



APCCHE 2012

The 14th Asia Pacific Confederation of Chemical Engineering Congress

21 – 24 February 2012
Singapore



Programme

Organisers



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INDUSTRY COUNCIL



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Message from the President APCChE

Er. Edwin Khew

Dear Delegates

On behalf of the Institution of Engineers, Singapore (IES) and the co-organisers and supporters of the 14th APCChE Congress 2012 may I bid all delegates, local and foreign, a very warm welcome to our island state of Singapore. I wish all our foreign delegates an enjoyable stay in Singapore and all delegates a fruitful congress .



This year, IES and Singapore are pleased to be hosting the APCChE Congress at the Suntec City Convention Hall. This 14th APCChE Congress is co-organised by the Institution of Engineers, Singapore, the Singapore Chemical Industry Council, National University of Singapore and Nanyang Technological University and the Organising Committee has selected the theme "Sustainable Development through Innovation in Chemical Engineering". This theme is extremely appropriate for this Congress during these challenging times globally understanding that climate change is a major concern of all global citizens and Chemical Engineers can step up, innovate and provide the sustainable solutions required by the world today.

To support this theme the Chevron Chem-E-Car Competition 2012 is an event sponsored by Chevron and held in conjunction with the 14th APCChE Congress at the Singapore Polytechnic on 21st February. It is jointly organized by Singapore, Nanyang and Ngee Ann Polytechnics.

This event has attracted a significant number of international teams to compete here in Singapore. The hosting of this competition provides various platforms of learning and innovating, and in particular, for chemical engineering students to apply what they have learnt in classrooms to actually design, implement and operate the moving and stopping mechanisms of the Chem-E-Car and to look at alternative solutions to sustainable mobility compared to fossil fuel driven vehicles.

Prizes for the competition will be given out at the Opening Ceremony of the 14th APCChE Congress 2012 in Suntec City Level 3 Lecture Hall on 22nd Feb.

My congratulations to all winners of the Chem-E-Car competition.

Other programmes that span the 3 days of the Congress includes:

- scientific and sustainability in practice
- process safety and sustainability
- Singapore's sustainable development strategies and practices etc.

I do hope that all chemical engineers and others attending this Congress will take away useful sustainable practices being shared and discussed over the 3 packed days and that you will innovate and implement these useful lessons within your own countries and industries for the betterment of our environment and our future generations.

On behalf of the IES Council, the APCChE Board, and the 14th APCChE Congress 2012 Organising Committee I again wish all the delegates and participants an eventful and enjoyable Congress and look forward to meeting each one of you at the gala dinner.

With Best Wishes

Edwin Khew

President of 14th APCChE Congress 2012

Vice President of Institution of Engineers, Singapore

Message from the Co-Chair, 14th APCChE 2012

Mr. Walter K. Szopiak

Dear Delegates

Singapore is the host of the 14th Asia Pacific Confederation of Chemical Engineering Congress in 2012. This year's theme "Enabling Sustainable Development Through Creative & Innovative Chemical Engineering" will help enhance communication among Chemical Engineering researchers and practitioners from Asian countries.

The Singapore Chemical Industry Council is pleased to support this important event for the industry and will be working hand in hand with the Institution of Engineers, Singapore, the National University of Singapore and the Nanyang Technological University.



In addition to the scientific and technical programmes, this year's Congress will be unique due to the inclusion of a special industry track focused on two areas of critical importance to the Chemical industry - Sustainability and Process Safety Management. Prominent industry experts from around the world will be speaking on these topics and we are confident that this will be an excellent platform for participants to network and share knowledge with other leaders, managers and practitioners in the industry.

We hope that the APCChE Congress 2012 will provide new opportunities for learning and beneficial networking experience for all attendees.

With Best Wishes

Walter K. Szopiak

Co-Chair, 14th APCChE Congress

Organising Committee &

Board Member, Singapore Chemical Industry Council

Message from the Technical Committee Chair, 14th APCChE 2012, Prof. Chi-Hwa Wang

Dear APCChE 2012 Delegates

On behalf of the technical committee, I would like to provide you with a brief summary on the conference program for the 14th Asia Pacific Confederation of Chemical Engineering Congress for 2012 with the theme "Enabling Sustainable Development Through Creative & Innovative Chemical Engineering".



Scheduled over the period Feb. 21-24, 2012 at the Suntec Singapore International Convention & Exhibition Center, the 14th APCChE Congress is comprised of 22 academic symposia with 485 plenary, keynote, oral and poster presentations by authors from 23 countries and regions, covering not only the Asia Pacific regions but also around the world. The topics of presentations have wide coverage on the subjects of classical and emerging chemical engineering science and technology. Please refer to the program book and E-Proceedings for the extended abstracts/abstracts of these papers. Short biography of invited, keynote and plenary speakers is available at the following conference website (<http://www.rpsonline.com.sg/apcche/index.html>) for references. Selected full papers will be published at special issues of the following two international refereed journals: Industrial & Engineering Chemistry Research (ACS) and Asia Pacific Journal of Chemical Engineering (Wiley).

I would like to take up this opportunity to acknowledge the contributions by authors of the submitted research papers and symposium chairs for their review on the technical contents of the scientific program. We plan to announce the APCChE 2012 Best Poster Presentation Award and APCChE 2012 Young Investigator Award winners in the gala dinner on Feb. 23, 2012 at the Marina Mandarin Hotel.

Look forward to meeting up with all of you during the APCChE 2012 in Singapore.

Sincerely yours,

Chi-Hwa Wang

Technical Committee Chair - 14th APCChE Congress 2012 &

Professor of Chemical and Biomolecular Engineering

National University of Singapore

14th APCChE Congress 2012 Organising Committee



Advisor
Er. Edwin Khew
President, APCChE



Advisor
Er. Tan Seng Chuan



Advisor
Mr. David Tan



Advisor
Mr. Terence Koh



Chairman
Dr. Foo Swee Cheng



Co-Chairman
Mr. Walter Szopiak



Finance
Mr. Heah Soon Poh



Chem-E-Car Chair
Mr. Tay Kheng Siang



Technical Chair
Prof. Wang Chi-Hwa



Technical Co-Chair
A/Prof. Wang Xin



Operation Chair
A/Prof. Xu Rong



Operation Co-Chair
A/Prof. Kus Hidajat



Member
Mr. Amit Bhatnagar



Member
Mr. Joe Eades



Member
Mr. Yow Kum Pang



Member
Mr. Mirko Stoll



Member
Er. Dr. Chew Soon Hoe



Member
Ms. Angie Ng

14th APCChE Congress 2012

Organising Committee

Scientific / Technical Program Committee

Prof. Wang Chi-Hwa, *Chairman*
A/Prof. Wang Xin, *Co-Chair*
Dr. Praveen Linga

Congress Operation Committee

A/Prof. Xu Rong, *Chairman*
A/Prof. Kus Hidajat, *Co-Chair*

Sponsorship Committee

Mr. Walter Szopiak, *Chairman*
Mr. Terence Koh
Dr. Foo Swee Cheng
Mr. Jan Lee
Mr. Amit Bhatnagar

Industrial Track

Sustainability in Practice Sub-Committee

Mr. Nils Steinbrecher, *Chairman*
Ms. Agnes Heng

Process Safety Management Sub-Committee

Mr. Amit Bhatnagar, *Chairman*
Mr. Thong, Patrick Loke Keat
Mr. Kuah Hsianyang

Chem-E-Car Competition

Panel of Judges

Mr. Mirko Stoll, *Chief*
Dr. Foo Swee Cheng
A/Prof. Jiang Rongrong
A/Prof. Kunn Hadinoto Ong
Ms. Phua Siew Teng
Mr. Soo Seng Lee
Dr. Lu XianMao
A/Prof. Jiang Jianwen
Dr. Saif Khan
A/Prof. Lakshminarayanan Samavedham

Panel of Auditors

Mr. Yow Kum Pang, *Chairman*
Dr. Foo Swee Cheng
Mr. Chong Tow Soon
Ms. Lee Hui Bee

Event Management

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Dr. Foo Swee Cheng
Mr. Jan Lee
Mr. Soo Seng Lee
Mr. Aaron Yuen Woh Peng
Ms. Lim Sze Ern

Secretariat for APCChE

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Ms. Wennie Amedo
Mr. Cheah Kok Keong
Ms. Lim Hui Leng

International Advisory Board

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Philippe Tanguy, *Corresponding Member / President WCCE8*

David Wood, *Chairman WCEC*

Xuhong Qian, *Director Chemical Industry and Engineering Society of China (CIESC)*

Guohua Chen, *Hong Kong Institution of Engineers (HKIE), Hong Kong University of Science & Technology*

Hwayong Kim, *Korean Institute of Chemical Engineers (KIChE), Seoul National University*

Mohd Ali Hashim, *Institution of Engineers Malaysia (IEM), University of Malaysia*

Kouichi Miura, *Society of Chemical Engineers of Japan (SCEJ), Kyoto University*

Russell Scott, *Australia/IChemE (Aust) RACI (Aust)*

Tim Dobbie, *Society of Chemical Engineers New Zealand (SCENZ)*

L. S. Fan, *American Institute of Chemical Engineers*

Ignacio E. Grossmann, *American Institute of Chemical Engineers*

Rajagopalan Srinivasan, *American Institute of Chemical Engineers, Singapore Chapter*

Keith Carpenter, *Executive Director, Institute of Chemical and Engineering Sciences*

Otto Lin, *Honorary Member, Hong Kong Institution of Chemical Engineers (HKIE),
Hong Kong University of Science & Technology*

Jan Althorp, *Corresponding Member, IChemE in Australia & Asia Pacific*

Willi Meier, *Corresponding Member, Society for Chemical Engineering and Biotechnology – Germany*

David Tan, *JTC*

Lawrence Cheung, *SCIC*

Rolf Prince, *Emeritus Professor, University of Sydney, Honorary Member*

Sommai Sirilertsombat, *President, TIChE, Deputy Managing Director, Siam Mitsui PTA Co. Ltd.*

Cheng-Liang Chen, *National Taiwan University*

Tjandra Setiadi, *Institut Teknologi Bandung*

B. C. Meikap, *Indian Institute of Technology*

Shien-Chang Chen, *President, Institute of Chemical Engineers, Chinese Taipei (IChECT)*

Scientific/Technical Programme Chairs

Armando Borgna, *ICES*

Arvind Rajendran, *NTU*

Bin Liu, *NUS*

Chi-Hwa Wang, *NUS*

Dalai Darren Sun, *NTU*

David Lou, *NTU*

Dong-An Wang, *NTU*

Dong-Yup Lee, *BTI/NUS*

En-Tang Kang, *NUS*

Hao Song, *NTU*

Hua Chun Zeng, *NUS*

Jianping Xie, *NUS*

Jianwen Jiang, *NUS*

Jianzong He, *NUS*

Jim Yang Lee, *NUS*

Jinchun Wu, *ICES*

Kai Chee Loh, *NUS*

Kheng Siong Tay, *Singapore Polytechnic*

Koon Gee Neoh, *NUS*

Kun-Lin Yang, *NUS*

Kwak Sang Kyu, *NTU*

Lakshminarayanan Samavedham, *NUS*

M. P. Srinivasan, *NUS*

Mary Bee Eng Chan, *NTU*

Mirko Stoll, *Ngee Ann Polytechnic*

Pui Kwan Wong, *ICES*

Qing Wang, *MSE, NUS*

Rangaiah Gade Pandu, *NUS*

Raymond Lau, *NTU*

Rensheng Deng, *IBN*

Rong Wang, *NTU*

Rongrong Jiang, *NTU*

S. Kawi, *NUS*

Saif Khan, *NUS*

Shamsuzzaman Farooq, *NUS*

Shing-Bor Chen, *NUS*

Sing Yan Chew, *NTU*

Susanna Su Jan Leong, *NTU*

(Neal), Tai-Shung Chung, *NUS*

Timothy Tan, *NTU*

Vinay Kumar Kariwala, *NTU*

Vincent Chan, *NTU*

Yan Hui Yang, *NTU*

Yen Peng Ting, *NUS*

Yen Wah Tong, *NUS*

Yow Kum Pang, *Nanyang Polytechnic*

Zhi Li, *NUS*

NUS: National University of Singapore

NTU: Nanyang Technological University

IBN: Institute of Bioengineering and Nanotechnology

ICES: Institute of Chemical and Engineering Sciences

BTI: Bioprocessing Technology Institute

Administrative Instructions

Conference Venue

Suntec International Convention & Exhibition Centre Centre
1 Raffles Boulevard Suntec City
Singapore 039593
Theatre and Meeting Rooms at Level 3
Please see location map and floor plan.

Parking

Complimentary parking coupons will NOT be issued at the conference. Local delegates are encouraged to take the public transportation to the venue.

Pre-Registration and Collection of Conference Packages

Suntec International Convention & Exhibition
Level 3 Foyer, outside Meeting Room 306 (Secretariat Room)

21 February 2012 18:00 - 20:00 (Light coffee/tea reception will be served)
22, 23 & 24 February 2012 08:00 - 16:00

Secretariat Room : Level 3, Meeting Room 306

Operating Hours : 22, 23 & 24 February 2012 08:00 - 17:00 daily

Internet connection will be available in the Secretariat Room during the operating hours.

Meals

Coffee/tea breaks is open to all conference delegates and will be served at the Level 3 foyer outside the Theatre and meeting rooms.

Buffet lunch will be served at the Gallery East, Level 3. Lunch is open to standard conference delegates and Committee members with the following colour badges:

Light Green, Red, Pink (for 22 Feb 2012) and **Light Grey** (for 23 Feb 2012).

Please wear your name badge at all times for identification.

Student delegates can buy their lunch at the Food Court at Level 1. The average cost of a lunch with drink is about S\$8 to 12.

Conference Dinner

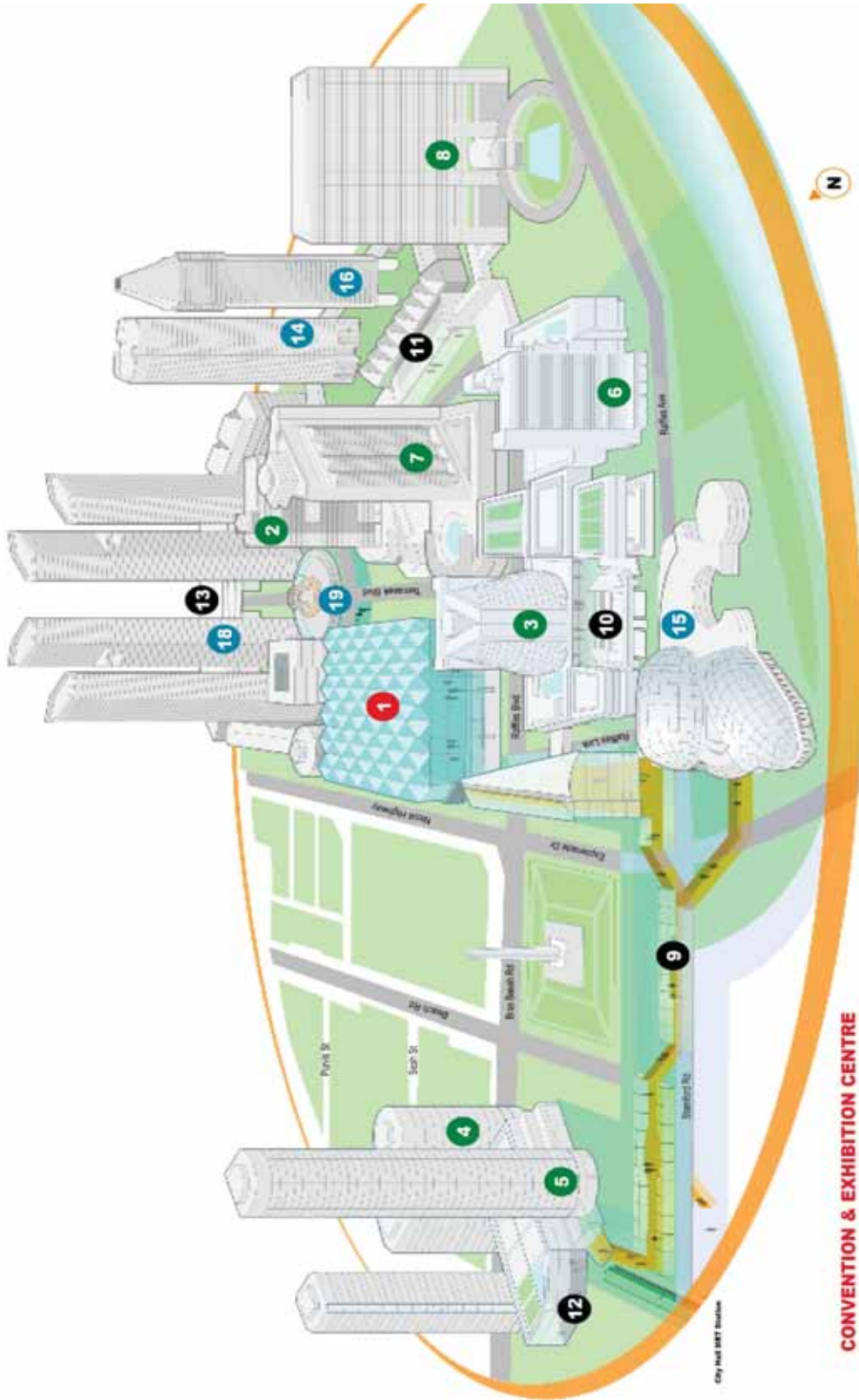
23 February 2012 (Thursday) : Marina Mandarin Singapore (across Raffles Boulevard) : Level 1 Ballroom
19:00 to 21:00 (Cocktail Reception will commence at 18:30)

Standard conference delegates and Committee members with the following colour badges are entitled to the conference dinner as part of their registration package: **Light Green** & **Red**. Please wear your name badge at all times for identification.

Student delegates or the spouses wishing to attend the dinner can purchase the additional conference dinner vouchers (S\$120 each).

Please inform the Secretariat at apcche2012@nus.edu.sg if you wish to purchase the dinner vouchers.

Conference Location Plan



CONVENTION & EXHIBITION CENTRE

- 1 Suntec Singapore

HOTELS

- 2 Conrad Centennial Singapore (509 rooms)
- 3 Marina Mandarin Singapore (575 rooms)
- 4 Raffles The Plaza (800 rooms)
- 5 Swissotel The Stamford Singapore (1,263 rooms)
- 6 The Oriental Singapore (524 rooms)
- 7 The Pan Pacific Singapore (784 rooms)
- 8 The Ritz-Carlton Millenia Singapore (610 rooms)

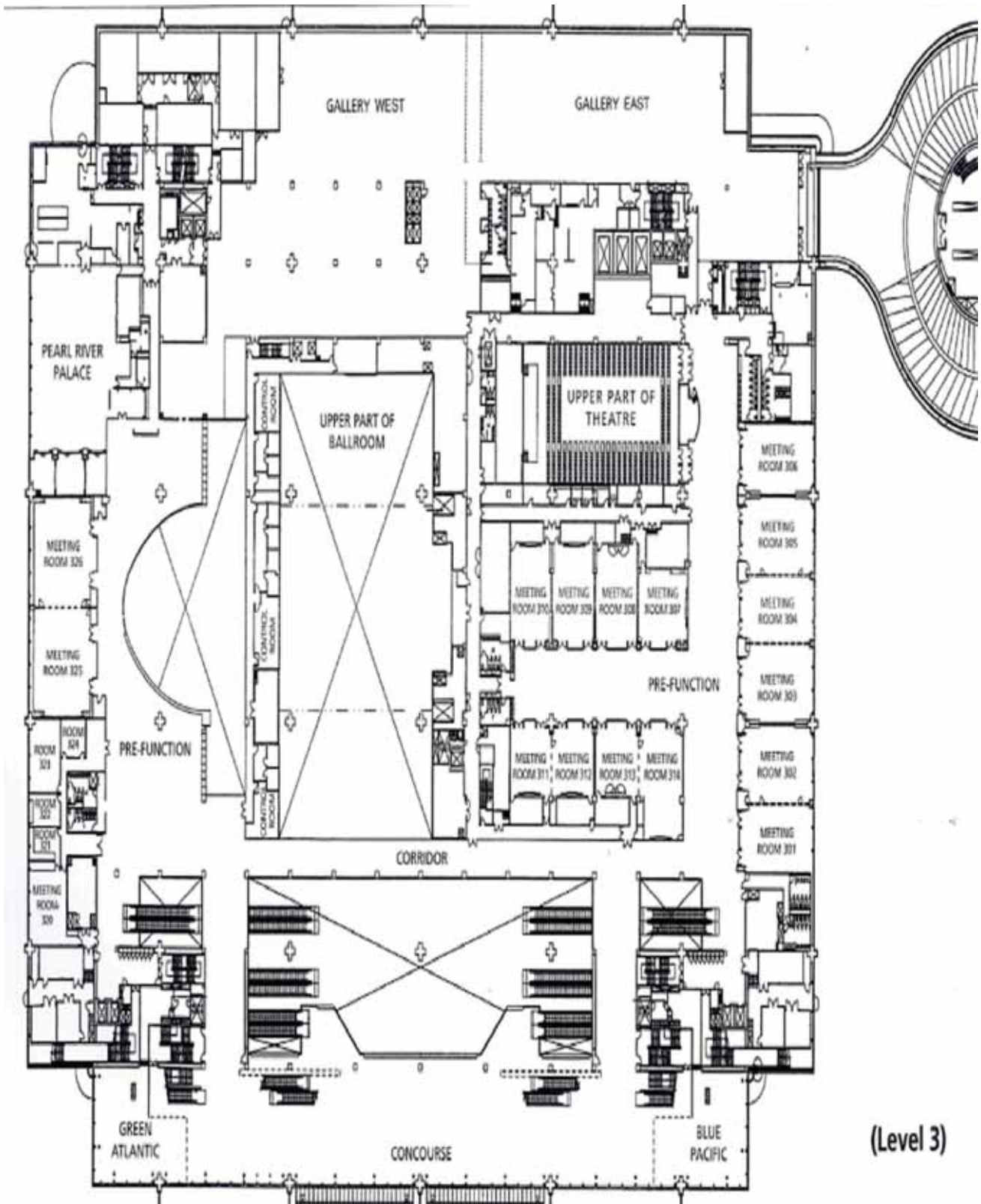
ENTERTAINMENT & SHOPPING

- 9 Citylink Mall
- 10 Marina Square Shopping Centre
- 11 Millenia Walk
- 12 Raffles City Shopping Centre
- 13 Suntec City Mall

OFFICES & OTHER FACILITIES

- 14 Centennial Tower
- 15 Esplanade - Theatres on the Bay
- 16 Millenia Tower
- 17 One Raffles Link
- 18 Suntec City Office Towers
- 19 The Fountain of Wealth

Conference Floor Plan



(Level 3)

Instructions for Presenters

Instructions for Keynote/Invited, Oral and Mini Talk Presentation

1. For **Keynote** presentation, it is limited to **25 minutes**, inclusive of Questions & Answers Session.
For **Invited and Oral presentation**, it is limited to **15 minutes**, inclusive of Questions & Answers Session.
Each **Mini Talk** presentation is limited to **10 minutes**, inclusive of Questions & Answers Session.
2. The Chairs of the sessions will be keeping to the time strictly. A student volunteer will remind the speaker 3 minutes before the end of your talk. You are to make your concluding remarks by then. Kindly allow for 2-3 minutes for the Q & A.
3. Presentation should preferably be done using Powerpoint. A laptop with LCD projector will be made available for all meeting rooms and sessions. To minimise technical difficulties, we request all presenters to save their presentation to a USB storage device in a format that can be read by Powerpoint on a Window-based PC.
4. Please use the laptop provided for presentation so as to minimize time wastage during the change-over.
5. There will not be any internet connection for the presentation laptops. You will not be able to download any files from remote servers.
6. Presenters should transfer their files to the laptops as early as possible. Preferable times are during coffee-breaks and lunch. A student volunteer will be available to assist the presenters.
7. Oral and Mini Talk Presenters are requested to submit their presenter information to the student volunteer when they are uploading their presentation on the laptop. The presenter information should include at least your title, name, affiliation. Please ask the student volunteer for the Presenter Information Form.
8. Keynote and Invited Presenters will not be required to submit their presenter information as these will be printed by the Organizer from the conference website.

Instructions for Poster Presenters

1. The poster layout should be **PORTRAIT** and not exceeding A1 size (594mm (W) x 841mm (H) / 23.3in (W) x 35 in (H)).
2. Presenters are to put up their posters at the Gallery East (Level 3) from 1.00pm onwards on 22 and 23 February 2012 respectively.
3. Presenters must remove their posters by 5.00pm each day.
4. The necessary stationery, eg Velcro tacks will be available on-site.
5. Posters are to be put up according to the assigned poster panel numbers. The poster panel numbers are reflected in the program booklet.
6. Presenters must be present during coffee/tea break session to explain their posters and answers.

Sponsors

Gold



Chem-E-Car Competition



Oronite

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Breaking New Ground

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Others





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Day 1: Wednesday 22 February 2012

Programme Overview

	Time/Venue	Suntec Convention Centre, Level 3, Theatre
Opening Ceremony	09:00 – 10:00	Opening Ceremony Welcome Speech Er Edwin Khew, <i>President of 14th APCCHE Congress 2012 and Vice President of Institution of Engineers, Singapore</i> Speech by Guest-of-Honor Mr Manohar Khiatani, <i>Chief Executive Officer, JTC Corporation</i> Presentation of Awards for the Chem-E-Car Competition Guest of Honor Mr Manohar Khiatani, <i>Chief Executive Officer, JTC Corporation</i>
	10:00 – 10:30	Tea / Coffee Break
Plenary Talks	10:30 – 11:10	Plenary Talk 1: Prospect of Chemical Looping Technology – Ionic Transfer, Solids Flow and Process Scale-up Prof. Liang-Shi Fan, <i>The Ohio State University, USA</i> Chair: Chi-Hwa Wang, <i>National University of Singapore</i>
	11:10 – 11:50	Plenary Talk 2: Engineering New Vaccine Processes Prof. Anton Middelberg, <i>University of Queensland, Australia</i> Chair: Chi-Hwa Wang, <i>National University of Singapore</i>
	11:50 – 13:00	Lunch Break
		Suntec Convention Centre, Level 3, Room 305
Seminar: Sustainability		Sustainability Seminar Chair: Nils Steinbrecher
	13:00 – 13:50	Sustainable Development Practice at DuPont Juan G. Aguirano, <i>Global Managing Director, DuPont Sustainable Solutions</i>
	13:50 – 14:30	Sustainable Growth – The Arguments for Moving to a Low Carbon Economy John Pearson, <i>Head South East Asia, Climate Change Network, British High Commission Singapore</i>
	14:30 – 15:10	The Singapore Chapter of the World Business Council for Sustainable Development: An Insight into Latest Opportunities for Business in Support of the Sustainable Development Agenda in Singapore Constant Van Aerscht, <i>Special Advisor to the World Business Council for Sustainable Development (WBCSD) in Singapore</i>
	15:10 – 15:40	Tea / Coffee Break
	15:40 – 16:20	Riding the Megatrend of Sustainability Victor Tay Kah Soon, <i>Chief Operating Officer, Singapore Business Federation, and Managing Director, SBF-PICO Events Pte Ltd</i>
	16:20 – 17:00	To be Confirmed
	17:00	End of Day 1

Day 1: Wednesday, 22 February 2012

Plenary Talks & Seminar

Plenary 1

Prospect of Chemical Looping Technology - Ionic Transfer, Solids Flow and Process Scale-up

Prof. Liang-Shi Fan, *The Ohio State University, USA*

The concept of chemical looping reactions has been widely applied in chemical industries, e.g., the production of hydrogen peroxide (H_2O_2) from hydrogen and oxygen using 9,10-anthraquinone as the looping intermediate. Fundamental research on chemical looping reactions has also been applied to energy systems, e.g., the splitting of water (H_2O) to produce oxygen and hydrogen using ZnO as the looping intermediate. Fossil fuel chemical looping applications had been used commercially with the steam-iron process for coal from the 1900s to the 1940s and had been demonstrated at a pilot scale with the carbon dioxide acceptor process in the 1960s and 1970s. There are presently no chemical looping processes using fossil fuels in commercial operation. A key factor that hampered the continued use of these earlier processes for fossil energy operation was the inadequacy of the reactivity and recyclability of the looping particles. This factor led to higher product costs for using the chemical looping processes, compared to the other processes that were petroleum or natural gas based. With CO_2 emission control now being considered as a requirement, interest in chemical looping technology has resurfaced. In particular, chemical looping processes are appealing due to their unique ability to generate a sequestration-ready CO_2 stream while yielding high energy conversion efficiency. Renewed fundamental and applied research since the early 1980s has emphasized improvement over the earlier shortcomings. New techniques have been developed for direct processing of coal or other solid carbonaceous feedstock in chemical looping reactors. Significant progress is underway in particle design, reactor development, and looping system integration, as demonstrated by the operation of several pilot or sub-pilot scale units worldwide, making it possible that chemical looping technology may be commercially viable in the future for processing carbonaceous fuels.

