

JGSEE

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JGSEE NEWSLETTER

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From the Director



Assoc. Prof. Dr. Bundit Fungtammasan

This issue of JGSEE Newsletter comes to our readers as the first phase of the government funded program to establish centers of excellence in graduate education and research in seven priority areas of science and technology - the Higher Education Development Project (HEDP, or commonly known as the ADB Project) - draws to a close. While the proposal for "Phase II" is still pending government approval, interim measures have been drawn up for this transitional period. For JGSEE this means, on the one hand the submission to the Commission on Higher Education (CHE) of a request for normal, annualized budget to support its operations, and on the other hand the request for permission to utilize for an extended period the unused project fund from the Energy Policy and Planning Office (EPPO), which has been approved. Longer term "fall back" measures are also being planned. The management of JGSEE would like to assure all its staff and stakeholders that JGSEE is not an ad-hoc affair, but one that is meant to outlive its members.

In this issue of JGSEE Newsletter, we congratulate Assoc. Prof. Dr. Sumroeng Jug-jai, and Prof. Dr. Somchai Wongwises, JGSEE's affiliated staff at the Department of Mechanical Engineering, KMUTT, on their promotion to full professor and professor level 11, respectively.

We are all delighted at the news that Assist. Prof. Dr. Srisuda Dhamwichukorn of the Environment Division, in collaboration with the AquaSiam Team of graduate students in business and management from Mahidol University, won the New Venture Championship (NVC) award at Portland, Oregon, USA. The team outshone such tough competitors as Stanford, Yale, Harvard, and Columbia universities, in a business plan developed on the basis of Dr. Srisuda's research results on the use of bacteria in wastewater treatment.

We welcome Assoc. Prof. Dr. Sirintornthep Towprayoon, the Chair of Environment Division, as new Deputy Director, succeeding Assoc. Prof. Dr. Prungchan Wongwises. We also welcome Dr. Peter du Pont, an energy efficiency and policy specialist of international repute, and Dr. Kasemnsan Manomaipibul, a postdoctoral fellow on air quality modeling from Georgia Institute of Technology, USA, to join our Energy and Environment divisions respectively.

JGSEE won a major grant from TRF (funding provided by EPPO) to conduct energy policy research for the promotion of renewable energy and energy efficiency in Thailand. More than twenty research groups both within and outside the JGSEE consortium are working tirelessly on the project, which is expected to deliver significant results soon.

The first announcement and call for paper for the second SEE Conference or the 4th RCETCE is out. Once again, Kyoto University will be our major partner. I hope our readers will contribute many papers to this event, which has been schedule for 21-23 November, 2006, at the Shangri-la Hotel in Bangkok.

Bundit Fungtammasan

Dr Sirintornthep Appointed New Deputy Director

Assoc. Prof. Dr. Sirintornthep Towprayoon, who has been in charge of JGSEE's Environment Division for the past several years, has recently been appointed the new Deputy Director of JGSEE. She succeeds Assoc. Prof. Dr. Prungchan Wongwises who has reached her mandatory retirement age for executive responsibilities. Dr. Sirintornthep looks forward to working closely with all core and affiliated staff, as well as supporting staff to strengthen a range of JGSEE's operations, particularly academic services and research. She will also be the Acting Chairperson of the Environment Division.



Assoc. Prof. Dr. Sirintornthep Towprayoon

Meanwhile, Dr. Prungchan will continue to serve JGSEE actively in teaching and research.

Welcome New Staff



Dr. Peter du Pont

Dr. Peter du Pont

JGSEE is pleased to welcome Dr. Peter du Pont as a new member of the Energy Division. He has worked in the field of energy conservation and energy policy since 1984. He holds a Bachelor's degree in Environmental Biology from Yale (1983), a Master's degree in Public Health (Environmental Toxicology) from the University of California at Berkeley (1985) and a Ph.D. degree in Public Policy (Energy and Environmental Policy) from the University of Delaware. He is part of the Energy Policy Research Group at JGSEE and is involved in JGSEE's Thailand Energy Policy Research Project.

His various research interests include success factors in design and implementation of sustainable energy policy; information acquisition and decision-making in energy policy design; analysis of energy-efficiency options and their effectiveness for residential and commercial sectors; energy-efficiency indicators as a policy tool; and integration of demand-side management (DSM) and energy-efficiency potential into power system planning.

Dr. du Pont is a half-time lecturer and researcher at JGSEE. He also serves as the Secretariat for the APEC Expert Group on Energy Efficiency & Conservation.

Dr. Kasemsan Manomaiphiboon

The Environment Division is pleased to welcome Dr. Kasemsan Manomaiphiboon as a new academic staff. His research work in the past several years has directly been involved with air quality science and engineering, and particularly air quality modeling.



