HKUST Jockey Club Institute for Advanced Study

IAS Symposium on Activated Sludge: Past and Next 100 Years

26 – 28 August 2014

# IAS SYMPOSIUM ON ACTIVATED SLUDGE-PAST AND NEXT 100 YEARS

## 26 – 28 August 2014

**HKUST Jockey Club Institute for Advanced Study**

**Organized by:**

香港科技大學 THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY

HKUST JOCKEY CLUB Institute for Advanced Study IAS

**Mainly Supported by:**

IWA the international water association

渠務署 Drainage Services Department

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# IAS Symposium on Activated Sludge: Past and Next 100 Years

26 – 28 August 2014

## WELCOME

**A**s one of the four global celebration events for the birth of activated sludge in 1914, The Hong Kong University of Science and Technology (HKUST) is honored to host this prestigious symposium on “Activated Sludge: Past and Next 100 years” in collaboration with the International Water Association (IWA), Drainage Services Department of the HKSAR Government, Sun Yat-sen University and with many other supporting bodies in Hong Kong and the region, for example, Singapore's Public Utilities Board (PUB) and Japan Sewage Works Agency (JSWA).

**W**astewater treatment has been practiced for a century in which the activated sludge technology plays the major role of protecting the water environment and offering an alternative water resource for reuse and recycle. With the growing concern around climate change, and given the increase in global population, and fast urbanization in emerging countries and particularly countries in Asia, new ideas, concepts and approaches to wastewater management are essential for the sustainable development of the region, and the world. These new ideas, concepts and approaches to wastewater management must be directed towards energy, water and resources recovery, and space saving. With these in mind, this conference has successfully invited 17 leading experts to review the past developments on activated sludge-based technologies and share their thoughts and experiences in developing future systems and technologies for the region, and for the world.

**O**n behalf of the Organizing Committee, I would strongly encourage you to actively participate in this unique conference. I look forward to welcoming all of you at this event in August 2014. I am confident the conference will provide an excellent opportunity for water professionals, academics, regulators and policy makers to learn from the past and think about the future by giving them a platform, which is intended to stimulating exchange and discussion followed by presentations from participants. Thank you very much for your strong support!

Professor Guang-Hao Chen, FIWA, Conference Chair

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## Organizing Committee

| | |
|---|---|
| Professor Guang-Hao Chen (Chair) | Professor<br>Department of Civil and Environmental Engineering<br>Associate Director of the Institute for the Environment<br>The Hong Kong University of Science and Technology |
| Ir Dr Ho-Kwong Chui, Samuel | Principal Environmental Protection Officer (Community Relations)<br>Environmental Protection Department<br>The Government of the Hong Kong Special Administrative Region |
| Ir Norman Cheng | Immediate Past Chairman<br>The Chartered Institution of Water and Environmental Management Hong Kong Branch (CIWEM HK) |
| Ir Wing-Cheong Fung | Senior Electrical & Mechanical Engineer<br>Drainage Services Department<br>The Government of the Hong Kong Special Administrative Region |
| Ms Christina Ko Hartinger | Director of Projects<br>Black & Veatch Hong Kong Limited |
| Ir Chi-Man Lam | Senior Engineer / Headquarters<br>Water Supplies Department<br>The Government of the Hong Kong Special Administrative Region<br><br>Representative<br>International Water Association (IWA) Regional Committee of Hong Kong, China (IWAHK) |
| Ir Professor Irene Man-Chi Lo | Chairperson<br>The Hong Kong Institution of Engineers (HKIE) Environmental Division<br><br>Professor<br>Department of Civil and Environmental Engineering<br>The Hong Kong University of Science and Technology |
| Professor Xiao-Yan Li | Professor<br>Department of Civil Engineering<br>The University of Hong Kong |
| Dr Tao Li | Director<br>China Regional Office<br>International Water Association (IWA) |
| Ir I-Man Leong, Echo | Technical Director<br>Water & Urban Development, Hong Kong<br>AECOM |
| Professor Fan-Gang Meng | Associate Professor<br>School of Environmental Science and Engineering<br>Sun Yat-sen University |
| Ir Yiu-Wing Ha | Works Manager<br>Department of Civil and Environmental Engineering<br>The Hong Kong University of Science and Technology |
| Dr Ji Dai | Post-doctoral Fellow<br>Department of Civil and Environmental Engineering<br>The Hong Kong University of Science and Technology |
| Mr Bo Wang | Research Assistant<br>Department of Civil and Environmental Engineering<br>The Hong Kong University of Science and Technology |

