

# JGSEE

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## JGSEE NEWSLETTER

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## Message from the Director



JGSEE ended year 2005 on a high note with the holding of the Joint International Conference on Sustainable Energy and Environment (SEE) in Hua Hin during 1-3 December 2004. More than 300 participants from 14 countries converged to the charming seaside resort to attend presentations of about 200 papers in oral and poster sessions, including the keynote address by the former Minister of Energy, Dr. Prommin Lertsuridej. Many of the papers were highly commended by the participants. On behalf of the Conference Organizing Committee Chair, I would like to once again thank all those who contributed to the success of this Conference, particularly the Management of Kyoto University's 21 COE Program on Sustainable Energy Systems, JGSEE's consortium partners and Rajamangala University of Technology, as well as JGSEE's staff members.

Having spent a nine month sabbatical with JGSEE's Environment Division, Prof. Larry Anderson has returned home to resume teaching and research at the University of Colorado at Denver. Prof. Anderson contributed, in no small measure, to strengthening teaching and research on air quality management at JGSEE and the Thai air quality research community as a whole. His simple life style and pleasant character was also well appreciated by all the colleagues. I wish him all the best and look forward to his return to JGSEE in the near future.

As you may be aware, the funding support for JGSEE by the Higher Education Development Program (HEDP), or commonly known as the "ADB Loan Program", and by the Energy Conservation Promotion Fund provided by the Ministry of Energy, ends in March 2006. A proposal requesting a 5-year second-phase (FY 2006-2010) funding support for all the seven centers of excellence under HEDP, including JGSEE, has been submitted to the Ministry of Education. The proposal won endorsement by the Board of the Commission on Higher Education, and is now awaiting approval by the cabinet. With the support for phase II, JGSEE will be able to significantly strengthen and consolidate its position on teaching, research, and services, in partnership with its consortium partners. Let's hope for the best.

Lastly, my three-year term as Director of JGSEE ended in January 2005. Subsequently, I was reappointed by the Council of KMUTT, at the recommendation of JGSEE's Board of Trustees. It is indeed a privilege for me to be given this unique opportunity serve JGSEE and the consortium for another three years. I look forward to working closely with all parties concerned and to receiving continued support and cooperation by the management and staff of JGSEE and the consortium partners to further advance our mission.

Bundit Fungtammasan



### **APEC Future Fuels Technologies**

The School recently completed a technical report on "Fuels and Fuel Technologies in Thailand: Current Status and Recommendations for the Future", as commissioned by the National Metals and Materials Technology Center (MTEC). The report, authored with JGSEE Director, Assoc. Prof. Dr. Bundit Fungtammasan, as Chief Editor and with a number of core staff and affiliated staff as co-editors, is intended to be a reference for Thai energy experts who were participants of "APEC-wide Foresight Project: Foresighting Future Fuel Technology", organized jointly by the National Research Council Canada, MTEC, and the APEC Center for Technology Foresight at NSTDA. The report, which covers conventional hydrocarbons (oil & gas, and coal), biofuels (biomass for heat and power, bioethanol and biodiesel), and hydrogen, is available for sale at the NSTDA bookshop.

### **JGSEE Offers New Programs**

The Joint Graduate School of Energy and Environment is offering two new education programs at the masters level: in Energy Technology and Management, and Environmental Technology and Management. The degrees under these programs are Master of Engineering and Master of Science. The objectives of the new programs are to educate advanced level engineers and scientists equipped with a mix of fundamental knowledge in energy and environment covering both technology and management aspects, analytical skills and communication skills in English, and a professional orientation. A sound appreciation of the potential impact on the environment due to energy production and use is emphasized. The programs are also designed to contribute to the body of knowledge and solutions of challenging energy related environmental problems in industry and in government.

The graduates of the energy program are expected to have a challenging and rewarding career path when they serve as professionals in governmental agencies and private sectors in the following domains: energy policy design and analysis, and planning; energy management in industrial plants and, commercial buildings; power plant design, engineering and operation; energy production and trading; energy system and process engineering in energy intensive industries; and renewable energy resource development. The graduates of the environment program are expected to excel in environmental policy, analysis, planning, management,

and consulting dealing with energy and natural resources; risk and impact assessment; waste minimization and utilization; pollution control; climate change and other environmental issues; planning and policy design for pollution abatement in municipalities; and engineering, planning and operation of environmental controls for power plants and other process plants.