Dr. Kasemsan Manomaiphiboon

He received a Bachelor's degree in Environmental (Sanitary) Engineering from Chulalongkorn University in 1993. He then worked for a couple of years as an engineer for consulting companies. Under scholarship of the Japanese and Thai Governments through the ASEAN organization for graduate studies, he received a Master's degree in Environmental Engineering (Air Quality) from the University of Cincinnati in 1999 and a Doctoral degree in Environmental Engineering (Air Quality) from Georgia Institute of Technology in 2004. He also received during his doctoral studies another Master's degree in Industrial Engineering. Following the completion of his PhD studies, he then worked as a postdoctoral fellow at the same school for one and a half years.

Dr. Kasemsan is a full-time lecturer and researcher at JGSEE. His current research work is geared toward comprehensive air quality modeling, including meteorology, emissions, and chemistry-transport for both local and regional scales. He has also interests in the interrelation between climate/climate change and regional air quality and the promotion of public participation and education in regional environmental management. His primary goals at JGSEE are to develop a sound and suitable regional air quality modeling system for Thailand and neighboring countries.

Congratulation

Promotions

JGSEE would like to congratulate **Dr. Sumrueng Jugjai**, one of the JGSEE affiliated staff at The Department of Mechanical Engineering KMUTT, for his promotion to full professor. His work on porous-media augmented combustion is well-recognized both locally and internationally.



Prof. Dr. Sumrueng Jugjai



Prof. Dr. Somchai Wongwises

We would also like to praise **Prof. Somchai Wongwises**, an academic staff of JGSEE at KMUTT, who has been promoted as Professor Level 11 in Engineering (Government Position Classification 11). Prof. Somchai has published extensively in international journals on topics related to two-phase flow.

National Awards

JGSEE also congratulates **Dr. Navadol Laosiripojana**, JGSEE's academic staff in the Energy Division, for winning the 2005 Outstanding Young Researcher Award announced by the Thailand Research Fund (TRF). His major contribution is in the field of methane reforming for hydrogen production.

Global Awards



Asst. Prof.
Dr. Srisuda Dhamwichukorn

Asst. Prof. Dr. Srisuda Dhamwichukorn of JGSEE's Environment Division, together with a team of graduate students from the College of Management, Mahidol University, won a global award on business plans based on technology innovation.

The team called "AquaSiam" was formed to investigate the possibility of commercializing the proprietary technology developed by Dr. Srisuda- The technology that employs bacteria in wastewater treatment and of marketing its by-product, through participation in three business plan competitions, which include New Venture Championship (NVC), Global Social Venture Competition (GSVC), and Moot Corp.

The AquaSiam Team is the winner of 15th Annual New Venture Championship, held in April 13-15, 2006 at Portland, Oregon, USA. The finalists and semifinalists include the teams from world-leading universities such as University of Michigan, University Washington, Hong Kong University of Science and Technology, Columbia University, Harvard University, Stanford University (Second Prize of this competition), and Yale University. In addition, the AquaSiam Team is the winner of Asian Moot Corp competition held in Bangkok and will be in the global Moot Corp competition during May 3-6, 2006 at Austin, Texas, USA.

Outstanding Papers

During the past year, JGSEE has published more than 30 articles in international journals. Among them, four articles have been included in the list of **ScienceDirect top 25 hottest articles**. The article, "Effects of operating parameters on the combustion of medical waste in a controlled air incinerator" by Mrs. Woranuch Jangsawand, Assoc. Prof. Dr. Bundit Fungtammasan, and Assoc. Prof. Dr. Somrat Kerdsuwan, appearing in "Energy Conversion and Management" (Vol.46 (20), 2005) has been voted the 13th most quoted article. The following articles, authored by Dr. Navadol Laosiripojana, "Catalytic Dry Reforming of Methane over High Surface Area Ceria" in "Applied Catalysis B: Environmental" (Vol.60, 2005), "Methane stream reforming over Ni/Ce-ZrO₂ catalyst: Influences of Ni/Ce-ZrO₂ support on reactivity, resistance toward carbon formation, and intrinsic reaction kinetics" in "Applied Catalysis A: General" (Vol.290, 2005), and "Synthesis gas production from dry reforming of methane over CeO₂ doped Ni/Al₂O₃: Influence of the doping ceria on the resistance toward carbon formation" in "Chemical Engineering Journal" (Vol.112, 2005), have been voted the 1st, 14th, and 6th rank of each journal respectively.