# PRELIMINARY PROGRAM SCHEDULE

| 26 August 2014, Tuesday | |
|---|---|
| **Time** | **Program** |
| **08:30-09:20** | **Registration & Reception** |
| **09:20-09:50** | **Welcoming and Opening Session (Chair: Professor Guang-Hao Chen, HKUST)** |
| 09:20-09:30 | Welcoming Remarks by Professor Joseph H W Lee, Vice-President of the Hong Kong University of Science and Technology for Research and Post-graduate Studies, HKSAR, China |
| 09:30-09:40 | Opening Remarks by Dr Glen T. Daigger, IWA President, Senior Vice President and Chief Water Technology Officer of CH2M HILL, USA |
| 09:40-09:50 | Opening Remarks by Ir Kum-Wah Chung, Daniel, JP, Director of Drainage Services Department, HKSAR, China |
| 09:50-10:20 | Coffee Break |
| **10:20-12:20** | ***Global Experience-I*** (Chair: Ir Dr Ricky Li Chung-Leung, DSD) |
| 10:20-11:00 | "From Ardern and Lockett to today and beyond", Dr Glen T. Daigger, IWA President, Senior Vice President and Chief Water Technology Officer of CH2M HILL, USA |
| 11:00-11:40 | "Biological nutrient removal: past, present and future", Dr James L. Barnard, Global Practice and Technology Leader of Black & Veatch, USA |
| 11:40-12:20 | "A century of activated sludge - advances in modelling", Professor George A. Ekama, University of Cape Town, South Africa |
| 12:20-14:00 | Lunch Time |
| **14:00-15:20** | ***Global Experience-II*** (Chair: Ir Norman Cheng, CIWEM HK) |
| 14:00-14:40 | "Strategies for further development of MBR technology", Professor Yoshimasa Watanabe, Chuo University, Japan |
| 14:40-15:20 | "Integrated fixed-film activated sludge system (IFAS)", Professor Hallvard Ødegaard, Norwegian University of Science and Technology, Norway |
| 15:20-15:40 | Coffee Break |

| | |
|---|---|
| **15:40-17:40** | ***Regional Experience-I*** (Chair: Ir Professor Irene Man-Chi Lo, HKIE Environmental Division) |
| 15:40-16:20 | "New challenges in recovery of resource and energy from sewage", Professor Qian Yi, Tsinghua University, China |
| 16:20-17:00 | "Activated sludge process in Japan - the past and the future", Dr Takao Murakami, Nissuicon, Japan |
| 17:00-17:40 | "Perspectives of wastewater treatment processes in Korea", Professor Shin Hang-Sik, Korea Advanced Institute of Science and Technology, Korea |
| **18:30-20:30** | Welcoming Dinner, Chinese Restaurant, G/F, HKUST |
| | 27 August 2014, Wednesday |
| **08:30-10:30** | ***Regional Experience-II*** (Chair: Ir I-Man Leong, Echo, AECOM) |
| 08:30-09:10 | "Acidogenic technology and application for hard-degradable organic industrial wastewater", Professor Ren Nanqi, Harbin Institute of Technology, China |
| 09:10-09:50 | "Overview of wastewater treatment-energy-greenhouse gas nexus: challenges and solutions forward", Professor Wun Jern Ng and Professor Liu Yu, Nangyang Technological University, Singapore |
| 09:50-10:30 | "Sea-water flushing and wastewater treatment in Hong Kong", Ir Dr Ricky Li Chung-Leung, Drainage Services Department, HKSAR, China |
| 10:30-10:50 | Coffee Break |
| **10:50-12:50** | ***Global Future Development*** (Chair: Ir Dr Samuel Ho-Kwong Chui, EPD) |
| 10:50-11:30 | "Granular sludge - the next stage in wastewater treatment", Professor Mark C. M. van Loosdrecht, Delft University of Technology, The Netherlands |
| 11:30-12:10 | "Moving from treatment to resource", Professor Bruce E. Rittmann, Arizona State University, USA |
| 12:10-12:50 | "New challenges, new answers - a system approach", Professor Peter Cornel, Technische Universität Darmstadt, Germany |
| 13:00-14:30 | Lunch Time |
| **14:30-17:30** | ***Regional Future Development*** (Chair: Professor Xiao-Yan Li, HKU) |
| 14:30-15:10 | "Maximizing the benefits of water reclamation", Professor Qu Jiuhui, Research Center for Eco-Environmental Sciences, the Chinese Academy of Sciences, China |
| 15:10-15:50 | "Towards energy efficient water reclamation process", Mr Wah Yuen Long & Dr Winson Lay Chee Loong, PUB, Singapore's National Water Agency, Singapore |
| 15:50-16:20 | Coffee Break & Photo-taking |
| 16:20-17:00 | "Future technologies for sewage management in coastal areas", Professor Guang-Hao Chen, Hong Kong University of Science and Technology, HKSAR, China |
| **17:00-17:30** | **Concluding Session** (Chair: Professor Guang-Hao Chen or special guest) |
| 19:00-21:30 | Gala Dinner |

