



AOTUE Conference 2016

11st Asia-Oceania Top University League on Engineering
Deans Meeting and Student Conference

Hosted by School of Engineering, HKUST
23-25 November 2016



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



SENG
工學院
SCHOOL OF
ENGINEERING

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Organizer

- The Hong Kong University of Science and Technology, Hong Kong

Participating Institutes

- Bandung Institute of Technology, Indonesia
- Chulalongkorn University, Thailand
- Hanoi University of Science and Technology, Vietnam
- Indian Institute of Technology Madras, India
- Korea Advanced Institute of Science and Technology, Korea
- Nanyang Technological University, Singapore
- National Taiwan University, Taiwan
- The Hong Kong University of Science and Technology, Hong Kong
- The University of Melbourne, Australia
- Tokyo Institute of Technology, Japan
- Tsinghua University, China
- University of Malaya, Malaysia

Welcome message from the Dean, School of Engineering, The Hong Kong University of Science and Technology



Dear colleagues,

It is a pleasure to welcome you to Hong Kong for the 11th The Asia-Oceania Top University League on Engineering (AOTULE) Annual General Meeting.

This year is a very important milestone for HKUST, as it marks our 25th anniversary. The University's anniversary slogan is "Innovating Today, Imagining Tomorrow". We are pleased to invite Deans of Engineering and representatives to this auspicious occasion and to explore the potential collaboration in online education to further improve international partnerships and student/staff mobility.

The Blended Learning (BL) approach has been used extensively in higher education for a number of years. With advances in computer technology, students have new ways to access and interact with both knowledge and people. However, new information and communication technologies do not on their own transform into good learning experiences. Good pedagogy and well-designed courses do.

At HKUST, the BL approach means a blend of online and face-to-face teaching that maximizes the benefits of both methods to help campus students achieve a higher level of learning. The online component of a blended course is delivered through a learning management system such as Canvas and consists of techniques including online video lectures/demonstrations, online activities and online assessments. The face-to-face component is delivered on campus and consists primarily of interactive exercises, group tasks, projects, and discussions. An effective BL approach requires a well thought out mixture of face-to-face teaching, self-study courseware online, synchronous and asynchronous online collaboration and readily accessible online reference materials to create a quality teaching solution. Having said that, it is not necessary for every learning solution to contain all of these learning components. What is most important is to align the learning technologies with an active-learning pedagogy that produces desired learning outcomes.

The high-quality online components developed may also be used for a MOOC delivery where the outreach of a faculty can be enhanced and a University's reputation can be increased.

The annual AOTULE Deans' meeting will run in parallel to the student conference and staff meeting. The theme for the Deans' meeting this year is "Technological Change in Education". The main emphasis in this meeting is to explore our several and collective response to the "avalanche of change", perceived or real, in higher education but, of course, not losing track of our main agenda of mobility.

As for the student conference, student will be divided into several groups to conduct the group project on "Global Programs related to Big Cities", apart from presenting their current research projects. This conference will be a good opportunity for students to interact and be exposed to non-traditional learning techniques which will enhance their learning and ability to communicate with people from different cultures and research fields.

The AOTULE promotes inter-university cooperation through joint programs including an annual Deans' meeting, student workshop and exchanges of students and staff, in order to improve the quality of engineering education and the research of the members. It aims to broaden participants' perspectives through education, research and cross-cultural interactions.

May I wish you a very productive stay in Hong Kong. I look forward to exchanging ideas with all our worthy members and enhancing the solid foundations of our collaboration.

Welcome you all!

Cheng, Tim K.T.

Dean of Engineering

Chair Professor of Electronic and Computer Engineering/Computer Science and Engineering

An Overview of School of Engineering

The Hong Kong University of Science and Technology (HKUST) is one of the most research intensive universities in Asia, where students are nurtured for new discoveries and technological inventions through rigorous research training.

The School of Engineering (SENG) is the largest of the five Schools within HKUST. It includes almost 40% of the University's student body, with over 3,200 undergraduates and more than 2,000 postgraduates. About 30% of the University's faculty members are in SENG.

The School comprises 6 departments - Departments of Chemical and Biomolecular Engineering (CBME), Civil and Environmental Engineering (CIVL), Computer Science and Engineering (CSE), Electronic and Computer Engineering (ECE), Industrial Engineering and Logistics Management (IELM), and Mechanical and Aerospace Engineering (MAE). Its Department of Chemical and Biomolecular Engineering is the only one in Hong Kong.

SENG provides more than 40 degree programs at the bachelor's, master's and doctoral levels. In addition to disciplinary programs and minor programs offered by the 6 departments, we also offer interdisciplinary programs by bringing together the expertise of two departments and with other schools of the University, as well as collaborating with top engineering schools in the world to offer joint degree programs at postgraduate level. The School seeks to be a world leader in engineering education innovation and research. Our postgraduate programs are designed to ensure that students have a solid grounding in discipline-based expertise and a holistic experience.

HKUST School of Engineering is committed to advancing science and technology. Our culture of collaborative teams and dynamic research themes fosters the free flow of innovative ideas across disciplines and results in exciting discoveries. In both our research endeavors and pioneering engineering education, SENG sets its sights on excellence: from our internationally renowned faculty members and increasingly multicultural student body to our first-rate facilities and partnerships with other leading academic institutions and key industries. Their achievements have been an important contribution to Hong Kong's transition to a knowledge-based society and to major global issues facing mankind.

AOTULE- The Asia-Oceania Top University League on Engineering

The Asia-Oceania Top University League on Engineering was founded in 2007 by forming strong collaborative relationships through exchanges of information, students, faculty members and staff among the top ranking engineering universities in the Asia-Oceania region.

The Asia-Oceania Top University League on Engineering (AOTULE) consists of the following university members:

- Bandung Institute of Technology, Indonesia
- Chulalongkorn University, Thailand
- Hanoi University of Science and Technology, Vietnam
- Indian Institute of Technology Madras, India
- Korea Advanced Institute of Science and Technology, Korea
- Nanyang Technological University, Singapore
- National Taiwan University, Taiwan
- The University of Melbourne, Australia
- The Hong Kong University of Science and Technology, Hong Kong
- Tokyo Institute of Technology, Japan
- Tsinghua University, China
- University of Malaya, Malaysia

The AOTULE promotes inter-university cooperation through a joint program including an annual Deans' meeting, student workshop and exchanges of students and staff, in order to improve the quality of engineering education and research of the members. It aims to broaden participating students' perspectives through education, research and cross-cultural interactions.

AOTULE Welcome Reception

23 November 2016 (Wednesday) Registration & Welcome Reception Venue: Unique, 2/F Li Dak Sum Yip Yio Kenneth Li Conference Lodge, HKUST Emcee: Miss Tam, Cheuk Yee Jamie	
17:40	Shuttle Bus Transfer from Crown Plaza Hotel to HKUST *Departs at 17:40 sharp from Crown Plaza Hotel
18:00-18:30	Registration
18:30-20:00	Welcome Reception
20:00	End of Welcome Reception
20:10	Shuttle Bus Transfer from HKUST to Crown Plaza Hotel *Departs at 20:10 sharp from Conference Lodge

AOTULE Deans Program

24 November 2016 (Thursday) Registration and Meeting Venue: IAS Lecture Theater, Lo Ka Chung Building, Lee Shau Kee Campus, HKUST	
08:00	Shuttle Bus Transfer from Crown Plaza Hotel to Lee Shau Kee Campus *Departs at 08:00 sharp from Crown Plaza Hotel
08:30-08:50	Registration
Opening Ceremony Venue: IAS Lecture Theater, Lo Ka Chung Building, Lee Shau Kee Campus, HKUST Emcee: Miss Tam, Cheuk Yee Jamie	
08:50-09:20	Welcome Address by Prof Cheng, Tim Dean of Engineering The Hong Kong University of Science and Technology Prof Chen, Tsuhan Executive Chair, AOTULE Dean, College of Engineering Nanyang Technological University, Singapore Prof Shallcross, David Steering Committee Chair, AOTULE The University of Melbourne, Australia
09:20-09:35	Group Photographs
Institution Overviews Venue: 7/F Roof Garden Conference Room, Lee Shau Kee Business Building, HKUST Chair : Prof Yeung, King Lun, Associate Dean of Engineering (Research & Graduate Studies)	
09:50-09:55	Bandung Institute of Technology, Indonesia
09:55-10:00	Chulalongkorn University, Thailand
10:00-10:05	Hanoi University of Science and Technology, Vietnam
10:05-10:10	Indian Institute of Technology Madras, India
10:10-10:15	Korea Advanced Institute of Science and Technology, Korea
10:15-10:20	Nanyang Technological University, Singapore
10:20-10:25	National Taiwan University, Taiwan
10:25-10:45	Morning Tea
10:45-10:50	The University of Melbourne, Australia

10:50-10:55	The Hong Kong University of Science and Technology
10:55-11:00	Tokyo Institute of Technology, Japan
11:00-11:05	Tsinghua University, China
11:05-11:10	University of Malaya, Malaysia
11:10-11:50	<p>Presentation Session for the 1st Theme “Best Practices of Innovative Teaching” *(10 mins presentation per institution)</p> <ul style="list-style-type: none"> • Chulalongkorn University, Thailand • Nanyang Technological University • The Hong Kong University of Science and Technology, Hong Kong • Tsinghua University, China
11:50-12:20	Discussion on 1 st Theme “Best Practices of Innovative Teaching”
12:20-13:30	<p>Networking Lunch Venue: 7/F Roof Garden Conference Room, Lee Shau Kee Business Building, HKUST</p>
13:30-14:20	<p>Presentation Session for the 2nd Theme “Best Practices of Entrepreneurship” *(10 mins presentation per institution)</p> <ul style="list-style-type: none"> • Bandung Institute of Technology, Indonesia • Indian Institute of Technology Madras, India • National Taiwan University, Taiwan • Tokyo Institute of Technology, Japan • The University of Melbourne, Australia
14:20-14:50	Discussion on 2 nd Theme “Best Practices of Entrepreneurship”
14:50-15:20	<p>Presentation on “Potential Education Research Projects Across University”</p> <ul style="list-style-type: none"> • By Prof Shallcross, David, Steering Committee Chair, AOTULE The University of Melbourne, Australia
15:20-15:30	Afternoon Tea
15:30-16:00	<p>Presentation Session for the 3rd Theme “Research Collaboration Across Partner Institutions” * (10 mins presentation per institution)</p> <ul style="list-style-type: none"> • Hanoi University of Science and Technology, Vietnam • Korea Advanced Institute of Science and Technology, Korea • University of Malaya, Malaysia
16:00-16:30	Discussion on the 3 rd Theme “Research Collaboration Across Partner Institutions”
16:30-18:00	<p>Deans’ Steering Committee Venue: 7/F Roof Garden Conference Room, Lee Shau Kee Business Building, HKUST Chair: Prof Shallcross, David</p>

16:30-17:30	Review of Minutes of AOTULE 2015 Meeting 2016 Financial Report & 2017 Plan – Member Due Invoices
17:30-18:00	AOTULE MOU Amendment and By-Law Revision AOTULE Meeting Proposals 2017, 2018
18:15	Shuttle Bus Transfer from Lee Shau Kee Business Building to Sai Kung *Departs at 18:15 sharp from Lee Shau Kee Business Building
AOTULE Banquet Venue: Chuen Kee Seafood Restaurant, 87-89 Man Nin Street, Sai Kung	
18:45-20:30	Dinner
20:45	Shuttle Bus Transfer from Sai Kung to Crown Plaza Hotel *Departs at 20:45 sharp from Sai Kung

25 November 2016 (Friday) Deans Meeting Venue: Room 7336, Sze-Yuen Chung Council Chamber (Lift 13-15), HKUST	
09:00	Shuttle Bus Transfer from Crown Plaza Hotel to Piazza, HKUST *Departs at 09:00 sharp from Crown Plaza Hotel
Deans' Steering Committee Venue: Room 7336, Sze-Yuen Chung Council Chamber (Lift 13-15), HKUST Chair: Prof Shallcross, David	
09:30-10:00	Summary of the Discussion on "Student Mobility and Professional Development on Postgraduate Studies" in Staff meeting By Ms Chau, Margaret, HKUST
10:00-10:15	Discussion about preparation AOTULE Summer Program 2017 in ITB
10:15-10:40	Unfinished business from previous day
10:40-11:00	Morning Tea
11:00-11:30	Highlights of meetings & 2017 Meeting Presentation
11:30-12:10	2016 Executive Chair Appreciation and Vote for New Executive Chair Voting for Steering Committee Chair and Vice-Chair Signing AOTULE Amended MOU
12:15-13:45	Farewell Lunch & Closing Ceremony Venue: G/F Chinese Restaurant, HKUST Winning team of the student conference presents their project to the Deans Emcee: Ms Bernal Garrido, Marie Noel Loullie
13:45-19:00	Optional City Tour
	Gather at Piazza, HKUST for Optional City Tour *Departs at 13:45 sharp from HKUST