Research Grants

Energy Policy

JGSEE, with the collaboration of affiliated staff from its consortium partners, has undertaken a **"Policy Research for the Promotion of R&D in Renewable Energy and Energy Efficiency in Thailand"**. This one-year, 60-million baht project is led by Assoc. Prof. Dr. Bundit Fungtammasan and supported by Asst. Prof. Dr. Chumnong Sorapipatana,

Assoc. Prof. Dr. Apichit Therdyothin, Assoc. Prof. Dr. Suwit Tia, and Assoc. Prof. Dr. Sirintornthep Towprayoon. The project is designed to provide information, analysis and policy recommendations that would support decision-making on the promotion of energy efficiency and the development and deployment of renewable energy technologies. Special emphasis will be given on practical measures and R&D plans that would contribute toward meeting the targets set by the government on the use of renewable energy and the improvements on energy efficiency.

Gasification of MSW

Dr. Suneerat Pipatmanomai is the project leader of an MTEC-funded 3-year project on the study of **"Factors influencing municipal solid waste gasification using a fluidised-bed reactor with the feed capacity up to 100 kg/h"**. The project, worth 1.5 million baht, is aimed at developing an effective gasification system, which is not only to solve the problem of excessive waste in Thailand and to increase the potential of MSW utilisation as part of the governmental scheme to promote renewable energy, but also to reduce environmental pollution (i.e. SO_x, NO_x and Dioxin).

APN's CAPaBLE Programme

JGSEE Environment Division, led by Assoc. Prof. Dr. Sirintornthep Towprayoon, was funded by APN under CAPaBLE project for 2006-2007. The topic is **"Greenhouse Gas (GHG) and Aerosol Emissions under Different Vegetation Land Use in the Mekong River Basin Sub-region"**.

Wastewater Treatment

Asst. Prof. Dr. Srisuda Dhamwichukorn, has received a grant from Mae Moa, EGAT for **the study of Mae Moa wastewater treatment using microorganisms**. Total funding is 3.5 million baht for 2 years.

LCA

Along with colleagues from Kasetsart University, Asst. Prof. Dr. Shabbir H. Gheewala of JGSEE is conducting a project on **Life Cycle Assessment (LCA) of building materials with Cementsai Building Products Co., Ltd. of the Siam Cement Group**. It is a 1-year project with an outlay of 1 million baht. The objectives of the project are application of LCA to building materials (floor tiles) for environmental improvement leading to higher eco-efficiency, improved benchmarking and more sustainable environmental management.

Asst. Prof. Dr. Shabbir H. Gheewala has also received a project grant of 500,000 baht from the National Institute for Advanced Industrial Science and Technology (AIST), Japan, for conducting an **investigation on the Life Cycle Inventory of biodiesel production from palm oil**. The project duration is 6 months and is focused on the greenhouse gas emissions for the whole life cycle of biodiesel production.

Hydrogen Production

Dr. Navadol Laosiripojana has received a research grant from PTT Public Company to **develop the prototype of a reforming unit fueled by PTT natural gas for later utilization in 1 kW fuel cells** and to study the possible use of fuel cells as a cogeneration system for various applications (i.e. building, and industrial) in Thailand. The duration of this project is 2 years with a grant of 2 million baht.

Optical Diagnostic Techniques: The Most Advanced Combustion Research Facilities in the Region

The Fuels, Combustion and Emission Control Research Group at JGSEE, comprising researchers from JGSEE and its partners particularly the Departments of Mechanical Engineering at King Mongkut's University of Technology Thonburi (KMUTT) and King Mongkut's Institute of Technology North Bangkok (KMITNB), is moving forward with state-of-the-art optical diagnostic techniques. The facilities for such techniques have been acquired by the partners own financial resources as follows: Planar Laser Induced Fluorescence spectroscopy (PLIFs) by KMUTT, Laser Doppler Anemometry (LDA) by KMITNB, and Particle Image Velocimetry (PIV) and Laser Diffraction Technique for drop size distribution measurement by JGSEE. These are believed to be the most advanced facilities of this kind in the ASEAN region. The development is driven by the strong desire of the research team members to acquire in-depth information on the combustion phenomena occurring in flames, so as to complement the conventional post-combustion flue gas analyses. Several projects undertaken by the group show useful results using these techniques. These projects include "Improvement of performance of LPG stove burner: application of PIV" (see figures1-4) and "Spray Characterization of Palm Oil Based Biodiesel" using Laser Diffraction Technique. There is also active international collaboration between JGSEE and **Complexe de Recherche Interprofessionnel en Aerothermochimie (CORIA)** et INSA Rouen in France, to further develop optical diagnostic techniques such as Laser Induced Incandescence for detecting soot particles from combustion of palm oil based biodiesel.