This presentation will describe the fundamental and applied aspects of modern chemical looping technology that utilizes fossil and biomass as feedstock. Specifically, the presentation will highlight ionic transfer, solids flow and process scale-up issues associated with the optimum feedstock conversion and relationship among the metal oxide conversion, solids flux and reactor configurations. Opportunities and challenges for chemical looping technology commercialization will also be illustrated.

LIANG-SHIH FAN is Distinguished University Professor and C. John Easton Professor in Engineering in the Department of Chemical and Biomolecular Engineering at Ohio State University. He is the U.S. Editor of Powder Technology and has served as a consulting editor of ten other journals and book series, including the AIChE Journal, I&EC Research, and the International Journal of Multiphase Flow. He has authored or coauthored four books, 350 journal articles, and twenty five patents, and has received a number of awards in recognition of his research and teaching, including ACS's E. V. Murphree Award in Industrial and Engineering Chemistry and the AIChE's Alpha Chi Sigma Award for Chemical Engineering Research. He is a member of the U.S. National Academy of Engineering, an Academician of the Academia Sinica, and a foreign member of the Mexican Academy of Sciences and the Chinese Academy of Engineering.

Plenary 2

Engineering New Vaccine Processes

Prof. Anton Middelberg, *University of Queensland, Australia*

In chemical engineering, the concept of a timely response to disturbance is taught in undergraduate courses. A complex system subject to disturbance is controlled by actions that mitigate the impact of disturbance before that disturbance magnifies to disrupt the entire system. The time constant of response must be smaller than the time

constant over which the disturbance will amplify. In vaccine engineering, this is not presently the case. The disturbance (e.g. a virus) can propagate faster than we can mount a vaccine response. This fact was amply demonstrated by the (H1N1) 2009 pandemic which led to social disruption and strain on the health system, even though the disease was mild in most cases.

Also central in chemical engineering is the concept of a product made to a cost the market can afford. Although vaccination has led to the eradication of smallpox, around 15 million people still die annually from infectious disease, with more than half of them being children under the age of 5.

A new vaccine engineering paradigm is urgently needed.

Here we report a new manufacturing approach which starts with non-infectious protein and builds structure, and hence antigenicity, without building infectivity. Our approach relies on the expression and purification of proteins prepared in bacterial cell factories which are then processed *in vitro* into virus-like particles (VLPs). Protein production in highly efficient bacteria maximises speed and efficiency while also minimising the need for high-level biocontainment during manufacture. The approach is both exciting and challenging, raising a number of research questions amenable to solution by chemical engineers. Combined, these aspects have the potential to move us toward a vaccine future based on fundamental chemical and molecular engineering, using fast, scaleable and cheap technological approaches.

Anton Middelberg is the 2010 Queensland Smart Futures Premier's Fellow at The University of Queensland, and the Professor of Chemical and Biomolecular Engineering. He researches the science of chemical self-assembly processing, to define new bio-inspired products and methods for their economic manufacture. His current focus is on developing new technology for rapid and cheap vaccine manufacture. Professor Middelberg has previously held tenured academic positions at Adelaide and Cambridge Universities, a Fulbright fellowship at UC Berkeley, and he was elected Fellow of Selwyn College Cambridge and Fellow of the Cambridge-MIT Institute. He has received a number of awards including the Brodie and Shedden-Uhde medals of the Institution of Engineers Australia, and in 2008 was named as one of the 100 most influential engineers in Australia. He has published more than 150 refereed papers at the interface between biology and engineering, and has editorial roles on leading journals including *Chemical Engineering Science* (Editor-in-Chief) and *Trends in Biotechnology*.

Sustainability Seminar

Sustainable Development Practice at DuPont

Juan G. Aguirano, *Global Managing Director, DuPont Sustainable Solutions*

Based on DuPont's 200 years of experience as an owner-operator, this presentation will explore best practices for developing, costing and implementing an effective sustainability strategy and supporting cultural change to improve organizational alignment, clarity and operational discipline resulting in increased shareholder's value and highest returns on sustainable investments.

Juan Aguiriano, Worldwide Managing Director of Sustainable Operations for DuPont Sustainable Solutions, is responsible for expanding a consulting practice that leverages real-world experience and proven approaches to help organizations improve and sustain return on operations and assets while reducing the environmental footprint. His mission is to deliver the right solutions to clients in the areas of environmental management, energy efficiency, capital effectiveness, and asset productivity.

An expert in corporate sustainability, climate change, and energy efficiency strategies, Aguiriano brings to his current position over 20 years of experience in running global operations in Europe and Asia. He has advised senior executives from some of the top 500 corporations in Europe, the Middle East, and Africa in industries such as oil and gas, power and utilities, cement, mining and steel.

Sustainable Growth - The Arguments for Moving to a Low Carbon Economy

John Pearson, *Head South East Asia, Climate Change Network, British High Commission Singapore*

As Greenhouse Gas emissions continue to rise, the world is facing the consequences of climate change - including severe impacts on weather patterns, food production, economic activity and health. Many Governments are already trying to tackle this by moving to a "low carbon" economy that is less dependent on fossil fuels. This presentation will examine the arguments for adopting such a pathway, and offer practical examples of actions being taken in countries around the world.

John Pearson is Head of the British Government's network on climate change in South East Asia. Based at the British High Commission in Singapore, he has held the position since September 2008.

John joined the Foreign and Commonwealth Office in 1990. He has held a variety of positions in London, including working in the FCO's Environment Policy Department. His other overseas postings have included Madrid, Brasilia and Montevideo, where he was Deputy Head of Mission.

The Singapore Chapter of the World Business Council for Sustainable Development: An Insight into Latest Opportunities for Business in Support of the Sustainable Development Agenda in Singapore

Constant Van Aerschot, *Special Advisor to the World Business Council for Sustainable Development (WBCSD) in Singapore*

With a business-driven initiative towards a "Vision 2050", and the recent blue print for Singapore's sustainable development strategy issued by the Inter-Ministerial Committee for Sustainable Development, how can companies combine an enhanced business model with quantifiable contributions to the green economy?

Constant is setting up the Singapore Chapter of the World Business Council for Sustainable Development (WBCSD). As construction sector expert, he co-chairs WBCSD's "Energy Efficiency in Buildings" project. With more than 20 years experience with and from within large corporations, consultancy, and NGOs, Constant specialises in identifying sustainable pathways through complex environmental, social and multi-stakeholder interests, promoting sustainable business solutions in diverse, multi-cultural environments at grass-roots and senior corporate level.

His more recent positions were VP Sustainable Development & Public Affairs, and Corporate Strategy Director in large manufacturing companies, and an Associate in a renowned international design consultancy firm. Constant was board member of several non-profit organizations and is an advisor to European think tanks.

Riding the Megatrend of Sustainability

Victor Tay Kah Soon, *Chief Operating Officer, Singapore Business Federation, and Managing Director, SBF-PICO Events Pte Ltd.*

Sustainability, together with other megatrends such as demographic change, urbanization and globalization, are not only influencing the way we live today, but their impact will increase substantially in the decades to come. In partnership with KPMG, SBF has developed a strategic framework that will help guide our Singapore enterprises navigate the route towards an outstanding sustainable business enterprise which can demonstrate high potential of business growth and offer attractive investment opportunity for local and foreign investors, which will be highlighted at this presentation.

Victor Tay is Chief Operating Officer of Singapore Business Federation (SBF), the country's APEX Business Chamber which assists its more than 17,000 members with business facilitation, voice representation and capacity building initiatives and services.

Prior to joining SBF, Victor was a Director at SPRING Singapore overseeing a spectrum of sectors across Transport, Logistics, Environmental, Engineering Services, Healthcare, Biomedical, Chemical, Education, Business Services. Victor has considerable experience in developing high-growth industries and grooming growth-oriented enterprises towards regional entities. His key competencies include industry strategies to upgrade overall ecosystem competence, implementing capability upgrading programmes, providing resources support and advisory to local enterprises, instilling of seed funds and financial assistance to these enterprises.

Prior to joining the government sector, Victor spent in excess of 10 years in the private sector as a management consultant with PricewaterhouseCoopers, KPMG and Coopers and Lybrand, providing consultancy services to various multinationals across the Asia Pacific region.

Day 1: Wednesday, 22 February 2012

Presentation Schedule

Session 1A	Topic 18: Environmental Science & Technology
Date/Time	22 February 2012 / 13:00 – 15:00 hrs
Venue	Room: 303
Chair(s)	Sun Dalai Darren (NTU) , Ting Yen Peng (NUS)

13:00 – 13:15
426: Invited **Biohydrogen Production from Starch-Rich Synthetic Wastewater Through a Thermophilic Fermentation**
 Billy Andreas, Ilona Sarvari Horvath, Khamdan Cahyari and Tjandra Setiadi* — **Institut Teknologi Bandung, Indonesia*

13:15 – 13:30
357: Invited **Chemical Engineering at the Sediment-Water Interface**
 Danny Reible* — **University of Texas at Austin, United States*

13:30 – 13:45
176: Invited **Monitoring Water Toxicity with Bioluminescent Fiber Optic Whole Cell Biosensors**
 Robert Steven Marks* — **Ben Gurion University of the Negev, Israel*

13:45 – 14:00
223: Oral **Modification of Soil Iron for the Chlorophenol-contaminated Site Remediation**
 Shyi-Tien Chen, W-H Tseng and Y-Y Hsieh* — **National Kaohsiung First University of Science and Technology, Taiwan*

14:00 – 14:15
378: Oral **Pyrosequencing Analysis for a Microbial Community of a Methane-Oxidizing Biofilm**
 Tae Gwan Kim* and Kyung-Suk Cho — **Ewha Womans University, Korea*

14:15 – 14:30
279: Oral **Stable Carbon and Nitrogen Isotope Compositions of Organic Matter in Sediment in the Inner Gulf of Thailand**
 Siripornpen Onpankoon*, Thanomsak Boonphakdee, Sirinart Laoharojanaphand and Wuthichai Chantarachot — **Burapha University, Thailand*

14:30 – 14:45
373: Oral **Bacterial Communities in a Methane Oxidation Biocover from Different Depths using Pyrosequencing Analysis**
 Kyung-Eun Moon*, Tae Gwan Kim and Kyung-Suk Cho — **Ewha Womans University, Korea*

14:45 – 15:00
466: Oral **Breakthrough Study of Chlorinated Compounds Contaminated H₂ over Modified-GAC**
 Prapaporn Luekittisup*, Tharaporn Yangyaim, Jitlada Chumee, Pongtanawat Khemthong and Nurak Grisdanurak — **Chulalongkorn University, Thailand*

Session 1B	Topic 5: Energy
Date/Time	22 February 2012 / 13:00 – 15:00 hrs
Venue	Room: 304
Chair(s)	Liu Bin (NUS), David Lou (NTU), Wang Qing (MSE, NUS)

13:00 – 13:25
850: Keynote **Materials Science Challenges for Large Scale Electrical Energy Storage**
 Jun Liu* — **Pacific Northwest National Laboratory, USA*

13:25 – 13:40
619: Invited **Fuel Cell Electrocatalyst based on Non-covalently Functionalized Carbon Nanotubes**
 Xin Wang* — **Nanyang Technological University, Singapore*

13:40 – 13:55
705: Invited **Visible-light-active TiO₂ Nanostructures for Solar Energy Harvesting**
 Timothy T. Y. Tan* — **Nanyang Technological University, Singapore*

Day 1 — Wednesday, 22 February 2012 : Presentation Schedule

- 13:55 – 14:10** **Development of Low-Cost and Efficient Photocatalyst Systems for Production of Solar Hydrogen**
751: Invited
 Wei Zhang, Yabo Wang, Jindui Hong and Rong Xu* — *Nanyang Technological University, Singapore
- 14:10 – 14:25** **Spectroscopic Observation of Tuning Pattern and Phase Equilibrium Measurements Using New sII Clathrate Hydrate Formers**
215: Oral
 Seongmin Park*, Woongchul Shin, Hyeyoon Ro, Dong-Yeun Koh, Jiwoong Seol and Huen Lee — *Korean Advanced Institute of Science and Technology, Korea
- 14:25 – 14:40** **Exergy Recuperative Fluidized Bed Drying of Rice Straw**
809: Oral
 Yuping Liu*, Muhammad Aziz, Chihiro Fushimi, Yasuki Kansha, Kazuhiro Mochidzuki, Shozo Kaneko, Atsushi Tsutsumi, Katsuhiko Yokohama, Kazuyuki Myoyo, Koji Oura, Keisuke Matsuo, Shogo Sawa and Katsuhiko Shinoda — *The University of Tokyo, Japan
- 14:40 – 14:55** **Nanoporous Graphitic-C₃N₄@Carbon Electrocatalysts for Highly Efficient Oxygen Reduction**
773: Oral
 Yao Zheng, Ji Liang* and Shi Zhang Qiao — *The University of Queensland, Australia

Session 1C	Topic 8: Thermodynamics and Molecular Simulations
Date/Time	22 February 2012 / 13:00 – 15:00 hrs
Venue	Room: 308
Chair(s)	Jiang Jianwen (NUS), Shiang-Tai Lin (National Taiwan University, Taiwan)

- 13:00 – 13:15** **Computational Design of Metal-organic Frameworks for CO₂ Capture**
47: Invited
 Chongli Zhong* — *Beijing University of Chemical Technology, China
- 13:15 – 13:30** **Unveiling Thermodynamic Driving Forces at the Nanoscale**
101: Invited
 Shiang-Tai Lin* — *National Taiwan University, Taiwan
- 13:30 – 13:45** **Computer Simulation of the Adsorption and Separation of CO₂/CH₄ and CO₂/N₂ in C60 Impregnated COF-108**
213: Oral
 Yujun Zhu, Jianhai Zhou, Jun Hu, Honglai Liu* and Ying Hu — *East China University of Science and Technology, China
- 13:45 – 14:00** **Effects of Functional Group and Residual Solvent on Membrane Structure and Gas Permeation in a Polymer of Intrinsic Microporosity: Insights from Atomistic Simulations**
123: Oral
 Weijie Fang*, Liling Zhang and Jianwen Jiang — *National University of Singapore, Singapore
- 14:00 – 14:15** **Drug Loading and Release by a pH-Sensitive Amphiphilic Diblock Polymer: From Fully Atomistic to Coarse-Grained Simulations**
271: Oral
 Zhonglin Luo* and Jianwen Jiang — *National University of Singapore, Singapore
- 14:15 – 14:30** **A Modified DSMC Algorithm and Application**
256: Oral
 Chao Liu*, Santosh Ansumali and Sang Kyu Kwak — *Nanyang Technological University, Singapore
- 14:30 – 14:45** **A Molecular Perspective for Energy, Environmental and Pharmaceutical Applications in Nanoporous Materials: From Metal-Organic Frameworks to Protein Crystals**
601: Invited
 Jianwen Jiang* — *National University of Singapore, Singapore

Session 1D	Topic 7: Membrane Science & Technology for Emerging Applications
Date/Time	22 February 2012 / 13:00 – 15:00 hrs
Venue	Theatre
Chair(s)	(Neal)Tai-Shung Chung (NUS), Wang Rong (NTU), Liang Hong (NUS)

- 13:00 – 13:25** **Polymeric Membranes for Energy and Water Sustainability**
590: Keynote
 Tai-Shung Chung* — *National University of Singapore, Singapore

Day 1 — Wednesday, 22 February 2012 : Presentation Schedule

- 13:25 – 13:50** **Membrane Engineering for Water Engineering**
345: Keynote Enrico Drioli* and Francesca Macedonio — *University of Calabria, Italy; and Hanyang University, Korea
- 13:50 – 14:05** **Membrane Processes for Alcohol-water Separation: Improving the Energy Efficiency of Biofuel Production**
795: Invited Leland M. Vane* — *U.S. Environmental Protection Agency, USA
- 14:05 – 14:20** **Thin-film Composite Membranes and Formation Mechanism of Thin-film Layer on Hydrophilic Cellulose Acetate Propionate for Forward Osmosis Processes**
824: Oral Xue Li *, Kai Yu Wang, Bradley Helmer and Tai-Shung Chung — *National University of Singapore, Singapore
- 14:20 – 14:35** **High Performance Thermally Self-cross-linked Polymers of Intrinsic Microporosity (PIM-1) Membranes for Energy Development**
668: Oral Fu Yun Li*, Youchang Xiao, Tai-Shung Chung (Neal) and Sibudjijng Kawi — *National University of Singapore, Singapore
- 14:35 – 14:50** **Nanohybrid Membranes for Green CO₂ Capture**
651: Oral Cher Hon Lau*, Songlin Liu, Donald R. Paul, Jianzhong Xia, Yan-Ching Jean, Hongmin Chen, Lu Shao and Tai-Shung Chung — *National University of Singapore, Singapore

Session 1E	Topic 11: Microfluidics for Chemistry and Life Sciences
Date/Time	22 February 2012 / 13:00 – 15:00 hrs
Venue	Room: 307
Chair(s)	Saif Khan (NUS)

- 13:00 – 13:25** **Lab-on-a-Chip Systems for Microchemical Synthetic Applications**
50: Keynote Dong-Pyo Kim* — *Chungnam National University, Korea
- 13:25 – 13:50** **Microfluidic Technologies to Create Functional Microgel Particles**
531: Keynote Patrick S. Doyle* — *Massachusetts Institute of Technology, USA
- 13:50 – 14:05** **Acoustically-Driven Microcentrifugation**
526: Invited Richard Shilton, Nick Glass, Peggy Chan, James Friend and Leslie Yeo* — *Royal Melbourne Institute of Technology University, Australia
- 14:05 – 14:20** **Fireflies-on-a-Chip - Ionic liquid-Aqueous Droplets for Biphasic Chemical Analysis**
778: Invited Saif Khan* — *National University of Singapore, Singapore
- 14:20 – 14:35** **Hydrodynamics of a Brownian and Non-brownian Torus**
515: Oral Rochish M Thaokar* — *Indian Institute of Technology, India
- 14:35 – 14:50** **3-D Collagen-based Microbubbles for Cardiomyocyte Culture**
643: Oral Jeng-Chun Mei*, Jiasheng Yu and Keng-Hui Lin — *National Taiwan University, Taiwan

Session 1F	Topic 10: Transport Phenomena
Date/Time	22 February 2012 / 13:00 – 15:00 hrs
Venue	Room: 309
Chair(s)	Raymond Lau (NTU), Shing-Bor Chen (NUS), Rensheng Deng (Institute of Bioengineering and Nanotechnology)

- 13:00 – 13:15** **Rapid Coal Pyrolysis to Acetylene in Thermal Plasma Reactor: From Fundamental Study to Industry**
70: Invited Yi Cheng* and Bin-Hang Yan — *Tsinghua University, China
- 13:15 – 13:30** **Force Driven Migration of Particles in Porous Media**
677: Invited Shing Bor Chen* — *National University of Singapore, Singapore

Day 1 — Wednesday, 22 February 2012 : Presentation Schedule

- 13:30 – 13:45**
501: Oral **Large Eddy Simulation (LES) of Glass-Fibre-Loaded Flow in an Internally Spout-Fluidised Bed for Processing of Thermoplastic Composites**
 Yuan Zong, Gance Dai, Xiaobing Huang and Xiaogang Yang* — *Glyndwr University, UK
- 13:45 – 14:00**
231: Oral **Drying of Solids in a Batch Fluidized Bed**
 Yelamarthi Pydi Setty* and Gowrishetty Srinivas — *National Institute of Technology, India
- 14:00 – 14:15**
167: Oral **A Fast and Robust Method for the Discrete Element Simulation of Non-Spherical Granular Flows**
 Francois Bertrand*, Olivier Dube, Jamal Chaouki — *Ecole Polytechnique de Montreal, Canada
- 14:15 – 14:25**
662: Mini Talk **Turbulent Dissipation Rates in a Baffled Stirred Tank of Rushton Turbine**
 Thiyam Tamphasana Devi* and Bimlesh Kumar — *Indian Institute of Technology, India
- 14:25 – 14:40**
521: Oral **Study of Temperature, Flow rate and Crude Oil Properties Effects on Ultrasonic Flow Meters Accuracy by CFD Simulation**
 S. Noroozi and S. H. Hashemabadi* — *Iran University of Science and Technology, Iran

Session 1G	Topic 1: Macromolecular Science and Engineering
Date/Time	22 February 2012 / 13:00 – 15:00 hrs
Venue	Room: 310
Chair(s)	Chan Bee Eng, Mary (NTU), En-Tang Kang (NUS)

- 13:00 – 13:25**
819: Keynote **Gel-Based Separation of Carbon Nanotubes for Scalable Printed Field-Effect Transistors**
 Mary B. Chan-Park*, Sara Mesgari, Weishan Chia and Suresh Kumar — *Nanyang Technological University, Singapore
- 13:25 – 13:40**
220: Oral **Recovery of Rare Metal Ions from An Aqueous Solution using Novel Emulsion Gel Adsorbents**
 He Liangliang*, Takuro Yoshida and Hideaki Tokuyama — *Tokyo University of Agriculture and Technology, Japan
- 13:40 – 13:55**
202: Oral **On the Dynamics of Polypropylene Melt: Long Chain Branching and Physical Cross-links**
 Yan Li, Jin-cheng Lu, Shao-long Qiu, Zhen-hua Chen, Fang-jun Zhu, Zhen Yao, Changchun Zeng and Kun Cao* — *Zhejiang University, China
- 13:55 – 14:10**
282: Oral **Covalent Functionalization of Graphene through Friedal-Crafts Acetylation Reaction and Synthesis of Polystyrene Nanocomposites**
 Krishnaraj. Arun*, Andikkadu Masilamani. Shanmugharaj and Sung Hun Ryu — *Kyung Hee University, Korea
- 14:10 – 14:25**
264: Oral **In vitro Degradation of Plasma Modified PLGA: Characterizations and Numerical Model**
 Dave Mangindaan*, Shu-Ling Wang and Meng-Jiy Wang — *National Taiwan University of Science and Technology, Taiwan

Session 1G	Topic 20: Industry – Pharmaceutical, Food & Beverage, Health Care and Home Products
Date/Time	22 February 2012 / 13:00 – 15:00 hrs
Venue	Room: 310
Chair(s)	Kamalesh Sengothi (Roche)

- 14:25 – 14:40**
371: Oral **Facile Preparation of Sagu Starch Esters**
 Felycia Edi Soetaredjo*, Suryadi Ismadji, Lien Huong Huynh, Novy S. Kasim, Ngoc Yen Tran-Thi, Aning Ayucitra and Yi-Hsu Ju — *National University of Science and Technology, Taiwan
- 14:40 – 14:55**
571: Oral **Experimental and Mathematical Modeling Investigation of Supercritical Extraction of Flavonoid Compounds from Dorema Aucheri (Apiaceae)**
 Bahareh Kamyab Moghadas*, A. A. Safekordi, J. Fathi Kaljahi, B. Honarvar and S. A. Vaziri — *Islamic Azad University, Iran

Session 2A	Topic 18: Environmental Science & Technology
Date/Time	22 February 2012 / 15:15 – 17:20 hrs
Venue	Room: 303
Chair(s)	Sun Dalai Darren (NTU), Ting Yen Peng (NUS)

- 15:15 – 15:30** **Replacement of Silica Fume using Silica Waste for Mortar Production**
828: Invited Petchporn Chawakitchareon* and Natthapol Sresthaolarn — *Chulalongkorn University, Thailand
- 15:30 – 15:45** **Bioremediation of Mine Tailings by Fungi- Capacities Enhanced by Metal Adaptation**
239: Invited Marjorie Valix* and Weizheng Ge — *The University of Sydney, Australia
- 15:45 – 16:00** **Response Surface Methodology for Alkali Pretreatment of Narrow Leaves Cattail**
212: Oral Arrisa Ruangmee* and Chayanoot Sangwichien — *Prince of Songkla University, Thailand
- 16:00 – 16:15** **Mineralization of Phenol in Water Utilizing Photo-assisted Fenton Reaction**
274: Oral Hiroyuki Nakagawa* and Emi Yamaguchi — *Kyoto University, Japan
- 16:15 – 16:30** **The Effects of Cu(II) Ion as an Additive on NH₃ Loss and CO₂ Absorption in Ammonia-based CO₂ Capture Processes**
199: Oral Yoori Kim*, Seong-Rin Lim, Chi-Kyu Ahn and Jong Moon Park — *Pohang University of Science and Technology, Korea
- 16:30 – 16:45** **Sorption of SO₂ and NO Over Palm Shell Activated Carbon (PSAC/CE) Sorbent: A Transient Study**
103: Oral S. Sumathi*, S. Bhatia, K. T. Lee and A. R. Mohamed — *Universiti Tunku Abdul Rahman, Malaysia
- 16:45 – 17:00** **Rare Metal Recovery from Ground Powder of Optical Glass by Chlorination**
381: Oral Takahiro Kato*, Kenji Murakami and Katsuyasu Sugawra — *Akita University, Japan
- 17:00 – 17:10** **A Study on the Contribution of Plastic Pipes to the Drinking Water Distribution System**
749: Mini Talk Yoonjin Lee* and Sangchul Nam — *Konyang University, Korea

Session 2B	Topic 5: Energy
Date/Time	22 February 2012 / 15:15 – 17:20 hrs
Venue	Room: 304
Chair(s)	Liu Bin (NUS), David Lou (NTU), Wang Qing (MSE, NUS)