AOTULE Staff Program

24 November 2016 (Thursday) Registration and Meeting Venue: IAS Lecture Theater, Lo Ka Chung Building, Lee Shau Kee Campus, HKUST	
08:00	Shuttle Bus Transfer from Crown Plaza Hotel to Lee Shau Kee Business Building *Departs at 08:00 sharp from Crown Plaza Hotel
08:30-08:50	Registration
Opening Ceremony Venue: IAS Lecture Theater, Lo Ka Chung Building, Lee Shau Kee Campus, HKUST Emcee: Miss Tam, Cheuk Yee Jamie	
08:50-09:20	Welcome Address by Prof Cheng, Tim Dean of Engineering The Hong Kong University of Science and Technology Prof Chen, Tsuhan Executive Chair, AOTULE Dean, College of Engineering Nanyang Technological University, Singapore Prof Shallcross, David Steering Committee Chair, AOTULE The University of Melbourne, Australia
09:20-09:35	Group Photographs
Session on "Student Mobility and Professional Development on Postgraduate Studies" Venue: Room 5007 , IAS Meeting Room, Lo Ka Chung Building, Lee Shau Kee Campus, HKUST Chair: Ms Chau, Margaret, Head (Research & Graduate Studies Administration)	
09:45-10:55	Presentation by member institutions on "Student Mobility and Professional Development on Postgraduate Studies" *7 institutions (10 mins presentation)
10:55-11:20	Morning Tea
11:20-12:20	Discussion on Best Practices and Challenges
12:20-13:30	Networking Lunch Venue: 7/F Roof Garden Conference Room, Lee Shau Kee Business Building, HKUST *Staff will attend the Deans meeting
13:30-15:20	Attending the Deans Meeting
15:20-15:30	Afternoon Tea
15:30-18:10	Attending the Deans Meeting
18:15-18:45	Shuttle Bus Transfer from Lee Shau Kee Business Building to Sai Kung

AOTULE Banquet Venue: Chuen Kee Seafood Restaurant, 87-89 Man Nin Street, Sai Kung	
18:45-20:30	Dinner
20:45	Shuttle Bus Transfer from Sai Kung to Crown Plaza Hotel *Departs at 20:45 sharp from Sai Kung
25 November 2016 (Friday) Deans Meeting Venue: Room 7336, Sze-Yuen Chung Council Chamber (Lift 13-15), HKUST	
09:00	Shuttle Bus Transfer from Crown Plaza Hotel to Piazza, HKUST *Departs at 09:00 sharp from Crown Plaza Hotel
Deans' Steering Committee Venue: Room 7336, Sze-Yuen Chung Council Chamber (Lift 13-15), HKUST Chair: Prof Shallcross, David	
09:30-10:00	Summary of the Discussion on Best Practices and Challenges on "Student Mobility and Professional Development on Postgraduate Studies" in Staff meeting
10:00-10:40	Unfinished business from previous day
10:40-11:00	Morning Tea
11:00-11:30	Highlights of meetings & 2017 Meeting Presentation
11:30-12:10	2016 Executive Chair Appreciation and Vote for New Executive Chair Voting for Steering Committee Chair and Vice-Chair Signing AOTULE Amended MOU
12:15-13:45	Farewell Lunch & Closing Ceremony Venue: G/F Chinese Restaurant, HKUST Winning team of the student conference presents their project to the Deans Emcee: Ms Bernal Garrido, Marie Noel Loullie
13:45-19:00	Optional City Tour
	Gather at Piazza, HKUST for Optional City Tour *Departs at 13:45 sharp from HKUST

AOTULE Student Program

24 November 2016 (Thursday) Registration and Meeting Venue: IAS Lecture Theater, Lo Ka Chung Building, Lee Shau Kee Campus, HKUST	
08:30-08:50	Registration
Opening Ceremony Venue: IAS Lecture Theater, Lo Ka Chung Building, Lee Shau Kee Campus, HKUST Emcee: Miss Tam, Cheuk Yee Jamie	
08:50-09:20	<p>Welcome Address by</p> <p>Prof Cheng, Tim Dean of Engineering The Hong Kong University of Science and Technology</p> <p>Prof Chen, Tsuhan Executive Chair, AOTULE Dean, College of Engineering Nanyang Technological University, Singapore</p> <p>Prof Shallcross, David Steering Committee Chair, AOTULE University of Melbourne, Australia</p>
09:20-09:35	Group Photographs
Student Conference Venue: IAS Lecture Theater, Lo Ka Chung Building, Lee Shau Kee Campus, HKUST Emcee: Mr Plantaz, Xavier Pierre Francois & Ms Tang, Yili Remark: Each student will be given 3 mins to present their research work	
09:45-09:54	Briefing
09:55-10:01	<p>Bandung Institute of Technology, Indonesia</p> <ul style="list-style-type: none"> • Mr Chandra, Nurohman • Ms Zakiyya, Nida Maisa
10:01-10:10	<p>Chulalongkorn University, Thailand</p> <ul style="list-style-type: none"> • Mr Ekapop, Verasakulvong • Mr Narong, Intiruk • Mr Thanabhat, Koomsubha
10:10-10:13	<p>Hanoi University of Science and Technology, Vietnam</p> <ul style="list-style-type: none"> • Mr Dao, Duong Hai
10:13-10:22	<p>Indian Institute of Technology Madras, India</p> <ul style="list-style-type: none"> • Mr Cherian, Philip • Ms Gopalapillai, Deepthi Sivadas • Mr Santhiappan, Sudarsun
10:22-10:28	Korea Advanced Institute of Science and Technology, Korea

	<ul style="list-style-type: none"> • Ms Kim, Yeeun • Mr Lee, Nokhaeng
10:28-10:43	Nanyang Technological University, Singapore <ul style="list-style-type: none"> • Ms Chen, Weiling • Mr Lunchev, Andrey • Mr Ng, Yan Hao • Mr Tan, Hong Wei • Ms Zeng, Xiaomei
10:43-10:46	National Taiwan University, Taiwan <ul style="list-style-type: none"> • Mr Yu, Che-Chin
10:46-11:01	The Hong Kong University of Science and Technology, Hong Kong <ul style="list-style-type: none"> • Mr Liang, Yingzong • Mr Pahija, Ergys • Mr Yang, Haoyu • Mr Yang, Yuebin • Mr Yu, Coleman
11:01-11:15	Morning Tea
11:15-12:15	Tokyo Institute of Technology, Japan <ul style="list-style-type: none"> • Asatyas, Syifa • Ayaganova, Assem • Behrens, Michael Alexander • Cao Vu, Dung • Egawa, Seiki • Gaddem, Mohamed Rami • Go, Tokohei • Juangsa, Firman Bagja • Kikuchi, Daisuke • Kunanusont, Nattanai • Maulana, Irwin • Maurya, Santosh Kumar • Murakami, Yuya • Nakai, Jun • Nakano, Rinako • Nakatani, Ryuichi • Orita, Ryoji • Perez, Paolo Nicolo, Conti • Saber, Mohammad • Suroso, Dwi Joko
12:15-12:21	Tsinghua University, China <ul style="list-style-type: none"> • Mr Ji, Zifei • Mr Li, Guo-Yang
12:21-12:27	University of Malaya, Malaysia

	<ul style="list-style-type: none"> • Mr Mohamad Badrol Hisyam bin Mayuddin • Mr Tan Yoke Meng
12:45-14:00	Networking Lunch Venue: G/F, Lo Ka Chung Building, Lee Shau Kee Campus, HKUST
14:00-18:00	<p>Group Discussion on the project “Global Problems related to Big Cities” (4-5 students/group)</p> <p>Each group may pick one of the following topics* :</p> <ol style="list-style-type: none"> 1. Heat island effect and thermal comfort 2. Transportation and mobility 3. Resilience against climate change 4. Consumption minimization and waste management 5. Ageing population and infrastructure <p><i>* Big Data technologies should be applied in any topic chosen in doing the group project.</i></p>
18:00-20:00	BBQ Venue: UC Bistro

25 November 2016 (Friday)

Student Conference

Venue: IAS Lecture Theater, Lo Ka Chung Building, Lee Shau Kee Campus, HKUST

Emcee: Mr Plantaz, Xavier Pierre Francois & Miss Tang, Yili

Judging Panel: Prof Chen, Lei, Department of Computer Science & Engineering

Prof Chau, Ying, Department of Chemical & Biomolecular Engineering

Prof Yee, Terrence, Technology Leadership & Entrepreneurship Program

Remark: Each group will be given 10 mins to present their group project + 5 mins Q &A Session

08:30-10:30	Group Presentation (10 mins/group + 5 mins Q & A) *8 groups (Group A/B/C/D/E/F/G/H)
10:30-10:45	Morning Tea
10:45-11:45	Group Presentation (10 mins/group + 5 mins Q & A) *4 groups (Group I /J /K /L)
11:45-12:15	Voting for the winner team (50% by peer evaluation and 50% by judging panel)
12:15-13:45	Farewell Lunch & Closing Ceremony Venue: G/F Chinese Restaurant, HKUST Winning team of the student conference presents their project to the Deans Emcee: Ms Bernal Garrido, Marie Noel Loullie
13:45-19:00	Optional City Tour
	Gather at Piazza, HKUST for Optional City Tour Departs at 13:45 sharp from HKUST

[Student Conference: # 1]

Multidirectional Ducted Wind Turbine : An Optimization of Wind Turbine Design to Improve the Efficiency of Electricity Production by Wind Energy

Mr Chandra, Nurohman
Bandung Institute of Technology, Indonesia

Currently, I am a student of Bandung Institute of Technology, Indonesia in the department of Aerospace Engineering. One of research focus here is aerodynamics and its computation. In the frame of sustainable living, I relate the knowledge of aerodynamics and energy issue by discussing about energy production especially electricity using natural wind energy as renewable resource. One of practicum activity in Aerospace Engineering Department of ITB is Computational Fluid Dynamics (CFD) using licensed softwares. CFD can model and help the visualization of fluid flows so that it can be examined for further purpose. CFD can visualize the flow properties such as velocity, total pressure, static pressure, and temperature.

[Student Conference: # 2]

Nitrogen Removal in Continuous Air Lift Reactor using Aerobic Granules

Ms Zakiyya, Nida Maisa
Bandung Institute of Technology, Indonesia

Aerobic granules as one of promising development of activated sludge has been studied by many researchers, especially in batch reactors. But batch system was pretty hard to be operated in full scale plant. On the other hand, continuous reactor provide a simple operation and maintenance. This study was operated in 7.2 L of continuous airlift reactor using aerobic granules in room temperature. Artificial wastewater was used with 100:20 of COD/N, and sodium acetate was used as the sole carbon source. It was operated in five decreased variations of HRT; 12, 10, 8, 6, and 4 hours of HRT, with about 800 mg/L of COD, 1.6-4.8 g COD/m³day of OLR and 0.44-1.13 kg N/m³day of nitrogen loading rate. The maximum removal of total nitrogen was happened in 10 hours of HRT with 0.56 kg N/m³day of nitrogen loading rate, which is 25.5% of removal. It reached 44.7% of ammonium removal in the same HRT variation. The removal efficiency was reduced with the decreased HRT.

[Student Conference: # 3]

A Spark Based Framework for Real-time Emerging Topic Detection on Twitters

Mr Ekapop, Verasakulvong
Chulalongkorn University, Thailand

Twitter is one of the most widespread social networks with 200 million active accounts and more than 400 tweets a day.

It is very interesting to explore and discover emerging topics, which are stories that most people are talking about, in real-time to know what happen around the world.

Although twitter data is very large, there are some existing solutions that can detect emerging topics from twitter data in real-time using only one computer in a normal situation. However, the number of tweets can be too large to process with a single machine on some special events, such as disaster, rebellion, football match, etc. Moreover, twitter data has been

growing rapidly due to smartphone allowing people to access the internet everywhere; thus, it is almost impossible to compute this large amount of data in real-time.

Apache Spark Streaming is a recent distributed in-memory computing on streaming data that can be employed to handle this kind of scenarios. Although there were some prior attempts to detect emerging topics in real-time, none of them can capture a relation among discovered topics and each is limited to only a single word.

This work aims to propose a spark-based framework to find emerging topics in real-time that can be a set of words and grouped into topic segments.

[Student Conference: # 4]

Facebook usage Behavior in Thailand

Mr Narong, Intiruk
Chulalongkorn University, Thailand

Facebook usage is an important information for online marketing such as what people like, when people online, and why people decision, etc. The information will support the online marketing to take suitable actions. In this work we are interested in "When are users in each category of Facebook online (Like) in Thailand?" We have monitored on 76 Facebook pages and we found that in a different Day of Week (DoW) and Hour of Day (HoD) the number of online users are different. Each category has a different peak time/day.