### **Credit Transfer for JGSEE Students to Partner Institutions**



**MOU signing for credit transfer**

JGSEE recently initiated a mechanism whereby JGSEE students who undertake their thesis study at a partner university within the consortium could have their previously earned credits transferred to a particular program of that university. The said program must be one that is energy or environment related, research based, and endorsed by the Professorial Board, to ensure compatibility. An MOU to this effect was signed between the President of KMUTT and the Presidents of all the four consortium partners on 3 October, 2005, at the Siam City Hotel. To date, several programs with such characteristics from Chiang Mai University, Prince of Songkla University, King Mongkut's Institute of Technology North Bangkok and Sirindhorn International Institute of Technology - TU have been endorsed, and some students have already been transferred. Under such an arrangement, the students involved continue to receive funding support from JGSEE and enjoy the added advantage of being a fully registered student of the partner institution.



### **Staff and Student Exchange with France**

JGSEE, in partnership with CORIA (Interprofessional Research Complexes in Aerothermochemistry) at Université et INSA de Rouen, France, succeeded recently in obtaining support from the French government under the Duo-France program. This enables 3 members of academic staff and 3 students from each side to exchange visits for short-term research of up to 4 months each for the next 2 years.

In this framework, Ms. Corine Lacour and Ms. Camille Hespel have been nominated by Université et INSA de Rouen as exchange students to JGSEE. Ms. Corine Lacour has been assigned to work under the guidance of Assoc. Prof. Dr. Sumrueng Jugjai, a member of our affiliated staff at the Department of Mechanical Engineering, King Mongkut's University of Technology Thonburi, while Ms. Camille Hespel is being supervised by Asst. Prof. Dr. Pumyos Vallikul, our affiliated staff at the Department of Mechanical Engineering, King Mongkut's Institute of Technology North Bangkok. In the mean time, Ms. Usa Makmool, an MPhil student under the supervision of Assoc. Prof. Dr. Sumrueng Jugjai and Mr. Pisit Yongyingsakthavorn, a PhD student under the supervision of Assoc. Prof. Dr. Bundit Fungtamassan, have been chosen by the School to conduct part of their research at CORIA.

### **MOU with University of Maryland**

Recognizing the benefits from collaboration in education and research activities, the Joint Graduate School of Energy and Environment signed a Memorandum of Understanding on Scientific Cooperation (MOU) with the Department of Mechanical Engineering, University of Maryland (UMD) USA, on the 7th December 2004. Under this MOU, collaborative research, invitation to conduct lectures, seminars, and workshops, exchanges of students and scientific materials will be pursued within the fields that are mutually acceptable. The MOU was signed by Dr. Bundit Fungtamassan, on behalf of JGSEE, and Prof. Ashwani Gupta, an internationally acclaimed expert on combustion science and technology particularly on the innovative high-temperature air combustion technology or HiTAC, on behalf of UMD.

## **Workshops, Conferences and Seminars Organized by JGSEE**

### **Seminar on Advances in Renewable Energy in Germany**



The Joint Graduate School of Energy and Environment, the Association of Former Thai Students in Germany under Royal Patronage (VTD) and the School of Energy and Materials (SEM), King Mongkut's University of Technology Thonburi organized a seminar on the topic of "Advances in Renewable Energy Technologies in Germany" on 4th February 2005 at Thai-German Cultural Foundation, Bangkok. The topics presented at the seminar included 'Renewable Energy Policy in Germany', 'Renewable Energy Situation in Thailand', 'Development of Wind Energy and Photovoltaic in Germany and its Integration into the National Grid', 'Solar Energy Systems in Germany', and 'Biomass as energy source in decentralized energy systems'.



### **International Conference on Sustainable Energy and Environment (SEE)**

The Joint Graduate School of Energy and Environment (JGSEE) organized in collaboration with Kyoto University a Joint International Conference on Sustainable Energy and Environment (SEE) during December 1-3, 2004 in Hua Hin, at the Hilton Hotel.