- 15:15 – 15:40** **Efficient Solid-state Dye Sensitized Solar Cells with Conjugated Polymer Hole Conductors**
777: Keynote Liu Bin*, Xizhe Liu, Wei Zhang, YueMing Cheng and Long Wang — *National University of Singapore, Singapore
- 15:40 – 15:55** **Panchromatic Ru(II) Based Sensitizers for DSSC Applications**
734: Invited Yun Chi* — *National Tsing Hua University, Taiwan
- 15:55 – 16:10** **Next Generation "Green" Chemical Technology**
170: Invited Debbie Chiu* — *LCY Chemical Corp., Taiwan
- 16:10 – 16:25** **Controlled Synthesis of Nanostructures for Energy Storage Application**
804: Invited Xianmao Lu* and Zhipeng Sun — *National University of Singapore, Singapore
- 16:25 – 16:40** **Exploration of Nb-doped Titania as Catalyst Support for Alkaline Direct Ethanol Fuel Cell**
291: Oral Son Truong Nguyen* and Xin Wang — *Nanyang Technological University, Singapore

Day 1 — Wednesday, 22 February 2012 : Presentation Schedule

16:40 – 16:55 **Upgrading of Heavy Oil Utilizing Reactive Separation**
458: Oral Ryuichi Ashida*, Akihiro Sakajo, Jun Maekawa, Yuki Koeda and Kouichi Miura — *Kyoto University, Japan

16:55 – 17:10 **Catalytic Performance of Acid-treated Multi-walled Carbon Nanotube and Chemically Converted Graphene Supported Platinum Catalyst for PEM Fuel Cell**
569: Oral Se Hoon Kim, Tae Kyu Lee, Ju Hae Jung, Jun Bom Kim and Seung Hyun Hur* — *University of Ulsan, Korea

Session 2C	Topic 8: Thermodynamics and Molecular Simulations
Date/Time	22 February 2012 / 15:15 – 17:20 hrs
Venue	Room: 308
Chair(s)	Jiang Jianwen (NUS), Shiang-Tai Lin (National Taiwan University, Taiwan)

15:15 – 15:30 **Advancing the Science of Clathrate Hydrates with Molecular Simulations**
63: Invited Amadeu K. Sum — *Colorado School of Mines, USA

15:30 – 15:45 **Molecular Mechanism of Solvent-Responsive Mixed Polymer Brushes**
67: Invited Honglai Liu*, Yunli Xu, Xueqian Chen and Xia Han — *East China University of Science of Technology, China

15:45 – 16:00 **Commercial Process Development of Supercritical CO₂-based Dry Cleaner for 300 mm Nanopattern Wafer**
518: Invited Ki-Pung-Yoo* — *Sogang University, Korea

16:00 – 16:15 **Explicit Inclusion of Molecular Conformations in Phase Equilibrium Prediction from the PR+COSMOSAC Equation of State**
278: Oral Chan-Chia Hsu* and Shiang-Tai Lin — *National Taiwan University, Taiwan

16:15 – 16:30 **Effects of Particle Shape and Matrix Polymer on Self-Assembled Morphology of Polymer-Grafted Nanoparticles**
157: Oral Lin Yung-Lung*, Sheng Yu-Jane and Tsaoc Heng-Kwong — *National Taiwan University, Taiwan

16:30 – 16:40 **Adsorption and Separation of CO₂/H₂ in Mono-, Di- and Trivalent Cation-Exchanged Zeolite-like Metal-Organic Frameworks: Atomistic Simulation Study**
160: Mini Talk Yifei Chen*, Anjaiah Nalaparaju and Jianwen Jiang — *National University of Singapore, Singapore

16:40 – 16:50 **Zeolite-like Metal-Organic Framework for Water Purification through Ion Exchange: A Molecular Dynamics Simulation Study**
180: Mini Talk Anjaiah Nalaparaju* and Jianwen Jiang — *National University of Singapore, Singapore

16:50 – 17:00 **Alternative Approach to Entropy Calculation via Molecular Simulation**
311: Mini Talk Wahyu Perdana Yudistiawan* and Sang Kyu Kwak — *Nanyang Technological University, Singapore

Session 2D	Topic 4: Synthesis and Processing of Nanomaterials
Date/Time	22 February 2012 / 15:15 – 17:20 hrs
Venue	Room: 309
Chair(s)	Zeng, Hua Chun (NUS), Timothy Tan (NTU), Chen Yuan (NTU), Jianping Xie (NUS)

15:15 – 15:30 **Carbon Nanotube Production and Application in Energy Storage**
646: Invited Weizhong Qian* — *Tsinghua University, China

Day 1 — Wednesday, 22 February 2012 : Presentation Schedule

- 15:30 – 15:45** **Green Process for Shape- and Size-Controlled Synthesis of Metal Nanomaterials**
639: Invited Jianping Xie* — *National University of Singapore, Singapore
- 15:45 – 16:00** **Amine-Functionalization of Multi-walled Carbon Nanotubes for Adsorption of Carbon Dioxide**
404: Oral Meei Mei Gui*, Yan Xin Yap, Siang-Piao Chai and Abdul Rahman Mohamed — *Monash University, Malaysia
- 16:00 – 16:15** **Effect of the Presence of the Electrolyte on Pore Structures of Silica Aerogels from Rice Husk Ash**
629: Oral Jia Huang and Tao Wang* — *Tsinghua University, China
- 16:15 – 16:30** **Synthesis of Zeolite Fibers by Ice-Templating**
119: Oral Hajime Tamon*, Hiroki Mori, Hiroaki Watanabe, Takuya Akatsuka and Noriaki Sano — *Kyoto University, Japan
- 16:30 – 16:45** **Fabrication of Carbon-core/TiO₂-sheath Nanofibers from Poly (vinyl alcohol)/TiO₂ Nanofibers by Iodine Vapor Treatment and Carbonization**
353: Oral Shinsuke Nagamine*, Shingo Ishimaru, Asumi Tanaka and Masahiro Ohshima — *Kyoto University, Japan
- 16:45 – 16:55** **Study the Method and Synthesis Parameters of SAPO-34 Ultra Fine Layer Formation on Alumina and Steel Support**
845: Mini Talk Zeinab Jabbari, Shohreh Fatemi* and Mahdi Davoodpour — *University of Tehran, Iran

Session 2E	Topic 14: Green and Sustainable Processes
Date/Time	22 February 2012 / 15:15 – 17:20 hrs
Venue	Room: 307
Chair(s)	Li Zhi (NUS), Wu Jinchun (ICES), Armando Borgna (ICES)

- 15:15 – 15:30** **Synthetic Biochemistry as a Tool for Sustainable Processing: An Industrial Perspective**
589: Invited Joseph P Adams* — *Glaxo Smith Kline R & D Ltd, UK
- 15:30 – 15:45** **Rational Design of Ionic Liquids for Lipase-Catalyzed Reactions**
43: Invited Toshiyuki Itoh* — *Tottori University, Japan
- 15:45 – 16:00** **Supercritical Fluid and its Application**
168: Invited Zhao-Tie Liu*, Jian-Gang Chen, Bao-Hui Zhao, Xuan Liu and Zhong-Wen Liu — *Ministry of Education, China
- 16:00 – 16:15** **Oxidative Dehydrogenation of Ethylbenzene with CO₂**
146: Invited Hao-Bing Yan, Chan Wang, Rui-Xue Yuan, Zhao-Tie Liu and Zhong-Wen Liu* — *Shaanxi Normal University, China
- 16:15 – 16:30** **Production of Optically Pure L- and D-lactic Acids from Lignocelluloses by Thermophilic Bacteria**
756: Invited Wu Jinchuan* — *Institute of Chemical and Engineering Sciences-(A-Star), Singapore
- 16:30 – 16:45** **New and Efficient Catalysts for Activation of Carbon Dioxide and Epoxide to Produce Cyclic Carbonate**
121: Invited Takashi Sakai* — *Okayama University, Japan
- 16:45 – 17:00** **A Potentially Useful Technology by Mimicking Natures - Rapid Conversion of Biomass and CO₂ into Chemicals and Fuels under Hydrothermal Conditions**
686: Invited Fangming Jin*, Xu Zeng, Zhenzi Jing and Zhibao Huo — *Shanghai Jiao Tong University, China

Day 1 — Wednesday, 22 February 2012 : Presentation Schedule

Session 2F	Topic 10: Transport Phenomena
Date/Time	22 February 2012 / 15:15 – 17:20 hrs
Venue	Theatre
Chair(s)	Raymond Lau (NTU), Shing-Bor Chen (NUS), Rensheng Deng (Institute of Bioengineering and Nanotechnology)

- 15:15 – 15:40** **Thermophoresis of Aerosol Particles with Chemical Reactions**
35: Keynote Huan J. Keh* and Tzu H. Hsieh — *National Taiwan University, Taiwan
- 15:40 – 16:05** **Rheology and the Resource Industries**
94: Keynote David V. Boger* — *The University of Melbourne; and Monash University, Australia
- 16:05 – 16:20** **Motion of Dispersed Phases in a Taylor Vortex**
727: Invited Rensheng Deng*, Qiao Jian and Chi-Hwa Wang — *Institute of Bioengineering and Nanotechnology, Singapore
- 16:20 – 16:35** **Relationship between Inter- and Intra-molecular Forces of Adsorbed Additives and Surface Forces in Dispersions**
65: Invited Yee-Kwong Leong* — *The University of Western Australia, Australia
- 16:35 – 16:50** **Insights to Interaction between Hydrophobically Modified 2-Hydroxyethyl Cellulose and Sodium Dodecyl Sulfate**
99: Invited Bing-Hung Chen* — *National Cheng Kung University, Taiwan
- 16:50 – 17:05** **Mathematical Modeling of Continuous Vertical Lime Kiln for all Process Zones Considering Solid Lime Particle Resistance**
715: Oral Yazid Bindar*, Tiur Elysabeth, Anton Irawan and Yogi W. Budhi — *Bandung Institute of Technology, Indonesia
- 17:05 – 17:20** **Intensification Using Rotating Fluidized Beds in a Static Geometry**
825: Oral Juray De Wilde* — *Universit Catholique de Louvain (UCL), Belgium

Session 2G	Topic 17: Process Systems Engineering
Date/Time	22 February 2012 / 15:15 – 17:20 hrs
Venue	Room: 310
Chair(s)	Rangaiah Gade Pandu (NUS), Vinay Kumar Kariwala (NTU)

- 15:15 – 15:40** **Process Systems Engineering of Multicomponent Crystallization and Formation of Complex Solids**
172: Keynote Ka Ming Ng* — *The Hong Kong University of Science and Technology, Hong Kong
- 15:40 – 15:55** **Role of Multi-scale Modelling and Control in the Thermal Management of the Solid Oxide Fuel Cell**
530: Invited Moses O. Tade*, Vijay Periasamy and Hong Mei Yao — *Curtin University, Australia
- 15:55 – 16:10** **Optimal Source-Sink Matching in Carbon Capture and Storage Systems with Time and Capacity Constraints**
502: Invited Raymond R. Tan*, Kathleen B. Aviso, Santanu Bandyopadhyay and Denny K. S. Ng — *De La Salle University, Philippines
- 16:10 – 16:25** **Development of New Soft Sensor Methods for Selecting Process Variables with Consideration of Process Dynamics**
66: Oral Hiromasa Kaneko* and Kimito Funatsu — *The University of Tokyo, Japan
- 16:25 – 16:40** **Model Identification based on ARX Models with Transfer Functions**
32: Oral Junnichiro Kon* and Yoshiyuki Yamashita — *Tokyo University of Agriculture and Technology, Japan

- 16:40 – 16:55**
566: Oral **Investigating the Effects of Energy Integration of CDU and FCC on the Total CO₂ Emissions Using Multi-objective Optimization**
 Mohmmad A. Al-Mayyahi*, Andrew F. A. Hoadley and Gade P. Rangaiah — *Monash University, Australia
- 16:55 – 17:10**
389: Oral **An Efficient Robust Constrained Model Predictive Control with Applications in Chemical Processes**
 Pornchai Bumroongsri* and Soorathep Kheawhom — *Chulalongkorn University, Thailand

Poster Group 1: Wednesday, 22 February 2012 : 13:00 – 17:00 hrs

Venue: Gallery East

Topic 7	Membrane Science & Technology for Emerging Applications
Board : 1 304: Poster	<p>Preparation of Polyacrylonitrile-Based Immobilized Metal-Ion Affinity Membrane for Protein Adsorption Yin-Jie Yang*, Ellis M. Shelley, Yi-Chia Liaw, Shing-Yi Suen, Min-Ying Wang, Eric D. Conte, Tai-Hong Cheng, Cheng-Chiang Huang and Shin-Ying Chou — *National Chung Hsing University, Taiwan</p>
Board : 2 332: Poster	<p>Preparation of PES/Banana Peel Mixed Matrix Membrane and Its Application Cheng-Kang Yang*, Chia-Hao Lin, Sarah A. Ward, Eric D. Conte and Shing-Yi Suen — *National Chung Hsing University, Taiwan</p>
Board : 3 360: Poster	<p>Interface Modification to Enhance Bipolar Membrane Performance Kittikun Sricharoen*, Said Abdu, John Erik Wong, Thomas Melin and Matthias Wessling — *RWTH Aachen University, Germany; and King Mongkut's University of Technology, Thailand</p>
Board : 4 394: Poster	<p>Synthesis and Characterization of Cu₃(BTC)₂ (HKUST-1) Membranes by Secondary Growth Method Seung-Jun Noh* and Jinsoo Kim — *Kyung Hee University, Korea</p>
Board : 5 844: Poster	<p>Fabrication and Application of Tubular Ceramic Membrane for Separation of CO₂ from Light Gases Mahdi Davoodpour and Shohreh Fatemi* — *University of Tehran, Iran</p>
Board : 6 555: Poster	<p>Experimental and Simulation of a Novel Hydrocyclone Shun-Chieh Chang, Shuo-Cheng Chang and Rome-Ming Wu* — *Tamkang University, Taiwan</p>
Board : 7 741: Poster	<p>Ultra-High Performance CO₂ Selective Membranes for Production of Clean Energy Jianzhong Xia* and Tai-shung Chung — *National University of Singapore, Singapore</p>

Topic 5	Energy
Board : 8 150: Poster	<p>Synthesis and Characterizations of MnO₂/CNTs Composite for a Rechargeable Lithium-Air Battery H. R. Eom*, M. S. Kim, T. Y. Kim, M. K. Kim and S. H. Baeck — *Inha University, Korea</p>
Board : 9 387: Poster	<p>Electrochemical Capacitors based on Graphene/MnO₂ Composite using Different Aqueous Electrolytes Woo Jin Yang*, Andikkadu Masilamani, Shanmugaraj and Sung Hun Ryu — *Kyung Hee University, Korea</p>

- Board : 10**
434: Poster **Performance Improvement in Direct Formic Acid Fuel Cells (DFAFCs) by Three Different Electrode Catalyst Coating Methods**
 S. J. Noh, S. M. Baik, J. Kim*, J. Han and Y.Kwon — **Kyung Hee University, Korea*
- Board : 11**
450: Poster **Characterization of Drying Techniques for Up-Grading Sludge Cake**
 Syamsudin* and Herri Susanto — **Institut Teknologi Bandung, Indonesia*
- Board : 12**
580: Poster **Numerical Investigation of Effect of Heterogeneous Reaction Model on Thermal Behavior in Pulverized Coal Combustion**
 Sohey Nozawa* and Yohsuke Matsushita — **Kyushu University, Japan*
- Board : 13**
89: Poster **The Potential of Ethyl Acetate and Methyl Acetate as an Additives for Gasoline Fuel for Compression — Ignition Engines**
 Farhad Ghobadi, Mohammad Reza Ehsani* and Hossein Dabbagh — **Isfahan University of Technology, Iran*
- Board : 14**
675: Poster **Effects of Poly(acrylonitrile-butylacrylate)-Polystyrene Water-Based Binder on the Performance of LIB Anodes**
 Nguyen Thi Minh Hien and Eun-Suok Oh* — **University of Ulsan, Korea*
- Board : 15**
275: Poster **Development of Lab Scale Gasifier for Mongolian Coal**
 Avid Budeebazar and HakJoo Kim* — **Korea Institute of Energy Research, Korea*
- Board : 16**
429: Poster **A Experimental Investigation of Selective CO₂ Adsorption in Landfill Gas**
 Hyung-Taek Kim and Sang Phil Yoon* — **Ajou University, Korea*
- Board : 17**
110: Poster **Removal of H₂S in Syngas Produced from Coal Gasification Using Microwave Plasma**
 Sang Jun Yoon*, Yong Ku Kim and Jae Goo Lee — **Korea Institute of Energy Research, Korea*
- Board : 18**
575: Poster **Metal Impurities Pretreatment Process for Solar Grade Silicon Purification**
 Yu-Chang Liu*, Yun-Fang Lu, Chi-Hung Liao, Yz-Zhen Zeng and Jen-Chieh Chung — **Institute of Nuclear Energy Research, AEC, Taiwan*
- Board : 19**
703: Poster **Natural Dyes from Philippine Plant Extracts as Sensitizers for Dye-Sensitized Solar Cells**
 Arthur A. Gonzales III*, Mark Daniel G. de Luna, Marlon Jesspher B. de Vera, Kara Therese S. Limchiu and Johanna Marie T. Sia — **University of the Philippines Diliman, Philippines*

Topic 10

Transport Phenomena

- Board : 20**
87: Poster **Analysis and Modeling of Main Recovery Mechanisms During Steam Injection Process in Naturally Fractured Reservoirs**
 Shirin Mohammadi, Mohammad R. Ehsani*, Mohammad Nikookar and Leili Sahranavard — **Isfahan University of Technology, Iran*
- Board : 21**
344: Poster **Effect of Shape Parameter of Venturi Type Micro-Bubbles Generator**
 Akihiro Matsuura*, Yasuhiro Sato, Yoichi Ikeda, Yoshihito Kato and Shuichi Iwata — **Daido University, Japan*
- Board : 22**
517: Poster **Instability of Charged Planar Membranes and Spherical and Cylindrical Vesicles**
 Rochish M Thaokar* — **Indian Institute Technology Bombay, India*
- Board : 23**
342: Poster **Quality by Design for Packaging and Shelf-Life of Granola-Breakfast-Product During Storage**
 Isabel S. M. Macedo, Maria J. Sousa-Gallagher, J. C. Oliveira and Edmond P. Byrne* — **University College Cork, Ireland*
- Board : 24**
102: Poster **Deformation and Flow Analysis of a Droplet in High Electric Fields**
 Daisuke Sakuma*, Takeo Shiojima, Yuji Hirose and Yasufumi Otsubo — **Chiba University, Japan*
- Board : 25**
358: Poster **Dimensionless Correlation in Alternating Flow of Immiscible Liquids in Microchannel**
 Hiroki Matsuno, Hiroyuki Hirano*, Tomohiro Nakagawa, Xian Wang and Naotaka Okamoto — **Okayama University of Science, Japan*

- Board : 26**
92: Poster **Numerical Modeling on a Molten Glass Flow by a Lagrangian Approach**
 Xiaosong Sun*, Mikio Sakai, Hiroaki Fujiwara and Yoshikatsu Tochigi — **The University of Tokyo, Japan*
- Board : 27**
255: Poster **Verification of Explicit MPS Algorithm**
 Masatoshi Oochi*, Seiichi Koshizuka and Mikio Sakai — **The University of Tokyo, Japan*
- Board : 28**
124: Poster **Numerical Study on the Coarse Grain Model of the DEM in a Powder Process**
 Shin Mizutani*, Mikio Sakai and Seiichi Koshizuka — **The University of Tokyo, Japan*
- Board : 29**
142: Poster **Numerical Analysis on Heat Transfer of the Blast Furnace Hearth during Tapping Process**
 Chen En Huang, San. Wen. Du and Wen Tung Cheng* — **National Chung Hsing University, Taiwan*
- Board : 30**
151: Poster **Numerical Study on Large Scale Discrete Element Modeling Based on a Scaling Law and a Parallel Computing Technique**
 Yusuke Shigeto*, Mikio Sakai and Seiichi Koshizuka — **The University of Tokyo, Japan*
- Board : 31**
105: Poster **Numerical Simulation on a Bead Mill by a Lagrangian-Lagrangian Method**
 Yoshinori Yamada* and Mikio Sakai — **The University of Tokyo, Japan*
- Board : 32**
83: Poster **The Effect of Rotor Speeds and Flow Rates on the Flow Pattern in an Annular Centrifugal Extractor**
 Kanako Kunii*, Ryuta Misumi, Kazuhiko Nishi, Meguru Kaminoyama, Hiroyasu Hirano, Hideki Ogino and Yuichi Sano — **Yokohama National University, Japan*
- Board : 33**
339: Poster **The Effect of Impeller Rotational Speed on Particle Behaviors in a Stirred Type Crystallizer Based on CFD Simulation**
 Takuji Sasaki*, Ryuta Misumi, Kazuhiko Nishi and Meguru Kaminoyama — **Yokohama National University, Japan*
- Board : 34**
455: Poster **Validation of Dynamic Contact Angle using Continuum Surface Force Model in MPS**
 Takahiro Yamakawa*, Seiichi Koshizuka and Mikio Sakai — **The University of Tokyo, Japan*
- Board : 35**
341: Poster **Experimental and CFD Based Analysis of the Hydrodynamic Characteristics of a Gas-Liquid-Solid Fluidized Bed**
 Hara M. Jena, Gopendra K. Roy and Bhim C. Meikap* — **Indian Institute of Technology, India*
- Board : 36**
237: Poster **Analysis of Operational Parameter Effects on Crude Oil Turbine Meter Accuracy Using CFD Simulation**
 A. Rostami and S. H. Hashemabadi* — **Iran University of Science and Technology, Iran*

Topic 8 **Thermodynamics and Molecular Simulations**

- Board : 37**
81: Poster **Binary Phase Behavior of Tetrahydrofurfuryl Acrylate, Tetrahydrofurfuryl Methacrylate and Supercritical Carbon Dioxide**
 Jung Min Kwon*, Dong Woo Cho, Won Bae and Hwayong Kim — **Seoul National University, Korea*
- Board : 38**
46: Poster **Molecular Simulation Studies of Separation of CH₄/H₂ Mixture in Metal-Organic Frameworks with Interpenetration and Mixed-Ligand**
 Bei Liu*, Changyu Sun and Guangjin Chen — **China University of Petroleum, China*
- Board : 39**
598: Poster **Liquid-Liquid Equilibria for Water + (N-Methyl-2-pyrrolidone, Dimethyl sulfoxide) + (Methyl methacrylate, Butyl methacrylate)**
 Jui-Tang Chen*, Wen-Lu Weng, Shin-Wei Ho and Yu-Ching Chien — **Ming-Hsin University of Science and Technology, Taiwan*
- Board : 40**
221: Poster **Vapor Pressures and Phase Equilibrium for Mixtures Containing Water, Acetonitrile and Ionic Liquid**
 Kexia Chen, Yeling Zheng, Changchun He, Changjun Peng* and Honglai Liu — **East China University of Science and Technology, China*
- Board : 41**
245: Poster **Ternary Liquid-Liquid Equilibria Measurement for Propanol and Propyl Acetate with the Ionic Liquid 1-Alkyl-3-Methylimidazolium Chloride at T=(298.15, 303.15, and 318.15) K**
 Jung-Chin Tsai and Tong-Yan Lin* — **Ming Chi University of Technology, Taiwan*

Board : 42 **New Thermochemical Software: CatCalc**
 480: Poster Kazuhisa Shobu* — **National Institute of Advanced Industrial Science and Technology, Japan*

Topic 13 Catalysis and Reaction Engineering

Board : 43 **Effect of Support on Ethylene Epoxidation over Ag-Based Catalysts**
 22: Poster Atiporn Chongterdtoonskul*, Johannes W. Schwank and Sumaeth Chavadej — **Chulalongkorn University, Thailand*

Board : 44 **Effect of Copper Surface Area and Acidic Sites for Dimethyl Ether Synthesis from Syngas Over Cu-Zno/Al₂O₃ Catalysts**
 139: Poster Jong Wook Bae*, Suk-Hwan Kang and A Rong Kim — **Sungkyunkwan University (SKKU), Korea*

Board : 45 **Comparative Study on the Efficiency and Mechanisms of Photo-catalytic Degradation of Crystal Violet by MTiO₃ (M=Ba, Sr)**
 82: Poster Wu-Sheng Huang, Tsung-Wen Yeh, Li-Wen Chen and Chiing-Chang Chen* — **National Taichung University of Education, Taiwan*

Board : 46 **Photocatalytic Degradation of Crystal Violet over Bi₂WO₆ Prepared Using Different Hydrothermal Methods: A Comparative Study**
 49: Poster Mei-Chun Cheng, Jau-Yuan Chen, Shih-Tsuen Huang and Chiing-Chang Chen* — **National Taichung University of Education, Taiwan*

Board : 47 **Ultrasound-Assisted Phase-Transfer Catalysis: Green Synthesis of Substituted Benzoate with Novel Dual-Site Phase-Transfer Catalyst in Solid-Liquid System**
 210: Poster Hung-Ming Yang* and Wei-Ming Chu — **National Chung Hsing University, Taiwan*

Board : 48 **TGA Study on Catalytic Gasification of Lignite**
 248: Poster Chan Young Park*, Young Woo Rhee, Moon Hee Han and Si Hyun Lee — **Chungnam National University, Korea*

Board : 49 **Synergistic Effects of Au alloying and CO Heat Treatment on PdCo/C Catalysts for Oxygen Reduction Reaction**
 301: Poster Yu-Chen Wei* — **National Central University, Taiwan*

Board : 50 **Selective Hydrogenation of Levulinic Acid to γ -Valerolactone over Carbon-Supported Noble metal Catalysts**
 609: Poster Pravin P. Upare*, Dong Won Hwang, Young Kyu Hwang and Jong-San Chang — **Korea and University of Science and Technology (UST), Korea*

Board : 51 **The Synthesis of the Mesoporous Silica Catalyst Support and Highly Enhanced Photocatalytic Activity of Supported Titania Nanoparticles**
 723: Poster Tzong-Horng Liou*, Bo-Chen Lai and Bin-Joen Tsay — **Ming Chi University of Technology, Taiwan*

Board : 52 **Synthesis and Characterization of Copper Oxide with Alumina Oxide Supporter Catalysts in Chemical Looping Process**
 313: Poster Pao-Chi Chen*, M. Lee, Zink Wu and Jason Lin — **Lunghwa University of Science and Technology, Taiwan*

Board : 53 **Kinetic Study of the Transesterification of Palm Oil with Ethanol**
 161: Poster Sanaz Shahla*, Gek Cheng Ngoh and Rozita Yusoff — **University of Malaya, Malaysia*

Board : 54 **Effects of Chemisorbed Carbon Monoxide on Kinetics of Hydrogen Oxidation Reaction at Nafion-Covered PtRu/C Rotating Disk Electrodes**
 158: Poster Ren-Bin Lin*, Pei-Wen Ho and Shin-Min Shih — **Chinese Culture University, Taiwan*

Board : 55 **Catalytic Combustion of Benzene Over LaMnO₃ type Perovskite Oxides**
 525: Poster Won Young Jung* and Seong-Soo Hong — **Pukyong National University, Korea*

Board : 56 **Preparation and Characterization of Ni-Mo/SBA-15 Catalysts for Direct Coal Liquefaction**
 227: Poster Do Hyeong Kim*, No-Kuk Park, Tae Jin Lee and Gi-Bo Han — **Yeungnam University, Korea*