[Student Conference: # 5]

Text Categorization for Thai Corpus using Character-Level Convolutional Neural Network

Mr Thanabhat, Koomsubha
Chulalongkorn University, Thailand

Text categorization is an important task in the internet era as the number of news, blogs, and articles are dramatically increased every day. A good categorization method can help in managing this large amount of data. In this research, our target is to improve the categorization process of Thai news which has a major difference compared to other languages - Thai is a non-space separated language. In traditional methods, a word segmentation is needed as a necessary pre-process which could affect an overall accuracy. We aim to discard this step by using one of popular deep learning techniques called Convolutional Neural Network (CNN). CNN is a neural network of which weights are shared and used to obtain features from a group of neighbor input. CNN has initially adopted in natural language classification on the word level. In the same way, by using character-level training, we can use CNN to categorize text without the word segmentation step. We expect this method to help in simplifying the process of Thai text categorization while its accuracy is still at the same level with the traditional method.

[Student Conference: # 6]

Aerodynamics Research On Airplane's Wings

Mr Dao, Duong Hai
Hanoi University of Science and Technology, Vietnam

This purpose of this research was to study the aerodynamics characteristics on airplane wings by the methods of experiment and simulation. More specifically, the distribution of velocity and pressure, lift coefficient and drag coefficient are the data of the aerodynamics characteristics that need to find out. In the experiment method, the profiles of NACA

65A004 and Supercritical was investigated inside a Wind tunnel with the angle of attack varies from 0 to 20 degrees . Simultaneously, Ansys software was used to simulate the aerodynamics of the same airfoils and angle of attack in the simulation method. In conclusion, the aerodynamics characteristics was established by both methods. The result was used to compare with the data from the other method to make a verification and conclude the notable points.

[Student Conference: # 7]

Sustainable Housing Using Glass Fibre Reinforced Gypsum Panels

Mr Cherian, Philip

Indian Institute of Technology Madras, India

Sustainable construction at affordable cost is one of the challenges faced by the building industry. Traditional construction using energy-intensive building materials such as bricks, cement, sand, etc., have led to a serious threat of increased greenhouse gas emission and resulting climate change. Furthermore, a lot of energy is habitually consumed in the process of heating and cooling the indoor environment of such buildings. Clearly, there is a need for energy-efficient and eco-friendly building products that help to minimize the environmental impact and are also affordable in terms of cost of construction and maintenance. GFRG (Glass Fibre Reinforced Gypsum technology is one such solution that has the potential for providing sustainable and affordable housing in India. GFRG panels are hollow load-bearing panels, suitable for construction of buildings up to 8-10 storeys together with minimal use of reinforced concrete (RC). Selected cavities of the walls and slabs are infilled with RC to enhance the load-carrying capacity. The remaining cavities can be filled with any inert material to provide improved thermal comfort. Studies conducted on the GFRG demonstration building at IIT Madras revealed that the embodied energy of this building is 50% less than a similar RC framed structure. Indoor thermal comfort has been studied in detail. The interior of the GFRG demo building is found to be 2 to 3 degree Celsius cooler, as compared to that of an adjacent conventional building.

[Student Conference: # 8]

Grid Integration of Renewable Energy

Ms Gopalapillai, Deepthi Sivadas

Indian Institute of Technology Madras, India

Power demands are ever on rise. Several day to day applications necessitates the availability of continuous power. Conventional power generation methods often resort to load shedding or intentional power outages as a means of demand side management. Uninterruptible power availability with less carbon foot print is essential to achieve sustainable living a reality. A paradigm shift in technology to harness renewable energy to meet this goal is in process. As compared to a large centralized renewable energy production unit, distributed power generation has gained much attention recently. Distributed generation (DG) or power generation at consumers' end helps in reducing transmission losses, shaving of peak loads and sustained operation during outages. With the price cuts in favor for photovoltaic technologies, solar PV based DG as a roof top solution seems to be the most appropriate technology. Integration of PV with utility grid is achieved through inverters hence the control and stable operation of a DG inverter is essential to draw the true benefit of renewable energy. Development of a suitable control technology to maintain the grid regulations with respect to acceptable limits of power quality is addressed in the present study. A methodology to identify the occurrence of unintentional disconnection of utility from the local DG network is the main objective of the work. Operation as an islanded network enabling the DG to operate without the stiff grid also falls under the broad spectrum of the research work under progress.

[Student Conference: # 9]

Class Imbalance Learning for Big Data Analytics

Mr Santhiappan, Sudarsun
Indian Institute of Technology Madras, India

Big Data Analytics is all about making sense from data, which is voluminous, varied in formats & quality and arriving at different speeds. An important task in big data analytics is; classification of data samples into appropriate classes. The correctness of a classifier depends heavily on the class proportions being uniformly distributed. But in practice, the data distribution suffers significant skew in the class proportions, which leads to the majority class (with more data samples) shadowing the prediction performance of minority classes. Class imbalance in the data set could be intrinsic due to the nature of the data distribution itself or extrinsic due to external reasons, such as velocity of data arrival, intermittent availability of data, and noise in equipment that captures data, etc. Handling class imbalance in big data setting becomes non-trivial, for not just the volume of data that needs to be processed but also the time window to process them. With more data, it's true that the smallest size class may have lot of samples, but there's also a possibility of more sub-classes in a class, which makes the within-class imbalance characteristics of a class even more challenging. A battery of class imbalance learning (CIL) methods to address the class imbalance condition is available in the literature. Typically the methods are categorized into sampling methods, cost-sensitive methods, kernel methods and active learning methods. We would be presenting some of the insights that we'd collected from our experiments with CIL methods on several large data collections.

[Student Conference: # 10]

Enhancing Healthcare Accessibility Measurements using GIS: A Case Study in Seoul, Korea

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With recent aging demographic trends, the capital city of Republic of Korea, Seoul is interested in enhancing geo-spatial analysis and monitoring the status of accessibilities of its citizens to healthcare services. The accessibility to healthcare is determined not only by geographic distances to service locations but includes travel time, available mode of transportation, and departure time. Having access to the up-to-date and accurate information regarding the healthcare accessibility allows the municipal government to plan for improvements including expansion of healthcare infrastructure, effective labor distribution, alternative healthcare options to weak accessibility regions, and redesign of public transportation routes and schedules. This paper proposes a new method named, Enhanced 2-Step Floating Catchment Area, which is customized for the city of Seoul where population density is higher and average distance between healthcare-service locations tend to be shorter than typical North American cities. The proposed new method is applicable to other major cities in the world including Asia and Europe with the similar attributes of Seoul. It is found that the proposed method is effective and efficient in determining the weak accessibility regions due to the newly employed GIS intersection techniques.

[Student Conference: # 11]

Introduction to active window system

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Noise is one of the main environmental pollutions. Many studies on the physiological and psychological effects of long-term noise exposure in human beings have researched and drawn public interest to the issues. In buildings, environmental noise such as traffic noise and construction noise is the main type that degrades the comfort of living spaces, and they mainly enter through windows. Numerous studies have documented active noise control approach that can reduce the amount of noise entering a room through the window. In this paper, we introduce an active window system to reduce the exterior noise entering a room through a general open window. The experimental results show that the proposed system can achieve a noise reduction of up to 10 dB for the entire room of the scale model regardless of the direction of the incident wave.

[Student Conference: # 12]

An Anomaly Detection View of Rumor Preemption

Ms Chen, Weiling

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Since information can spread rapidly and widely more than ever on Online Social Networks (OSNs), they have become new hot beds of false rumor diffusion. Due to the potential harm these false information may bring to the public, false rumor detection has become a significant but challenging research topic. While previous research work mostly views it as a classification task, we treat it as an anomaly detection problem. In this paper, false rumors are viewed as anomalies and we perform Factor analysis of mixed data (FAMD) on our proposed features to detect these anomalies. Two strategies based on Euclidean distance and Cosine similarity are proposed to describe the deviation degree. A rank based on deviation degree is computed which can facilitate further rumor detection. We show our method can achieve good performance and can shed light on automatic detection of false rumors on OSNs.

[Student Conference: # 13]

Polyaromatic hydrocarbons for liquid based electrode applications in lithium secondary batteries

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A possible option to overcome some limitations of Li-ionic batteries, including slow rate of charge and discharge, relatively low energy density, high cost, and safety issues, is to use liquid based electrodes due to their fast ion transport, high solubility of active components, and complete elimination of such solid electrode drawbacks as metal dendrite formation. While some types of non-solid cathodes (like air cathode) have already been investigated, utilization of liquid based anodes is a relatively new approach.

One promising concept for a liquid based anode uses solvated electron solutions (SES), which are formed by the reaction between polycyclic aromatic hydrocarbons (PAH) and alkali metals in organic solvents. This concept has been successfully demonstrated with biphenyl as the PAH. Larger PAH systems with more aromatic rings would increase the possible number of alkali metal atoms per PAH in SES, and have a positive influence on the conductivity of the system due to improved interactions between the PAHs in solution, which should lead to improvement of SES electrochemical properties. Substituents with different nature incorporated in PAH molecules may also have an impact on SES characteristics, as well as electron withdrawing anti-aromatic systems (e.g. cyclopentadienone).

To this end a series of new PAHs of various sizes, including ones containing heteroatoms are being made and the properties of the resulting SES investigated. The goal of the research is to find fundamental relations between the structure of PAH and electrochemical properties of the resulting Li SES. The understanding of these relations will determine optimal properties of the Li SES for applications in liquid based anodes.

[Student Conference: # 14]

Flame performance of non-halogenated polymer-based thermal coatings for concrete structures

Mr Ng, Yan Hao
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Concrete is a non-combustible material with low thermal conductivity compared to steel. However, its microstructure is susceptible to damage in fire and gradual loss of compressive strength can be observed. Sufficient concrete cover and minimum cross-sectional dimension have been a widely accepted practice to ensure structure integrity, and the use of passive fire-protection is infrequent. A change in building occupancy may lead to an increase in fire ratings, and additional concrete cover increases the weight of the structure. Cementitious and geo-polymer based thermal barriers developed for stringent tunnel fire also require a certain thickness to protect the concrete structure.

Although the use of polymer-based thermal barrier is able to provide fire protection without increasing the weight of a structure, it is a significant challenge to develop non-halogenated coatings that are capable of meeting stringent standard fire curves prescribed in building codes. The performance of intumescent systems that are commonly applied to steel structures is not guaranteed due to the many inherent problems associated with these coatings (durability, adhesion to substrate at high temperatures, rigidity of char, etc.).

Synergy between flame retardant additives and tuning them in accordance with the inherent and intrinsic properties of a matrix is a possible solution to meet the challenging requirements. Coatings that rely on condensed-phased mechanism have been developed in our laboratory and several tests have been conducted to evaluate their performance to be used for structural applications.

[Student Conference: # 15]

Aerosol Jet Printed Strain Gauge

Mr Tan, Hong Wei
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In the recent years, there is much interest among researchers and engineers to fabricate functional electronics embedded in 3-dimensional complex structures using additive manufacturing technologies. Additive manufacturing allows on-demand mass customized fabrication of low-cost, low-volume electronics to be either fabricated directly on the substrates' surfaces or embedded within 3d structures. This paper briefly discusses the fabrication process of the strain gauge using aerosol jet printing. The performances of the aerosol-jet printed strain gauges are evaluated, to find out the potentials of using additive manufacturing technologies to fabricate cheap and customizable strain gauges.

[Student Conference: # 16]

Stress-induced shape memory properties in zirconia-based ceramics

Ms Zeng, Xiaomei
Nanyang Technological University, Singapore

Shape memory materials, which can fully recover their shape after significant deformation, have drawn great attention for their promising potential as smart materials. Recently, zirconia-based ceramics, which are traditionally brittle, were reported to work as shape memory ceramics with high strength and high ductility. We systematically explored the stress-induced shape memory properties in small volume zirconia and the underlying mechanism of martensitic transformation. The study of transformation crystallography provides in-depth understanding of the transformation stress and recoverable strain in shape memory zirconia. Zirconia-based shape memory ceramics are highly potential for actuation and energy damping applications.

[Student Conference: # 17]

Competitive photo and thermal catalytic removal of NO_x: From reaction pathways to applications in industry

Mr Yu, Che-Chin
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Three reaction types of photocatalytic NO removal, photo-assisted selective catalytic reduction (photo-SCR), photo-oxidation and photo-decomposition, were designated in flue gas under elevated temperatures. The reliability of reaction pathways is supported by the excellent agreement of the change in the thermodynamic properties of individual catalytic reactions, providing the basis for designing the photocatalytic removal of NO with a hydrocarbon in flue gas. Then, in developing a higher activity for NO_x abatement from stationary emission sources, photo-SCR was systematically investigated over TiO₂ supported on a spherical γ -Al₂O₃/ β -Al₂O₃. The NO_x removal efficiencies of TiO₂/ β -Al₂O₃ photocatalyst at 120°C for real flue gas (in pilot-scale photoreactor) and simulated flue gas (in lab-scale photoreactor) were 68-75% and 43.5%, respectively, in the presence of reducing reagent (C₄H₁₀). SEM and XPS techniques revealed that sulfur temporarily occupied the active sites of the photocatalyst, causing deactivation. Spent TiO₂/ β -Al₂O₃ photocatalyst has been regenerated via desulfurization by either air or hydrogen at 400-500°C. The effects of regeneration temperature and regeneration time on the photocatalytic activity are methodically investigated, demonstrating that using hydrogen at 500°C in 1h could completely regenerate the spent photocatalyst.