| 28 August 2014, Thursday | |
|---|---|
| **08:30-12:20** | ***IAS Workshop: The Future of Wastewater Treatment in China*** |
| 08:30-08:35 | Welcoming Remarks by Professor Lionel M. Ni, Special Assistant to the President, Dean of HKUST Fok Ying Tung Graduate School, the Hong Kong University of Science and Technology, HKSAR, China |
| 08:35-08:55 | Opening Remarks by Mr Liu Zhiquan, Deputy Director-General of Department of Science, Technology and Standards, Ministry of Environmental Protection of the People's Republic of China (TBC) |
| **08:55-09:55** | ***Keynote Speeches*** |
| 08:55-09:15 | Professor Qian Yi, Tsinghua University, China |
| 09:15-09:35 | Professor Qu Jiuhui, Research Center for Eco-Environmental Sciences, the Chinese Academy of Sciences, China |
| 09:35-09:55 | Professor Ren Nanqi, Harbin Institute of Technology, China |
| 09:55-10:10 | Coffee Break |
| **10:10-12:20** | ***Presentations by invited Mainland Guests (10 min each)*** |
| | 13-15 leading experts in Mainland will present their views |
| 12:30-14:30 | Lunch Time |
| **14:30-17:30** | ***Technical visit to Sha Tin Sewage Treatment Works including the visit to the first SANI full-scale demo plant*** |

## MAIN SPEAKERS

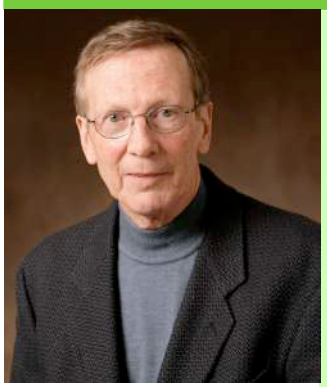
### Dr Glen T. Daigger – *Main Speaker of Global Experience-I*

Senior Vice President and Chief Water Technology Officer, CH2M HILL, USA.
President of International Water Association (IWA)
Member of the US National Academy of Engineering
Distinguished Member of the American Society of Civil Engineers (ASCE)

Specialized in "biological wastewater treatment and treatment process design, in particular biological nutrient removal (both nitrogen and phosphorus), combined trickling filter and activated sludge systems, the use of biological selectors to control activated sludge bulking, and oxygen transfer".

2012 Purdue University's Distinguished Engineering Alumni Award

### Dr James L. Barnard – *Main Speaker of Global Experience-I*



Global Practice and Technology Leader of Black & Veatch, USA.

Specialized in "biological nutrient removal (BNR), wastewater treatment, and sustainable development".

1987 WEF's Thomas R. Camp Award
1988 Koch/Imhoff Award from the International Water Association
2007 Clarke Prize from the National Water Research Institute
2011 Fellow of Water Environment Federation
2011 Lee Kuan Yew Water Prize

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## Professor George A. Ekama – *Main Speaker of Global Experience-I*

Professor, Department of Civil Engineering, University of Cape Town

Member of the South African Academy of Science
Member of the South African Academy of Engineering

Specialized in "WWTP modelling, biological sulphate reduction and autotrophic denitrification, energy recovery from concentrated organics waste streams, and source separation of urine".