- Board : 57**
407: Poster **Longevity Tests Ni-based Catalysts Prepared by Impregnation and Precipitation Methods for Methanation of Synthetic Gas**
 Jae-Young Park*, No-Kuk Park, Tae Jin Lee, Dong Jun Koh and Joon Hyun Baik — *Yeungnam University, Korea
- Board : 58**
477: Poster **Preparation and Activity Tests of CuO/Al₂O₃ for Catalytic Reduction of SO₂ from O₂ Contained Regeneration Gas**
 Cheolho Jeong*, No-Kuk Park, Tae Jin Lee, Jeom-In Baek and Chong Kul Ryu — *Yeungnam University, Korea
- Board : 59**
457: Poster **Catalytic Conversion of n-Alkanes to Aromatics over Silylated Ga-exchanged HZSM-5 Catalysts**
 Tunchanok Nitipan*, Siriporn Jongpatiwut, Thirasak Rirksomboon and Boonyarach Kitiyanan — *Chulalongkorn University, Thailand
- Board : 60**
485: Poster **Photo-epoxidation of Propylene to Propylene Oxide over V-Ti/MCM-41: A Wavelength Effect on Photocatalytic Activities**
 Van-Huy Nguyen*, Hsiang-Yu Chan, Hsunling Bai and Jeffrey C. S. Wu — *National Taiwan University, Taiwan
- Board : 61**
782: Poster **An Experimental Investigation on Methanol to Propylene Process Reactors**
 Amir Hossein Tarighaleslami* and Mohammad Nozarifard — *Islamic Azad University, Iran

Topic 18

Environmental Science & Technology

- Board : 62**
93: Poster **Studying Arsenic Removal using Nanoscale Zero-valent Iron**
 Uma Ramachandran and Shobana Ganesan* — *BITS Pilani, Dubai UAE
- Board : 63**
251: Poster **The Effect on the Perchlorate Removal by the Amine Ligands Functionalized on the Mesoporous Materials**
 Byunghwan Lee* and Sang Don Lee — *Keimyung University, Korea
- Board : 64**
253: Poster **Bisphenol A Detection in Aqueous Solution Using Pellet-Type Porous Gold Electrode**
 Byunghwan Lee*, Sang Don Lee and Younghun Kim — *Keimyung University, Korea
- Board : 65**
249: Poster **Desorption Characteristics of Used Activated Carbons**
 Soon Chul Kwon*, Joo Yeon Kim, Sung Min Yoon, Moon Hee Han and Young Woo Rhee — *Chungnam National University, Korea
- Board : 66**
698: Poster **Biosurfactant-Producing Bacteria for Enhancing Solubility of Petroleum Hydrocarbons**
 Waritha Tulalamba*, Nanthorn Paorach, Wanwasan Wongwongsee, Natthariga Laothamteep, Ekawan Luepromchai and Onruthai Pinyakong — *Chulalongkorn University, Thailand
- Board : 67**
696: Poster **Screening of Biosurfactant-Producing Bacteria and Its Application for Vegetable Oil Extraction**
 Jinnapat Chaiyasit*, Nanthorn Paorach, Natthariga Laothamteep, Ekawan Luepromchai and Onruthai Pinyakong — *Chulalongkorn University, Thailand
- Board : 68**
697: Poster **Immobilization of Serratia sp. W4-1 in Chitosan-Activated Carbon Beads for Diesel-Contaminated Water Treatment**
 Chalinee Chamcheun* and Onruthai Pinyakong — *Chulalongkorn University, Thailand
- Board : 69**
356: Poster **Microwave-Assisted Alkali Pretreatment for the Enhancement of Biogas Production from Banana Stalk Waste**
 Chao Li*, Xiangyang Lu, Xiyu Cheng, Yun Tian and Jing Liu — *Hunan Agricultural University, China
- Board : 70**
147: Poster **EMMC Process for Treatment of Thin-Film Transistor Liquid Crystal Display (TFT-LCD) Wastewater**
 Jyh-Shyong Chang*, Ming-Chun Yen and Chiao-Hua Chen — *Tatung University, Taiwan

- Board : 71**
379: Poster
An Innovative Method to Assess Biodegradation Rates of Gaseous Compounds with Low Solubility
 Tae Gwan Kim*, Taewoo Yi, Min Kyeong Kim and Kyung-Suk Cho — *Ewha Womans University, Korea
- Board : 72**
615: Poster
Influence of Synthesis Parameters on CO₂ Capture of CaO-SiC Sorbents
 Meilina Widyawati*, Tamara L. Church and Andrew T. Harris — *The University of Sydney, Australia
- Board : 73**
755: Poster
An Evaluation of Combined Treatment Using Slurping and In-Situ Soil Flushing to Remediate an Oil-Contaminated Site in Korea
 Yoonjin Lee* and Hwan Lee — *Konyang University, Korea
- Board : 74**
385: Poster
Bioremediation of Diesel-Contaminated Soils by Natural Attenuation, Biostimulation and Bioaugmentation
 Kyung-Suk Cho*, Hee Wook Ryu, Eun-Hee Lee and Yeon-Sil Kang — *Ewha Womans University, Korea
- Board : 75**
386: Poster
Reduction of Perchlorate by Salt Tolerant Bacterial Consortia
 Hee Wook Ryu, Seong Jin Nor, Kyung Eun Moon, Kyung-Suk Cho*, Daniel K. Cha and Kang In Lee — *Ewha Womans University, Korea
- Board : 76**
519: Poster
Sustainable and Effective Treatment of Sanitary Waste through a 2-stage Process
 Andrew Kon* — *Singapore Polytechnic, Singapore
- Board : 77**
376: Poster
Release Behavior of Fluorine during Heat Treatment of Steel Dusts
 Takahiro Kato*, Kenji Murakami and Katsuyasu Sugawra — *Akita University, Japan
- Board : 78**
657: Poster
Tomorrows Architecture: Biological NanoArchitecture
 Maged F. Elsamny* — *Alexandria University, Egypt
- Board : 79**
321: Poster
Beryllium Distribution from Sapphire Treatment Process within Home Factories in Chanthaburi Province
 Yada Wongwattanakul, Chakkaphan Sutthirat and Arubol Chotipong* — *Chulalongkorn University, Thailand

Topic 19 **Industry – Petrochemical, Special Chemicals, Polymers, Semiconductors**

- Board : 80**
617: Poster
Compatibilizing Effect of Poly(phenylenevinylene) in Functionalized Graphene Sheets/Polycarbonate Nanocomposites
 Jin Ho Park*, Soon Cheol Kim, Jin Taek Choi, Seong Min Oh, Kyung Min Oh, Su Jin Han, Trung Dung Dao and Han Mo Jeong — *University of Ulsan, Korea
- Board : 81**
310: Poster
Self-Assembled Behavior of Functionalized Alkanethiols on Au(111) Electrode Characterized by Cyclic Voltammetry and Scanning Tunneling Microscopy
 Pei-Ying Lai*, Jing-Wei Su, Wei-Ping Dow and Shueh-Lin Yau — *National Chung Hsing University, Taiwan
- Board : 82**
314: Poster
Through Silicon via Filling by Ni-W Electrodeposition for Three-dimensional Chip Stacking
 Hsin-Man Huang* and Wei-Ping Dow — *National Chung Hsing University, Taiwan

Topic 20 **Industry – Pharmaceutical, Food & Beverage, Health Care and Home Products**

- Board : 83**
633: Poster
In Vitro Antioxidant Properties of the Edible Basidiomycete Phellinus Igniarius by Solid-state Fermentation
 Ming-Yeou Lung* — *Ming-Hsin University of Science and Technology, Taiwan

Topic 4 **Synthesis and Processing of Nanomaterials**

- Board : 84**
26: Poster
Synthesis and Characterization of Fe₃O₄ Nano-powder via a Simple Wet Chemical Method
 Ali Shamel*, Esmael Darrezereshki and Ali Behrad — *Islamic Azad University, Iran

Day 2: Thursday, 23 February 2012

Programme Overview

		Time/Venue	Suntec Convention Centre, Level 3, Theatre	
Seminar: Process Safety Management			Process Safety Management Seminar Chair: Ramabhadran Srinivasan	
	08:30 – 09:10		Singapore's Approach to Process Safety Management Go Heng Huat, <i>Deputy Director, OSH Specialist Department, Occupational Safety & Health Division, Ministry of Manpower</i>	
	09:10 – 09:40		Learning from Major Process Safety Incidents Brian D. Rains, <i>Leader, DuPont's Process Safety/ Operations Risk Management Consulting Practice, USA</i>	
	09:40 – 10:10		Keys to Effective Site Wide Risk Management & Efficient Resource Utilisation Don Kimbril, <i>Chief Safety Engineer, ExxonMobil Chemical Company</i>	
	10:10 – 10:30		Tea / Coffee Break	
Plenary Talks	10:30 – 11:10		Plenary Talk 3: Process Safety: Great Britain HSE Regulator Approach Judith Hackitt CBE, <i>Chairperson Health and Safety Executive, UK</i> Chair: Kus Hidajat, <i>National University of Singapore</i>	
	11:10 – 11:50		Plenary Talk 4: Engineering Considerations in the Design of Energy Storage Materials Prof. Jim Yang Lee, <i>National University of Singapore</i> Chair: Kus Hidajat, <i>National University of Singapore</i>	
	11:50 – 12:30		Plenary Talk 5: Critical Role Of Leadership in Preventing Major Accidents in Chemical Process Industry Graeme Ellis, <i>Principal Lead Consultant, ABB Consulting, UK</i> Chair: Kus Hidajat, <i>National University of Singapore</i>	
	12:30 – 13:20		Lunch Break	
Seminar: Process Safety Management			Process Safety Management Seminar (Continued) Chair: Thong, Patrick Loke Keat	
	13:20 – 13:45		GHS Implementation in Singapore Veronica Chow, <i>Senior Assistant Director (Occupational Hygiene), Occupational Safety and Health Division, Ministry of Manpower</i>	
	13:45 – 14:20		Process Safety - PHA Study & Challenges in Industry Rachelle Doyle, <i>Senior Process Safety Specialist, Energy Technology Company, Chevron Energy Technology Pty Ltd, Perth, Australia</i>	
	14:20 – 14:55		Process Safety Hazard Analysis - Use of Bow Tie Tool for Easy Hazard Analysis Study Syed Zaiful Hamzah, <i>Principal Risk Consultant, ABS Consulting, Singapore</i>	
	14:55 – 15:15		Tea / Coffee Break	
				Process Safety Management Seminar (Continued) Chair: Amit Bhatnagar
	15:15 – 15:50		Safety Instrumented System - A Critical Barrier Sujith Panikkar, <i>CFSE, FSE (TÜV SÜD), FS Expert (TÜV Rheinland), Consultant- Safety Systems Engineering, Yokogawa Engineering Asia Pte Ltd, Singapore</i>	
	15:50 – 16:25		Process Safety Indicators – Key to Incident Free Operation Bernard Leong, <i>Health, Safety & Environment Manager, Petrochemical Corporation of Singapore (Private) Limited</i>	
	16:25 – 17:00		Process Safety Risk Reduction Approach – An Insurance Risk Engineering Perspective Yue Feng Chen, <i>Vice- President, Global Energy Risk Engineering –Asia Energy Practice, Marsh (Singapore) Pte Ltd</i>	
	17:00 – 17:30		Q & A Forum: Process Safety Management Seminar Moderator: Amit Bhatnagar	
	17:30		End of Day 2	

Day 2: Thursday, 23 February 2012

Seminar & Plenary Talks

Process Safety Management Seminar

Singapore's Approach to Process Safety Management

Go Heng Huat, *Deputy Director, OSH Specialist Department, Occupational Safety & Health Division, Ministry of Manpower*

Process Safety Management is a holistic management of Process Safety to prevent process incidents and mitigate their consequences. The talk covers the development of process safety management, the regulatory framework to engender the adoption of process safety management and the way forward.

Go Heng Huat is a Deputy Director of the Occupational Safety and Health Division, Ministry of Manpower. He holds a Bachelor of Science (Hons) and Master of Science in Chemical Engineering from the University of Newcastle, UK. He is an Associate Member of the Institution of Chemical Engineers.

Go Heng Huat has been actively involved in the Singapore standardization especially in the area of safety standards. He sits in Management System Standard Committee of SPRING Singapore and chairs the Technical Committee on Occupational Safety and Health Management System. He is a member of the Council Committee for Management Systems and Products of the Singapore Accreditation Council. Mr Go is also an Adjunct Associate Professor with the Department of Chemical Engineering and Biomolecular Engineering of the National University of Singapore.

Learning from Major Process Safety Incidents

Brian D. Rains, *Leader DuPont's Process Safety/ Operations Risk Management Consulting Practice, USA*

Incident investigations teams routinely identify not just a single root cause that triggered the incident but also a number of other, contributing causes. One explanation for this observation is the well known "Swiss cheese model" as described by James Reason. A second explanation is the interdependent nature of the various PSM elements; how weakness in one can contribute to failure in another. In the highly complex facilities that are operated by Oil & Gas, Chemicals, Metals companies, only a truly integrated and interdependent approach to PSM implementation will successfully prevent serious Process Safety Incidents

Brian started his career with DuPont in 1981 and has gained extensive experience primarily in manufacturing and technology. He has held Plant Manager roles in the USA, Spain and Singapore as well as other a wide range of other leadership assignments. In Singapore, he served as Director of the Singapore Chemical Industry Council and as Chair of the Responsible Care Committee. He has been leading the process safety management practice since 2008 for DuPont Sustainable Solutions. Brian is sought after speaker in major events across the globe and has interacted with major process companies across all regions.

Brian was born in California. He earned his B.S. degree in Chemical Engineering from Brigham Young University in 1981.

Keys to Effective Site Wide Risk Management & Efficient Resource Utilisation

Don Kimbril, *Chief Safety Engineer, ExxonMobil Chemical Company*

Every operating facility has risks....many of them. Those risks are not the same...some are more significant than others. The keys to effective risk management incorporates a comprehensive process of risk discovery, risk assessment that prioritizes based upon significance, and resource allocation that maximizes risk reduction. This paper will describe the process in place within ExxonMobil to do just that.

Don has worked in the Safety Engineering field for ExxonMobil for the past 32 years. He has worked in operations at various ExxonMobil affiliates around the world ranging from offshore platforms in the North Sea to petrochemical plants in the United States. Don has a Bachelors degree in Industrial Engineering from Auburn University, and a Masters degree from Texas A&M University. He is a Certified Safety Professional and a Registered Professional Engineer.

Plenary 3

Process Safety: Great Britain HSE Regulator Approach

Judith Hackitt CBE, *Chairperson Health and Safety Executive, UK*

Judith Hackitt CBE, FREng and Chair of the Health and Safety Executive, Great Britain, will become Deputy President of IChemE in May 2012. Judith has spoken at a number of international conferences about the importance of process safety and has been actively involved with business leaders in raising awareness of the need for leadership from the very top if standards are to be improved further.

In her keynote address she will provide an update on recent developments including:

- The UK regulator's approach to major hazards inspection on and offshore;
- Tools and techniques available for assessing the consequences of major incidents and addressing land use planning implications;
- The development of a national competence framework for process safety;
- Development of meaningful indicators of process safety performance; and
- Case studies highlighting examples of industry good practice in leadership and experience sharing.

Judith was appointed Chair of the Health and Safety Commission with effect from 1 October 2007 for a term of 5 years and became Chair of the Health and Safety Executive when the two organisations merged on 1 April 2008. Judith previously served as a Commissioner between 2002 and 2005. She was awarded her CBE for services to health and safety.

Judith worked in Brussels for the European Chemical Industry Association (CEFIC) in 2006/7. She worked at the Chemical Industries Association as Director of Business and Responsible Care (1998-2002) and Director General (2002-2006).

Judith began her working career in 1975 with Exxon Chemicals where she spent 15 years in various process management roles at Fawley. She was subsequently European Operations Director of a speciality pigments business before becoming Group Risk Manager at Elementis PLC with world-wide responsibility for health and safety, insurance and litigation. She also served for three years as a non-executive Director of Oxfordshire Health Authority.

Judith trained as a Chemical Engineer at Imperial College, London and is a Fellow of the Institution of Chemical Engineers, an Ordinary Member of Council of the Institution of Chemical Engineers, a Fellow of the City and Guilds Institute and an Honorary Vice President of the Institution of Occupational Safety and Health. She was elected as a Fellow of the Royal Academy of Engineering in July 2010.

Judith was appointed as a non-Executive Director of the Energy Saving Trust in January 2009. She became a Trustee of the National Coal Mining Museum for England in June 2009.

Judith has also been named as the president-elect of the Institution of Chemical Engineers (IChemE) for 2013/14. She will take up the role of deputy president in 2012-2013.

Plenary 4

Engineering Considerations in the Design of Energy Storage Materials

Prof. Jim Yang Lee, *National University of Singapore, Singapore*

An energy storage system is essential for managing the mismatch between energy supply and energy demand in any energy system, a situation that will become more common with the increasing use of renewable energy sources in the energy mix. Since electricity is the most useful form of energy, electrical energy storage systems (EESS) have naturally generated the greatest interest. While there are many options for EESS, rechargeable batteries will remain as the most accessible solution for some time. However, the storage requirement for these larger scale applications far exceeds the capability of current battery systems which have been designed for portable electronics. While engineering solutions such as system integration may provide some relief, they also intensify some of the innate deficiencies of the batteries. A more holistic solution for the continuing development of battery systems must also explore new and safer materials through innovations.

This presentation will discuss some of the approaches that should be used for the design of "practical electrode materials". For example the composite approach, component selections that are based on cost and safety considerations, mesoscale assembly of nanostructured materials, and scalability and "greenness" of manufacturing processes. Many examples will be drawn from our research experience on lithium-ion battery materials.

Lee Jim Yang is Professor and Head of the Department of Chemical and Biomolecular Engineering at NUS. He also holds a concurrent appointment with the NUS Graduate School and an Adjunct Scientist appointment at the Institute of Materials Research and Engineering (IMRE). He graduated from the then University of Singapore with first class honours, and received his Master and PhD degrees from the University of Michigan at Ann Arbor. He is a member of the American Institute of Chemical Engineers (AIChE), American Chemical Society (ACS) and The Electrochemical Society (ECS).

Professor Lee researches on new materials for lithium-ion batteries and room temperature direct alcohol fuel cells for portable applications. He is well cited for his works on carbon-tin composite anode materials for lithium ion batteries, carbon-nanotube supported anode catalysts, fuel-tolerant cathode catalysts and alcohol-blocking polymer electrolyte membranes for direct alcohol fuel cells. He also works on shape- and size-controlled synthesis of nanoparticles and "green synthesis" of metal nanoparticles with simple micro-organisms and small biomolecules. His new interests include photolysis of water and microbial fuel cells. He has coordinated several energy-related initiatives for the Faculty of Engineering at NUS.

Plenary 5

Critical Role Of Leadership in Preventing Major Accidents in Chemical Process Industry

Graeme Ellis, *Principal Lead Consultant, ABB Consulting, UK*

This paper will explore the leadership failings that contributed to recent major accidents, and the cost of these to both the company reputation and the individuals involved. Key issues will be discussed that can lead to improved leadership in the major hazard industries, including Petrochemicals, Chemicals and Pharma plants. These will include; attitudes and decisions of senior manager affecting the safety culture of the organisation, reinforcing the importance of safety by personal example, thorough understanding of major accident hazards and key risk control systems, investigating process safety incident and near misses to find the underlying causes, developing world class safety management systems, and identifying weaknesses in these systems using targeted performance indicators.

Graeme Ellis is a Principal Lead Consultant with ABB Consulting based in the UK. He has a Process Engineering background and 32 years experience in the process industry previously with Kellogg, Hercules and ICI. Graeme trained as a hazard study leader and has worked as a Process Safety Consultant in all sectors of the process industry since 1994. His main areas of work are Process Safety management and risk assessment, particularly with major accident hazard sites in the UK. Graeme is a member of the Energy Institute Process Safety committee, and the 'expert panel' developing standards for Process Safety Leadership training, supported by UK HSE and chaired by the Chemical Industries Association.

Process Safety Management Seminar

GHS Implementation in Singapore

Veronica Chow, *Senior Assistant Director (Occupational Hygiene), Occupational Safety and Health Division, Ministry of Manpower*

Presentation outlines GHS as a baseline of Chemical Management and roadmap for its implementation in Singapore

Process Safety - PHA Study & Challenges in Industry

Rachelle Doyle, *Senior Process Safety Specialist, Energy Technology Company, Chevron Energy Technology Pty Ltd, Perth, Australia*

Process Hazards Analyses (PHA) studies are a key tool used to recognize and manage process safety risks. Ineffective PHA can lead to hazards not being identified, consequences not being fully understood and the subsequent risks being underestimated. Challenges to PHA effectiveness can arise from a number of sources ranging from out of date process safety information, lack of rigor, inappropriate analysis technique, to team member selection issues. This presentation will outline some common failures mechanisms, along with methods that can be used in the preparation, execution and validation of a PHA study to assist in achieving a successful study

Rachelle started her career as a Chemical Engineer with Alcoa and has held various process engineering, operations, process safety positions in operating companies and specialist consulting companies before joining Chevron on the Gorgon Project and then into her current Chevron Energy Technology Company assignment as a Senior Process Safety specialist based in Perth, Australia.

Rachelle has a Bachelor's degree in Chemical Engineering and a Graduate Diploma in Business from Curtin University in Australia.

Process Safety Hazard Analysis - Use of Bow Tie Tool for Easy Hazard Analysis Study

Syed Zaiful Hamzah, *Principal Risk Consultant, ABS Consulting, Singapore*

The Bow-Tie tool is a easy to use HAZAN tool with clear presentation on multiple barriers installed for each threat and the ability to see how the degradation of individual barriers increases the overall risk. It is a good visual tool indicating multiple barriers and the mitigation steps put in place to prevent Loss Of Containment incidents.

Syed Zaiful Hamzah is a Principal Risk Consultant at ABS Consulting in Singapore, where is serves primarily as the lead consultant and project manager for the undertaking of risk assessments for offshore and onshore installations. His primary areas of expertise are in the preparation of HSE cases, bow-tie analysis, HAZOP/PHA facilitation and various technical safety studies such as Quantitative Risk Assessment (QRA), Fire & Explosion Assessment (FEA), Escape, Temporary Refuge, Evacuation & Rescue Analysis (ETRERA), Emergency Systems Survivability Analysis (ESSA) etc. He has almost 20 years experience in Asia and Europe, covering plant operations, corporate risk management and risk consulting.

Syed hold as BSc. Degree in Chemical & Petroleum-Refining Engineering from Colorado School of Mines, Golden, Colorado, USA.

Safety Instrumented System - A Critical Barrier

Sujith Panikkar, *CFSE, FSE (TÜV SÜD),FS Expert (TÜV Rheinland),Consultant- Safety Systems Engineering, Yokogawa Engineering Asia Pte Ltd, Singapore*

The talk aims to address the position of Safety Instrumented systems in the overall risk reduction strategy for a process plant and how this forms a critical safety preventive. In this perspective, the factors that influence reliability of such

critical systems and design conformance to safety targets are examined. How standards (IEC61508/ 61511) provide the necessary guidance for realization of safety instrumented systems.

Sujith has a Masters degree in SHE from NUS, Singapore and is a Certified Functional Safety Expert. He has over 21 years of experience in the field of Industrial Automation Systems & products for Oil & Gas, Petroleum Refining, LNG, downstream petrochemicals industry projects including Distributed Control Systems and Safety Instrumented Systems for ESD/ BMS/ F&G applications and Intrinsically Safe hazardous area interfaces. Currently he is engaged in Functional Safety and Safety Systems Engineering Practice at Yokogawa in Singapore.

Process Safety Indicators - Key to Incident Free Operation

Bernard Leong, *Health, Safety & Environment Manager, Petrochemical Corporation of Singapore (Private) Limited*

The presentation will touch on background of recent thrusts in Process Safety and what stakeholders need to commit. It will briefly cover the company's initiatives and its selection of Key Performance Indicators for Process Safety and Reliability.

The paper will wrap up with importance of learning and sharing collaboration within the industry.

Bernard has more than 20 years experience in the process industry, in the areas of process technology and operations. He spent the last 5 years in HSE capacity, first in line function safety and health and recently in corporate capacity.

Bernard develops and administers policies and programs for workplace safety and health, and environmental issues in accordance with corporate and legal requirements.

Process Safety Risk Reduction Approach - An Insurance Risk Engineering Perspective

Yue Feng Chen, *Vice- President, Global Energy Risk Engineering - Asia Energy Practice, Marsh (Singapore) Pte Ltd*

The Oil, Gas and Petrochemical sectors in Asia are in a continuous state of growth across many markets in the region. Despite this momentum, the industry has suffered record losses across the region, highlighting the risk exposures as the industry develops and matures. Are we learning from these lessons? This presentation will provide insights and approach to manage risks from insurance risk engineering perspective. Risk ranking and the areas of concerns in rating risks from the insurance market will be shared in the presentation

Yue Feng is Marsh Asia's Engineering practice leader based in Singapore. He has worked with oil, gas and petrochemical clients across Europe and Asia.