[Student Conference: # 18]

A Shortcut Model for Energy Efficient Water Network

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This paper presents a shortcut model for energy efficient water network synthesis with single contaminant. The proposed model is based on the idea of reducing repeated heating and cooling proposed by Feng et al. [1]. To avoid sub-optimum that can be generated from Feng's model, the proposed model only minimizes the number of temperature "valleys" instead of the total number of "peaks and valleys" of the water network. With the new formulation, the proposed model not only guarantees global optimum but also becomes much easier to be solved.

[Student Conference: # 19]

Modeling of Microalgae Growth for Biofuel Production

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Microalgae are considered a possible solution to the increasing global energy demand. The lack of competition with crops and the possibility to use them for the production of fuels, food and fine chemicals makes of it a flexible source for several applications. Development of models to predict the growth of microalgae becomes very important in order to avoid long experimental procedures. After the development of a reliable model, with sufficient experimental information, it will be possible to optimize the growing conditions in order to maximize the productivity of a desired component, such as lipids for biodiesel generation.

[Student Conference: # 20]

Stock market analysis and prediction based on sentiment analysis

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Nowadays, tons of millions of unstructured text data are on the internet. Making full use of these footprints to do research on people's attitudes and sentiments could give us insights. This research collects text data from online stock forums and focus on apply text sentiment analysis on these data. How sentiments are correlated to stock market has been explored, and a simple model for prediction of stock market trend has been build.

[Student Conference: # 21]

N-Doped Carbon-Coated Hollow Carbon Nanofibers with Well-Dispersed TiO_x for Integrated Separator of Lithium-Sulfur Batteries

Mr Yang, Yuebin

The Hong Kong University of Science and Technology, Hong Kong

Li-batteries have held a dominant position in the energy storage area for decades. However, due to the limitation of its chemistry, the energy density of Li-ion batteries is stuck at $\sim 300 \text{ mA h g}^{-1}$. In recent years, new focus is placed on Li-S batteries which are environmentally friendly, cost effective and promising for its high energy density (theoretical: $\sim 2600 \text{ Wh kg}^{-1}$). In this study, nitrogen-doped carbon coated hollow carbon nanofibers with TiO_x nanoparticles filled in the void between the carbon nanofibers and carbon coating layer were subtly designed to be integrated on the Celgard separator as a polysulfide trap to achieve high performance Li-S batteries. To better understand the properties of the separator coating layer, the fabricated materials were carefully examined and evaluated. The result reveals that the TiO_x nanoparticles could be well contained in the void between the inner core of carbon nanofiber and the nitrogen-doped carbon layer. The integrated separator has the coating layer of $\sim 0.36 \text{ mg/cm}^2$, which still renders the sulfur content (including the coating weight on the separator) to be above 50%. The assembled battery employing this integrated separator exhibited a capacity of $\sim 1000 \text{ mAh g}^{-1}$ at 0.5 C and $\sim 900 \text{ mAh g}^{-1}$ at 1 C with a high retention rate, suggesting a promising approach for future lithium sulfur batteries.

[Student Conference: #22]

Time series based music mining

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Time series is getting ubiquity nowadays. With the advance monitoring equipment, we can easily make measurements of an experiment continuously day and night. Scientists are definitely interested in exploiting time series. Some of them may reflect the real mechanism hidden under the experiment. Time series is large in size and thus old methods being used in the data mining society work very slowly. Many techniques are developed to tackle it such as using cheap lower bounding measure instead of the expensive real actual distance measure during the comparisons in algorithms and early abandoning [7, 2]. For time series, there are many experiments showing that simple nearest neighbor classification outperforms other fancy classification algorithms [1]. Hence, the choice of the distance measure is important to further improve the accuracy of classification. Different domains may require different invariances. This paper first provides a background of time series, invariance, and similarity measure. Besides, we list several methods to convert general data to time series in order to convince readers that many data can be treated as time series. After that, we try to use the existing distance measure on music data and claim that they are not good enough for our example. Hence, we need a new invariance. At last, we will introduce a novel invariant distance measure that can perfectly handle our example. We call this invariant distance measure as piecewise uniform scaling (PUS).

[Student Conference: #23]

Mechanisms underlying nonfouling behaviors of self-assembled monolayers of oligo(ethylene glycol)-terminated alkanethiols on gold and silver

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Nonfouling surfaces are widely applied in various fields, ranging from ship-coating to biomaterials for blood-contacting devices. Study of mechanisms underlying nonfouling behavior is demanded for improvements in design of nonfouling surfaces. To date, the mechanisms have not been clearly revealed at the molecular level. Self-assembled monolayers of oligo (ethylene glycol)-terminated alkanethiols (OEG SAMs) on metal substrates are ideal model system to study interactions between biomolecules and artificial surfaces. In this study, we analyzed physical properties of OEG SAMs formed on gold and silver substrates, i.e. surface forces and hydrogen-bonding states of water molecules at the interface. Platelet adhesion and protein adsorption tests showed that OEG SAM on gold is cell- and platelet- resistant (nonfouling), whereas OEG SAM on silver is cell-adhering and platelet-adsorbing (fouling) surface. In surface force measurements, repulsive forces in the range of 4-6 nm were observed when two-identical OEG SAMs on gold brought close to each other. When the SAMs were replaced by OEG SAMs on silver, attraction forces appeared. Shift of OH stretching modes of the interfacial water measured by surface-enhanced infrared absorption spectroscopy revealed changes of hydrogen-bonding states of water molecules. In the vicinity of OEG SAM on gold, water molecules with three hydrogen bonds were dominant. In the case of OEG SAM on silver, most of water molecules were tetrahedrally coordinated. From these results, we suggest that water molecules having three hydrogen bonds with thickness of 2-3 nm play important role in the nonfouling behavior of OEG SAM on gold.

[Student Conference: #24]

LiNi_{1/3}Co_{1/3}Mn_{1/3}O₂ synthesized by spray pyrolysis: a promising cathode material for all-solid-state batteries

Ms Ayaganova, Assem
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Due to the high theoretical and practical energy density lithium-ion batteries are attractive power sources for electronic applications and electric vehicles. To meet the requirements of these applications, improvements in the cathode, anode and electrolyte materials of conventionally used batteries should be made. All-solid-state batteries show several benefits in comparison to the conventional batteries with liquid electrolytes. They are non-flammable, offer high energy density and long lifecycle. LiNi_{1/3}Co_{1/3}Mn_{1/3}O₂ (NMC) is a promising cathode material for application in all-solid-state batteries, due to its high practical capacity of 160 mAh/g in the voltage range of 2.5-4.5 V and 200 mAh/g in 2.8- 4.6 V at 0.1 C. The aim of this research is the optimization of the synthesis of NMC cathode material via ultrasonic spray pyrolysis for future application in all-solid-state batteries. LiNi_{1/3}Co_{1/3}Mn_{1/3}O₂ was successfully synthesized by spray pyrolysis. Cathode material possessed spherical and mesoporous morphology, layered structure and excellent stoichiometrical ratio of metal ions. As a results, LiNi_{1/3}Co_{1/3}Mn_{1/3}O₂ cathode material showed high rechargeable capacity around 160 mAh/g at 0.1 C in 2.5-4.5 V voltage range.

[Student Conference: #25]

Upgrading Japanese Cypress Pyrolysis Vapors using Supported Ionic Liquid [bmim][BF₄] Catalyst

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Biomass can be converted to bio-oil using pyrolysis. Pyrolysis has high bio-oil yields; however, the bio-oil quality is low and has high oxygen content. In this work, a new type of catalyst utilizing ionic liquids is tested to improve the bio-oil quality and decrease the oxygen content. The ionic liquid [bmim][BF₄] was chosen as a catalyst medium because it is stable at high temperatures and has Brønsted acid sites. The Brønsted acid sites help catalyze the deoxygenation reactions. The [bmim][BF₄] was supported on both silica and ZrO₂&TiO₂ and used to upgrade pyrolysis vapors. The catalysts were analyzed using Raman spectroscopy and BET analysis. Bio-oil analysis by H-NMR shows that the quality of the bio-oil increases with increased coating of [bmim][BF₄] on the silica support from 0.60 to 0.66. However, the ZrO₂&TiO₂ support showed the opposite trend with coating of [bmim][BF₄]. Coating catalyst supports with ionic liquid may be used to isolate the steric effects of the catalyst support.

[Student Conference: #26]

Vehicle Load Sensing for Bridge Structures

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Overweight trucks have been identified as the main cause of fatigue damages in bridge structures. Vehicle load sensing, i.e. the practice of detecting vehicular axle weights using embedded sensors, has become increasingly important. Recently, the technology based on sensors attached on a bridge's major structural members to weigh vehicle axles in motion, has proved to be more preferable than the pavement-based sensing approach using sensors embedded on pavement. This paper presents problems encountered in the current vehicle load sensing practice for bridge structures as well as investigation on a new sensor application and analysis method to tackle those problems.

[Student Conference: #27]

Effect of Si coating on high temperature oxidation of iron

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High temperature oxidation of silicon coated iron was conducted to clarify the effect of silicon coating on the formation of silica layer at the scale/substrate interface. Silicon was sputtered on polished iron and the thickness of silicon was about 100 nm. Oxidation tests were conducted at 1173 K in air for up to 3.6 ks. Before the oxidation test, there were some places on the sample surface where silicon peeled off. After the oxidation test, thick iron oxides could be observed at the place where silicon exfoliated. There is a thin oxide layer which may be containing silicon at interface between iron and iron oxide. On the other hand, iron oxides were not observed at the place where Si coating was stable.

[Student Conference: #28]

Biodiesel Production in Microreactor with Ionic Liquids as Heterogenous Catalyst

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The use of biodiesel as a renewable source of energy is increasingly growing. The literature describes alcoholysis, to produce biodiesel, by different technological routes using several catalysts such as inorganic acids, inorganic bases and enzymes. Depending on the catalyst chosen for the reaction, there are certain peculiarities for these catalysts. Among the proposed alternatives to classical catalysts, the use of ionic liquids (ILs) seems to be promising as they have low toxicity, high catalytic activity, excellent chemical and thermal stability. The main goal of this work is to assess the possibility of intensifying and optimizing the production of biodiesel using ILs as a catalyst. For this purpose, the idea is to combine ILs with microreactors (MR).

IL was synthesized by following the procedures mentioned in the literature. Imidazole and pyridine ILs were chosen to obtain Brønsted acidic function for catalysis. ILs were used as monomers and also as polymers. Fused silica microcapillary serves as a microreactor. Immobilization of the ILs is carried out essentially in three steps: Cleaning, Silanization and Immobilization.

The vinyl function in the ionic liquid molecule allows chemical bonding for immobilization on the inner surface of the microcapillary. Although the reaction of transesterification is usually monitored by Gas Chromatography (GC), this technique is time consuming and expensive because it needs many standards in case of non pure oil. We tried to replace the GC quantification by FTIR.

[Student Conference: #29]

Graphoepitaxy of In₂O₃ microcrystals by quasi-VLS method

Mr Go, Tokohei
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Indium-tin oxide (In₂O₃ doped with SnO₂) is widely utilized as a transparent electrode in solar cells and flat panel display. However, pure In₂O₃ in a form of polycrystalline and/or amorphous films are often insufficient for the use in active devices such as invisible thin-film transistors. Notion of "epitaxy" is to make a joint between crystalline materials with similar structures, by which a singlecrystalline film can be grown on single crystals with perfect in-plane orientation. Such a

technique often requires high production cost. Therefore, fabrication of single-crystalline In_2O_3 films on low-cost substrates have been desired. "Graphoepitaxy" provides a solution: even on an inexpensive glass substrate, in-plane orientation can be achieved by utilizing a periodic surface texture with submicron spacing and anisotropy of interface energy between films and substrates. Moreover, high degree of freedom for choice of materials is advantageous to large area and low-cost production. Here, we report graphoepitaxy of In_2O_3 on inverted-pyramid-texture substrates through implementation of a quasi-VLS method.