1998 WISA's Piet Vosloo Memorial prize (infrequent) for development of mathematical models for biological wastewater treatment plant design.
2002 Senior Fellow of the Water Institute of Southern Africa
2004 WISA/WRC/CSIR Stander Memorial Lecturer
2013 National Order of Mapungubwe Award

## Professor Yoshimasa Watanabe – *Main Speaker of Global Experience-II*

Professor, Research and Development Initiative, Chuo University, Japan.

Specialized in "development of water metabolic system of area-based society, hybrid water and wastewater treatment technology using membrane, and phosphorous recovery from sludge".

2008 the International Water Association (IWA) Award for Outstanding Contribution to Water Management and Science

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## Professor Hallvard Ødegaard – *Main Speaker of Global Experience-II*

Professor Emeritus, Department of Hydraulic & Environmental Engineering, Faculty of Engineering Science and Technology, Norwegian University of Science and Technology (NTNU), Trondheim, Norway

CEO – Scandinavian Environmental Technology AS (SET AS), Trondheim, Norway

Specialized in "development of the moving bed biofilm reactor (MBBR) process, chemical/biological treatment processes, sludge treatment by hydrolysis processes, effective particle separation processes in wastewater treatment."

1990 The Water Prize of the Norwegian Water Association (Norway)
1995 The Water Prize of the Swedish Association for Water (Sweden)
2006 The Internationalization Prize of NTNU
2006 The Technoport Prize for Innovative Environmental Technology
2010 Knight of 1st Class from the Norwegian King

## Professor Qian Yi – *Main Speaker of Regional Experience-I*

Professor, Department of Environmental Science and Engineering, Tsinghua University

Academician of the Chinese Academy of Engineering, China

Specialized in "wastewater treatment, sustainable development, and circular economy principle and policy".

1993 The Third Prize of National Science and Technology Progress
1997 Highest Prize for Global Cooperation of China Environment and Development
1998 The Third Prize of National Science and Technology Invention
2003 The Second Prize of National Science and Technology Progress

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## Dr Takao Murakami – *Main Speaker of Regional Experience-I*

Head of Engineering, Senior Technical Adviser, Nihon Suido Consultants Co., Ltd., Japan

Specialized in "Development of biological nutrient removal process, resource recovery from wastewater and sludge, and wastewater treatment and reuse by MBR"

## Professor Shin Hang-Sik – *Main Speaker of Regional Experience-I*

Professor Emeritus, Department of Civil and Environmental Engineering, Korea Advanced Institute of Science and Technology, Korea

Specialized in “nutrient (nitrogen & phosphorus) removal in wastewater, anaerobic digestion of organic wastes, membrane technology and membrane bioreactor”.

## Professor Ren Nanqi – *Main Speaker of Regional Experience-II*

Professor, Vice President of Harbin Institute of Technology

Academician of the Chinese Academy of Engineering, China

Specialized in “Environmental biotechnology, bio-energy technology of H2, CH4 and Electricity, microbial ecology, POPs in water, air and soil, and R&D of novel industrial wastewater treatment technique and equipment”.

2004 The Second Prize of National Science and Technology Progress
2008 The Second Prize of National Science and Technology Invention
2011 Fellow of International Water Association (IWA)
2013 Science and Technology Progress Award from the Ho Leung Ho Lee Foundation

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## Professor Wun Jern Ng – *Main Speaker of Regional Experience-II*

Professor, Dean of the College of Engineering, Nanyang Technological University, Singapore.
Executive Director, Nanyang Environment and Water Research Institute (NEWRI)

Specialized in "water quality, treatment science, and development of treatment technologies, and the cyclic MBR applied with granulated biomass".

The ASEAN Engineering Award
The Outstanding University Researcher Award

## Professor Liu Yu – *Main Speaker of Regional Experience-II*

Associate Chair (Research) of the School of Civil and Environmental Engineering, and Co-Director of Advanced Environmental Biotechnology Centre, Nanyang Environment & Water Research Institute, Nanyang Technological University, Singapore.