Day 2: Thursday, 23 February 2012

Presentation Schedule

Session 3A	Topic 10: Transport Phenomena
Date/Time	23 February 2012 / 08:30 – 10:10 hrs
Venue	Room: 303
Chair(s)	Raymond Lau (NTU), Shing-Bor Chen (NUS), Rensheng Deng (Institute of Bioengineering and Nanotechnology)

- 08:30 – 08:45** **Mass Transfer Characteristics in a Shallow Bubble Column**
732: Invited Raymond Lau* and Tao Chen — *Nanyang Technological University, Singapore
- 08:45 – 09:00** **Electrostatic Charging Phenomena in Particulate Flow Systems**
739: Invited Ah-Hyung Alissa Park* and Xiaozhou Zhou — *Columbia University, USA
- 09:00 – 09:15** **Desulphurization of Flue Gas in Gas-liquid and Gas-liquid-solid Systems**
659: Oral Susanta K. Jana* and Musango Lungu — *Malaviya National Institute of Technology Jaipur, India
- 09:15 – 09:30** **Characterizing the Pore Structure-Transport Property of Porous Materials with X-ray Microtomography**
266: Oral Michael Angelo B. Promentilla* — *De La Salle University, Philippines
- 09:30 – 09:45** **Alternate Effects of Thermo-solutal Marangoni Convection on Flow Patterns in a Floating Half Zone**
368: Oral Hisashi Minakuchi, Yasunori Okano*, Kensaku Mizoguchi, Satoru Gima and Sadik Dost — *Osaka University, Japan

Session 3B	Topic 1: Macromolecular Science and Engineering
Date/Time	23 February 2012 / 08:30 – 10:10 hrs
Venue	Room: 307
Chair(s)	Chan Bee Eng, Mary (NTU), En-Tang Kang (NUS)

- 08:30 – 08:45** **Effects of CaCO₃ Concentration on The Dynamic and Viscoelastic Properties of Polypropylene Melts**
326: Oral Tee Tiam-Ting, Tin-Sin Lee*, Soo-Tueen Bee, Chong-Yu Low and Han-Liang Liew — *Universiti Tunku Abdul Rahman, Malaysia
- 08:45 – 09:00** **Surface-mediated Inkjet Printing for the Fabrication of Organic Thin Film Devices**
779: Oral Dai Gun Yoon, Seok-Ho Hwang, Oh Young Kim and Byung Doo Chin* — *Dankook University, Korea
- 09:00 – 09:10** **Preventing Particles Agglomeration in Gas Phase Polymerization of Isoprene by Using Nano-SiO₂**
207: Mini Talk Qiang Fu*, Zhen Yao and Kun Cao — *Zhejiang University, China
- 09:10 – 09:20** **Model Development for Semicontinuous Production of Ethylene and Norbornene Copolymer at Elevated Pressure**
208: Mini Talk Bin-Bin Dai*, Yue-Xiao Song, Shao-Jie Liu, Zhen Yao and Kun Cao — *Zhejiang University, China

Day 2 — Thursday, 23 February 2012 : Presentation Schedule

Session 3C	Topic 6: Biochemical Engineering / Biofuel
Date/Time	23 February 2012 / 08:30 – 10:10 hrs
Venue	Room: 304
Chair(s)	Loh Kai Chee (NUS), Susanna Leong Su Jan (NTU)

- 08:30 – 08:55** **A Roadmap for the Next Generation of Biodiesel**
118: Keynote Simon Ng*, Shuli Yan, Manhoe Kim and Steven O Salley — *Wayne State University, USA
- 08:55 – 09:10** **Engineering an Inner Membrane Transporter of for Improved Hydrocarbon Efflux in *E. Coli***
687: Invited Jee Loon Foo and Susanna Su Jan Leong* — *Nanyang Technological University, Singapore
- 09:10 – 09:25** **Data Mining of Robust Enzymes for Green Production of Fine Chemicals**
173: Oral Jian-He Xu*, Hui-Lei Yu, Chun-Xiu Li and Gao-Wei Zheng — *East China University of Science and Technology, China
- 09:25 – 09:40** **Efficient Synthesis of Alkyl Glucosides by an Extremely Thermostable Recombinant -Glucosidase from *Dictyoglomus Thermophilum***
322: Oral Huilei Yu*, Zhengzheng Zou, Chunxiu Li and Jianhe Xu — *East China University of Science and Technology, China
- 09:40 – 09:55** **Transgene Amplification and Hyperproductivity in CHO Cells Gaining Mechanistic Insights through Systems Analysis**
818: Oral Le Huong*, Jacob Nitya M., Tsao Yung-Shyeng, Ng Sze Wai, Loo Bernard L. W., Liu Zhong and Hu Wei-Shou — *University of Minnesota, USA

Session 3D	Topic 7: Membrane Science & Technology for Emerging Applications
Date/Time	23 February 2012 / 08:30 – 10:10 hrs
Venue	Room: 305
Chair(s)	(Neal) Tai-Shung Chung (NUS), Wang Rong (NTU), Liang Hong (NUS)

- 08:30 – 08:55** **Inorganic Membrane Technologies in China: Present and Future Trends**
595: Keynote Wanqin Jin* — *Nanjing University of Technology, China
- 08:55 – 09:10** **Preparation of Anti-biofouling Membranes by Surface Modification Methods**
130: Invited Meng-Jiy Wang* — *National Taiwan University of Science and Technology, Taiwan
- 09:10 – 09:25** **Concentration of Sodium Salicylate via Electrodialysis Process: Comparison of Limiting Current Density for Cation Exchange Membranes**
334: Oral Jeng Yih Law* and Mohamad Roji Sarmidi — *Universiti Kuala Lumpur Malaysian Institute of Chemical & Bioengineering Technology, Malaysia
- 09:25 – 09:40** **Dual-layer Hydrophobic-hydrophilic PVDF Hollow Fiber Membranes for Continuous Membrane Distillation Operation**
683: Oral Felinia Edwie*, May May Teoh and Tai-Shung Chung — *National University of Singapore, Singapore
- 09:40 – 09:55** **Modification of Polyacrylonitrile Nanofiber Membranes and their Applications in Protein Adsorption**
708: Oral Jun-Yi Wu*, Tai-Hong Cheng, Shin-Ying Chou and Yu-kaung Chang — *Ming Chi University of Technology, Taiwan

Day 2 — Thursday, 23 February 2012 : Presentation Schedule

Session 3E	Topic 14: Green and Sustainable Processes
Date/Time	23 February 2012 / 08:30 – 10:10 hrs
Venue	Room: 308
Chair(s)	Li Zhi (NUS), Wu Jinchun (ICES), Armando Borgna (ICES)

- 08:30 – 08:45**
68: Invited **Combination of Azolide Chemistry and Lipase Specificity for Preparing Stereo- and Regio-isomers**
 Shau-Wei Tsai* — *Chang Gung University, Taiwan
- 08:45 – 09:00**
728: Invited **Engineering of P450 Monooxygenase for Regio- and Stereoselective Biohydroxylations**
 Li Zhi* — *National University of Singapore, Singapore
- 09:00 – 09:15**
771: Oral **Adsorption of Cu(II) Ion on Zeolite A Synthesized from Coal Bottom Ash in Fixed Bed Column System**
 Nurul Widiastuti*, Fahimah Martak, Hamzah Fansuri and Mia Ratnasari — *Institut Teknologi Sepuluh Nopember, Indonesia
- 09:15 – 09:30**
523: Oral **Mineral Carbonation Accelerated by a Bipolar Membrane Electrodialysis Approach**
 Peng Bai*, Paul Sharratt, Tze Yuen Yeo and Jie Bu — *Institute of Chemical and Engineering Sciences, A*Star, Singapore
- 09:30 – 09:40**
211: Mini Talk **Optimization of Rice Husk Pretreatment using Box-Behnken Design (BBD)**
 Teck Nam Ang*, Gek Cheng Ngoh and Adeline Seak May Chua — *University of Malaya, Malaysia
- 09:40 – 09:50**
681: Mini Talk **Utilization of Hige method for Green Preparation of Silver Nanoparticles**
 Chee Meng Ng, Pao Chi Chen* and Sivakumar Manickam — *The University of Nottingham Malaysia Campus, Malaysia
- 09:50 – 10:00**
584: Mini Talk **Production of Green Hydrogen by Mechanical Mixing of Aluminum with Water using Stainless Steel Reactor**
 Masatoshi Sugioka*, Kazuyuki Higashino, Yoshio Uemichi and Yasuharu Kanda — *Muroran Institute of Technology, Japan

Session 3F	Topic 21: Bioenergy from Biomass and Environmental Microbiology
Date/Time	23 February 2012 / 08:30 – 10:10 hrs
Venue	Room: 309
Chair(s)	He Jianzhong (NUS), Yang Kun-Lin (NUS)

- 08:30 – 08:55**
660: Keynote **From Individuals to Community: Application of Molecular Tools to Understand Environmental Microbial Communities Participating in Bioremediation**
 Lisa Alvarez-Cohen* — *University of California, USA
- 08:55 – 09:10**
674: Invited **A New Butanol Producing Clostridium Species with High Level of Hemicellulosic and Cellulosic Hydrolyzing Activity**
 Xin Fengxue*, Sandhi Eko Bramono and He Jianzhong — *National University of Singapore, Singapore
- 09:10 – 09:25**
695: Oral **Acetobacterium Populations Implicated in the Anaerobic Reductive Debromination of Octa- and Penta- Brominated Diphenyl Ether Technical Mixtures**
 Chang Ding*, Wai Ling Chow, Lip Kim Lee and Jianzhong He — *National University of Singapore, Singapore
- 09:25 – 09:40**
217: Oral **Nonrenewable Energy and Greenhouse Gas Profile of the Production of Ammonium Sulfate from Nitrogen-Fixing Photosynthetic Cyanobacteria**
 Luis F. Razon* — *De La Salle University, Philippines
- 09:40 – 09:55**
581: Oral **Accumulation of Cellobiose and Xylobiose in the Enzymatic Hydrolysis of Lignocelluloses**
 Laura Sutarlie*, Qi Chao and Kun-Lin Yang — *National University of Singapore, Singapore

Day 2 — Thursday, 23 February 2012 : Presentation Schedule

Session 3G	Topic 13: Catalysis and Reaction Engineering
Date/Time	23 February 2012 / 08:30 – 10:10 hrs
Venue	Room: 310
Chair(s)	S. Kawi (NUS), Yang Yan Hui (NTU), Wong Pui Kwan (ICES), Armando Borgna (ICES)

08:30 – 08:40 **Studies on Steam CO₂ Reforming of Methane on Ni-based Perovskite-like Catalyst for the Application in the MeOH Synthesis Process**

835: Mini Talk

Dong Ju Moon, Eun Hyeok Yang*, Yoon Ju Lee, Byung Sung Ahn, Suk Woo Nam and Sang Woo Kim — *Korea Institute of Science and Technology, Korea

08:40 – 08:50 **Studies on Effect of Structure of Support in Fischer-Tropsch Synthesis over Silica-modified Co-based Catalyst**

836: Mini Talk

Dong Ju Moon, Jae Sun Jung*, Su Bin Lee and Sang Woo Kim — *Korea Institute of Science and Technology, Korea

08:50 – 09:00 **Bulk Monolithic Catalyst as a Novel Shape for Fischer-tropsch Synthesis, Fabrication and Comparison with Pellet Shape**

830: Mini Talk

A. Zamaniyana*, Y. Mortazavi, A. A. Khodadadi and F. Bahadoran — *Research Institute of Petroleum Industry, Iran

Session 3G	Topic 18: Environmental Science & Technology
Date/Time	23 February 2012 / 08:30 – 10:10 hrs
Venue	Room: 310
Chair(s)	Sun Dalai Darren (NTU), Ting Yen Peng (NUS)

09:00 – 09:15 **Degradation of Reactive Red 141 by SonoelectroFenton Process Utilizing Reticulated Vitreous Carbon RVC Cathode for *in situ* H₂O₂ Generation**

729: Oral

Oliver Dan de Luna*, Mark Daniel de Luna, Aleth Feliciano, Louise Dorothy Faye Acupang, Troy Benedict Ty — *University of the Philippines Diliman, Philippines & Mapua Institute of Technology, Philippines

09:15 – 09:30 **Characterization of Corn Cob-HDPE and Coconut Coir-HDPE Composites with Alkaline Pretreatment and CaCO₃ Additives**

713: Oral

David Thomas Tanco Gonzales*, April Ann M. delos Santos, Christine Joy T. Torregozza, Dybianne Toralde Rubio, Ma Kristina Borilla, Kristine R. Tolod and Mark Daniel Garrido de Luna — *University of the Philippines Diliman, Philippines

Session 4A	Topic 18: Environmental Science & Technology
Date/Time	23-February-2012 / 13:20 – 15:00 hrs
Venue	Room: 303
Chair(s)	Sun Dalai Darren (NTU), Ting Yen Peng (NUS)

13:20 – 13:35 **Decomposition of Gaseous Isopropanol by UV/TiO₂ Process with Applying Bias Potential in a Polymer Electrolyte Cell**

484: Oral

Wei-Ming Hou* and Young Ku — *National Taiwan University of Science and Technology, Taiwan

13:35 – 13:50 **Effect of Current Density on Mineralization of Bisphenol A in Aqueous Solution by Electrolysis/Ozonation Process**

488: Oral

Ku Young, Yang Chun Han, Chiu Ping Chin* and Ku Shan Chieh — *National Taiwan University of Science and Technology, Taiwan

13:50 – 14:05 **Effect of Wastewater Characteristics on the Performance of a Largescale EGSB**

451: Oral

Tuyet-Minh Le*, SoonKeat Tan, Ying Dai and Yu Liu — *Nanyang Technological University, Singapore

Day 2 — Thursday, 23 February 2012 : Presentation Schedule

14:05 – 14:20 **Performance of a Biosurfactant Obtained from Sapindus Mukurossi in Removing Cadmium from Soil**
145: Oral
 Soumyadeep Mukhopadhyay*, Mohd Ali Hashim, Jaya Narayan Sahu and Bhaskar Sen Gupta —
 *University of Malaya, Malaysia

14:20 – 14:35 **Design of Anaerobic Fluidized Bed Bioreactor**
665: Oral
 Zhiyi Deng*, Ka Y. Fung, Ka M. Ng and Chaohai Wei — *The Hong Kong University of Science and Technology, Hong Kong

14:35 – 14:50 **Low Temperature BioHydropyrolysis of the Polymeric Components of WEEE**
108: Oral
 Chan Oi Sum and Valix Marjorie* — *The University of Sydney, Australia

Session 4B	Topic 5: Energy
Date/Time	23-February-2012 / 13:20 – 15:00 hrs
Venue	Room: 304
Chair(s)	Liu Bin (NUS), David Lou (NTU), Wang Qing (MSE, NUS)

13:20 – 13:35 **Metal Oxide Based Nanostructured Anode Materials for Li-ion Batteries**
543: Invited
 Xiong Wen (David) Lou* — *Nanyang Technological University, Singapore

13:35 – 13:50 **Graft Copolymer Directed Organized TiO₂ Films for Solid-state Dye-sensitized Solar Cells**
792: Invited
 Sung Hoon Ahn, Jung Tae Park, Jong Kwan Koh and Jong Hak Kim* — *Yonsei University, Korea

13:50 – 14:05 **Fiber Photovoltaic cells**
820: Invited
 Zhibin Lv, Dan Wang, Shaocong Hou, Hongwei Wu, Xin Cai, Yongping Fu and Dechun Zou* —
 *Peking University, China

14:05 – 14:20 **Microwave Chemistry for the Synthesis of Materials with Photovoltaic Applications**
842: Invited
 Peter Chen*, Ta-Chuan Kuo and Guo-Chine Wang — *National Cheng Kung University, Taiwan

14:20 – 14:35 **Bio-char Injection for Ironmaking Blast Furnace**
461: Oral
 Agung Tri Wijayanta*, Md. Saiful Alam, Koichi Nakaso, Jun Fukai and Masakata Shimizu —
 *Kyushu University, Japan

14:35 – 14:50 **Dewatering and Upgrading of Low-Rank Coal and Biomass by Utilizing Degradative Solvent Extraction**
471: Oral
 Janewit Wannapeera, Li Xian, Nakorn Worasuwanarak, Ryuichi Ashida and Kouichi Miura* —
 *Kyoto University, Japan

Session 4C	Topic 6: Biochemical Engineering / Biofuel
Date/Time	23-February-2012 / 13:20 – 15:00 hrs
Venue	Room: 305
Chair(s)	Loh Kai Chee (NUS), Susanna Leong Su Jan (NTU)

13:20 – 13:45 **Symbiotic Hollow Fiber Membrane Photobioreactor for Microalgae Growth and Activated Sludge Waste Water Treatment**
814: Keynote
 Loh Kai Chee* and Yu-Tran Khanh Linh — *National University of Singapore, Singapore

13:45 – 14:00 **Efficient Hydrocarbon Pollutants Treatment by a Novel Strain Rhodococcus NTU-1**
600: Invited
 Hwai-Shen Liu* and Chih-Wen Liu — *National Taiwan University, Taiwan

14:00 – 14:15 **Glycerine Phase Separation of Continuous Ethyl Ester Production Comparing between KOH and KOCH₃ catalysts**
412: Oral
 Suwadee Jangissarakun* and Chakrit Tongurai — *Prince of Songkla University, Thailand

14:15 – 14:30 **Biorefinery for Biofuel and Biochemicals Production from Agricultural Wastes**
676: Oral
 Jun-chi Horiuchia*, Kiyoshi Tada, Tohru Kanno and Yuaya Takamura — *Kitami Institute of Technology, Japan

Day 2 — Thursday, 23 February 2012 : Presentation Schedule

14:30 – 14:45 **A Novel Approach to Biodiesel Production**
513: Oral Andrew Kon* and Desmond Lim — *Singapore Polytechnic, Singapore

Session 4D	Topic 7: Membrane Science & Technology for Emerging Applications
Date/Time	23-February-2012 / 13:20 – 15:00 hrs
Venue	Room: 308
Chair(s)	(Neal) Tai-Shung Chung (NUS), Wang Rong (NTU), Liang Hong (NUS)

13:20 – 13:45 **Fouling on Membrane: A Detailed Study**
776: Keynote Duu-Jong Lee* — *National Taiwan University of Science and Technology, Taiwan

13:45 – 14:00 **Biomimetic Membranes Embedded with Aquaporin for Water Reuse and Desalination**
685: Oral H. Wang*, P. Zhong, T.S. Chung, Y.W. Tong, K. Jeyaseelan, A. Armugam, Z. Chen and M. Hong — *National University of Singapore, Singapore

14:00 – 14:15 **Design of Membrane Micro-morphology for Membrane Distillation for Better Desalination Performance**
636: Oral Peng Wang*, May May Teoh and Tai-Shung, Chung — *National University of Singapore, Singapore

14:15 – 14:30 **The Evolution of Poly(hydroxyamide amic acid) to Poly(benzoxazole) via Stepwise Thermal Cyclization: Structural Changes and Gas Transport Properties**
637: Oral Huan Wang*, Songlin Liu, Tai-Shung Chung, Hongmin Chen, Yan-Ching Jean and Kumari Pallathadka Pramoda — *National University of Singapore, Singapore

14:30 – 14:45 **Attractive Potential of Marine Biopolymer for Composite Membrane Involved with Selected Separation by Desired Networks Achieved Molecular Size Recognition**
449: Oral Peng Wu and Masanao Imai* — *Nihon University, Japan

Session 4E	Topic 14: Green and Sustainable Processes
Date/Time	23-February-2012 / 13:20 – 15:00 hrs
Venue	Room: 307
Chair(s)	Li Zhi (NUS), Wu Jinchun (ICES), Armando Borgna (ICES)

13:20 – 13:35 **The Complementary and Integrated Chemo-enzymatic Processes for Fine Chemical Syntheses**
630: Invited Takeshi Sugai*, Yasunobu Yamashita, Yukihiro Niitsu, Manabu Hamada, Chihiro Hiraoka, Toshinori Higashi and Mitsuru Shoji — *Keio University, Japan

13:35 – 13:50 **Development of Biocatalysts for Production of Industrial Chemicals**
808: Invited Yasushi Kazuno* and Terunori Fujita — *Mitsui Chemicals Singapore R&D Centre Pte. Ltd, Singapore

13:50 – 14:05 **Polyolefins — Challenges for the Future**
760: Invited Haruyuki Makio* and Terunori Fujita — *Mitsui Chemicals Singapore R&D Centre Pte. Ltd., Singapore

14:05 – 14:20 **Molecular Assembly in Ionic Liquids as a Novel Medium for Biocatalysis Reactions**
436: Invited Masahiro Goto* — *Kyushu University, Japan

14:20 – 14:35 **Holoabzyme: Construction of an Antigen-combining Site for Artificial Catalytic Components**
540: Invited Ikuro Fujii* — *Osaka Prefecture University, Japan

14:35 – 14:50 **Reconstruction of Violacein Biosynthetic Pathway and Bioprocess for Violacein Production**
69: Invited Xin-Hui Xing*, Pei-xia Jiang, Cheng Yang, Ruiping Zhang and Chong Zhang — *Tsinghua University, China

Day 2 — Thursday, 23 February 2012 : Presentation Schedule

Session 4F	Topic 13: Catalysis and Reaction Engineering
Date/Time	23-February-2012 / 13:20 – 15:00 hrs
Venue	Room: 309
Chair(s)	S. Kawi (NUS), Yang Yan Hui (NTU), Wong Pui Kwan (ICES), Armando Borgna (ICES)

- 13:20 – 13:35**
608: Invited **Pd/ZnO Catalyst for Methanol Reforming on Microchannel Reactors**
F. J. Echave, O. Sanz, I. Velasco, M. A. Centeno, J. Odriozola, G. Arzamendi, L. M. Ganda and M. Montes* — *University of the Basque Country (UPV/EHU), Spain
- 13:35 – 13:50**
765: Invited **Chemicals Production from Biomass and Organic Wastes with High-temperature Liquid Water and High-pressure Carbon Dioxide**
Masayuki Shirai* — *Advanced Industrial Science and Technology, Japan
- 13:50 – 14:05**
95: Oral **Transesterification of Vegetable/Microalgal Oils to Biodiesel Using Metal-loaded Zeolite Catalysts**
Bing-Hung Chen*, Yu-Yuan Wang, Tn Hiep Dang and Duu-Jong Lee — *National Cheng Kung University, Taiwan
- 14:05 – 14:20**
27: Oral **Modeling and Optimization of Catalytic Reforming Unit to Determine the Operating Conditions to Obtain Maximum Ron Along the Operating Period**
Sorood Zahedi Abghari*, Hamid Ganji, Mehdi Ahmadi Marvast and Hooman Javaheri Zadeh — *Research Institute of Petroleum Industries, Iran
- 14:20 – 14:35**
31: Oral **Heterogeneous Modeling and Simulation of Trickle-bed Hydrotreating reactor**
Hamid Ganji*, Peyman Mahinsa, Mohammad Taghi Sadeghi, Saeed Shokri and Hooman Javaherizade — *Research Institute of Petroleum Industry, Iran
- 14:35 – 14:50**
807: Oral **Double Substituted Perovskite Oxide $\text{La}_x\text{Sr}_{1-x}\text{Ni}_y(\text{Al}_z\text{Ga}_{1-z})_1\text{YO}_3\text{-d}$ (LSNAG) as Stable Catalyst for Oxidative CO_2 Reforming of Methane**
Yasotha Kathiraser*, Shi Tian Ho and Sibudjing Kawi — *National University of Singapore, Singapore

Session 5A	Topic 4: Synthesis and Processing of Nanomaterials
Date/Time	23 February 2012 / 15:15 – 17:20 hrs
Venue	Room: 303
Chair(s)	Zeng, Hua Chun (NUS), Timothy Tan (NTU), Chen Yuan (NTU), Jianping Xie (NUS)

- 15:15 – 15:40**
640: Keynote **Chirality Selective Synthesis and Enrichment of Single Walled Carbon Nanotubes for Macroelectronics**
Li Wei, Hong Wang, Qiang Wang, Fuming Chen and Yuan Chen* — *Nanyang Technological University, Singapore
- 15:40 – 16:05**
209: Keynote **Harnessing Solar Energy through Photocatalysis : From Material Design to Reactor Engineering**
Rose Amal* — *The University of New South Wales, Australia
- 16:05 – 16:20**
831: Invited **Design of Iron Promoted Nano-Rh Catalysts for Renewable Hydrogen Production via Ethanol Steam Reforming**
Luwei Chen* — *Institute of Chemical and Engineering Sciences, A*Star, Singapore
- 16:20 – 16:35**
135: Invited **Controlled Synthesis and Derivatives of the First Tri-continuous Mesoporous Material IBN-9**
Yu Han* — *King Abdullah University of Science and Technology, Saudi Arabia
- 16:35 – 16:50**
309: Oral **Preparation of a High Performance Thermal Insulator from Porous Polymeric Material-reinforced Xerogel**
Kazunori Hosokawa*, Haruo Shikuma, Shinsuke Nagamine and Masahiro Ohshima — *Kyoto University, Japan

Day 2 — Thursday, 23 February 2012 : Presentation Schedule

16:50 – 17:05 **Preparation of Silver-coated Copper Particles via Liquid to Particle Conversion Process**
468: Oral J. Y. Seo*, D. S. Jung and S. B. Park — *Korea Advanced Institute of Science and Technology, Korea

Session 5B	Topic 12: Separation Science and Technology for a Sustainable Future
Date/Time	23 February 2012 / 15:15 – 17:20 hrs
Venue	Room: 307
Chair(s)	Farooq, Shamsuzzaman (NUS), Arvind Rajendran (NTU)

15:15 – 15:30 **Adsorptive Capture of CO₂ from Post-combustion Flue Gas: A Pilot Plant Study**
717: Invited Sathish Kumar Guntuka, Rama Rao Vemula, Ricky Nilam, Faruque Hassan, Paul Sharratt, Mohammad Amanullah, Iftekhar A Karimi, Arvind Rajendran* and Shamsuzzaman Farooq — *Nanyang Technological University, Singapore

15:30 – 15:45 **Separation of Particles in a Hydrocyclone Separator**
25: Oral Vivek Kumar, Sudipto Chakraborty and B. C. Meikap* — *Indian Institute of Technology, India; and University of Kwazulu-Natal, South Africa

15:45 – 16:00 **Process Development for Purification of C-phycoerythrin from Disrupted Spirulina Platensis by using Packed and Expanded Bed Techniques**
710: Oral Shih-Long Hsu* and Yu-kaung Chang — *Ming Chi University of Technology, Taiwan

16:00 – 16:15 **Application of Response Surface Methodology to Optimize the Retrofit a Side Column to a DWC**
114: Oral Nguyen Van Duc Long* and Moonyong Lee — *Yeungnam University, Korea

16:15 – 16:30 **Valuable High Purity Silica and Hydromagnesite from a CO₂ Mineralization Process**
512: Oral Tze Yuen Yeo*, Jie Bu, Peng Bai, Pavan Kumar Naraharisetti, Hsien Hui Khoo and Paul Sharratt — *Institute of Chemical and Engineering Science, Singapore

16:30 – 16:45 **Supercritical Fluid Extraction of 10-deacetylbaocatin III from Taxus Wallichiana Zucc: Mathematical Modeling and Simulation**
395: Oral Nguyen Quang Duy, Chau Ngoc Do Quyen, Le Anh Kien, Phan Dinh Tuan and Le Thi Kim Phung* — *HCMC University of Technology, Vietnam

16:45 – 16:55 **Alternative Separation Technology for Oily-Water System in a Biodiesel Production Process**
832: Mini Talk Wilaiporn Sawangpon*, Sutham Sukmanee and Pornsiri Kaewpradit — *Prince of Songkla University, Thailand

16:55 – 17:05 **Kinetically Controlled Adsorption for Post-combustion CO₂ Capture**
718: Mini Talk Reza Haghpanah, Arvind Rajendran and Shamsuzzaman Farooq* — *Nanyang Technological University, Singapore

Session 5C	Topic 2: Biomaterials and Biotechnology
Date/Time	23 February 2012 / 15:15 – 17:20 hrs
Venue	Room: 304
Chair(s)	Vincent Chan (NTU), Chi-Hwa Wang (NUS)

15:15 – 15:40 **Multifunctional Envelope-type Nano Device for Non-viral Gene Delivery Concept and Application for Nanomedicine**
258: Keynote Hideyoshi Harashima* — *Hokkaido University, Japan

15:40 – 16:05 **Hybrid Virus/Polymer and Virus/Lipid Gene Delivery Vectors**
775: Keynote Daniel W Pack* — *University of Illinois, USA

Day 2 — Thursday, 23 February 2012 : Presentation Schedule

- 16:05 – 16:20** **Chitosan Nanoparticles used for Drug Delivery and Cell Imaging**
51: Invited Yong Hu* — *Nanjing University, China
- 16:20 – 16:35** **Study of Cell Proliferation in Porous Scaffold in a Taylor-Couette Bioreactor**
532: Invited Qiao Jian and Chi-Hwa Wang* — *National University of Singapore, Singapore
- 16:35 – 16:50** **Design of Dendritic Cell-Targeting Magnetic Polyplexes for Enhanced malaria DNA Vaccine Delivery**
419: Oral Fatin Nawwab Al-Deen*, Cordelia Selomulya, Sue D. Xiang, Magdalena Plebanski and Ross L. Coppel — *Monash University, Australia
- 16:50 – 17:05** **Encapsulation of Doxorubicin and Chitosan-p53 Nanoparticles in Monodispersed Double-Walled Microspheres**
497: Oral Qingxing Xu*, Chi-Hwa Wang and Daniel W. Pack — *University of Illinois at Urbana-Champaign, USA; and National University of Singapore, Singapore