[Student Conference: #30]

Thermal Conductivity of SiNCs/Polymer Nanocomposite for Thermal Insulating Material

Mr Juangsa, Firman Bagja
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Silicon is the second most abundant element in the earth's crust, providing enormous potential to be utilized for various applications. Silicon nanocrystal (SiNCs) with reduced size to nanoscale brings new unique properties, and have been mainly used for its optical and electrical properties, mostly utilized as optoelectronic devices. Moreover, research on SiNCs showed promising results of reduced thermal conductivity properties of silicon, by controlling the particle grain size.

Observing and analyzing thermal transport and its effect on thermal conductivity of single nanoparticle is practically not possible, due to the limitation of thermal conductivity measurement device. Therefore, nano scale thermal transport has been observed by measuring the thermal conductivity of the bulk nanostructured material. Many methods were proposed for nanostructure fabrication, but they have some drawbacks such as high temperature process that cause crystal growth, random and broad crystal size distribution, and relatively high cost. Here we would like to propose nanostructure material of SiNCs and polymer nanocomposite for nanoscale thermal analysis. The SiNCs were produced with plasma with narrow size distribution and nanocomposite was fabricated in low temperature, avoiding the crystal growth. Additionally, solution processing makes nanocomposite production low cost for large scale application.

In this research, nanocomposite material of SiNCs and polymer were produced and analyzed for the size-dependent effect of SiNCs thermal properties, and its effect on the nanocomposite thermal properties. Comprehensive understanding about the phonon transport mechanism in nanocomposite (< 10 nm) materials will allow nanostructured composite application for various applications that require a silicon-based low-thermal conductivity material.

[Student Conference: #31]

Surface quality and microstructure of Al-Mg alloy strips fabricated by vertical-type high-speed twin roll casting

Mr Kikuchi, Daisuke
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Al-Mg alloy strips fabricated by vertical-type high-speed twin roll casting shows periodical marks which consist of the "muddy zone" and the "shiny zone". They form the stripe perpendicular to the casting direction. They look metallic luster and white band respectively. The muddy zone has much more surface cracks than shiny one. The cracks remain even after cold rolling processes and deteriorate the quality of the strip products. In this study, in order to figure out what the periodical marks are and how they are formed during the casting, relationship between the surface quality of the strip and microstructure was investigated through microstructural observation and chemical analysis both on the surface and cross-section of the strips. The results conclude that periodical change of cooling rate during casting causes the periodical marks on the strip surface. When the cooling rate is lower, the muddy zone was formed because of inverse segregation: the residual liquid was squeezed out to the surface due to solidification shrinkage.

[Student Conference: #32]

Characteristic and performance of supercritical drying carbon porous electrode for Li-air battery

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Porous electrodes for Li-air battery consisting of carbon black and PVDF were fabricated from normal vaporization method and supercritical carbon dioxide drying method at 10 and 20 MPa, 40°C to investigate characteristic and performance. Porosity measurement results show that ultra-porous electrode fabricated from supercritical drying has 1.6 times higher porosity than electrode fabricated from normal vaporization. Moreover, porosity of electrode was increasing with increasing supercritical drying pressure which could be explained from higher expansion rate of solvent before drying. XRD and TG results show that polymer was crystallized out of structure after increasing supercritical drying pressure which affect reduction of conductivity. Capacity measurement results using dried air as inlet gas show that improving of specific capacity of Li-air battery depends on porosity of electrode. Here, electrode from 20 MPa supercritical drying gave 30 times higher specific capacity than vaporized electrode. This could be explained that Lithium peroxide, which is non-conductive discharge product, could be more accumulated for high porosity electrode. Accordingly, oxygen can be dispersed into the deep site of electrode hence the reaction can be occurred on both surface and deep site of the cathode, leading to improvement of battery performance.

[Student Conference: #33]

Iron(II)-doped Synthetic Zeolite for removing Cyanide from Aqueous Solutions

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Cyanide-containing wastewater has become a serious problem because it is categorized as hazardous waste, which should be well-treated before discharging into the environment. Currently, the trend of adsorption technique for cyanide removal is increasing due to many reports described the use of activated carbon, modified natural zeolite, and several bio-adsorbent materials to eliminate cyanide. Unlike activated carbon that has being applied in many industries to process cyanide, the useful synthetic zeolite has almost no information despite it has a lot of advantages and also can cover the adsorbent regeneration issue which is the lack of activated carbon; resulting to the high operating cost. To utilize synthetic zeolite for removing cyanide, an MFI-type synthetic zeolite was prepared and doped with iron(ii)-ions. SEM observation as well as XRD and BET analyses were conducted to study the characteristic of this iron-zeolite. Then, batch-cyanide uptake experiments were carried out by mixing NaCN solutions in several different initial concentration with the adsorbent at a fix L/S dose of 10g/L and agitation speed 200rpm in 250ml Erlenmeyer flask at room temperature for 72h by maintaining the pH between 10.5-11. The cyanide degradation was measured by using TOC/TN analyzer. The kinetic studies and adsorption isotherms were then performed to understand the adsorption behaviors. The results revealed that iron(ii)-zeolite can remove more than 90% of cyanide compound over the equilibrium which was reached at 24h of contact time. The pseudo-second order model better represented the kinetic of the process, while adsorption isotherm followed Langmuir model.

[Student Conference: #34]

Design of a Mixed Reality system for Codesigning with End-users

Mr Maurya, Santosh Kumar
Tokyo Institute of Technology, Japan

To ensure that the design outcomes match end-users' needs, our research aims at involving end-users in the early stage of the design process. A Mixed Reality (MR) tool was developed; it enables to visualize a product model in a Virtual Reality (VR) environment through a VR headset and to modify the virtual model through a tangible user interface (TUI). As compared to existing systems, our MR tool provides a high level of both immersion and control. The users' perception of the tool and its impact on the design process were evaluated experimentally, through sensors, questionnaires and behavioral / process analysis. Data show a good acceptance level by the users and a positive impact on the design process.

[Student Conference: #35]

Fabrication of chitosan/PVA nanoparticles suspension using supercritical carbon dioxide

Mr Murakami, Yuya
Tokyo Institute of Technology, Japan

Drug nanoparticles coated by cationic material are known to show very long residence time in eyes and thus, expected to greatly improve bioavailability of eye drops. In this research chitosan was chosen as coating material because of its good properties such as existence of cationic group in acid condition, biodegradability, biocompatibility and bioadhesivity. Supercritical Fluid Extraction of Emulsion (SFEE) was chosen as the fabrication method. In order to make emulsion, poly(vinyl alcohol) or PVA was utilized as surfactant and ethyl acetate (EA) was used as organic solvent. Due to the strong interaction between PVA and chitosan and also PVA and hydrophobic chemicals (or drugs), utilization of PVA is expected to improve stability of the particles. Particle size and surface charge of the particles (or zeta potential) before and after SFEE process were measured by dynamic light scattering (DLS). The results suggested that both of the particle size and zeta potential of emulsion greatly increased with chitosan concentration up to 1000 nm and 50 mV respectively. Additionally, the particle size greatly decreased after SFEE process while zeta potential remained constant. This suggests that only the organic solvent was effectively removed from the emulsion during SFEE and chitosan/PVA composite was successfully obtained. The size of the composite was around 200 nm, which is enough small to be candidate of drug carrier.

[Student Conference: #36]

Effect of Oxygen on Furan Resin Curing

Mr Nakai, Jun
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This research was conducted to improve the mechanical properties of furan resin. It is empirically known that curing process of furan resin requires using oxygen. In previous study, it was identified that hydrogen peroxide solution was capable for curing furan resin. However, there are some disadvantage of using hydrogen peroxide solution. For example, hydrogen peroxide solution decrease elastic modulus of furan resin and make many voids in furan resin. This is caused by water in hydrogen peroxide solution. So it was needed to use another oxygen supply instead of hydrogen peroxide solution. To supply oxygen to furan resin without adding water, we tried to use activated carbon which added oxygen. In the results, flexural strength was increased as well as hydrogen peroxide solution-added furan resin and elastic modulus did not decreased. From SEM observation, surface of activated carbon-added furan resin can be observed many small voids. This

is because activated carbon absorbed water when furan resin curing. It is concluded that activated carbon which absorbed oxygen can be substitute for hydrogen peroxide solution to supply oxygen to furan resin. In the future, some experiments will be conducted to make NFRP using activated carbon-added furan resin and investigate chemical reaction furan resin and oxygen.

[Student Conference: #37]

Investigation of Transport-Reaction Phenomena in Multi-Layered PEFC Cathode Catalyst Layer

Ms Nakano, Rinako
Tokyo Institute of Technology, Japan

Improvement in power generation performance of Polymer Electrolyte Fuel Cell (PEFC) is required for its market supremacy in automotive applications. In particular, it is important to suppress concentration overpotential in high current density operation. The microstructure of cathode catalyst layer (CCL) is known to dictates the power generation performance of PEFC. Also, in CCL, the ideal transport properties for the species in its membrane side and in its gas diffusion layer side are different. To design the microstructure of CCL, we fabricated three kinds of multi-layered CCL that has the difference in I/C ratio of 2nd layer (I/C = 0.88, 0.50, 0.31). I/C ratio is the mass fraction of ionomer and carbon black. Then we analyzed oxygen transport properties in CCL by evaluating of oxygen transport resistance (RCL) using limiting current measurements and electrochemical surface area per Pt loading amount in CCL (ECA). As I/C ratio is decreased from 0.88 to 0.50, RCL is decreased 49%. On the contrary, I/C ratio is decreased from 0.50 to 0.31, RCL is slightly increased. And ECA is monotonically decreased as I/C ratio is decreased from 0.88 to 0.31. These results show that the species transport characteristics alone has optimum condition in the 2nd CCL at around I/C = 0.50 and that the conjugated transport and reaction characteristics may require different optimization strategy due to the monotonically decreasing trend of ECA with the decreasing value of I/C. These clearly show that it is important to design microstructure of CCL to improve oxygen transport properties.

[Student Conference: #38]

Directed Self-Assembling Lithography Materials in Next Generation Microelectronics

Mr Nakatani, Ryuichi
Tokyo Institute of Technology, Japan

Block copolymer (BCP) lithography is a technique that could be used for high-throughput and large-area nanolithography. BCP lithography utilizes the self-assembled nanostructures that formed by microphase-separation of BCPs in thin films. In BCP lithography, nanofabrication under 10 nm (sub-10nm) is set as a challenging goal for next generation. We have recently developed fluorine- and silicon-containing BCP, poly(methacryl polyhedral oligomeric silsesquioxane-b-trifluoroethyl methacrylate) (PMAPOSS-b-PTFEMA), which could create perpendicular oriented lamellar structures with a half pitch size of less than 10 nm on silicon wafer. However, it was not able to synthesize the precise controlled PMAPOSS-b-PTFEMAs by anionic polymerization. In this study, the reversible addition-fragmentation chain transfer (RAFT) was employed as a new approach to control the primary structure of PMAPOSS-b-PTFEMAs such as molecular weight (Mn), polydispersity (PDI) and composition. Moreover, we demonstrated the patterning of PMAPOSS-b-PTFEMA self-assembled nanostructures in thin films through optimization of thermal annealing temperature and time, and finally, we showed the result of experiment on plant scale for linear-alignment of BCP domains with using large-area pre-patterned Si-substrate.

[Student Conference: #39]

Fluorescence Enhancement in Imide Compounds by Introducing Steric Electron-Donor Groups

Mr Orita, Ryoji

Tokyo Institute of Technology, Japan

Organic fluorescent materials can be applied in many fields such as displays, light emitting devices (LEDs), and spectrum converters for solar cells. Recently, polyimide (PI), a thermally and chemically stable polymer, has been attracting much interests due to its potential applications as novel fluorescent materials. Previously, we found that low-molecular-weight imide compounds having an electron-donor group in the phthalic anhydride moieties exhibit enhanced fluorescence properties compared with unsubstituted phthalimide compound (NHPI) due to enhancement of the electron transition. However, in general, fluorescence intensities are significantly reduced in the solid state due to self-absorptions or intermolecular energy transfers. Since fluorescent materials are usually expected to be applied in solid states, novel materials exhibiting strong fluorescence even in the solid states are strongly demanded.

In this study, two phthalimide compounds substituted by a bulky electron-donor group at the phthalic anhydride moieties, which is expected to suppress the intermolecular quenching mentioned above, and their fluorescence properties were examined in solution and solid states.

In solution, the two bulky-amino-substituted imide compounds showed stronger fluorescence than NHPI due to enhancement of the electron transitions by the electron-donating amino group. Similar to solution, NHPI showed a weak fluorescence in the solid state. On the other hand, the two bulky-amino-substituted imide compounds showed strong fluorescence even in the solid state. In addition, the imide compound having bulkier substituent showed stronger fluorescence than the other because that enlarges intermolecular distance and suppressed the intermolecular quenching effectively.