A total of 197 papers covering 10 energy and environment related topics were presented in oral and poster sessions. The topics covered include:

- \* Solar energy, wind energy, hydro and geothermal energy
- \* Hydrogen and fuel cells
- \* Bio-energy, energy from waste and waste management
- \* Energy conservation and management including clean use of conventional fuels
- \* Cleaner production and emission reduction technology
- \* Air pollution emission and its models
- \* Climate change, greenhouse gases emission and climate models
- \* Impacts of air pollution and greenhouse gases on ecosystem and their mitigation options
- \* Energy and environmental policies
- \* Nuclear Fusion
- \* Special Topic (s)



The conference attracted over 300 participants representing 18 countries, making this international event a resounding success. Keynote lectures were given by outstanding experts from Japan and Thailand in the field of energy and environment including an opening keynote lecture by the former Minister of Energy, Dr Prommin Lertsuridej on "Thailand's Energy Strategies and Opportunities for Regional Cooperation", and Professor Kaya, who has chaired Japan's National Energy Planning Commission for the last 15 years.

A selection of 15 invited papers, elaborating some of the most advanced, cutting-edge technologies, innovative policies and case studies, were also presented.

The Conference ended on a high note with a poster award ceremony to honor the best poster as well as two runner-ups, as voted by participants of the event.

Assoc. Prof. Dr. Bundit Fungtammasan presented a special prize and certificate for best poster to Sorapong Pavasupree, Supachai Ngamsinlapasathian, Sommai, Pivsa-Art, Yoshikazu Suzuki and Susumu Yoshikawa from Kyoto University for their work on "Synthesis, Characterization and Application of Single and Mixed Oxides Nanomaterials".





A post-conference excursion to the following sites was also held:

1. Biogas production from pig manure for electricity generation in Ratchaburi province.
2. Natural methods of domestic waste and wastewater treatment using simple and economical technologies in Petchaburi province.

The overall organization of this event, the technical quality of the papers presented, and the venue of this conference were praised by all participants.

A pre-conference seminar on Clean Coal Technologies was also organized as part of this international event, gathering experts from both Thai and Japanese institutions. The seminar was organized with the collaboration of Japan-based International Energy Research Exchange (IERE), Central Research Institute for Electric Power Industry (CRIEPI), IHI, and SIIT and EGAT.

#### **Workshop on Air Quality Data Analysis and Interpretation**

A training workshop was organized during 7-11 March 2005 at the Pollution Control Department (PCD) on Air Quality Data Analysis and Interpretation. The participants were mainly from government and academia. The training was provided by Prof Larry Anderson, a visiting professor at JGSEE from the University of Colorado, Denver. The topics taught included: introduction to the atmosphere and air pollution, evaluation of emission inventory, air pollution modeling, chemistry of ozone formation, etc. Many illustrative examples related to air pollution in Thailand were given as part of this workshop with particular focus on the situation in Bangkok and Chiang Mai. These two study places had been extensively investigated by Prof. Larry Anderson, thanks to data collected and provided by PCD.

This workshop was very successful as it allowed, in addition to providing useful basic knowledge in the area of atmospheric science and more particularly air pollution in urban areas, the opportunity to highlight the complexities of the mechanisms involved and the importance attached to this field of study due to its many adverse impacts on the environment.

#### **Workshops on Air Quality Modeling**

A workshop on air quality modeling entitled 'The Models-3/CMAQ (Community-based Model of Air Quality)' was held on 15-17 May 2005 at the Department of Science, KMUTT by the Joint Graduate School of Energy and Environment and the Pollution Control Department, with the collaboration of the Department of Mathematics. The main purpose of the workshop was to transfer knowledge and experiences of experts from the US EPA and the US academics in air quality modeling to Thai scientists. The course focused primarily on the situation of air pollution, the importance of air quality modeling, and how to prepare the model's input data as well as emission inventory. Over 50 participants, comprising academics, government officials, students, etc. attended the workshop.

Another workshop based on the use of CMAQ was also organized by the Joint Graduate School of Energy and Environment during 2-4 May 2005 at the Department of Mathematics, Faculty of Science, King Mongkut's University of Technology Thonburi. Prof. Meigen Zhang from the Institute of Atmospheric Physics, Chinese Academy of Sciences, was invited to conduct this training. The course focused mainly on the potential fields of application of this modeling tool, its working concept and how to prepare the database and display related graphic information.