Specialized in "biological processes and advanced environmental biotechnology for wastewater reclamation".

2003 National Technology Award
2013 The Minister for National Development R&D Merit Award

## Ir Dr Ricky Li Chung-Leung – *Main Speaker of Regional Experience-II*

Chief Electrical & Mechanical Engineer, Drainage Services Department, The Government of the Hong Kong SAR

He was promoted as Chief E&M Engineer in 2009 and was posted at the Drainage Services Department (DSD) in 2012 for the provision of project management and advisory services on E&M aspects of capital works projects, as well as leading the sewage treatment research and development work undertaken by DSD.

## Professor Mark C. M. van Loosdrecht – *Main Speaker of Global Future Development*

Professor and Group Leader of Environmental Biotechnology, Department of Biotechnology, Delft University of Technology, the Netherlands

Member of the Royal Dutch Academy of Arts and Sciences
Member of the Dutch Academy of Engineering

Specialized in “biological wastewater treatment, nutrients removal, biofilm systems, Anammox, Sharon process, Granular sludge, process and reactor design and modeling”.

1995 Dutch Water Innovation Award
2007 DOW Energy Award
2008 Grand Award of International Water Association (IWA)
2010 Honorary Doctorate ETH-Zurich
2010 Knighthood in the order of the Dutch Lion
2012 Lee Kuan Yew Water Prize
2013 Simon Stevin Master Award

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## Professor Bruce E. Rittmann – Main Speaker of Global Future *Development*

Director and Regents' Professor, Swette Center for Environmental Biotechnology, School of Sustainable Engineering and the Built Environment, Arizona State University

Member of the US National Academy of Engineering

Specialized in "environmental biotechnology biofilms microbial ecology".

2011 Excellence in Environmental Engineering Award of the American Academy of Environmental Engineers
2012 Fellow of International Water Association (IWA)
2012 Distinguished Member of the American Society of Civil Engineers
2013 Honorary Member, American Academy of Environmental Engineers and Scientists
2013 Fellow of Water Environment Federation
2014 Palladium Medal, American Association of Engineering Societies

## Professor Peter Cornel – *Main Speaker of Global Future Development*

Professor, Dr -ING, Technische Universität Darmstadt, Germany

Specialized in "environmental biotechnology, and wastewater treatment technology".

2013 Willy Hager Medal, the prize is awarded every three years to scientists who have made an outstanding theoretical and practical contribution to water and wastewater treatment.

## Professor Qu Jiuhui – *Main Speaker of Regional Future Development*

Professor, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences

Academician of the Chinese Academy of Engineering, China

Specialized in "water quality control technology, principal, technology and application for drinking water quality and safety control, water quality risk assessment, and pollution control".

2004 The Second Prize of National Science and Technology Progress
2006 The Second Prize of National Science and Technology Progress
2009 Science and Technology Progress Award from the Ho Leung Ho Lee Foundation
2010 IWA East Asia Project Innovation Honor Award in Applied Research
2012 The Second Prize of National Science and Technology Invention

## Mr Wah Yuen Long – *Main Speaker of Regional Future Development*

Chief Specialist for Water Reclamation and the Advisor (Used Water) to PUB, Singapore's National Water Agency

Former Director of Water Reclamation (Plants) Department where he was responsible for all the municipal wastewater treatment plants in Singapore.

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## Dr Winson Lay Chee Loong – *Main Speaker of Regional Future Development*

Principal Engineer at the Changi Water Reclamation Plant, PUB, Singapore's national water agency

The Changi Water Reclamation Plant is currently the largest used water treatment Plant in Singapore and has a treatment capacity of 800,000 $m^3$/day.

2014 Biographical record in Marquis 31st edition of Who's Who in the World.

## Professor Guang-Hao Chen – *Main Speaker of Regional Future Development*

Professor, Department of Civil and Environmental Engineering, the Hong Kong University of Science and Technology

Associate Director of the Institute for the Environment, the Hong Kong University of Science and Technology

Specialized in "biological wastewater treatment process exploration, sewer biofilm modeling, low-cost MBR, and urine treatment".