[Student Conference: #40]

Redox-Mediated Photocatalytic Water-Splitting In Optofluidic Coiled Microreactor Tubes

Mr Perez, Paolo Nicolo, Conti

Tokyo Institute of Technology, Japan

In order to effectively solve the global energy crisis, environmental problems and dependence on fossil fuels, a multitude of new forms of energy have been being developed. Among these new forms of energy, hydrogen possesses the best potential as a promising energy carrier and the fuel of the future. Compared to existing methods to produce hydrogen, photocatalytic water splitting can constitute a cleaner and more sustainable process, using only sunlight and water as main resources. So as to maximize efficiency of photocatalytic water splitting, optofluidics, integrating optics and microfluidics, has recently been given attention. By taking advantage of the optical properties of the reactor material for better photon capture, the microfluidic platform allows for a more efficient mass transport and uniform light penetration, both of which enhance reaction efficiency. The novel reactor was fabricated by applying the concept of secondary flow development. The coiled geometry of this reactor allows for full development of secondary flow, improving the mass transport properties. Recent researches employed rigorous and complex techniques to fabricate the reactor of different geometries such as micro-pillars and micro-grooved geometries, while reporting equivalent hydrogen efficiency from 3 to 15%. The current research has the potential to produce twice as much as those from previous works. With these results, the potential of hydrogen as the next main energy source will be realized.

[Student Conference: #41]

Catalytic Hydrothermal Liquefaction of Microalgae For Bio-Oil Production Using Nanocatalyst

Mr Saber, Mohammad
Tokyo Institute of Technology, Japan

Due to exhaustibility of fossil fuels and their adverse effects on the environment, bio-oil has been considered as an alternative energy source for fuel applications. The hydrothermal liquefaction is defined as biomass-to-liquid conversion route carried out in the hot compressed water with or without the presence of a catalyst. The major concern in HTL is the high pressure of the process which results in high capital cost of equipment. Thus, the process pressure and temperature should be reduced, but at a lower temperature, bio-oil yield is not high enough to make HTL an economical process for sustainable fuel production. In this research, we investigated the applicability of a nanocatalyst (nano-Ni/SiO₂), an acid catalyst (synthesized zeolite), and an alkali catalyst (Na₂CO₃) to increase the bio-oil yield at low temperatures (210°C, 230°C, 250°C). The major result of this work was higher bio-oil yields with the order of nano-Ni/SiO₂ > zeolite > Na₂CO₃ in hydrothermal liquefaction of microalgae *Nannochloopsis* sp.. The highest bio-oil yield (30.0 wt%) was obtained at 250°C by using Nano Ni/SiO₂. Moreover, applying catalyst resulted in a decrease in the oxygen and the nitrogen contents of the bio-oil and consequently an increase in its heating value. The results of this research also suggest the possibility of nanocatalyst recovery for 2-3 times.

[Student Conference: #42]

Channel Synthesis for Wideband MIMO Channel Performance Prediction

Mr Suroso, Dwi Joko
Tokyo Institute of Technology, Japan

The fifth-generation wireless communication system, 5G, is now closer to be a reality. The data rates more than 10 Gbps is expected and Multiple-Input-Multiple-Output (MIMO) utilizing large antenna array will be one of the keys for this realization. This research aims to simulate the large array MIMO utilizing parameters from a relatively small array by using the channel synthesis method and evaluation based on its channel capacity characteristics. MIMO technique deploys the multiple antennas both transmitter and receiver. This multiple antenna system has been proven to increase the data rate dramatically in the system. The double-directional model excludes the antenna effects from the propagation channel in the radio channel measurement is utilized. Wireless channel measurement has been conducted in microcell (height of transmitter and receiver are 3-m and 8-m, respectively) urban environment in Ishigaki City, Okinawa. The antenna used was uniform circular antenna both transmit and receive antenna with 12-elements (dual polarized, provide 24 x 24 MIMO channel). At center frequency 11 GHz with 400 MHz Bandwidth (2048-subcarriers) and 2000 snapshots. The channel synthesis is validated by comparing both capacity results from measurements and synthesized channel. The results show that the channel synthesis is following the trend of channel capacity graph of measurement results. The capacity is reaching for about 10 Gbps in this scenario, which means this can be applied in the 5G. The channel synthesis method can be used to predict the MIMO channel performance with different antenna types and element sizes which essential in 5G wireless communication system

[Student Conference: #43]

New Concept Rotating Detonation Engine Research

Mr Ji, Zifei
Tsinghua University, China

Detonation, regarded as approximate constant-volume combustion, makes the advantages of such as self-pressurization, high intensity of reaction and rapid heat release. Therefore, utilization of detonation-combustor can establish a high efficiency of thermodynamic cycle, which can improve the economic efficiency and reduce pollutant emission. Three kinds of detonation-based propulsion system, pulse detonation engine (PDE), standing detonation engine (SDE), and rotating detonation engine (RDE) have been proposed. The RDE competes against the others, because detonation could be initiated once and then propagate continuously in an annular combustor, in view of high detonation frequency and wide operation range. A theoretical analysis on the continuous rotating detonation aero-turbine engine system is conducted, based on the mathematical models of different sub-processes and the analytical parametric cycle models. Then, the overall performances of the RDE are studied, and the variations of performance metrics are compared under different flight conditions and operating conditions.

[Student Conference: #44]

Controlling elastic wave propagation in a soft bilayer system via wrinkling-induced stress patterns

Mr Li, Guo-Yang
Tsinghua University, China

Compression of a film/substrate bilayer system with different surface/interfacial structures can lead to diverse buckling patterns including sinusoidal wrinkles, ridges, folds, creases and tilted sawteeth wrinkles. In this paper, we show that elastic wave band gaps in the film/substrate bilayer system largely depend on the wrinkling patterns. More interestingly, we find that different wrinkling patterns investigated here can coexist and evolve in one bilayer system and the elastic wave propagation behaviors can be controlled by manipulating the hybrid wrinkling patterns. Our analysis also reveals that the periodic stress pattern plays a dominant role in tuning the bandgap structures in comparison with geometrical patterns caused by surface instability. A careful investigation on the transmission spectra of the composite systems has validated the main findings given by the analysis based on the Bloch wave theory. Potential uses of the method and materials reported here in gaining wide attenuation frequency ranges and the design of nesting Fibonacci superlattice have been demonstrated.

[Student Conference: #45]

Quantum Dots Cadmium Selenide (CdSe) as Saturable Absorber in Ytterbium Doped Fiber Pulsed Laser Generation

Mr Mayuddin, Mohamad Badrol Hisyam bin
University of Malaya, Malaysia

We demonstrated the generation of Q-switched and mode-locked pulse laser from an ytterbium doped fiber laser cavity using quantum dots cadmium selenide (QD CdSe) doped polymethyl methacrylate (PMMA) as saturable absorber (SA). The QD CdSe was produced via synthesis process of cadmium oxide (CdO), selenium (Se) and manganese (Mn) as precursor. The QD CdSe was then doped into PMMA via emulsion polymerization process. The produced PMMA-QD CdSe was formed into thin flake and placed between 2 fiber ferrules end to form an SA device. By increasing the QD CdSe concentration, the laser cavity exhibit Q-switched pulse at pump power of 970 – 1200 mW, with tunable repetition rate of 24.5 – 40.5

kHz and pulse width of 6.8 to 3.7 μs . The slope efficiency calculated at 13.5% with maximum peak power of 0.28W, maximum pulse energy of 1.1 μJ and signal-to-noise ratio (SNR) of 44 dB. The mode-locked operation achieved by lowering the QD CdSe concentration where 12.6 MHz pulse train with pulse width of 6.45 ps emerged by varying pump power from 310 mW to 468 mW. The calculated slope efficiency is 12.6% with SNR of 41 dB. These obtained result is a promising indicator that QD CdSe can become a good choice for saturable absorber and another photonic device.

[Student Conference: #46]

Characterisation of Hydroxyapatite Derived From Animal Bones

Mr Loo, Zi Zhen
University of Malaya, Malaysia

Hydroxyapatite is being considered for applications in biomedical mainly due to its calcium to phosphorus ratio being similar to that of hard tissues, possessed excellent biocompatibility and exhibited superior osteoconduction characteristics. The synthesis of hydroxyapatite by using synthetic chemicals as the starting calcium precursors has been widely reported however the development of hydroxyapatite from using natural calcium sources are not well investigated. In this work, the viability of preparing hydroxyapatite using natural available animal bones through a thermal decomposition method applied to bovine bone, caprine bone and galline bone have been investigated. The bone samples were sourced locally, cleaned to remove fats and proteins followed by calcination in an air atmosphere at different temperatures ranging from 600 $^{\circ}\text{C}$ to 1000 $^{\circ}\text{C}$. The calcined powders were prepared and characterized to determine the phases present using X-ray diffraction and FTIR. The results revealed that the thermal stability of the HA matrix was not disrupted, particularly for the bovine bone and that all of the sintered bodies exhibited phase pure HA. This was not the case for the caprine and galline bones where a small amount of bioresorbable tri-calcium phosphate phase was observed after the calcination process. Nevertheless, bovine and caprine bone heat treated at 750 $^{\circ}\text{C}$ and galline bone at 600 $^{\circ}\text{C}$ were identified as the optimum calcination temperatures. Therefore heat treated powder at optimum temperatures was used to produce green bodies for the sintering process. The bulk density and mechanical properties of sintered samples were also measured.

List of students for group project

No	University	Title	Name (Surname, First Name)	Background	Group No
1	Bandung Institute of Technology, Indonesia	Mr	Chandra, Nurohman	Mechanical Engineering and Aerospace Engineering	A1
2	Bandung Institute of Technology, Indonesia	Ms	Zakiyya, Nida Maisa	Environmental engineering	B1
3	Chulalongkorn University, Thailand	Mr	Ekapop, Verasakulvong	Computer Engineering	C1
4	Chulalongkorn University, Thailand	Mr	Narong, Intiruk	Computer Engineering	D1
5	Chulalongkorn University, Thailand	Mr	Thanabhat, Koomsubha	Computer Engineering	E1
6	Hanoi University of Science and Technology, Vietnam	Mr	Dao, Duong Hai	Mechanical Engineering and Aerospace Engineering	C2
7	Indian Institute of Technology Madras, India	Mr	Cherian, Philip	Civil Engineering	F1
8	Indian Institute of Technology Madras, India	Ms	Gopalapillai, Deepthi Sivadas	Electrical Engineering	D2
9	Indian Institute of Technology Madras, India	Mr	Patel, Poojan Jitendra	Civil Engineering	B2
10	Indian Institute of Technology Madras, India	Mr	Santhiappan, Sudarsun	Computer Science and Engineering	G1
11	Korea Advanced Institute of Science and Technology, Korea	Ms	Kim, Yeeun	Civil Engineering	F2
12	Korea Advanced Institute of Science and Technology, Korea	Mr	Lee, Nokhaeng	Mechanical Engineering and Aerospace Engineering	H1
13	Nanyang Technological University, Singapore	Ms	Chen, Weiling	Computer Science and Engineering	I1
14	Nanyang Technological University, Singapore	Mr	Lunchev, Andrey	Materials Science and Engineering	G2
15	Nanyang Technological University, Singapore	Mr	Ng, Yan Hao	Civil Engineering	J1
16	Nanyang Technological University, Singapore	Mr	Tan, Hong Wei	Mechanical Engineering and Aerospace Engineering	K1
17	Nanyang Technological University, Singapore	Ms	Zeng, Xiaomei	Materials Science and Engineering	L1
18	National Taiwan University, Taiwan	Mr	Yu, Che-Chin	Chemical and Biomolecular Engineering	E2

No	University	Title	Name (Surname, First Name)	Background	Group No
19	The Hong Kong University of Science and Technology, Hong Kong	Mr	Liang, Yingzong	Chemical and Biomolecular Engineering	K2
20	The Hong Kong University of Science and Technology, Hong Kong	Mr	Pahija, Ergys	Chemical and Biomolecular Engineering	H2
21	The Hong Kong University of Science and Technology, Hong Kong	Mr	Yang, Haoyu	Technology Leadership and Entrepreneurship Program	J2
22	The Hong Kong University of Science and Technology, Hong Kong	Mr	Yang, Yuebin	Chemical and Biomolecular Engineering	I2
23	The Hong Kong University of Science and Technology, Hong Kong	Mr	Yu, Coleman	Technology Leadership and Entrepreneurship Program	L2
24	Tokyo Institute of Technology, Japan	Ms	Asatyas, Syifa	Materials Science and Engineering	E3
25	Tokyo Institute of Technology, Japan	Ms	Ayaganova, Assem	Chemical Science and Engineering	C3
26	Tokyo Institute of Technology, Japan	Mr	Behrens, Michael Alexander	Mechanical Engineering	L3
27	Tokyo Institute of Technology, Japan	Mr	Cao Vu, Dung	Civil and Environmental Engineering	A2
28	Tokyo Institute of Technology, Japan	Mr	Egawa, Seiki	Materials Science and Engineering	G3
29	Tokyo Institute of Technology, Japan	Mr	Gaddem, Mohamed Rami	Chemical Science and Engineering	A3
30	Tokyo Institute of Technology, Japan	Mr	Go, Tokohei	Chemical Science and Engineering	H3
31	Tokyo Institute of Technology, Japan	Mr	Juangsa, Firman Bagja	Mechanical Engineering	I3
32	Tokyo Institute of Technology, Japan	Mr	Kikuchi, Daisuke	Materials Science and Engineering	C4
33	Tokyo Institute of Technology, Japan	Mr	Kunanusont, Nattana	Chemical Science and Engineering	D3
34	Tokyo Institute of Technology, Japan	Mr	Maulana, Irwin	Transdisciplinary Science and Engineering	K3
35	Tokyo Institute of Technology, Japan	Mr	Maurya, Santosh Kumar	Mechanical Engineering	H4
36	Tokyo Institute of Technology, Japan	Mr	Murakami, Yuya	Chemical Science and Engineering	I4
37	Tokyo Institute of Technology, Japan	Mr	Nakai, Jun	Chemical Science and Engineering	J3