## **U**pcoming Conferences and Workshops

### **International Renewable Energy Conference**

The Joint Graduate School of Energy and Environment in collaboration with CMP Media (Thailand) Co. Ltd is organizing a one-day special conference on "Power Generation from Renewable Energy: Practical Approaches", which will be held on 8 July 2005, as an integral part of "Thailand International Renewable Energy Conference and Exhibition 2005" at BITEC International Trade and Exhibition Centre during 7-10 July 2005. The conference opening will be presided over by the Minister of Energy and expected to have participants from industry, business, government, and research institutions, both from Thailand and neighboring countries. The conference consists of four major categories of renewable energy resources and technologies; Biomass and Biogas, Hydrogen and Fuel Cell, Photovoltaic and Solar thermal, and Hydro and Wind. The highlight of this conference is the presentation of various invited papers by internationally renowned experts on their respective fields. JGSEE, with contribution from Prof. Christoph Menke, has been instrumental in designing the technical program. For more information, please visit <[www.thai-exhibition.com/renewableenergy](http://www.thai-exhibition.com/renewableenergy)>.

### **Workshop on Application of Anaerobic Digestion**

This workshop is being co-organized by JGSEE and School of Bioresources and Technology, King Mongkut's University of Technology Thonburi (KMUTT) to disseminate information regarding the fundamentals, operation and management practices, as well as operational problem solving for anaerobic treatment systems. There will be three days of lectures and a site visit to SPM farm, Ratchaburi. Professor Birgitte K. Ahring, Head of Environmental Microbiology and Biotechnology Group, Biocentrum-DTU, Technical University of Denmark, is the invited speaker. She has extensive experience in the field of anaerobic treatment systems and will be supported by experts from JGSEE and KMUTT. The workshop will be held at JGSEE during June 29 - July 1, 2005. It targets factory and farm operators, environmental managers, academics and research scientists, as participants. The expected number of participants is around 20 - 30. For further information, please visit the JGSEE website at <[www.jgsee.kmutt.ac.th](http://www.jgsee.kmutt.ac.th)> or contact Assoc. Prof. Dr. Sirintornthep Towprayoon at [sirin@jgsee.kmutt.ac.th](mailto:sirin@jgsee.kmutt.ac.th) and Assoc. Prof. Dr. Pawinee Chaiprasert at [pawinee.cha@kmutt.ac.th](mailto:pawinee.cha@kmutt.ac.th).

## **V**isiting Professors

### **Prof. Larry Anderson**

The Joint Graduate School of Energy and Environment was privileged to welcome Professor Larry G. Anderson, professor of chemistry from the University of Colorado, Denver, USA, as a visiting professor on a sabbatical year from July 2004 to March 2005.

He provided the School with his wealth of experience and expertise in the field of atmospheric science and more particularly air pollution. A major part of his activities here in Thailand involved the study of air quality in Bangkok as well as Chiang Mai. Also, as part of the current interest shown by the Thai government in the use of alternative fuels for vehicles, Prof. Larry Anderson was invited to attend various conferences in Thailand dealing with this topic and presented results of his research work. Much of the focus was on the potential air quality concerns related to biodiesel and ethanol fuel use and the feasibility of fuel switch in Thailand.

Towards the end of his stay at JGSEE, a workshop was organized at the Pollution Control Department during which Prof. Anderson provided a one-week training on air quality data analysis and interpretation. This workshop was also an occasion for him to summarize the work and investigation he accomplished during his nine months stay in Bangkok.

Prof. Anderson brought to the Joint Graduate School an invaluable experience and played an important role in strengthening cooperation between the school and various stakeholders from academia and government, as well as enhancing recognition for its expertise in the field of atmospheric science and more particularly air quality.

### **Dr. Albert Chan**

Dr. Chan from the Institute for Chemical Process and Environmental Technology, National Research Council of Canada (NRC), came to Thailand in December 2004 to participate in the International Conference on Sustainable Energy and Environment jointly organized by JGSEE and Kyoto University. Following the conference, he was invited by the School to lecture on "the concept of sustainability assessment as a complementary step to a life cycle assessment approach". The lecture focused on the



methodology developed to assess and integrate the concept of sustainability to an LCA approach and was illustrated with some case studies.