Figure 1:
True color photographs of impinging flame



Figure 2:
Instantaneous images of impinging flame
at $H = 3$ cm, without particles seeding

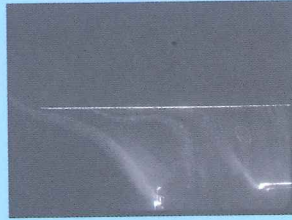


Figure 3:
Instantaneous images of light scattering of
impinging flame

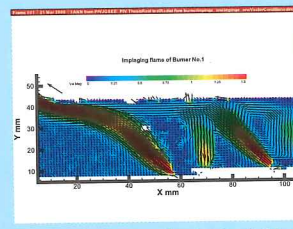


Figure 4: Averaged velocity field of
impinging flame

Conferences

International Conference on "Sustainable Energy and Environment: Technology and Policy innovations" or "SEE 2006"



JGSEE is pleased to announce the holding of the second international conference on "Sustainable Energy and Environment : Technology and Policy Innovations" (SEE2006), jointly organized by the Joint Graduate School of Energy and Environment :

Technology and Policy Innovations" (SEE2006), jointly organized by the Joint Graduate School of Energy and Environment and Kyoto University. This conference will be held in **Bangkok during 21-23 November 2006**. This event follows the successful first JGSEE and Kyoto University joint international conference on "Sustainable Energy and Environment" (SEE)

held at Hua Hin in December 2004. The conference program is designed to encourage and stimulate fresh perspectives on the challenges, opportunities and solutions to energy and environmental sustainability. The topics covered will thereby include:

- **Advanced Energy Technology:** Energy storage; hydrogen and fuel cells; nuclear; space solar power
- **Renewable Energy Technology:** Solar energy; photovoltaics; wind energy; hydro and geothermal energy
- **Biomass and Biofuels:** Biomass for heat and power; biofuels for transportation
- **Air Pollution and Climate Change:** Air pollutants emission and its models; climate models; greenhouse gases emission and controls; carbon management
- **Energy and Environmental Management:** Waste management; waste treatment; cogeneration; energy efficiency technology; energy management including clean use of conventional fuels
- **Energy and Environmental Policy:** Policy for promotion of energy efficiency in sectors such as building, industry, and transport; power generation; Demand Site Management (DSM) and renewable energy promotion; Clean Development Mechanism (CDM)

Over 300 participants, from academia, industry, government agencies and NGOs are expected to contribute to this international forum, to interact and report on research and development results, and to identify opportunities for cooperation in the fields of sustainable energy and environmental technology, and policy.

Intending participants and contributors are invited to visit www.jgsee.kmutt.ac.th

Energy Accounting and Modeling Seminar (LEAP)

JGSEE is expanding its energy research network by developing expertise in energy accounting and modelling. During 27-30 March, more than 30 energy professionals and researchers attended an intensive four-day training course entitled **"Energy Scenarios Using the LEAP Accounting Tool"** LEAP is the Long-range Energy Alternatives Planning system, an Excel-based energy accounting system that is in use by hundreds of energy planners and analysts worldwide.



The seminar was organized by JGSEE and was led by Dr. Charlie Heaps of the Stockholm Environment Institute - Boston. JGSEE was privileged to have Dr. Heaps leading the training course, as he is the developer of LEAP, has extensive international experience, and has done LEAP analysis and training in scores of countries internationally.

The seminar provided an overview of the LEAP energy accounting system; covered international examples; and promoted discussion of how LEAP can be applied in Thailand. A major objective of the course was to develop skills in energy scenario analysis to support the work on Energy Policy Research being carried out by JGSEE to provide input to the Thai government on potentials and policy measures for energy efficiency and sustainable energy. The course also had an international dimension, as several Asian energy researchers and planners with LEAP experience also attended.

PTT Training Workshop on Natural Gas Based Cogeneration

JGSEE organized a two-day training workshop on "Natural-gas Based Combined Heat and Power (CHP)" at PTT Public Company. The objective of the workshop is to enable sales staff (technical and non technical) of PTT to evaluate for existing and potential industrial and commercial natural gas users the possibility to use natural gas for cogeneration purposes. The evaluation was based on a minimum set of data and the technological and economic evaluation done with a simple spread sheet tool. The training was conducted by Prof. Dr. Dusan Gvozdenac of the University of Novi-Sad, Serbia, Prof. Dr.-Ing Christoph Menke, a member of JGSEE and Dr. Athikom Bangviwat, with Dr. Suneerat Pipatmanomai as coordinator.

International Seminar: "Sustainable Energy Development in Thailand: Options and Tools"

JGSEE, sponsored by the National Research Council of Thailand (NRCT), held a one-day international seminar on the topic of "Sustainable Energy Development in Thailand: Options and Tools" at Siam City Hotel on 11 November 2005. The main objective of this seminar was to highlight the need for scenario planning for a sustainable energy future and to provide a perspective on the likely scenarios for energy and power supply mix in Thailand. The need for modern energy planning tools and their development was also discussed. Keynote lecturers included international experts such as Mr. Uwe Fritsche of Germany's Institute of Applied Ecology (Oeko Institute) and local experts such as Prof. Prida Wibulsawad.

Postage here

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