No	University	Title	Name (Surname, First Name)	Background	Group No
38	Tokyo Institute of Technology, Japan	Ms	Nakano, Rinako	Mechanical Engineering	L4
39	Tokyo Institute of Technology, Japan	Mr	Nakatani, Ryuichi	Chemical Science and Engineering	B3
40	Tokyo Institute of Technology, Japan	Mr	Orita, Ryoji	Chemical Science and Engineering	G4
41	Tokyo Institute of Technology, Japan	Mr	Perez, Paolo Nicolo, Conti	Chemical Science and Engineering	B4
42	Tokyo Institute of Technology, Japan	Mr	Saber, Mohammad	Transdisciplinary Science and Engineering	J4
43	Tokyo Institute of Technology, Japan	Mr	Suroso, Dwi Joko	Transdisciplinary Science and Engineering	F3
44	Tokyo Institute of Technology, Japan	Ms	Chen, Shiruo	Metallurgical Engineering	A4
45	Tokyo Institute of Technology, Japan	Mr	Matsuda, Hiroaki	Metallurgical Engineering	C5
46	Tokyo Institute of Technology, Japan	Ms	Okihara, Maya	Metallurgical Engineering	D4
47	Tokyo Institute of Technology, Japan	Ms	Watanabe, Hitomi	Metallurgical Engineering	F4
48	Tokyo Institute of Technology, Japan	Mr	Hamaguchi, Kohei	Mechanical Engineering and Science	J5
49	Tokyo Institute of Technology, Japan	Mr	Hattori, Taiki	Mechanical Engineering and Science	K4
50	Tokyo Institute of Technology, Japan	Mr	Homma, Takahiro	Mechanical Engineering and Science	B5
51	Tokyo Institute of Technology, Japan	Ms	Kanayama, Saaya	Mechanical Engineering and Science	D5
52	Tokyo Institute of Technology, Japan	Mr	Kashiyama, Reo	Mechanical Engineering and Science	G5
53	Tokyo Institute of Technology, Japan	Mr	Ishibashi, Yoji	International Development Engineering	H5
54	Tokyo Institute of Technology, Japan	Mr	Tagawa, Hoshi	International Development Engineering	E4
55	Tokyo Institute of Technology, Japan	Mr	Xiong, Yi	International Development Engineering	I5
56	Tsinghua University, China	Mr	Ji, Zifei	Mechanical Engineering and Aerospace Engineering	F5

No	University	Title	Name (Surname, First Name)	Background	Group No
57	Tsinghua University, China	Mr	Li, Guo-Yang	Mechanical Engineering and Aerospace Engineering	K5
58	University of Malaya, Malaysia	Mr	Mayuddin, Mohamad Badrol Hisyam bin	Electrical Engineering	A5
59	University of Malaya, Malaysia	Mr	Loo, Zi Zhen	Mechanical Engineering and Aerospace Engineering	E5

Transportation (From Airport to HKUST)

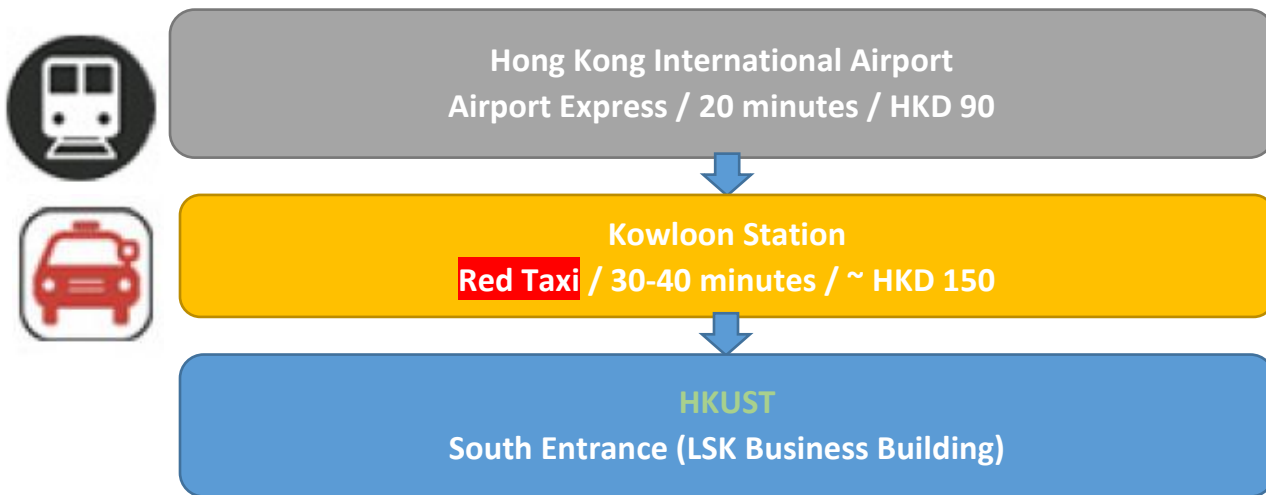
By Taxi:

The easiest and fastest way to travel to HKUST from the airport is by taxi. It may not be the cheapest method but it saves you the hassle of carrying your luggage on and off public transportation in an unfamiliar city. From the airport, **take a red taxi*** at the designated taxi stand; the fare is approximately HKD300 for the entire journey. Please note that your **driver will only accept HK dollars in cash**.

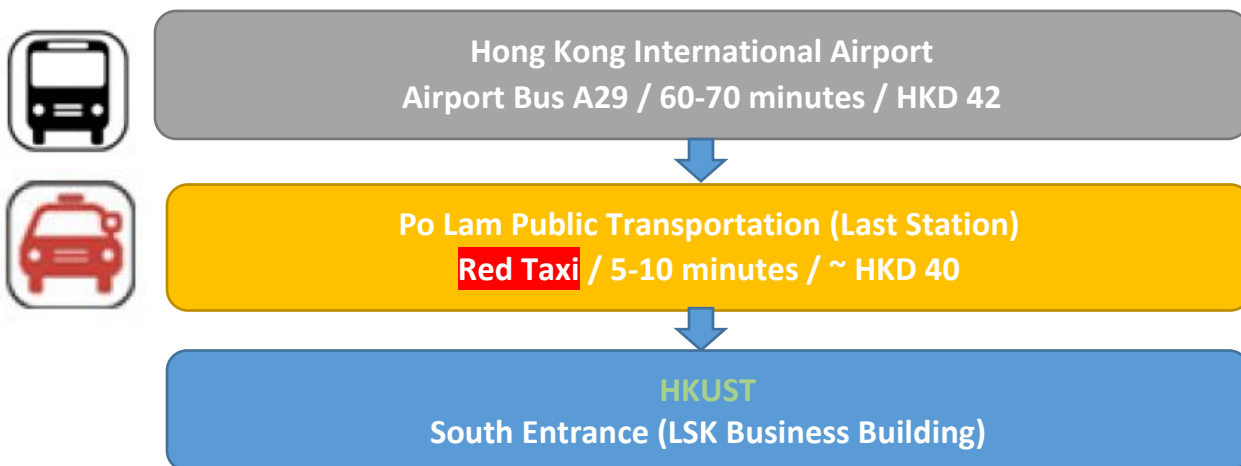
(*) Please ensure that you board a **red-colored taxi**. Green or blue-colored taxis are restricted to travel in the New Territories and Lantau Island respectively.

Alternative Methods:

THE SPEEDY WAY



THE AVERAGE SPEED, AVERAGE PRICE WAY



Transportation (From Airport to Crown Plaza Kowloon East)

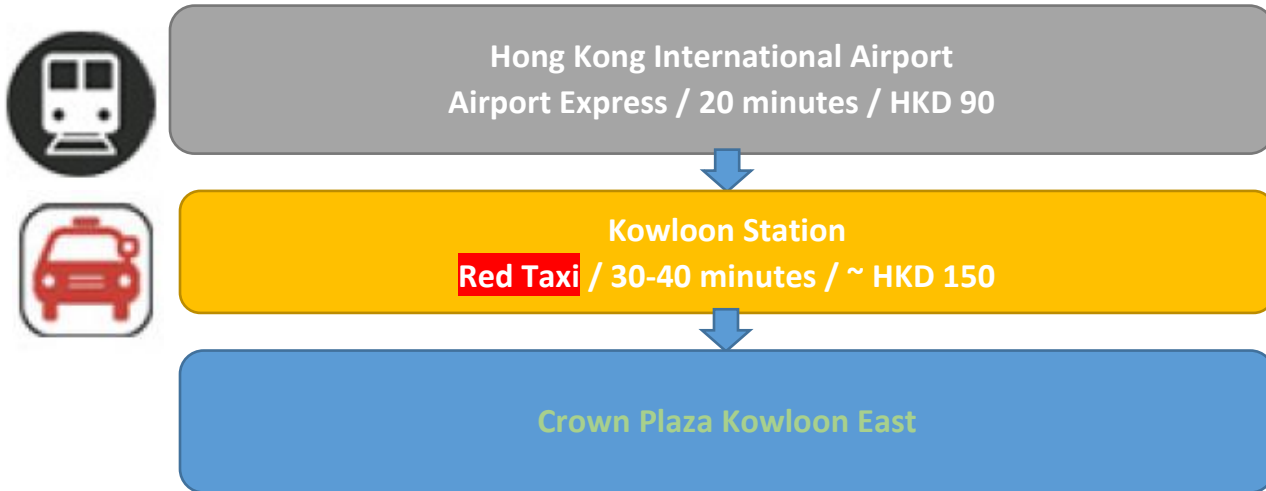
By Taxi:

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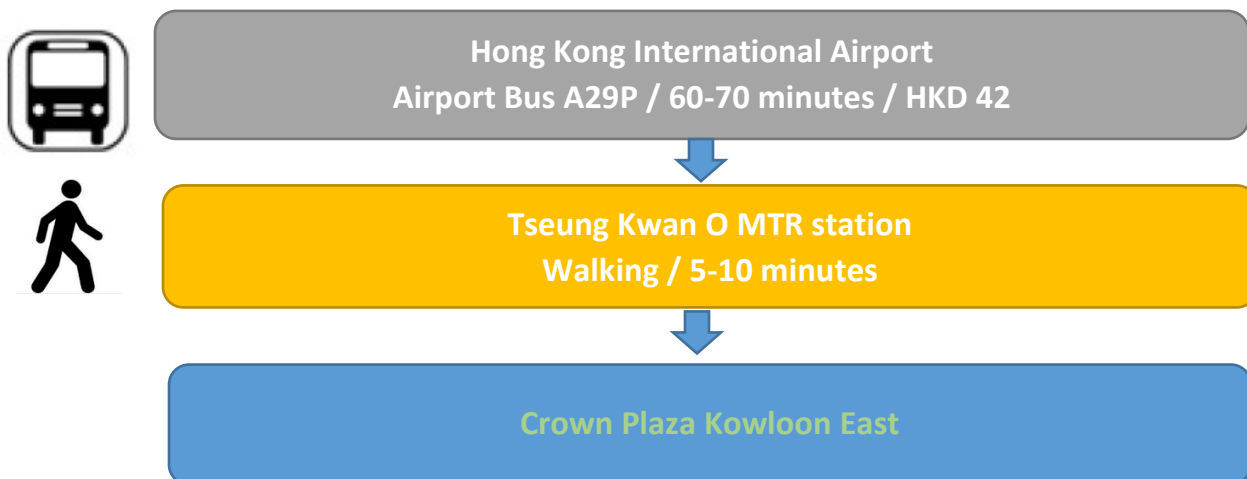
(*) Please ensure that you board a **red-colored taxi**. Green or blue-colored taxis are restricted to travel in the New Territories and Lantau Island respectively.