Session 5D	Topic 10: Transport Phenomena
Date/Time	23 February 2012 / 15:15 – 17:20 hrs
Venue	Room: 305
Chair(s)	Raymond Lau (NTU), Shing-Bor Chen (NUS), Rensheng Deng (Institute of Bioengineering and Nanotechnology)

- 15:15 – 15:30** **DNS (Direct Numerical Simulation) Approach for the Dynamics of Colloidal Dispersions**
52: Invited Ryoichi Yamamoto* — *Kyoto University, Japan
- 15:30 – 15:45** **Engineering Multiscale Modeling - Why Do We Need the Engineering Approach?**
632: Invited Olaf Hinrichsen* — *Technische Universitt Mnchen, Germany
- 15:45 – 16:00** **The S-REA (Spatial Reaction Engineering Approach) as a Non-equilibrium Multiphase Model for Accurate Modeling of Baking Process**
414: Oral Aditya Putranto*, Xiao Dong Chen and Weibiao Zhou — *Monash University, Australia
- 16:00 – 16:15** **Modeling and Simulation of Sedimentation in Glycol Heat Exchanger by Computational Fluid Dynamics (CFD)**
783: Oral Behrouz Raei*, Davood Abbaspour and Frahad Shahraki — *Islamic Azad University, Iran
- 16:15 – 16:30** **Effect of Colloidal Particle Behavior on the Apparent Viscosity of Molten Glass**
107: Oral Mikio Sakai*, Yoshinori Yamada, Xiaosong Sun, Motoyuki Iijima, Yoshikatsu Tochigi, Hiroaki Fujiwara, Kouhei Otake and Eiji Ochi — *The University of Tokyo, Japan
- 16:30 – 16:45** **Process Intensification: Development of Mechanistic Model for a Thin Liquid Film Flowing Over Horizontal Spinning Disk**
511: Oral Nurhazwani Yusoff Azudin*, Mohd Fadhil Majnis and Syamsul Rizal Abd Shukor — *Universiti Sains Malaysia, Malaysia
- 16:45 – 17:00** **A Comparative Study on Diffusivity and Mass Transfer Coefficients of Mushrooms and Vegetables Dried in a Fluidized Bed Dryer using ANN**
85: Oral Subasini Jena and Abanti Sahoo* — *National Institute of Technology, India

Session 5E	Topic 17: Process Systems Engineering
Date/Time	23 February 2012 / 15:15 – 17:20 hrs
Venue	Room: 308
Chair(s)	Rangaiah Gade Pandu (NUS), Vinay Kumar Kariwala (NTU)

- 15:15 – 15:30** **Process Development for LNG-FPSO : Natural Gas Liquefaction Cycle and NGL Recovery Processes**
545: Invited Nguyen Van Duc Long, Sanggyu Lee and Moonyong Lee* — *Yeungnam University, Korea

Day 2 — Thursday, 23 February 2012 : Presentation Schedule

- 15:30 – 15:45** **Stochastic Global Optimization Techniques: Progress, Challenges and Prospects for Chemical Engineering Applications**
622: Invited
 G.P. Rangaiah*, H. Zhang and S. Sharma — *National University of Singapore, Singapore
- 15:45 – 16:00** **Design of Energy Systems Through Total Site Integration**
315: Oral
 Cheng-Liang Chen* and Chih-Yao Lin — *National Taiwan University, Taiwan
- 16:00 – 16:15** **Adaptive Control of Polymerization Reactor**
193: Oral
 Pinakpani Biswas and Amar Nath Samanta* — *Indian Institute of Technology, India
- 16:15 – 16:30** **Optimization of a Direct Methanol Fuel Cell with 2D Approximate Analytical Solutions and Pattern Search Algorithm**
475: Oral
 Mohammad Sadegh Tavallali*, Sher Lin Ee, Karl Erik Birgersson and Ia Karimi — *National University of Singapore, Singapore
- 16:30 – 16:45** **ERT Application to Milk Flow Monitoring for Control of the Milk Powder Production Process**
361: Oral
 Sharifi Mohadeseh* and Young Brent — *University of Auckland, New Zealand
- 16:45 – 17:00** **Mathematical Modeling and Control of SOFC Fuelled with Hydrogen**
548: Oral
 Seyedahmad Hajimolana*, Mohd Azlan Hussain and Wan Mohd Ashri Wan Daud — *University of Malaya, Malaysia
- 17:00 – 17:15** **Pickering Emulsions Generation: Drop Stabilization Rate**
268: Oral
 Émir Tsabet*, Seddiqui Shad and Louis Fradette — *École Polytechnique de Montréal, Canada

Session 5F	Topic 13: Catalysis and Reaction Engineering
Date/Time	23 February 2012 / 15:15 – 17:20 hrs
Venue	Room: 309
Chair(s)	S. Kawi (NUS), Yang Yan Hui (NTU), Wong Pui Kwan (ICES), Armando Borgna (ICES)

- 15:15 – 15:30** **Catalytic Applications of Nanohybrids CNT/Support in Liquid Phase Reactions**
613: Invited
 M. T. Jimare, F. Cazaa, C. Royo, E. Romeo, D. Resasco and A. Monzon* — *Universidad de Zaragoza, Spain
- 15:30 – 15:45** **Dynamics of the Catalase — Glucose Oxidase Oscillatory Reaction**
736: Oral
 Martin Cp, Lenka Schreiberov* and Igor Schreiber — *Institute of Chemical Technology, Czech Republic
- 15:45 – 16:00** **Effects of the Products on Automotive Exhaust Gas After-treatment Over Pt-Rh Catalyst**
364: Oral
 Takuya Yoshinoya*, Hiroki Oka, Motoaki Kawase, Tatsuya Yoshikawa and Kouichi Miura — *Kyoto University, Japan
- 16:00 – 16:15** **Preparation of Visible-Light-Active Photocatalytic Thin Film by RF Sputtering for Hydrogen Generation**
216: Oral
 Chi-Hung Liao*, Chao-Wei Huang and Jeffrey Chi-Sheng Wu — *National Taiwan University, Taiwan
- 16:15 – 16:30** **Preparation and Characterization of Ag Doped TiO₂ Photocatalysts for Decomposition of Methylene Blue Designed by Experimental Design Strategies**
294: Oral
 I-Li Chen* — *National Tsing Hua University, Taiwan
- 16:30 – 16:45** **Effects of Copper Precursors on the Activity of Copper Oxide Catalysts for CO Oxidation**
224: Oral
 Gaurav Rattan*, R. Prasad and R. C. Katyal — *Delhi Technological University (formerly DCE), India
- 16:45 – 17:00** **Kinetic and Reaction Network Analysis of Phenol Photocatalytic Oxidation by General Rate Equation Method**
418: Oral
 Tai-Shang Chen* and Jia-Ming Chern — *Tatung University, Taiwan
- 17:00 – 17:15** **The Effect of Ultrasonic on the Biodiesel Production from Palm Oil Using K/gamma-Al₂O₃ as a Heterogeneous Catalyst**
634: Oral
 Wanida Koo-amornpattana*, Lakkhana Thintharua and Juthamas Wongprachanukool — *Mahidol University, Thailand

Poster Group 2: Thursday, 23 February 2012 : 13:00 – 17:00 hrs

Venue: Gallery East

Topic 14 Green and Sustainable Processes

- Board : 1**
768: Poster **A Study to Produce Ferrite Powders from IC Lead Frame Scraps**
 Robert Liu, H. S. Wu, Ruth Yeh*, C. H. Lin and Yungtse Hung — *Minghsin University of Science and Technology, Taiwan
- Board : 2**
667: Poster **Synthesis of Acid-Resistant and Non-Toxic Chitosan-Citrate Gel Beads for Cu(II) Ion Adsorption**
 Tsung-Kuan Lin, Rung-Jie Jang, Shun-Chou Jiang and Shao-Jung Wu* — *Ming Chi University of Technology, Taiwan
- Board : 3**
693: Poster **Bioactive Ingredients Enriched from Chinese Herb by Super Critical Extraction and Simulated Moving Bed**
 Ming-Tsai Liang, Ru-Chien Liang*, Hsia-Fen Hsu and Jer-Yiing Houg — *I Shou University, Taiwan
- Board : 4**
720: Poster **Development of New Enzymes for Green Transformation of Ester to Amide via Aminolysis**
 Shichao Zeng* and Zhi Li — *National University of Singapore, Singapore
- Board : 5**
716: Poster **Regio- and Stereo-Selective Subterminal Biohydroxylation of Non-Activated Carbon Atoms**
 Yi Yang* and Zhi Li — *National University of Singapore, Singapore
- Board : 6**
492: Poster **A Promising Process for the Preparation of Cyclic Carbonates Using a Catalyst System Comprising Alkaline Earth Metals and Phosphines**
 Yiping Ren, Wei Shi and Jae-Jin Shim* — *Yeungnam University, Korea
- Board : 7**
769: Poster **Ammonium Removal Using Batch and Fixed Bed Column by Zeolite A-Carbon Synthesized from Coal Bottom Ash**
 Nurul Widiastuti*, Didik Prasetyoko, Hamzah Fansuri and Yanik Ika Widiastuti — *Institut Teknologi Sepuluh Nopember, Indonesia

Topic 12 Separation Science and Technology for a Sustainable Future

- Board : 8**
164: Poster **Effect of the Mass Ratio of Fine Particle on the Entrainment in a Bubbling Fluidized Bed with Binary Particle**
 Joon Hwan Kim and Dong Hyun Lee* — *Sungkyunkwan University, Korea
- Board : 9**
104: Poster **Application of Factorial Design to Optimize a Dividing Wall Column Structure**
 Sung Keun Jang*, Nguyen Van Duc Long and Moonyong Lee — *Yeungnam University, Korea
- Board : 10**
189: Poster **Homogeneous Liquid-Liquid Extraction Method in Order to Recycle Indium from Liquid Crystal Display**
 Takeshi Kato*, Yoshiyuki Ishiwatari, Makoto Furukawa, Hitoshi Yamaguchi and Shukuro Igarashi — *Ibaraki University, Japan
- Board : 11**
276: Poster **Effect of Taylor-vortex by Elliptical Inner Cylinder on L-Threonine Crystal Behavior in Drowning-out Crystallization**
 Sooyun Lee*, Nguyen Anh Tuan and Woo-Sik Kim — *Kyung Hee University, Korea
- Board : 12**
714: Poster **Method Development for Extraction of GST-EGFP Fusion Protein by Immobilized Metal Affinity Chromatography**
 Shiau-Jyun Yang* and Yu-kaung Chang — *Ming Chi University of Technology, Taiwan
- Board : 13**
709: Poster **Stirred Fluidized Bed Immobilized Metal Affinity Chromatography for Direct Recovery of Poly His-Tagged Enhanced Green Fluorescent Protein**
 Yan-Syun Chou* and Yu-kaung Chang — *Ming Chi University of Technology, Taiwan

Day 2 — Thursday, 23 February 2012 : Presentation Schedule

- Board : 14**
367: Poster **Adsorptive Separation of Terephthalic Acid from TPA Wastewater**
Hung-Chan Chen, Ping-Jia Fu, Pei-Jen Lu and Jia-Ming Chern* — **Tatung University, Taiwan*
- Board : 15**
136: Poster **Separation of Saccharides with Supported Ionic Liquid Membranes Containing Calixarenes as a Carrier**
Naoki Oku*, Michiaki Matsumoto and Kazuo Kondo — **Doshisha University, Japan*
- Board : 16**
44: Poster **Separation of Metal Impurities from Silicon Sawing Waste**
Tzu-Hsuan Tsai* and Fu-Lin Wen — **National Taipei University of Technology, Taiwan*
- Board : 17**
184: Poster **Electrochemical Recovery of Indium from ITO Etch Waste**
Yung-Fu Wu*, Hung-Chih Chen and Yu-Sheng Wang — **Ming Chi University of Technology, Taiwan*

Topic 17 Process Systems Engineering

- Board : 18**
122: Poster **Development of a Data Reconciliation System for an Integrated Clinker Production System Containing Preheater, Calciner, Kiln and Coolers**
Sorood Zahedi Abghari*, Mansoor Shirvani, Manoochehr Bokaian, Ghasem Arab and Nader Shakeri — **Research Institute of Petroleum Industries, Iran*
- Board : 19**
78: Poster **Synthesis of Chilled Water Networks with Inter-Plant Integration**
Cheng-Liang Chen*, Meng-Da Lee, Tzu-Chi Wang, Hui-Chu Chen and Jui-Yuan Lee — **National Taiwan University, Taiwan*
- Board : 20**
510: Poster **Maintenance Needs of a Palm Oil Refinery**
Intan Suhairi Salleh*, Khairiyah Mohd-Yusof and Gholamreza Zahedi — **Universiti Teknologi Malaysia, Malaysia*
- Board : 21**
784: Poster **Steam Level Optimization in a Total site Using Exergoeconomic Approach**
Shahin Shamsi* and Mohamad Reza Omidkhan Nasrin — **Islamic Azad University, Iran*
- Board : 22**
508: Poster **Simulation of Cosmo Balls in Wastewater Treatment**
Siti Aslina Hussain*, Tan Hong Tat and Azni Idris — **Universiti Putra Malaysia, Malaysia*

Topic 4 Synthesis and Processing of Nanomaterials

- Board : 23**
100: Poster **Defect-free Ultrathin Nickel Film Fabricated by Application of Supercritical Carbon Dioxide Emulsion**
Tso-Fu Mark Chang* and Masato Sone — **Tokyo Institute of Technology, Japan*
- Board : 24**
406: Poster **Morphology-Controlled Carbon Aerogels for Energy Storage Devices**
Nam P. V. Nguyen*, Nithin Mohan and Hai M. Duong — **National University of Singapore, Singapore*
- Board : 25**
722: Poster **The Preparation of MCM-48 Silica Molecular Sieves and Its Application in Synthesizing Ordered Mesoporous Carbons Using a Green Approach**
Tzong-Horng Liou*, Liang Chu, Bin-Joen Tsay and Bo-Chen Lai — **Ming Chi University of Technology, Taiwan*
- Board : 26**
257: Poster **Characterization of Faceted Nano-Cu₂O Films Prepared by Electrodeposition Methods**
Leo Chau-Kuang Liao*, Yong-Jie Peng and Yu-Chieh Lin — **Yuan Ze University, Taiwan*
- Board : 27**
306: Poster **Preparation of Latex-Blended Polystyrene/Carbon Nanotube Nanocomposites and their Properties**
Myung Hwan Kang, Won-Jin Noh and Seong Jae Lee* — **The University of Suwon, Korea*
- Board : 28**
375: Poster **Surface Characteristics and Wettability Properties of Amine Functionalized Graphene Nanosheets**
Jeong Hwan Yoon*, Sung Hun Ryu and Andikkadu Masilamani. Shanmugaraj — **Kyung Hee University, Korea*
- Board : 29**
495: Poster **Preparation of Silica Aerogels via Supercritical Fluid Drying Technology**
Wei Shi*, Van Hoa Nguyen and Jae-jin Shim — **Yeungnam University, Korea*

Day 2 — Thursday, 23 February 2012 : Presentation Schedule

- Board : 30**
171: Poster **Design of Experiment in Synthesis of Nano Silica, Effect of Precipitation Parameters on Properties**
Hamideh Kolahdouzan, Saied Nouri Khorasani*, Mansour Bidoki and Sedigheh Vaezifar — **Isfahan University of Technology, Iran*
- Board : 31**
594: Poster **Synthesis and Characterization of Nano-Sized Calcium Carbonate (CaCO₃) Particles in Micro Emulsion Solutions**
Mohsen Rastgoo Sisakht, Saied Nouri Khorasani*, Mohammad Hosein Enayati, Ali Zadhoush and Hasan Pezeshki — **Isfahan University of Technology, Iran*
- Board : 32**
366: Poster **Effect of Preparation Condition on Photoluminescence Characteristics of Zn₂SiO₄ : Mn**
Takahiro Kato, Hiroshi Sato, Kenji Murakami and Katsuyasu Sugawra* — **Akita University, Japan*

Topic 2

Biomaterials and Biotechnology

- Board : 33**
620: Poster **Characterization of a Novel 3D Hydrogel for Tissue Engineering**
Siew Pei Hoo*, Zhilian Yue, Timothy Tan and Peggy P. Chan — **Monash University, Australia*
- Board : 34**
587: Poster **Nanoscale Characterisation of Cell Growth in 3D Scaffold with Ion and Electron Beams**
Aswan Al-Abboodi*, Jing. Fu, Pauline M. Doran and Peggy P. Chan — **Monash University, Australia*
- Board : 35**
284: Poster **Mechanical and Physical Properties of Light-Cured Dental Resin Composites**
Ho-Nam Ryu*, Chang-Soon Choi, Ki-Mook Park, Kun-Ho Song and Kwang-Rae Lee — **Kangwon National University, Korea*
- Board : 36**
411: Poster **Development of Enterovirus 71 Vaccine Based on Virus-like Particles**
Shih-Yeh Lin*, Cheng-Yu Chung, Yao-Chi Chung, Hsin-Yi Chiu and Yu-Chen Hu — **National Tsing Hua University, Taiwan*
- Board : 37**
766: Poster **Synthesis and Characterization of Iron Oxide-Chitosan Magnetic Nanoparticles and Application for MR Imagine Biomedical Contrast Agents**
Robert Lian-Huey Liu*, Rui-Qi Lee, Keng-Liang Ou, Chi-Ming Lee, Wen-Tien Hsiao, Yu-Jing Ding, Jia-Yu Yang, Ben-Je Lwo and Ming-Der Ger — *1. *National Defense University, Taiwan, R.O.C* and 2. *Minghsin University of Science and Technology, Taiwan*
- Board : 38**
648: Poster **Evaluating the Encapsulation Efficiency and Release Rate of Antibody to Vascular Endothelial Growth Factor in Alginate Microspheres via Paper-based ELISA**
Po-Chen Wu*, Chao-Min Cheng and Jiashing Yu — **National Taiwan University, Taiwan*
- Board : 39**
206: Poster **Bio-Based Polymer Networks from Vegetable Oil**
Na Ri Jang and Beom Soo Kim* — **Chungbuk National University, Korea*

Topic 6

Biochemical Engineering / Biofuel

- Board : 40**
204: Poster **Production of Polyhydroxyalkanoates by *Ralstonia Eutropha* from Volatile Fatty Acids**
Jung Hyun Yun and Beom Soo Kim* — **Chungbuk National University, Korea*
- Board : 41**
230: Poster **Effect of Inoculum Age and Volume on Microbial Production of Xylitol**
Yelamarthi Pydi Setty* and Katuri Srivani — **National Institute of Technology, India*
- Board : 42**
285: Poster **Efficient Lysozyme Refolding Strategy**
Yun-Chi Chen* and Hwai-Shen Liu — **National Taiwan University, Taiwan*
- Board : 43**
324: Poster **Enantioselective Hydrolysis of O-Chloromandelonitrile by Novel Arylacetonitrilase Mined from Gene Database**
Chensheng Zhang, Zhijun Zhang, Chunxiu Li, Huilei Yu* and Jianhe Xu — **East China University of Science and Technology, China*
- Board : 44**
628: Poster **Extraction of Bio-oil from Microalgae and Preparation of Biodiesel Using Lipase**
Young Hyeon Kim* and Eun Yeol Lee — **Kyung Hee University, Korea*

Day 2 — Thursday, 23 February 2012 : Presentation Schedule

- Board : 45**
627: Poster **Cloning and Expression of Glycosyltransferase of *Stenotrophomonas* Species Strain for the Glycosylation of Various Flavonoids**
Ok Kyung Lee*, Sung Hee Choi and Eun Yeol Lee — *Kyung Hee University, Korea
- Board : 46**
625: Poster **Nano-Formulation of Marine Recombinant Epoxide Hydrolase for the Synthesis of Enantiopure Chemicals**
Eun Yeol Lee* and Sung Hee Choi — *Kyung Hee University, Korea
- Board : 47**
626: Poster **Molecular Characterization of Exolytic Alginate Lyase for Saccharification of Alginate into Unsaturated Uronic Acid**
Eun Yeol Lee* and Hee Sook Kim — *Kyung Hee University, Korea
- Board : 48**
149: Poster **Reactivity and Thermostability of Coated Lipase in Organic Media**
Ryousuke Yamada*, Michiaki Matsumoto and Kazuo Kondo — *Doshisha University, Japan
- Board : 49**
444: Poster **Effect of Alumina Supports on the Hydrodeoxygenation of *Jatropha* Oil**
Korakoch Seetawarin*, Suchada Butnark and Siriporn Jongpatiwut — *Chulalongkorn University, Thailand
- Board : 50**
448: Poster **Effect of Biomass Feedstocks on the Production of Hydrogenated Biodiesel over Pd/TiO₂ Catalyst**
Panatcha Bovornseripatai*, Somchai Osuwan, Suchada Butnark and Siriporn Jongpatiwut — *Chulalongkorn University, Thailand
- Board : 51**
446: Poster **Hydrogenolysis of Hydrogenated Biodiesel for the Production of Biojet over Pt, Ir, and PtIr Supported H-Y Zeolite Catalysts**
Chayasari Srimingkwanchai*, Siriporn Jongpatiwut, Somchai Osuwan and Suchada Butnark — *Chulalongkorn University, Thailand
- Board : 52**
447: Poster **Deoxygenation of Beef Fat over Pd Supported Mesoporous Titania Catalysts**
Tossaporn Jindarat*, Somchai Osuwan, Suchada Butnark and Siriporn Jongpatiwut — *Chulalongkorn University, Thailand
- Board : 53**
318: Poster **Direct Conversion of Microalgae Culture for Biodiesel Production by Using Sub/Supercritical Methanol**
Atsushi Kishita*, Diah Ajeng Setiawati, Gede Suantika and Rina Riana Sondari — *Tohoku University, Japan
- Board : 54**
293: Poster **Optimum Performance of Multiple Enzymes in Laundry Detergent**
Jeng Yih Law*, Sharifah Nur Amanina Said Abd Karim, Norilhamiah Yahya and Suhaini Hj. Mamat — *Universiti Kuala Lumpur Malaysian Institute of Chemical & Bioengineering Technology, Malaysia
- Board : 55**
377: Poster **A New Approach for Microbial Immobilization in a Microreactor**
Kyuya Nakagawa*, Kenji Shiratai and Seigo Nakagawa — *University of Hyogo, Japan
- Board : 56**
319: Poster **Development of a Synthetic Yeast Co-culture for Enhanced Fermentation of Lignocellulosic Hydrolysates by Kinetic Modeling and Analysis**
Lakshmanan Meiyappan* and Lee Dong-Yup — *National University of Singapore, Singapore

Topic 9

Biosensors and Biomolecules on Solid Surfaces

- Board : 57**
340: Poster **Prussian Blue Modified Biosensors Based on Interdigital Array Microelectrodes**
Shih-Peng Yang*, Wen Wang, Meng-Jiy Wang and Chiapyng Lee — *National Taiwan University of Science and Technology, Taiwan
- Board : 58**
347: Poster **A Disposable Glucose Biosensor Base on Nickel Microelectrode**
Jyun-Jhong Lee*, Wen Wang, Meng-Jiy Wang and Chiapyng Lee — *National Taiwan University of Science and Technology, Taiwan
- Board : 59**
647: Poster **Biopolymer-Coated Redox Dye Film for Oxygen Detection**
Chau Hai Thai Vu*, Nan Young Jang and Keehoon Won — *Dongguk University-Seoul, Korea
- Board : 60**
174: Poster **Fiber Optic Immuno Sensor to Viral Pathogens**
Robert Steven Marks* — *Ben Gurion University of the Negev, Israel

Topic 21 Bioenergy from Biomass and environmental microbiology

- Board : 61**
363: Poster **Improvement of Xylooligosaccharides Production and Lignocellolytic Enzyme Activity by Aspergillus Japonicus in Rice Hull Through Ultrasonic Technology**
 Chun-Yao Yang* and Tony J. Fang — *National Chung Hsing University, Taiwan
- Board : 62**
582: Poster **Cross-linked Cellulase Immobilized on Silica Gel for Hydrolyzing Cellulose and Ethanol Production**
 Laura Sutarlie* and Kun-Lin Yang — *National University of Singapore, Singapore
- Board : 63**
323: Poster **Gasification of Pinus Densiflora (Japanese Red Pine) and Quercus Mongolica (Mongolian Oak) in a Fluidized Bed Reactor with Dolomite Catalyst**
 Hoang Vu Ly*, Jinsoo Kim and Seung-Soo Kim — *Kyung Hee University, Korea
- Board : 64**
694: Poster **Depolymerization of Lignin by an Anaerobic Microbial Consortium I3 and its Application on Lignocellulosic Materials**
 Yi-Rui Wu* and Jianzhong He — *National University of Singapore, Singapore
- Board : 65**
439: Poster **Thermogravimetric Characterization of Palm Kernel Cake in a Closed Tubular Reactor**
 Hoang Vu Ly, Thanh-An Ngo, Jinsoo Kim* and Seung-Soo Kim — *Kyung Hee University, Korea

Topic 11 Microfluidics for Chemistry and Life Sciences

- Board : 66**
370: Poster **Novel Deformability-Based Flow Cytometer via Fluid Elasticity Driven Focusing**
 Sukgyun Cha, Taeho Shin, Byunghwan Lee, Younghun Kim and Ju Min Kim* — *Ajou University, Korea

Topic 15 Chemical Engineering Education

- Board : 67**
621: Poster **A Study on Vocational Knowledge and Skill Requirements for Technological and Vocational University Graduates in Bioenergy and Biobased Products Industries**
 Ming-Chung Wang, Pao-Chi Chen and Ching-Yi Lee* — *Minghsin University of Science and Technology, Taiwan
- Board : 68**
664: Poster **Integrating Design Thinking into Chemical Product Design — An Initial Experience**
 Sin-Moh Cheah* and Claire H. T. Ng — *Singapore Polytechnic, Singapore

Topic 1 Macromolecular Science and Engineering

- Board : 69**
528: Poster **The Effect of Oxidation on the Properties of Graphene and Its Polycaprolactone Nanocomposite**
 Trung Dung Dao*, Kyung Min Oh, Jin Taek Choi, Hyung-il Lee, Han Mo Jeong, Yong Sung Kim and Sung-Jin Park — *University of Ulsan, Korea
- Board : 70**
219: Poster **Preparation and Swelling/Mechanical Properties of Emulsion gel Adsorbents**
 Hideaki Tokuyama*, He Liangliang and Takuro Yoshida — *Tokyo University of Agriculture and Technology, Japan
- Board : 71**
654: Poster **Modification and Characterization of Silica Nanoparticles for NBR Composite**
 Young Seok Lee, Hyun Soo Ryu, Myung-Ha Lee, Jong Cheol Lee and KiRyong Ha* — *Keimyung University, Korea
- Board : 72**
328: Poster **Effects of Injection Moulding Processing Parameters on Green Starch Based Polymer Compound**
 Tiam-Ting Tee, Tin-Sin Lee* and Soo-Tueen Bee — *Universiti Tunku Abdul Rahman, Malaysia
- Board : 73**
822: Poster **Highly Porous Poly(acrylamide) Beads with Dual Sized Porosity**
 Kwang-Seon Ko, Jin-Kie Shim and Jun-Young Lee* — *Korea Institute of Industrial Technology, Korea

Day 3: Friday, 24 February 2012 Programme Overview

Time/Venue	Suntec Convention Centre, Level 3, Room 303 & 304
Plenary Talks	<p>10:30 – 11:10</p> <p>Plenary Talk 6: Nanostructured Materials for Biomedical, Catalytic and Energy Applications Prof. Jackie Y. Ying, <i>Institute of Bioengineering and Nanotechnology, Singapore</i> Chair(s): Rong Xu, <i>Nanyang Technological University, Singapore</i>; Chi-Hwa Wang, <i>National University of Singapore</i></p>
	<p>11:10 – 11:50</p> <p>Plenary Talk 7: How Good are Block Copolymer Membranes? Prof. Edward Cussler, <i>University of Minnesota, USA</i> Chair(s): Neal TS Chung, <i>National University of Singapore</i>; Chi-Hwa Wang, <i>National University of Singapore</i></p>
	<p>11:50 – 12:30</p> <p>Plenary Talk 8: Quorum-Sensing Control of Gene Expression: Taming a Gene Regulatory System for Synthetic Biology Prof. E. Peter Greenberg, <i>University of Washington, USA</i> Chair(s): Rong Xu, <i>Nanyang Technological University, Singapore</i>; Kus Hidajat, <i>National University of Singapore</i></p>
12:30 – 13:20	Lunch Break
17:30	End of Day 3

Day 3: Friday, 24 February 2012

Plenary Talks

Plenary 6

Nanostructured Materials for Biomedical, Catalytic and Energy Applications

Prof. Jackie Y. Ying, *Institute of Bioengineering and Nanotechnology, Singapore*

Nanostructured materials are of interest for a variety of applications. This talk describes the synthesis and properties of two classes of nanostructured materials: nanoparticulate materials and nanoporous materials for catalytic and biological applications. Nanoparticulate materials are made up of crystallites or particles of ~ 10nm and possess ultrahigh surface areas. Through controlled synthesis in reverse microemulsions, my laboratory has achieved complex oxide nanoparticles with ultrahigh thermal stability for the effective catalytic combustion of methane. This approach has also enabled us to derive polymeric nanoparticles for the glucosesensitized delivery of insulin. Through various wet-chemical syntheses, we have also attained nanocomposite systems as highly effective environmental catalysts, efficient fuel cell materials, highly selective sensors, multifunctional magnetic quantum dots, bioactive tissue engineering scaffolds and implants, and targeted drug delivery systems.

