total Contracted Amount: Baht 460,000

27.8 Training/ Conferences Initiated in 2006

Advanced Network Security Training

Duration 1 January 2006 to 31 May 2006

Course Coordinator:

Prof. Kanchana Kanchanasut

Sponsors: Training participants

Total Contracted Amount: Baht 350,000

VoIP and SIP Training

Duration 1 May 2006 to 30 June 2006

Course Coordinator: Prof. Kanchana Kanchanasut

Sponsors: Training Participants

Total Contracted Amount: Baht 250,000

TEIN2 Workshops in 2006 for HRD

Duration 1 April 2006 to 31 March 2007

Course Coordinator:

Prof. Kanchana Kanchanasut

Sponsors: TEIN2

Total Contracted Amount: Baht 2,056,000

Basic Routing Training

Duration 1 June 2006 to 31 August 2006

Course Coordinator Prof. Kanchana Kanchanasut

Sponsors Participants

Total Contracted Amount Baht 540,000

Basic DNS Training

Duration 1 Aug 2006 to 30 Nov 2006

Course Coordinator: Prof. Kanchana Kanchanasut

Sponsors: Participants

Total Contracted Amount: Baht 315,660

Advanced Routing Training

Project Description The 3-day training course on Advanced Routing will enable participants to perform advanced configuring and policy-based functions for the internet routing, and to be able to perform trouble shooting.

Duration 1 Aug 2006 to 30 Nov 2006

Course Coordinator: Prof. Kanchana Kanchanasut Ms. Wit Hmone Tin Latt

Sponsors: Participants

Total Contracted Amount: Baht 325,000

Asian Internet Engineering Conference 2006

Project Description To organize the Asian Internet Engineering Conference (AINTEC) 2006 <www.interlab.ait.ac.th/aintec06>

AINTEC is to bring together researchers and engineers interested in the practical and theoretical problems in internet technologies. It aims at addressing issues pertinent to the Asian region with vast diversities of socio-economic and networking conditions while inviting high quality and recent research results from the global international research community to be presented.

Duration September 2006 to May 2007

Course Coordinator: Prof. Kanchana Kanchanasut

Dr. Apinun Tunpan
Mr. Mohammad Abdul Awal
Ms. Wit Hmone Tin Latt

Sponsors: Researchers/engineers interested in internet technologies

Total Contracted Amount: Baht 800,000

APNG Secretariat

Project Description To host APNG Secretariat providing overall organization services for APNG and APNG Camp meetings

Duration Dec 2006 to Nov 2007

Course Coordinator: Prof. Kanchana Kanchanasut

Sponsors: APNG

Total Contracted Amount: Baht 600,000

DNSSEC Workshop

Project Description

Duration Oct-06 to Mar-07

Course Coordinator: Prof. Kanchana Kanchanasut

Sponsors: ccTLDs Operators

Total Contracted Amount: Baht 350,000.00

Chapter 28: OVERVIEW OF RESEARCH ACTIVITIES

28.1 Grant and Sponsored Research

Academic Units	Completed	Ongoing / In Progress	TOTAL
S E T	54	59	113
CS-IM	3	5	8
CEIM	4	4	8
DME-IEM	2	2	4
GGE	9	5	14
Mech-Mic	5	11	16
RSGIS	14	7	21
SE	4	9	13
TC	1	0	1
TE	3	2	5
WEM	9	14	23
ICT	0	0	0
S E R D	51	98	149
ASE	3	10	13
AARM	4	8	12
E	18	10	28
EEM	10	32	42
FEBT	4	7	11
GDS	9	10	19
NRM	3	6	9
PPT	0	1	1
RRDP	0	8	8
UEM	0	6	6
S O M	2	2	4
AIT EXTENSION	66	0	66
INTERLAB	5	7	12
TOTAL	178	166	344

28.2 Publications

Academic Units	Refereed Journals	Refereed Books/ Chapters	Conference Proceedings	Other Publications	TOTAL
SET	99	20	205	17	341
CS-IM	5	2	7	0	14
CEIM	10	0	11	0	21
DME-JEM	12	1	21	0	34
GGE	16	3	30	3	52
Mech-Mic	13	2	19	4	38
RSGIS	12	1	26	2	41
SE	10	9	28	0	47
TC	6	0	24	0	30
TE	2	0	13	3	18
WEM	13	2	26	5	46
ICT	0	0	0	0	0
SERD	153	28	131	40	351
ASE	26	2	7	0	35
AARM	21	6	0	3	30
E	35	3	32	0	70
EEM	22	4	27	8	61
FEFT	9	1	10	0	20
GDS	12	3	16	10	41
NRM	11	0	8	7	26
PPT	3	0	11	0	14
RRDP	8	0	2	3	13
UEM	8	9	18	9	44
SOM	28	2	10	4	44
INTERLAB	3	0	20	24	47
TOTAL	285	50	366	85	786

28.3 Students' Research

Academic Units	Doctoral	Masters	TOTAL
SET	27	252	279
CS-IM	3	49	52
CEIM	3	17	20
DVE-IEM	2	20	22
GGE	1	19	20
Mech-Mic	2	32	34
RSGIS	5	30	35
SE	3	18	21
TC	3	22	25
TE	3	12	15
WEM	2	15	17
ICT	0	18	18
SERD	19	233	252
ASE	5	21	26
AARM	3	13	16
E	1	30	31
EEM	6	51	57
FEBT	0	17	17
GDS	0	23	23
NRM	1	26	27