2011 Fellow of International Water Association (IWA)
2012 Huber International Technology Prize of Germany (PhD student)
2012 IWA East Asia Project Innovation Honor Award in Applied Research
2012 IWA Global Grand Project Innovation Honor Award in Applied Research
2012 IWA Sustainability Prize
2012 Finalist of Smart Cities Award in Project Organized Smart City World Congress in Spain

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**TOPIC 1: A CENTURY OF ACTIVATED SLUDGE – ADVANCES IN MODELLING**
Professor George A. Ekama

**TOPIC 2: INTEGRATED FIXED-FILM ACTIVATED SLUDGE SYSTEM (IFAS)**
Professor Hallvard Ødegaard

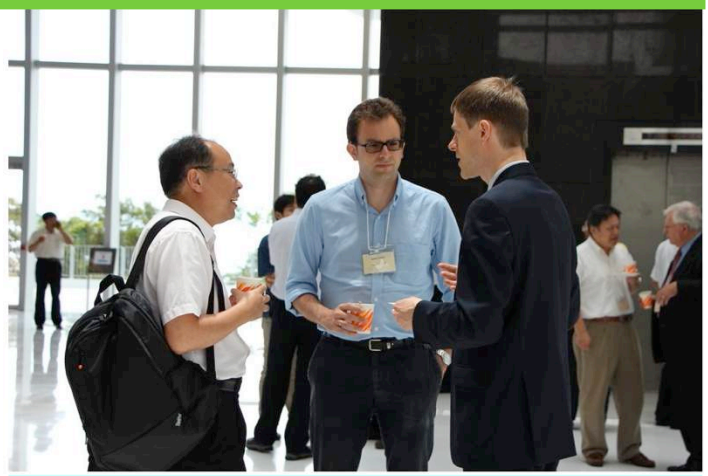
**TOPIC 3: FUTURE SEWAGE TREATMENT PROCESSES**
Professor Mark C. M. van Loosdrecht

**TOPIC 4: MOVING FROM TREATMENT TO RESOURCE**
Professor Bruce E. Rittmann

**TOPIC 5: NEW CHALLENGES, NEW ANSWERS – A SYSTEM APPROACH**
Professor Peter Cornel

**TOPIC 6: FUTURE TECHNOLOGIES FOR SEWAGE MANAGEMENT IN COASTAL AREAS**
Professor Guang-Hao Chen

**AND MORE …**



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1. More than 200 researchers, scientists and managers from all around the world.
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5. Collect inspiration and new ideas to direct the development of your organization to a smarter

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## WE INVITE YOU TO JOIN US AS A SPONSOR

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Overall event and Gala Dinner sponsor (1)

- 10 one day tickets
- Link to company website from conference website
- Acknowledgement on conference website
- Logo on opening audio visual slides for sessions
- 1 page A4-sized B&W advertisement in the proceedings
- Logo on all conference collaterals
- Logo and 200-word company profile in conference book and website
- 1 page A4-sized dedication from CEO in conference book

### SILVER SPONSOR — HK$ 100,000

Overall event and Reception Dinner sponsor (1)

- 8 one day tickets
- 2 days booth (worth HK$10,000)
- Link to company website from conference website
- Acknowledgement on conference website
- Logo on opening audio visual slides for sessions
- 1 page A4-sized B&W advertisement in the proceedings
- Logo on all conference collaterals
- Logo and 200-word company profile in conference book and website

### JADE SPONSOR — HK$ 60,000

Overall event and Proceedings (USB) sponsor (1)

- 4 one day tickets
- 2 days booth (worth HK$10,000)
- Link to company website from conference website
- Acknowledgement on conference website
- Logo on opening audio visual slides for sessions
- 1 page A4-sized B&W advertisement in the proceedings
- Logo on all conference collaterals
- Logo and 200-word company profile in conference book and website

### PEARL SPONSOR — HK$ 30,000

Overall event sponsor

- 2 one day tickets
- Link to company website from conference website
- Acknowledgement on conference website
- Logo on opening audio visual slides for sessions
- 1 page A4-sized B&W advertisement in the proceedings
- Logo on all conference collaterals