My laboratory is also involved in the synthesis of novel nanoporous materials with tailored pore size and structure, composition and surface chemistry, as well as particle size and morphology. These materials are developed as supports for nanocluster, organometallic, organo and enzymatic catalysts for the synthesis of chiral pharmaceuticals and specialty chemicals. The resulting heterogenized catalysts provide for excellent activity, enantioselectivity and reusability.

Prof. Jackie Y. Ying graduated with B.E. *summa cum laude* from The Cooper Union, and received her Ph.D. from Princeton University. Prof. Ying was Professor of Chemical Engineering of Massachusetts Institute of Technology. She has been the Executive Director of the Institute of Bioengineering and Nanotechnology since 2003. Prof. Ying has published over 280 journal articles, has over 140 patents issued or pending. She has been recognized with a number of awards, including the American Ceramic Society Ross C. Purdy Award, David and Lucile Packard Fellowship, Office of Naval Research Young Investigator Award, National Science Foundation Young Investigator Award, Camille Dreyfus Teacher-Scholar Award, American Chemical Society Faculty Fellowship Award in Solid-State Chemistry, TR100 Innovator Award, and American Institute of Chemical Engineers (AIChE) Allan P. Colburn Award. She was elected a member of the German National Academy of Sciences, Leopoldina. She was named one of the "One Hundred Engineers of the Modern Era" by AIChE in its Centennial Celebration. Prof. Ying is the Editor-in-Chief of *Nano Today*.

Plenary 7

How Good are Block Copolymer Membranes?

Prof. Edward Cussler, *University of Minnesota, USA*

Block copolymers can spontaneously self assemble into a variety of structures which are nanometers in size. When these structures are used to make membranes, they promise more selective separations. The degree to which this promise can be realized is the subject of this paper.

The topic will be organized around three specific structures: lamellae, bicontinuous gyroids, and aligned cylinders. Studies of lamellae often aim at composites of a rubber and a glass. If the composite has the low permeability of the glass but the high flexibility of the rubber, the composite could be used as a barrier coating, like a corrosion resistant paint. However, to date, only the low permeability has been realized.

Membranes based on gyroids have two continuous phases. In some cases, one relatively impermeable phase provides the structural rigidity, and the second more permeable phase gives selectivity. These membranes can show actual selectivities for gas mixtures equal to the ideal selectivities obtained with pure gases. In other cases, one phase may be removed by etching to make a nanoporous isotropic filter. Such filters promise selective ultrafiltration, but may foul easily.

Cylinders in block copolymer films can spontaneously align perpendicular to the membrane surface, and then the cylinders can be selectively removed by etching. Such membranes have nanoporous cylindrical pores which provide unusually selective ultrafiltration, but their fluxes are low and their fouling is uncertain. Thus while the promise of these block copolymer membranes remains large, this promise can only be fully realized by additional developments.

Edward L. Cussler, currently Distinguished Institute Professor at the University of Minnesota, received his B.E. with honors from Yale University in 1961, and his M.S. and Ph.D. in Chemical Engineering from the University of Wisconsin in 1963 and 1965, respectively. After thirteen years teaching at Carnegie-Mellon University, Cussler joined the University of Minnesota in 1980. He has written over 230 articles and five books, including *Diffusion*, *Bioseparations*, and more recently, *Chemical Product Design*. Cussler has received the Colburn and Lewis Awards from the American Institute of Chemical Engineers (AIChE), for whom he served as Director, Vice President, and President. He has received the Separations Science Award from the American Chemical Society, the Merryfield Design Award from the American Society of Engineering Education, and honorary doctorate degrees from the Universities of Lund and Nancy. Cussler is a Fellow of the American Association for the Advancement of Science and a member of the National Academy of Engineering.

Plenary 8

Quorum-Sensing Control of Gene Expression: Taming a Gene Regulatory System for Synthetic Biology

Prof. E. Peter Greenberg, *University of Washington, USA*

Acyl-homoserine lactone (AHSL) quorum sensing serves as a cell-density dependent gene control system in many *Proteobacteria* and for several reasons has been deployed in synthetic gene expression systems. There are two genes required for quorum sensing, a *luxI* homolog, which directs synthesis of the diffusible AHSL signal, and a co-evolved *luxR* homolog, which codes for a signal responsive transcriptional regulator of a specific set of genes. There are over 200 bacterial species that use AHSL signals and specificity is built into the acyl moiety of the signal. They are of particular use in synthetic biology because

1. AHSLs are diffusible across cell membranes and the complication of a transport system for the ligand is not a concern.
2. Signal is self-generated.
3. Signal production is in a positive autoregulatory loop that suppresses noise.
4. There is signal specificity and feed forward systems can easily be assembled.

In natural systems quorum sensing is used for control of public goods, excreted or secreted gene products. It is a communication system for coordinating cooperation. Cooperation is subject to social cheating-it is subject to the emergence of quorum sensing mutants that do not produce the public goods but benefit from production of these products by cooperators in the group. Thus stability of synthetic systems can become an issue. Thus we have been developing information on molecular policing mechanisms to restrain cheaters and we have constructed synthetic systems for cheater restraint. Because quorum sensing controls virulence in a number of important pathogens it has been the target of therapeutic development. There will also be discussion of cheater emergence in persistent infections and the idea of whether we might capitalize on social aspects of bacterial infections to induce a tragedy of the commons whereby cheater overrun cooperators and cause a collapse of the population.

Acknowledgement: Work on quorum sensing control of cooperation in the authors laboratory has been supported by grants from the US National Institutes of Health (GM59026 and AI057141), the US Army Research Office (W911NF0910350), and The Agricultural and Food Research Initiative Competitive Grants Program 2010-65108-20536 from the US Department of Agriculture.

Prof. Greenberg received his Bachelor's degree from Western Washington University, a master's from the University of Iowa, PhD from the University of Massachusetts. After a postdoctoral at Harvard he joined the faculty at Cornell University, eventually moved back to the University of Iowa and finally returned to the Pacific Northwest his boyhood home as a member of the University of Washington School of Medicine Microbiology faculty. Dr. Greenberg has spent his scientific career studying microbial social behavior. He has focused in communication and coordination of social activities in *Proteobacteria*. Bacterial communication controls virulence in a variety of pathogenic bacteria and has thus become a target for development of new therapeutic strategies. Bacteria have also become models for studies of selection for and evolution of cooperative behavior. The work carried out by members of the Greenberg research group has been recognized by his election as a fellow of the National Academy of Sciences, the American Association of Arts and Sciences, the American Association for the Advancement of Science and the American Academy of Microbiology.

Day 3: Friday, 24 February 2012

Presentation Schedule

Session 6A	Topic 3: Systems and Synthetic Biology
Date/Time	24 February 2012 / 08:30 – 10:10 hrs
Venue	Room: 307
Chair(s)	Lee Dong-Yup (BTI/NUS), Hao Song (NTU)

08:30 – 08:55 Yeast as a Platform Cell Factory in Future Biorefineries

803: Keynote Jens Nielsen* — *Chalmers University of Technology, Sweden

08:55 – 09:10 Synthetic Biology around Translation Process

72: Invited Gyoo Yeol Jung*, Sang Woo Seo, Jina Yang and Byung Eun Min — *Pohang University of Science and Technology, Korea

09:10 – 09:25 Integration of in Silico and Experimental Approaches for Creation of Microbial Cell Factories

74: Invited

Hiroshi Shmizu* — *Osaka University, Japan; Japan Science and Technology Agency (JST), Core Research for Evolutional Science and Technology (CREST); and Advanced Low Carbon Technology Research and Development Program (ALCA)

09:25 – 09:40 Engineering Microbes to Sense and Eradicate a Human Pathogen: A Novel Synthetic Biology-driven Antimicrobial Strategy

781: Invited

Matthew Wook Chang*, Nazanin Saeidi, Choon Kit Wong, Tat-Ming Lo, Hung Xuan Nguyen, Hua Ling, Susanna Su Jan Leong and Chueh Loo Poh — *Nanyang Technological University, Singapore

Session 6B	Topic 9: Biosensors and Biomolecules on Solid Surfaces
Date/Time	24 February 2012 / 08:30 – 10:10 hrs
Venue	Room: 305
Chair(s)	Yang Kun-Lin (NUS), Jiang Rongrong (NTU)

08:30 – 08:55 Engineering Nanoscale Environment of Biocatalysts at Electrode Surface for High Performance Biosensors

535: Keynote

Ping Wang* — *University of Minnesota, USA

08:55 – 09:10 Immobilized Oligopeptide Microarrays for Detecting Proteases

638: Invited

Chih-Hsin Chen and Kun-Lin Yang* — *National University of Singapore, Singapore

09:10 – 09:25 Activity and Stability Comparison of Immobilized NADH Oxidase on Multi-walled Carbon Nanotubes, Carbon Nanospheres, and Single-walled Carbon Nanotubes

702: Invited

Rongrong Jiang* — *Nanyang Technological University, Singapore

09:25 – 09:40 Biomolecule Sensor Based on Nanoconjugate Comprised of Popcorn-Shaped Gold Nanoparticles and Quantum Dots

165: Oral

Zhang Tao*, Chen Shing Bor and Larry Yung Lin Yue — *National University of Singapore, Singapore

09:40 – 09:55 Bacteriorhodopsin Fabrication on ITO Electrodes for Photoelectric Biosensor and Photocell Applications

374: Oral

Kai-Ru Jheng, Meng-Shiun Tsai and Hsiu-Mei Chen* — *National Taiwan University of Science and Technology, Taiwan

Day 3 — Friday, 24 February 2012 : Presentation Schedule

- 09:55 – 10:10** **Synthesis and Characterization of Cellulose Acetate — Glucose Oxidase Nanofibers for Biosensor Applications**
738: Oral
 Mark Daniel G. de Luna*, Ruben Kristoffer Cariño, Brylee David Tiu, Kristine Tolod, Marvin Herrera
 — *University of the Philippines Diliman, Philippines

Session 6C	Topic 7: Membrane Science & Technology for Emerging Applications
Date/Time	24 February 2012 / 08:30 – 10:10 hrs
Venue	Room: 308
Chair(s)	(Neal) Tai-Shung Chung (NUS), Wang Rong (NTU), Liang Hong (NUS)

- 08:30 – 08:55** **Thermally Rearranged Polymer Membranes Tuned for Transport of Small Molecules**
303: Keynote
 Young Moo Lee* — *Hanyang University, Korea
- 08:55 – 09:10** **Advances in Membrane Technology: Forward Osmosis/Pressure Retarded Osmosis Membranes and Biomimetic Membranes**
596: Invited
 Rong Wang*, Chuyang Tang and Tony Fane — *Nanyang Technological University, Singapore
- 09:10 – 09:25** **Thermal Annealing Membranes Grafted with Thermal Labile Molecules for Enhancement in Gas Performance and Natural Gas Plasticization Reduction**
704: Oral
 Mei Ling Chua*, You Chang Xiao and Tai-Shung Chung — *National University of Singapore, Singapore
- 09:25 – 09:40** **Study of the Fabrication of Cellulose Triacetate Forward Osmosis Membranes**
673: Oral
 Rui Chin Ong* and Tai-Shung Chung — *National University of Singapore, Singapore
- 09:40 – 09:55** **Microporous Polybenzoxazole Membranes for Biofuel Dehydration**
670: Oral
 Yee Kang Ong*, Huan Wang and Tai-Shung Chung — *National University of Singapore, Singapore

Session 6D	Topic 14: Green and Sustainable Processes
Date/Time	24 February 2012 / 08:30 – 10:10 hrs
Venue	Room: 309
Chair(s)	Li Zhi (NUS), Wu Jinchun (ICES), Armando Borgna (ICES)

- 08:30 – 08:45** **The Production of 5-Hydroxymethylfurfural from Fructose in Iso-propanol, A Green and Efficient System**
551: Invited
 Yugen Zhang* — *Institute of Bioengineering and Nanotechnology, Singapore
- 08:45 – 09:00** **Bacterionanofibers Applicable to a New Method for Surface Immobilization of Microbial Cells**
588: Invited
 Katsutoshi Hori* — *Nagoya University, Japan
- 09:00 – 09:15** **Antimicrobial Polymers Derived from Natural Resin Acids**
509: Invited
 Chuanbing Tang* — *University of South Carolina, USA
- 09:15 – 09:30** **Synergetic Effect between Coal and Biomass during Co-pyrolysis**
317: Oral
 Krerkkaiwan Supachita*, Kuchonthara Prapan, Yamamoto Hidetoshi, Fushimi Chihiro and Tsutsumi Atsushi — *Chulalongkorn University, Thailand
- 09:30 – 09:45** **Asymmetric Trans-dihydroxylation of Cyclic Olefins by Enzymatic or Chemo-enzymatic Sequential Epoxidation and Hydrolysis in One Pot**
719: Oral
 Yi Xu, Aitao Li*, Xin Jia and Zhi Li — *National University of Singapore, Singapore
- 09:45 – 10:00** **Efficient Enantioselective Reduction of Ketone with Cofactor Recycling by Highly Active and Easily Recyclable Nanobiocatalysts**
730: Oral
 Thao Phuong Nguyen Ngo* and Zhi Li — *National University of Singapore, Singapore

Session 6E	Topic 15: Chemical Engineering Education
Date/Time	24 February 2012 / 08:30 – 10:10 hrs
Venue	Room: 310
Chair(s)	M.P. Srinivasan (NUS), Jim Yang Lee (NUS)

- 08:30 – 08:45** **Teaching Chemical Engineering in the 21st Century using the CDIO Framework**
556: Oral Sin-Moh Cheah* and Dennis Sale — *Singapore Polytechnic, Singapore
- 08:45 – 09:00** **Graduate Education in the New World**
797: Invited M. P. Srinivasan* — *National University of Singapore, Singapore
- 09:00 – 09:15** **Capability Building in CDIO for New Lecturer: A Case Study**
726: Oral Poh-Hui Chua*, Sin-Moh Cheah and Mark Nivan Singh — *Singapore Polytechnic, Singapore
- 09:15 – 09:30** **Active Learning in Chemical Reaction Engineering: Experience from Singapore Polytechnic**
564: Oral Katerina Yang* and Sin-Moh Cheah — *Singapore Polytechnic, Singapore

Session 7A	Topic 4: Synthesis and Processing of Nanomaterials
Date/Time	24 February 2012 / 13:20 – 15:00 hrs
Venue	Room: 303
Chair(s)	Zeng, Hua Chun (NUS), Timothy Tan (NTU), Chen Yuan (NTU), Jianping Xie (NUS)

- 13:20 – 13:45** **Aqueous Synthesis of Nanostructured Enzyme Nanogel**
754: Keynote Zheng Liu* — *Tsinghua University, China
- 13:45 – 14:00** **Biomaterials Synthesis using Microfluidic Approaches**
77: Invited Peggy P. Y. Chan*, Aisha Qi, Anushi Rajapaksa, James Friend and Leslie Yeo — *Monash University, Australia
- 14:00 – 14:15** **Effects of DC Electric Field on Catalytic Activity in Carbon Nanotube Synthesis**
228: Oral Kohta Masunaga*, Hiroyuki Ito, Yuji Nakamura and Osamu Fujita — *Hokkaido University, Japan
- 14:15 – 14:30** **Synthesis of CdTe/CdS Core/Shell Quantum Dots under Ambient Air Atmosphere with Type-I to Type-II Band Alignment Transition**
443: Oral Meng-Qiao Dai* and Lin-Yue Lanry Yung — *National University of Singapore, Singapore
- 14:30 – 14:45** **Creative Synthesis of Non-Carbon Nanotubes by Submerged Arc Plasma**
205: Oral Noriaki Sano* and Hajime Tamon — *Kyoto University, Japan

Session 7B	Topic 3: Systems and Synthetic Biology
Date/Time	24 February 2012 / 13:20 – 15:00 hrs
Venue	Room: 307
Chair(s)	Lee Dong-Yup (BTI/NUS), Hao Song (NTU)

- 13:20 – 13:35** **Estimating Kinetic Parameters of Large-scale Metabolic Models**
821: Invited Gengjie Jia, Gregory N. Stephanopoulos and Rudiyanto Gunawan* — *Institute for Chemical and Bioengineering, Switzerland
- 13:35 – 13:50** **Rapid Estimation of Kinetic Parameters in S-system Type Differential Equation Models for Metabolic Reaction Networks**
397: Oral Michio Iwata* and Fumihide Shiraishi — *Kyushu University, Japan

Day 3 — Friday, 24 February 2012 : Presentation Schedule

13:50 – 14:05 **Novel Codon Optimization Approach towards Synthetic Design of Recombinant Genes**
320: Oral Bevan Kai-Sheng Chung* and Dong-Yup Lee — *National University of Singapore, Singapore and Technology and Research (A*Star), Singapore

14:05 – 14:20 **Reconstruction and Analysis of Genome Scale Metabolic Network of Rhodococcus erythropolis for Improved Desulfurization**
470: Oral Shilpi Aggarwal*, Iftekhhar A. Karimi and Dong-Yup Lee — *National University of Singapore, Singapore

Session 7C	Topic 21: Bioenergy from Biomass and environmental microbiology
Date/Time	24 February 2012 / 13:20 – 15:00 hrs
Venue	Room: 304
Chair(s)	He Jianzhong (NUS), Yang Kun-Lin (NUS)

13:20 – 13:35 **Understanding the Microbial Ecology of Biomethane-generating Systems**
73: Invited Patrick Lee* — *City University of Hong Kong, Hong Kong

13:35 – 13:50 **Role of Microbial Syntrophy in Bioenergy Production**
71: Invited Wen-Tso Liu* — *University of Illinois, USA

13:50 – 14:05 **Lignin-baited Bio-Trap Beads to Search for Novel Lignin Degrading Microbes in Tropical Forest Soil**
273: Invited Kristen M. DeAngelis, Kerry L. Sublette, Whendee L. Silver, Terry C. Hazen and Gary L. Andersen* — *Lawrence Berkeley National Laboratory, USA

14:05 – 14:20 **Production and Physico-chemical Characterisation of Bio-oil from the Pyrolysis of Jatropa curcas Wastes**
233: Oral Seyed AmirMostafa Jourabchi*, Suyin Gan and Hoon Kiat Ng — *The University of Nottingham Malaysia Campus, Malaysia

Session 7D	Topic 7: Membrane Science & Technology for Emerging Applications
Date/Time	24 February 2012 / 13:20 – 15:00 hrs
Venue	Room: 305
Chair(s)	(Neal) Tai-Shung Chung (NUS), Wang Rong (NTU), Liang Hong (NUS)

13:20 – 13:35 **Reinforcing H₃PO₄-doped Polybenzimidazole Proton Exchange Membrane by Polyester Macromer Crosslinker**
642: Invited Siok Wei Tay, Zhaolin Liu and Liang Hong* — *Institute of Materials Research and Engineering, Singapore

13:35 – 13:50 **Regulation of α -L-Guluronic Acid Blocks and Electrolytes Ions for Tailoring Design of Alginate Gel Structure and Application for Promising Capability of Selective Mass Transfer**
482: Oral Keita Kashima* and Masanao Imai — *Nihon University, Japan

13:50 – 14:05 **Physical and Mechanical Properties of Oxygen Ion Transfer Membranes La_{0.7}Sr_{0.3}Co_{1-x}Fe_xO_{3- δ} and La_{1-x}Sr_xCo_{0.8}Fe_{0.2}O_{3- δ} (0.0=x=0.5)**
767: Oral Hamzah Fansuri*, Didik Prasetyoko, Irmina Kris Murwani, Nurul Widiastuti and Bambang Prijamboedhi — *Institut Teknologi Sepuluh Nopember, Indonesia

14:05 – 14:20 **Theoretical and Experimental Investigations of a N₂-Selective Membrane**
362: Oral Panithita Rochana*, Ekin Ozdogan and Jennifer Wilcox — *Stanford University, USA

14:20 – 14:35 **Structured Zeolite Adsorbents with Remarkably High CO₂ over N₂ Selectivity and Uptake Capacity**
712: Oral Farid Akhtar*, Qingling Liu, Niklas Hedin and Lennart Bergström — *Stockholm University, Sweden

Day 3 — Friday, 24 February 2012 : Presentation Schedule

14:35 – 14:50 **Cell Performance Modeling of Direct Methanol Fuel Cells using Protonexchange Solid Electrolytes**
203: Oral
 S. Jessie Lue, Bo Yan Wang*, Hun Kai Lin and K. P. O. Mahesh — **Chang Gung University, Taiwan*

Session 7E	Topic 15: Chemical Engineering Education
Date/Time	24 February 2012 / 13:20 – 15:00 hrs
Venue	Room: 308
Chair(s)	M.P. Srinivasan (NUS), Jim Yang Lee (NUS)

13:20 – 13:45 **Chemical Engineering Education in the Virtual World**
38: Keynote
 David C. Shallcross*, Jo Dalvean, Roger Hadgraft, Ken Mann, Ian Cameron, Caroline Crosthwaite, Nicoleta Maynard, Moses Tade and John Kavanagh — **University of Melbourne, Australia*

13:45 – 14:10 **Process Intensification in Undergraduate Education**
763: Keynote
 Hwai-Shen Liu* — **National Taiwan University, Taiwan*

14:10 – 14:25 **Educating Fit for Purpose 21st Century Chemical Engineers; Appreciating Complexity, Inherent Uncertainty and a Broader Perspective**
75: Invited
 Edmond P. Byrne* — **University College Cork, Ireland*

14:25 – 14:40 **Teaching Teamwork & Communication Skills in Chemical Engineering: The CDIO Way**
679: Oral
 Jessy Jee-Chin Yau* and Sin-Moh Cheah — **Singapore Polytechnic, Singapore*

14:40 – 14:55 **Multiphase Pumping Technology: Its significant Application Towards Gas Flaring Reduction in Oil Production**
84: Oral
 Nader Nabhani* and Morteza Yazdanifard — **Petroleum University of Technology, Iran*

Session 7F	Topic 2: Biomaterials and Biotechnology
Date/Time	24 February 2012 / 13:20 – 15:00 hrs
Venue	Room: 309
Chair(s)	Koon Gee Neoh (NUS), Sing Yian Chew (NTU)

13:20 – 13:45 **Gelatin Microspheres as Scaffolds for Tissue Engineering with Human Adipose Derived Stem Cells**
750: Keynote
 Tong Yen Wah* — **National University of Singapore, Singapore*

13:45 – 14:00 **Nanofiber Scaffold-based Gene-silencing for Regenerative Medicine**
671: Invited
 Sing Yian Chew* — **Nanyang Technological University, Singapore*

14:00 – 14:15 **Instructive Biomaterials to Control Spatial Organization of Neovessels**
764: Invited
 Hyunjoon Kong* — **University of Illinois, USA*

14:15 – 14:30 **Mechanisms and Promotion of 3D Neurite Bridging between Microspheres Fabricated from Renewable PHBV Polymer**
605: Oral
 Wenhui Chen* and Yen Wah Tong — **National University of Singapore, Singapore*

14:30 – 14:45 **Preparation and in Vitro Release of Itraconazole from Polyketal Microparticles**
442: Oral
 Lu-Chun Liu, Chi-Sheng Lo*, Kan-Sheng Shih and Chen-Yu Kao — **National Taiwan University of Science and Technology, Taiwan*

Session 7G	Topic 9: Biosensors and Biomolecules on Solid Surfaces
Date/Time	24 February 2012 / 13:20 – 15:00 hrs
Venue	Room: 310
Chair(s)	Yang Kun-Lin (NUS), Jiang Rongrong (NTU)

13:20 – 13:45 **Electrochemistry-based Monitoring of Real Time Polymerase Chain Reaction for Point of Care Applications**

60: Keynote

I-Ming Hsing* — **The Hong Kong University of Science and Technology, China*

13:45 – 14:00 **Nanostructures Materials for Novel Biosensing Applications**

162: Invited

J. Justin Gooding*, Leo M. H. Lai, Ian Y. Goon, Kyloon Chuah, Guozhen Liu, Elizabeth Murago, Erwann Luais and Rose Amal — **The University of New South Wales, Australia*

14:00 – 14:15 **Interdigital Array Microelectrodes Based Glucose Biosensors**

117: Invited

Chia-Pyng Lee and Meng-Jiy Wang* — **National Taiwan University of Science and Technology, Taiwan*

14:15 – 14:30 **Direct Electrochemistry of Glucose Oxidase Immobilized on Multi-walled Carbon Nanotubes Modified Sputtering Deposited Gold Electrodes**

343: Oral

You-Syuan Jhai*, Wen Wang, Meng-Jiy Wang and Chiapyng Lee — **National Taiwan University of Science and Technology, Taiwan*

14:30 – 14:45 **Amperometric Biosensor based on Nickel Electrodes Coated with a Nanocomposite Layer Containing Prussian Blue and Multi-walled Carbon Nanotubes**