#### **Dr. Christophe Dumouchel**

Dr. Christophe Dumouchel, a senior CNRS (French National Agency for Scientific Research) researcher, University of Rouen, INSA, France, was invited in September 2004 to present his research work at the Joint Graduate School of Energy and Environment. His research activities concern the use of Laser Diffraction Technique and the lecture given at JGSEE focused on the characterization of liquid fuel and liquid spray, a topic being investigated (on biodiesel) by JGSEE staff and students.

#### **Prof. Cen Kefa**

Prof. Cen Kefa from the College of Mechanical and Energy Engineering, Zhejiang University, China, was invited as a visiting professor to JGSEE during which he gave a presentation on the topic of 'Introduction of Recent Research in the Field of Energy and Environment' in December 2004. The presentation included circulating fluidized bed combustion (CFBC) technology, coal water slurry combustion technology, low NO<sub>x</sub> pulverized coal combustion technology, coal gasification and biomass gasification. Prof. Cen is a senior academician of Chinese Academy of Engineering and is internationally recognized for his work on clean coal technologies and waste incineration.

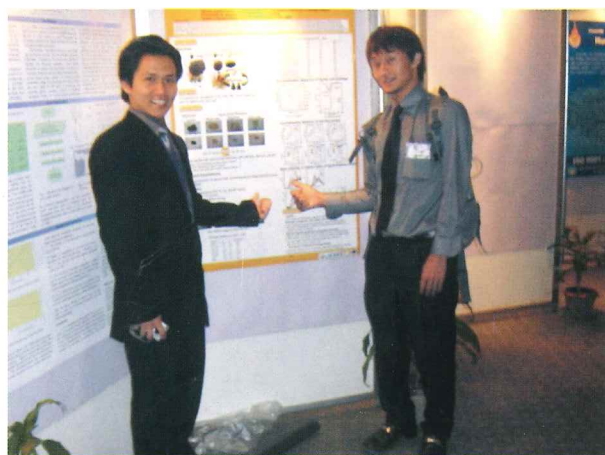
### **International Recognition for JGSEE Faculty**

Asst. Prof. Dr. Savitri Garivait of JGSEE has been invited by the Intergovernmental Panel on Climate Change's (IPCC) National Greenhouse Gas Inventories Task Force as an expert on aerosols to the National Greenhouse Gas Inventories Programme (NGGIP). The objective of the research group is to conduct a preliminary assessment of issues related to developing estimates for anthropogenic emissions of aerosols identified in the IPCC Third Assessment Report as having an impact on climate change, with primary focus on carbonaceous aerosols.

## **Student Achievements**

#### **Best Poster Award**

Mr. Taro Sonobe, a PhD student at JGSEE, was recently awarded the poster award for this work entitled "Co-Pyrolysis of Thai Lignite and Agricultural Residues" at the 3rd Eco-Energy and Materials Science and Engineering Symposium (EMSES) in Chiang Mai during 6-9 April 2005. Mr. Taro's research is supervised by Dr. Nakorn Worasuwannarak of the Energy Division of JGSEE.



Taro Sonobe (right) at the EMSES, Chiang Mai

#### **Top 25 Hottest Articles**

The article, "Experimental Investigation on the Performance of the Refrigeration Cycle Using a Two-phase Detector as an Expansion Device" by Somjin Disawas and Somchai Wongwises, appearing in the International Journal of Refrigeration (Vol. 27, No. 6, Sept. 2004) has been in the list of Top 25 most frequently cited articles of the International Journal of Refrigeration. Mr. Somjin Disawas was a JGSEE student doing his MPhil under the supervision of Prof. Somchai Wongwises, Department of Mechanical Engineering, KMUTT.

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*Postage here*

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The Joint Graduate School of Energy and Environment  
King Mongkut's University of Technology Thonburi  
91 Pracha Uthit Rd., Bangmod. Tkungkru.  
Bangkok 10140 THAILAND  
Tel : 02-470-8309-10, 02-8729014-15  
Fax : 02-427-9634, 02-872-6736  
Website: [www.jgsee.kumutt.ac.th](http://www.jgsee.kumutt.ac.th)

Advisors:  
Assoc. Prof. Dr. Bundit Funthammasan  
Assoc. Prof. Dr. Prungchan Wongwises  
Assoc. Prof. Dr. Sirintornthep Towprayoon  
Asst. Prof. Dr. Chumnong Sorapipatana  
Editors:  
Asst.Prof.Dr. Shabbir H. Gheewala  
Dr. Navadol Lasoiripojana