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## CONTACT US

**If you are interested in the IAS Symposium on Activated Sludge – Past and Next 100 Years, please contact:**


Ir Ha Yiu Wing

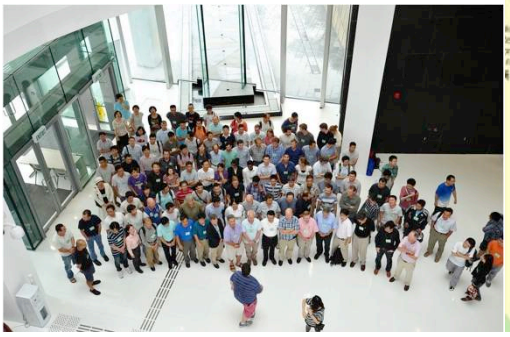
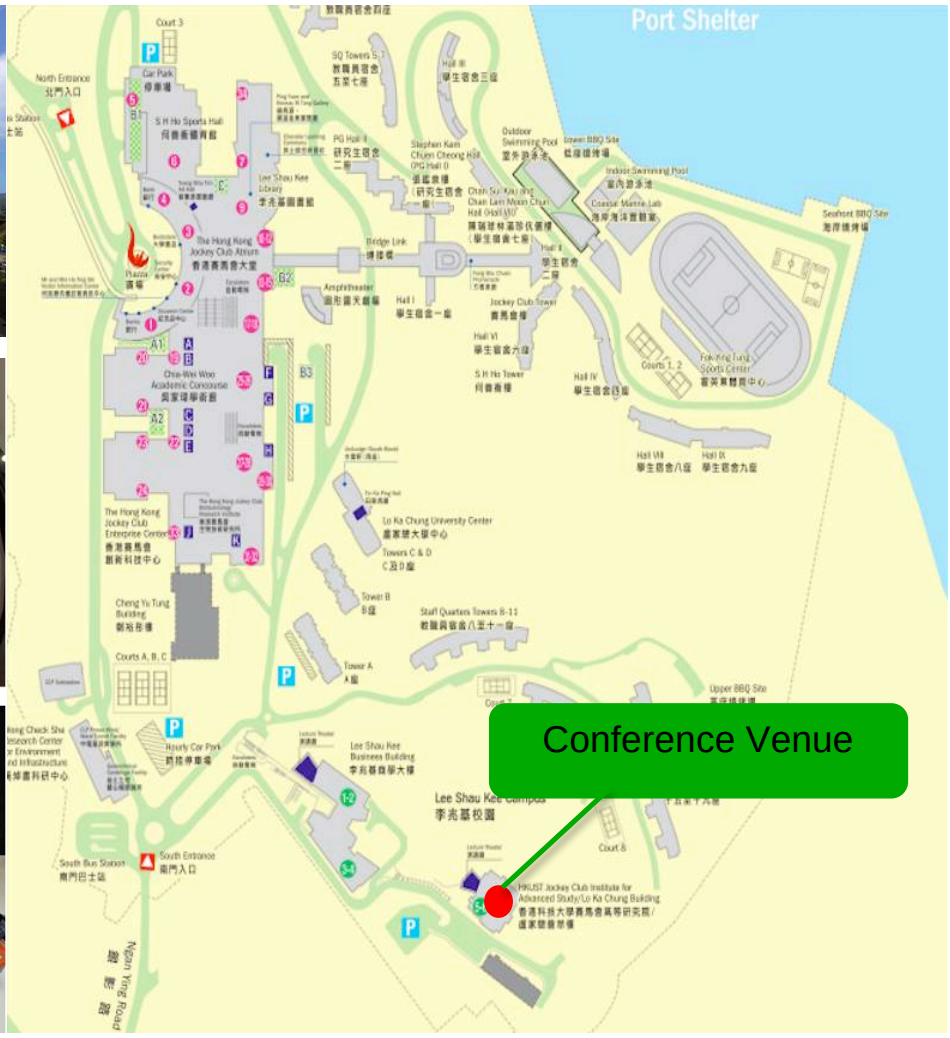
Tel: (852) 2358 8743

Fax: (852) 2358 1534

Email: iasas100y@ust.hk

Mailing Address:

Department of Civil and Environmental Engineering
Room 3575, Main Academic Building
The Hong Kong University of Science & Technology
Clear Water Bay, Kowloon, Hong Kong


## VENUE LOCATION