338: Oral

Kuan-Yu Chen*, Wen Wang, Meng-Jiy Wang and Chiapyng Lee — **National Taiwan University of Science and Technology, Taiwan*

14:45 – 14:55 **Development of Protein Biosensor Utilizing Peptide Probes for the Detection of Biomarkers**

152: Mini Talk

Jong Pil Park* and Myungyi Ryu — **Daegu Haany Univesity, Korea*

Session 8A	Topic 4: Synthesis and Processing of Nanomaterials
Date/Time	24 February 2012 / 15:15 – 17:20 hrs
Venue	Room: 303
Chair(s)	Zeng, Hua Chun (NUS), Timothy Tan (NTU), Chen Yuan (NTU), Jianping Xie (NUS)

15:15 – 15:30 **Comparison of Horizontal and Vertical Chemical Vapour Deposition Reactor for the Production of Hierarchical Carbon Fibres**

350: Oral

Suraya Abdul Rashid*, Muhammad Zamir Abdul Rashid and Muharniza Azinita Musa — **University Putra Malaysia, Malaysia*

15:30 – 15:45 **Facile and Efficient Synthesis of Graphene-TiO₂ Composites in Ionic Liquid**

490: Oral

Van Hoa Nguyen* and Jae-Jin Shim — **Yeungnam University, Korea*

15:45 – 16:00 **Silver Nanoparticles Decorated Graphene and Graphene Oxide Nanocomposite in Supercritical CO₂: Antibacterial Activity**

494: Invited

Yuvaraj Haldorai, Van Hoa Nguyen and Jae-Jin Shim* — **Yeungnam University, Korea*

16:00 – 16:15 **Synthesis of Magnetite Nanoparticles by Electrochemical Method using Pulsed-Direct Current**

474: Oral

Heru Setyawan*, Fauziatul Fajaroh, Karina A. Rachman, Memik D. Pusfitasari and Minta Yuwana — **Sepuluh Nopember Institute of Technology, Indonesia*

16:15 – 16:30 **Synthesis of Highly Fluorescent and Monodisperse Metal Nanoclusters**

666: Oral

Xun Yuan*, Zhentao Luo, Jim Yang Lee and Jianping Xie — **National University of Singapore, Singapore*

Day 3 — Friday, 24 February 2012 : Presentation Schedule

- 16:30 – 16:45** **Preparation of -Chitin Porous Structure Combining Nonsolvent-solvent Exchange Induced Phase Separation and Supercritical Drying Processes**
316: Oral
 Ratanajiaroen Pakavadee* and Ohshima Masahiro — *Kyoto University, Japan
- 16:45 – 17:00** **Controlling Periodicity of Colloidal Stripe Pattern by Programmed Convective Self-Assembly Method**
382: Oral
 Yasushi Mino*, Satoshi Watanabe and Minoru T. Miyahara — *Kyoto University, Japan
- 17:00 – 17:10** **Nanocomposites of Iron Oxide and Conductive Polymers for EMI Shielding**
408: Mini Talk
 Ying-Ting Huang*, Jinn-Jong Wong and Mu-Jen Young — *Industrial Technology Research Institute, Taiwan

Session 8B	Topic 12: Separation Science and Technology for a Sustainable Future
Date/Time	24 February 2012 / 15:15 – 17:20 hrs
Venue	Room: 304
Chair(s)	Farooq, Shamsuzzaman (NUS), Arvind Rajendran (NTU)

- 15:15 – 15:30** **The Clathrate Hydrate Process for Pre-combustion Capture of Carbon Dioxide from IGCC Power Plants**
796: Invited
 Ponni Valavan Babu and Praveen Linga* — *National University of Singapore, Singapore
- 15:30 – 15:45** **Process Design for Production of β -galactosidase from *Pichia pastoris***
707: Oral
 Jian-Xing Jiang and Yu-kaung Chang* — *Ming Chi University of Technology, Taiwan
- 15:45 – 16:00** **Preparation of Carbon Cryogel Microhoneycomb from Phenol and Formaldehyde by Ice-Templating and Activation**
120: Oral
 Hajime Tamon*, Shuhei Okumura and Noriaki Sano — *Kyoto University, Japan
- 16:00 – 16:15** **Enantioselective Separation of Chiral Aromatic Amino Acids with Surface Functionalized Magnetic Nanoparticles**
431: Oral
 Sudipa Ghosh*, Hui Fang Tan, M. S. Uddin and K. Hidajat — *National University of Singapore, Singapore
- 16:15 – 16:30** **Extraction and Purification of Zeaxanthin from *Nannochloropsis Oculata* by Using Supercritical Fluids Anti-solvent Precipitation**
188: Oral
 Chieh-Ming J. Chang*, Siang-En Hong, Yueh-Cheng Cho, Li-Pin Chang, Yuan-Chuen Wang and Shih-Lan Hsu — *National Chung Hsing University, Taiwan
- 16:30 – 16:45** **Adsorption and Diffusion of CO₂ and Nitrogen on 13X and Silica Gel**
711: Oral
 Shreenath Krishnamurthy*, Reza Haghpanah, Arvind Rajendran and Shamsuzzaman Farooq — *National University of Singapore, Singapore
- 16:45 – 17:00** **Removal of Sulfur-oxidated Compounds in Oxidative Desulfurization Process**
500: Oral
 Jong-Nam Kim*, Chang Hyun Ko, Sang Sup Han, Hee Tae Beum, Jihye Park and Sam Mok Lim — *Korea Institute of Energy Research, Korea

Session 8C	Topic 6: Biochemical Engineering / Biofuel
Date/Time	24 February 2012 / 15:15 – 17:20 hrs
Venue	Room: 307
Chair(s)	Loh Kai Chee (NUS), Susanna Leong Su Jan (NTU)

- 15:15 – 15:30** **Engineering Global Transcription Factor Cyclic AMP Receptor Protein for Improved 1-Butanol Tolerance**
700: Oral
 Rongrong Jiang*, Hongfang Zhang, Huiqing Chong and Chi-Bun Ching — *Nanyang Technological University, Singapore

Day 3 — Friday, 24 February 2012 : Presentation Schedule

- 15:30 – 15:45** **Pharmacophore and Virtual Screening to Design the Potential Influenza Virus Endonuclease Inhibitors**
327: Oral
 Huang-Sheng Liao*, Josephine W. Wu, Hsuan-Liang Liu, Jian-Hua Zhao, Kung-Tien Liu, Chih-Kuang Chuang, Hsin-Yi Lin, Wei-Bor Tsai and Yih Ho — *National Taipei University of Technology, Taiwan
- 15:45 – 16:00** **The Identification of Transthyretin Inhibitors through Molecular Docking, Scoring and Virtual Screening**
283: Oral
 Zheng-Li Zhou*, Hsuan-Liang Liu and Josephine W. Wu — *National Taipei University of Technology, Taiwan
- 16:00 – 16:15** **Biodiesel Production using Membrane Bioreactor System for in situ Glycerol Separation**
244: Oral
 Myung Joo Ko, Hyun June Park, So Yeon Hong, Camila Flor Yagonia* and Young Je Yoo — *Seoul National University, Korea
- 16:15 – 16:30** **A New Approach for Enzyme Immobilization in a Microreactor**
369: Oral
 Kyuya Nakagawa*, Yuki Goto and Akihiro Tamura — *University of Hyogo, Japan

Session 8D	Topic 17: Process Systems Engineering
Date/Time	24 February 2012 / 15:15 – 17:20 hrs
Venue	Room: 305
Chair(s)	Rangaiah Gade Pandu (NUS), Vinay Kumar Kariwala (NTU)

- 15:15 – 15:30** **Design and Control of Reactive Divided Wall Column for Ethyl Acetate and Isopropyl Acetate Processes**
491: Oral
 Hao-Yeh Lee*, I-Lung Chien and Hsiao-Ping Huang — *National Taiwan University of Science and Technology, Taiwan
- 15:30 – 15:45** **Local Adaptive Soft Sensors for Catalyst Activation Prediction**
218: Oral
 Wang-Dong Ni*, Soon-Keat Tan and Wun-Jern Ng — *Nanyang Technological University, Singapore
- 15:45 – 16:00** **Simultaneous Chemical and Phase Equilibrium of Glycerol-Water Reforming**
761: Oral
 Hafis Irsyad, Mukarramah Samsu and Ye Lwin* — *Universiti Teknologi Petronas, Malaysia
- 16:00 – 16:15** **Optimal Operational Adjustment in Multi-Functional Energy Systems in Response to Process Inoperability**
287: Oral
 Raymond R. Tan*, Harresh Kasivisvanathan, Ivan Dale U. Barilea and Denny K. S. Ng — *De La Salle University, Philippines
- 16:15 – 16:30** **New Approach for Optimizing Pooling Problems Using Integrated Differential Evolution**
614: Oral
 Haibo Zhang, Kai Lun Lee and G. P. Rangaiah* — *National University of Singapore, Singapore
- 16:30 – 16:45** **Optimization of a Multi-product Biosynthesis Factory for Multiple Objectives: Challenges and Prospects for Chemical Engineering Applications**
843: Oral
 Lee Fook Choon* — *Singapore Polytechnic, Singapore
- 16:45 – 17:00** **Short-Term Scheduling of Refinery Production Operations**
288: Oral
 Sanjeev Yadav* and Munawar A. Shaik — *Indian Institute of Technology, India
- 17:00 – 17:10** **A Methodology for Augmenting Sparse Pairwise Comparisons in the Analytic Hierarchy Process using Partial Ranking of Alternatives**
348: Mini Talk
 Raymond R. Tan and Michael Angelo B. Promentilla* — *De La Salle University, Philippines
- 17:10 – 17:20** **Mixing Performance of the Superblend™ Coaxial Mixer with Shear-thinning Fluids**
175: Mini Talk
 Xiao Wang, Louis Fradette*, Katsuhide Takenakab, Philippe Tanguy — *Ecole polytechnique de Montreal, Canada

Day 3 — Friday, 24 February 2012 : Presentation Schedule

Session 8E	Topic 5: Energy
Date/Time	24 February 2012 / 15:15 – 17:20 hrs
Venue	Room: 308
Chair(s)	Liu Bin (NUS), David Lou (NTU), Wang Qing (MSE, NUS)

- 15:15 – 15:30**
645: Oral **Composite Hollow Fiber Membranes Fabricated via Continuous Coating Process for Co₂/N₂ Separation**
 Hang Zheng Chen*, You Chang Xiao and Tai-Shung Chung — *National University of Singapore, Singapore
- 15:30 – 15:45**
305: Oral **Carbon Dioxide Reduction for Carbon Monoxide Production using Solid Oxide Electrolysis Cell**
 Arnoldus Lambertus Dipu*, Keirei Uruma, Junichi Ryu and Yukitaka Kato — *Tokyo Institute of Technology, Japan
- 15:45 – 16:00**
300: Oral **Multi-junction Solar Cells with Different Deposited Thin Films for Photoelectrochemical Water Splitting Reactions**
 Chao-Wei Huang*, Chi-Hung Liao, Chih-Hung Wu and Jeffrey Chi-Sheng Wu — *National Taiwan University, Taiwan
- 16:00 – 16:15**
192: Oral **Enhanced Visible Light Photocatalytic Activity of N-doped TiO₂ for Hydrogen Production from Water Splitting**
 Ren-Jang Wu* and Ying-Chieh Hsieh — *Providence University, Taiwan
- 16:15 – 16:30**
476: Oral **Development Updraft Gasifier with Side Stream for Conversion of South Sumatera Coal into Synthesis Gas**
 Yusman Arullah* and Herri Susanto — *PT. Pupuk Sriwidjaja Palembang, Indonesia
- 16:30 – 16:45**
97: Oral **Hydrogen Production from Deliquescence of Ammonia borane in Presence of Light-weighted Catalysts**
 Chang-Chen Chou*, Cheng-Hong Liu, Bing-Hung Chen and Duu-Jong Lee — *National Cheng Kung University, Taiwan
- 16:45 – 16:55**
214: Mini Talk **Water-Soluble Structure H Clathrate Hydrate Formers and Phase Equilibrium Measurement**
 Woongchul Shin*, Seongmin Park, Dong-Yeun Koh, Jiwoong Seol, Hyeyoon Ro and Huen Lee — *Korean Advanced Institute of Science and Technology, Korea

Session 8F	Topic 2: Biomaterials and Biotechnology
Date/Time	24 February 2012 / 15:15 – 17:20 hrs
Venue	Room: 309
Chair(s)	Yen Wah Tong (NUS), Chi-Hwa Wang (NUS)

- 15:15 – 15:30**
678: Invited **Mathematical Simulation of Ultrasound-Induced Drug Release from Liposomes**
 Giora Enden*, Luai Khoury and Avi Schroeder — *Ben-Gurion University of the Negev, Israel
- 15:30 – 15:45**
805: Invited **Cellular DNA Damage Response to Zinc Oxide Nanoparticles Hinges on the Tumor Suppressor p53 Pathway**
 David Leong* — *National University of Singapore, Singapore
- 15:45 – 16:00**
699: Oral **Gelatin Microspheres as Scaffolds for Culturing Human Adipose Derived Stem Cells and Human Hepatoma Cells**
 Anjaneyulu Kodali* and Tong Yen Wah — *National University of Singapore, Singapore
- 16:00 – 16:15**
604: Oral **Effect of 3D Matrix Stiffness on Malignancy and Drug Resistance**
 Youyun Liang*, Jaehyun Jeong, Ross DeVolder, Chaenyung Cha, Fei Wang, Yen Wah Tong and Hyunjoon Kong — *University of Illinois at Urbana-Champaign, USA; and National University of Singapore, Singapore

Day 3 — Friday, 24 February 2012 : Presentation Schedule

- 16:15 – 16:30**
106: Oral **Synthesis of Sugar-containing Amphiphilic Block Copolypeptides as Novel Carriers for Drug Delivery**
 Jeng-Shiung Jan and Yun-Duan Chen* — *National Cheng Kung University, Taiwan
- 16:30 – 16:40**
128: Mini Talk **Biodegradation of Benzene by Mycoplasma sp. MVMB2**
 Sheeba Varma Surendra*, Visalatchi Andi, Brinda Lakshmi Mahalingam and Velan Manickam — *Anna University, India
- 16:40 – 16:50**
295: Mini Talk **The Improvement of Mechanical Strength between Denture based Material and Soft Lining**
 Wan-Ping Chang* and Wen-Chien Liao — *National Defense Medical Center, Taiwan
- 16:50 – 17:00**
265: Mini Talk **The Creation of Calcium Peroxide Embedded Micro-Fibril Cellulose Membrane for Biomedical Application**
 Chia-Wen Chang* and Meng-Jiy Wang — *National Taiwan University of Science and Technology, Taiwan

Session 8G	Topic 13: Catalysis and Reaction Engineering
Date/Time	24 February 2012 / 15:15 – 17:20 hrs
Venue	Room: 310
Chair(s)	S. Kawi (NUS), Yang Yan Hui (NTU), Wong Pui Kwan (ICES), Armando Borgna (ICES)

- 15:15 – 15:30**
801: Oral **Liquid Phase Oxidation of Benzyl Alcohol Over Pd and Rh Catalysts on N-doped Mesoporous Carbon: Effect of the Surface Basicity**
 Bo Wang*, Yanhui Yang and Armando Borgna — *Institute of Chemical and Engineering Sciences, Singapore
- 15:30 – 15:45**
802: Oral **Guaiacol Deoxygenation as a Model Reaction for Bio-Oil Upgrading over Supported Metal Catalysts**
 Jie Chang*, Tanate Danuthai, Silvia Dewiyanti, Michael Tasrif, Thiam Peng Ang, Chuan Wang and Armando Borgna — *Institute of Chemical and Engineering Sciences-A*Star, Singapore
- 15:45 – 16:00**
735: Oral **Spatial and Temporal Patterns in Three-way Catalytic Monoliths: Stability and Bifurcation Analysis of Major Reaction Subnetworks**
 Otto Hadac, Martin Kohout and Igor Schreiber* — *Institute of Chemical Technology, Czech Republic
- 16:00 – 16:15**
498: Oral **Catalytic Hydrogenation of CO₂ for Sustainable Transport**
 Maya R Musadi* — *National Institute of Technology, Indonesia
- 16:15 – 16:30**
740: Oral **Novel Liquid-Like Nanoparticles Organic Hybrid Materials (NOHMs) for CO₂ Capture**
 Ah-Hyung Alissa Park*, Youngjune Park, Kun-Yi Andrew Lin and Camille Petit — *Columbia University, USA
- 16:30 – 16:40**
812: Mini Talk **Dehydrogenation of Methylcyclohexane: Kinetics and Reactor Modeling**
 Muhammad Usman* and David Cresswell — *University of the Punjab, Pakistan
- 16:40 – 16:50**
838: Mini Talk **Catalytic Methane Decomposition on Silica Supported Co Catalyst for Pure Hydrogen and Carbon Nanotubes Production**
 Sushil Kumar Saraswat* and K. K. Pant — *Indian Institute of Technology, India

Chevron Chem-E-Car Competition

The Chemical-Energy-Car (Chem-E-Car) Competition is a student-based competition focusing on the design, construction and operation of a prototype car that is powered by a chemical energy source.

This event is under the 14th Asian Pacific Confederation of Chemical Engineering Congress 2012 in Singapore and the competition is held on 21st February 2012 at the Singapore Polytechnic campus. The event has been awarded exclusive sponsorship from the Chevron Oronite Pte Ltd, which has provided tremendous support in many ways other than financial as well.

In this event, each car will compete in two different races. Race One is the 'precision race' whereby the car is required to carry a certain 'water' load and traverse a given distance before coming to a halt at the finishing line. The car achieving the nearest distance from the finishing line of the race track will be declared the champion for this race and will be awarded the highest score. Race Two is unique in this Chem-E-Car Competition 2012 and is a test of the car's power and speed. Each car will compete to finish a given distance at the ramping track in the shortest possible time. The best performing car will be the champion for this race and awarded the highest score. Besides these two races, each competing team has to submit a poster design to be judged by competent and non-partisan judges. The poster design will be judged based on Content, Design and Presentation reflecting the combination of completion of a defined task, design creativity and issues related to safety, environment and health as the prototype model car handles chemical fuel.

This event in Singapore has attracted a total of thirty teams from the Asia Pacific countries including Iran, Chinese Taipei (Taiwan), Malaysia and host country Singapore. Though we have introduced a new category for the local schools and junior colleges to participate, the majority of the participating teams are predominantly from the IHL category comprising the universities and polytechnics, including the twelve overseas teams. As all competing teams must satisfy the JSA requirements before being accepted for the competition, our panel of auditors works closely (and relentlessly) with the teams to clarify issues related to safety.

The competition is about working as a team to design a relatively complex chemical process and meeting a tight schedule. The winning Chem-E-Car is strongly dependent on its mechanical robustness and based on sound theoretical design. The competition will test each team's ability to design a mini-reactor that must operate under safe conditions to propel the movement of the Chem-E-Car, and which often requiring contestants to be flexible and fast-thinking to address the set conditions on the competition day.

It is hoped that through this event, our young potential chemical engineers will strengthen their competencies in collaboration, planning and management skills over and above their innovative, technical and analytical skills that will position them well to take on the challenges of the future. We hope to see our international teams also building cross cultural skills to assist them in globalisation, a necessity for future advancement.

APCCChE 2012 Topics & Chairs

Topic	Title	Chair(s)
1	Macromolecular Science and Engineering	Chan Bee Eng, Mary (NTU), En-Tang Kang (NUS)
2	Biomaterials and Biotechnology	Vincent Chan (NTU), Chi-Hwa Wang (NUS), Koon Gee Neoh (NUS), Sing Yian Chew (NTU), Yen Wah Tong (NUS)
3	Systems and Synthetic Biology	Lee Dong-Yup (BTI/NUS), Hao Song (NTU)
4	Synthesis and Processing of Nanomaterials	Zeng, Hua Chun (NUS), Timothy Tan (NTU), Chen Yuan (NTU), Jianping Xie (NUS)
5	Energy	Liu Bin (NUS), David Lou (NTU), Wang Qing (MSE, NUS)
6	Biochemical Engineering / Biofuel	Loh Kai Chee (NUS), Susanna Leong Su Jan (NTU)
7	Membrane Science & Technology for Emerging Applications	(Neal) Tai-Shung Chung (NUS), Wang Rong (NTU), Liang Hong (NUS)
8	Thermodynamics and Molecular Simulations	Jiang Jianwen (NUS), Shiang-Tai Lin (National Taiwan University, Taiwan)
9	Biosensors and Biomolecules on Solid Surfaces	Yang Kun-Lin (NUS), Jiang Rongrong (NTU)
10	Transport Phenomena	Raymond Lau (NTU), Shing-Bor Chen (NUS), Rensheng Deng (Institute of Bioengineering and Nanotechnology)
11	Microfluidics for Chemistry and Life Sciences	Saif Khan (NUS)
12	Separation Science and Technology for a Sustainable Future	Farooq, Shamsuzzaman (NUS), Arvind Rajendran (NTU)
13	Catalysis and Reaction Engineering	S. Kawi (NUS), Yang Yan Hui (NTU), Wong Pui Kwan (ICES), Armando Borgna (ICES)
14	Green and Sustainable Processes	Li Zhi (NUS), Wu Jinchun (ICES), Armando Borgna (ICES)
15	Chemical Engineering Education	M.P. Srinivasan (NUS), Jim Yang Lee (NUS)
16	Chem-E-Car Competition	Tay Kheng Siong (Singapore Polytechnic), Yow Kum Pang (Nanyang Polytechnic), Mirko Stoll (Ngee Ann Polytechnic), Lakshminarayanan Samavedham (NUS)
17	Process Systems Engineering	Rangaiah Gade Pandu (NUS), Vinay Kumar Kariwala (NTU)
18	Environmental Science & Technology	Sun Dalai Darren (NTU), Ting Yen Peng (NUS)
19	Industry – Petrochemical, Specialty Chemicals, Polymers, Semiconductors	
20	Industry – Pharmaceutical, Food & Beverage, Health Care and Home Products	Kamalesh Sengothi (Roche)
21	Bioenergy from Biomass and Environmental Microbiology	He Jianzhong (NUS), Yang Kun-Lin (NUS)

Programme-At-A-Glance

Day 1 — Wednesday, 22 February 2012	Time/Venue	Suntec Convention Centre, Level 3, Theatre								
	09:00 - 10:00	Opening Ceremony Welcome Speech: Er Edwin Khew, <i>President of 14th APCChE Congress 2012 and Vice President of IES, Singapore</i> Speech by Guest-of-Honor: Mr Manohar Khatani, <i>Chief Executive Officer, JTC Corporation</i> Presentation of Awards for the Chem-E-Car Competition: Guest of Honor Mr Manohar Khatani, <i>Chief Executive Officer, JTC</i>								
	10:00 - 10:30	Tea / Coffee Break								
	10:30 - 11:50	Plenary Talk 1: Prospect of Chemical Looping Technology – Ionic Transfer, Solids Flow and Process Scale-up Prof. Liang-Shi Fan, <i>The Ohio State University, USA</i> Plenary Talk 2: Engineering New Vaccine Processes Prof. Anton Middelberg, <i>University of Queensland, Australia</i>								
	11:50 - 13:00	Lunch Break								
		Room 303	Room 304	Room 308	Theatre	Room 307	Room 309	Room 310	Gallery East	Room 305
	13:00 - 15:00	Session 1A Topic 18	Session 1B Topic 5	Session 1C Topic 8	Session 1D Topic 7	Session 1E Topic 11	Session 1F Topic 10	Session 1G Topic 1 & 20	Posters Group 1	Sustainability Seminar
	15:00 - 15:15	Tea / Coffee Break & Poster Session (Group 1)								
	15:15 - 17:20	Session 2A Topic 18	Session 2B Topic 5	Session 2C Topic 8	Session 2D Topic 4	Session 2E Topic 14	Session 2F Topic 10	Session 2G Topic 17		
Day 2 — Thursday, 23 February 2012	Time/Venue	Room 303	Room 307	Room 304	Room 305	Room 308	Room 309	Room 310	Theater	
	08:30 - 10:10	Session 3A Topic 10	Session 3B Topic 1	Session 3C Topic 6	Session 3D Topic 7	Session 3E Topic 14	Session 3F Topic 21	Session 3G Topic 13&18	Process Safety Management Seminar	
	10:10 - 10:30	Tea / Coffee Break								
		Suntec Convention Centre, Level 3, Theatre								
	10:30 - 12:30	Plenary Talk 3: Process Safety: Great Britain HSE Regulator Approach Judith Hackitt CBE, <i>Chairperson Health and Safety Executive, UK</i> Plenary Talk 4: Engineering Considerations in the Design of Energy Storage Materials Prof. Jim Yang Lee, <i>National University of Singapore, Singapore</i> Plenary Talk 5: Critical Role Of Leadership in Preventing Major Accidents in Chemical Process Industry Graeme Ellis, <i>Principal Lead Consultant, ABB Consulting, UK</i>								
	12:30 - 13:20	Lunch Break								
		Room 303	Room 304	Room 305	Room 308	Room 307	Room 309	Gallery East	Theater	
	13:20 - 14:55	Session 4A Topic 18	Session 4B Topic 5	Session 4C Topic 6	Session 4D Topic 7	Session 4E Topic 14	Session 4F Topic 13	Posters Group 2	Process Safety Management Seminar	
	14:55 - 15:15	Tea / Coffee Break & Poster Session (Group 2)								
15:15 - 17:30	Session 5A Topic 4	Session 5B Topic 12	Session 5C Topic 2	Session 5D Topic 10	Session 5E Topic 17	Session 5F Topic 13				
18:30 - 21:00	Conference Dinner @ Marina Mandarin Singapore (across Raffles Boulevard) : Level 1 Ballroom									
Day 3 — Friday, 24 February 2012	Time/Venue	Room 307	Room 305	Room 308	Room 309	Room 310				
	08:30 - 10:10	Session 6A Topic 3	Session 6B Topic 9	Session 6C Topic 7	Session 6D Topic 14	Session 6E Topic 15				
	10:10 - 10:30	Tea / Coffee Break								
		Suntec Convention Centre, Level 3, Room 303 & 304								
	10:30 - 12:30	Plenary Talk 6: Nanostructured Materials for Biomedical, Catalytic and Energy Applications Prof. Jackie Y. Ying, <i>Institute of Bioengineering and Nanotechnology, Singapore</i> Plenary Talk 7: How Good are Block Copolymer Membranes? Prof. Edward Cussler, <i>University of Minnesota, USA</i> Plenary Talk 8: Quorum-Sensing Control of Gene Expression: Taming a Gene Regulatory System for Synthetic Biology Prof. E. Peter Greenberg, <i>University of Washington, USA</i>								
	12:30 - 13:20	Lunch Break								
		Room 303	Room 307	Room 304	Room 305	Room 308	Room 309	Room 310		
13:20 - 15:00	Session 7A Topic 4	Session 7B Topic 3	Session 7C Topic 21	Session 7D Topic 7	Session 7E Topic 15	Session 7F Topic 2	Session 7G Topic 9			
15:00 - 15:15	Tea / Coffee Break									
	Room 303	Room 304	Room 307	Room 305	Room 308	Room 309	Room 310			
15:15 - 17:20	Session 8A Topic 4	Session 8B Topic 12	Session 8C Topic 6	Session 8D Topic 17	Session 8E Topic 5	Session 8F Topic 2	Session 8G Topic 13			



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