Alternative Methods:

THE SPEEDY WAY



THE AVERAGE SPEED, AVERAGE PRICE WAY



港鐵路綫圖 MTR system map



LOCATION MAP
THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY

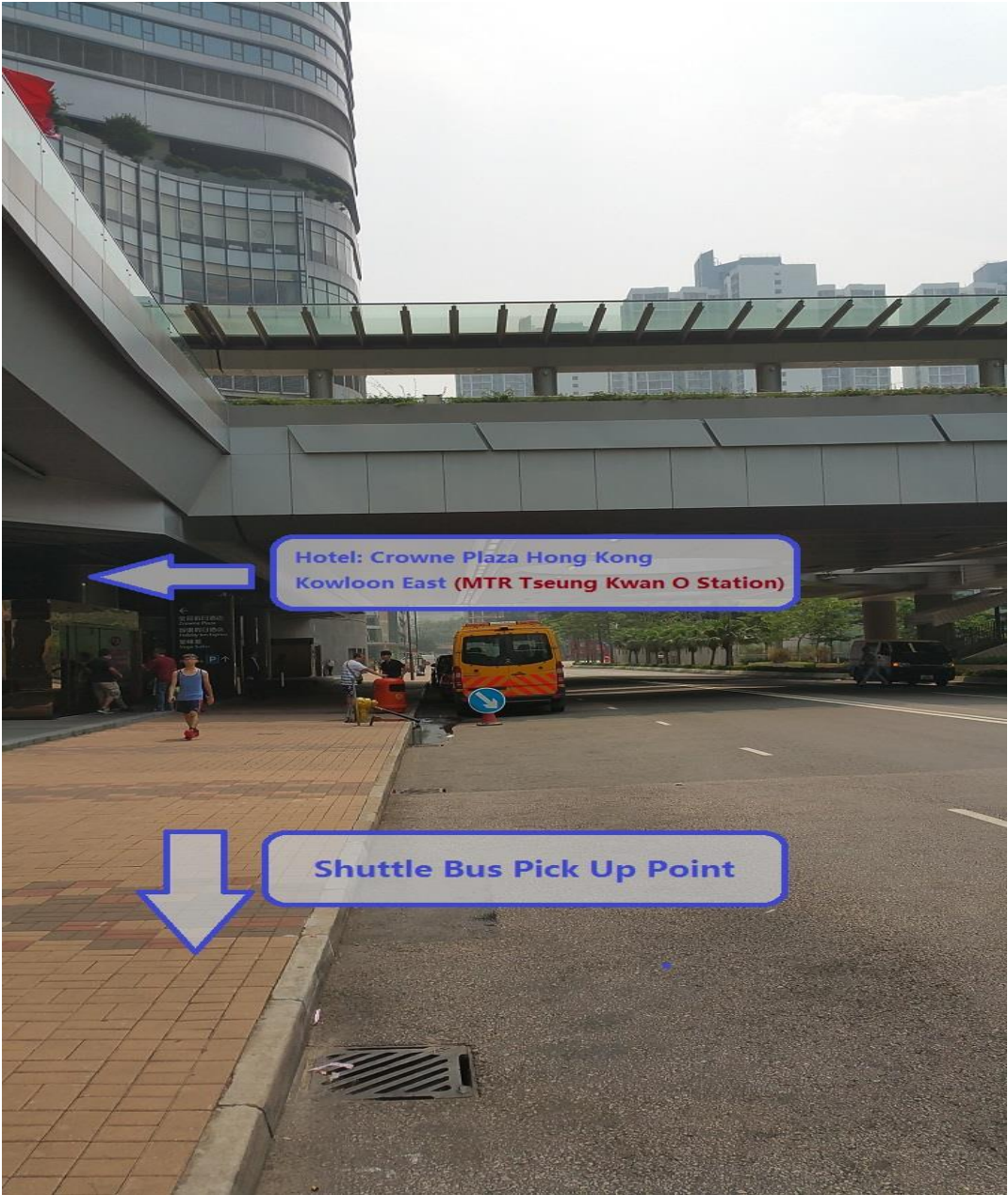


MTR Stations with bus or green minibus service to HKUST 提供往科大巴士或綠色專線小巴服務的港鐵車站	
Diamond Hill 鑽石山 :	🚌 91, 91M
Choi Hung 彩虹 :	🚌 91, 91M 🚗 11, 11S
Ngau Tau Kok 牛頭角 :	🚗 104
Tiu Keng Leng 調景嶺 :	🚌 792M
Hang Hau 坑口 :	🚗 11, 11M, 11S
Po Lam 寶琳 :	🚌 91M 🚗 11S, 12

Transportation from airport to HKUST:
For passengers with bulky luggage, taking a taxi to HKUST direct is recommended.
Those with simple luggage may take Airport Bus A22 to Lam Tin, and change for taxi to HKUST.

- 🚌 Bus Routes 巴士路線
- 🚗 Green Minibus Routes 綠色專線小巴路線

Pickup Point *Crowne Plaza Hong Kong Kowloon East (Outside Road)

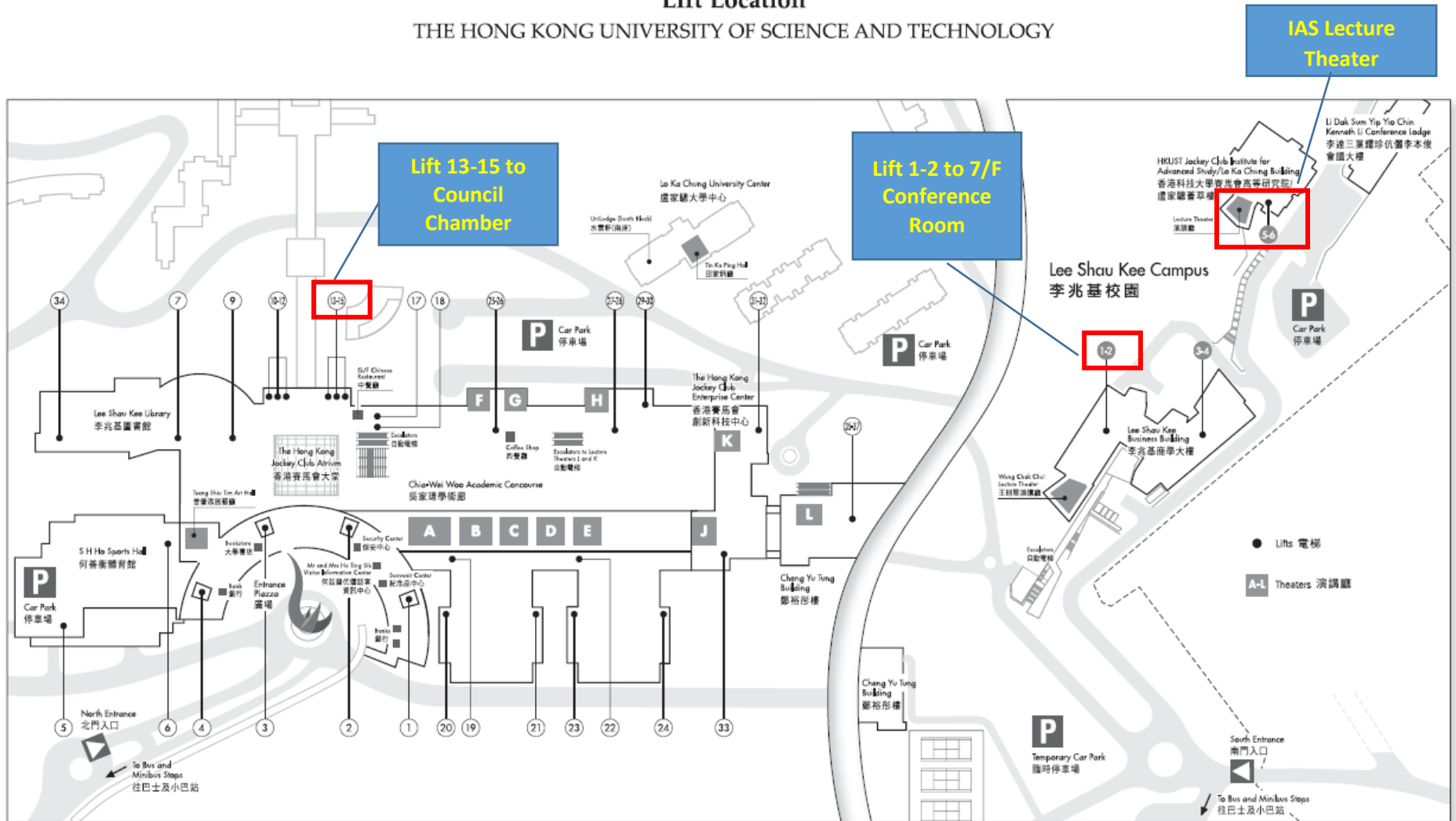


HKUST Campus Map



Map of Lift Location

Lift Location THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY



Wifi connection

Setting up Android Device to Access **eduroam**

This page provides sample instructions for visitors to connect to eduroam. This is a general guideline as different brands may have widely different network configuration steps and from past experience may change from generation to generation.

Configure and Access eduroam

Step 1: Bring up Wireless Network Connection Menu

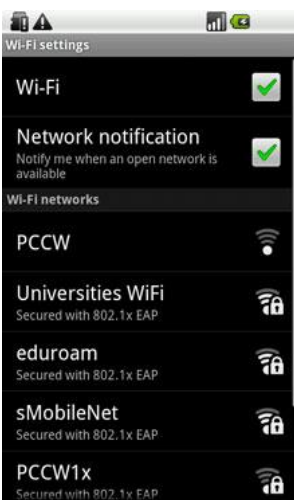
Select Menu → Settings → Wireless & networks → Wi-Fi settings

Step 2: Configure Wireless Network Properties

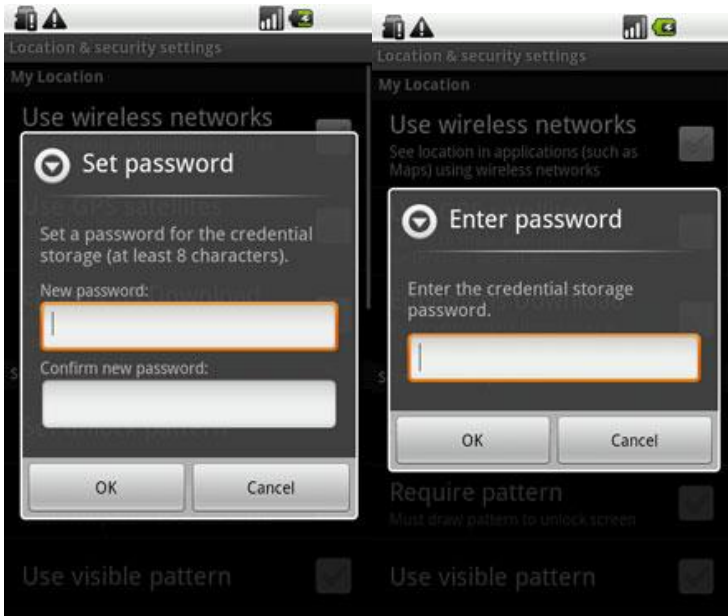
- a. Select Wi-Fi to turn on Wi-Fi



- b. Select eduroam



- c. Set password for the credential storage / or / Enter the stored password for the credential storage



- d. Enter wireless network information
 - o EAP method: PEAP
 - o Phase 2 authentication: MSCHAPV2
 - o Identity: "aotule2016"
 - o Wireless password: "seng@hkust"
 - o Select Connect
- e. The status of eduroam now changes to Connected

Setting up Apple iPhone / iPad / iPod Touch Device to Access eduroam

This page provides sample instructions for **visitors** to set up **Apple iPhone / iPad / iPod Touch devices** to connect to **eduroam**.

Configure and Access eduroam

Step 1: Bring Up Wireless Network Connection Menu

- a. Select **Settings** → **Wi-Fi** in the home screen
- b. Change the option of **Wi-Fi** to **ON**
- c. Select **eduroam**



Step 2: Enter User Name and Password

- Enter your "**aotule2016**" in **Username** field
- Enter your "**seng@hkust**" in **Password** field
- Click **Join**

Step 3: Verify Certificate

- Make sure **Thawte DV SSL SHA256 CA** and **wireless.ust.hk** are shown
- Click **Trust**

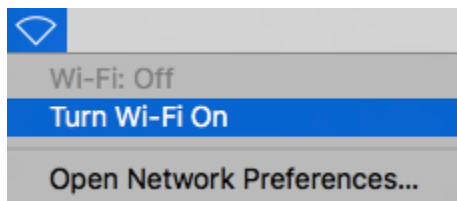
Setting up Mac OS X Device to Access eduroam

This page provides sample instructions for **visitors** to set up **Mac OS X devices** to connect to **eduroam**.

Configure and Access eduroam

Step 1: Bring Up Wireless Network Connection Menu

- Click **AirPort** icon at the top-right corner of the screen
- Select **Turn AirPort On**

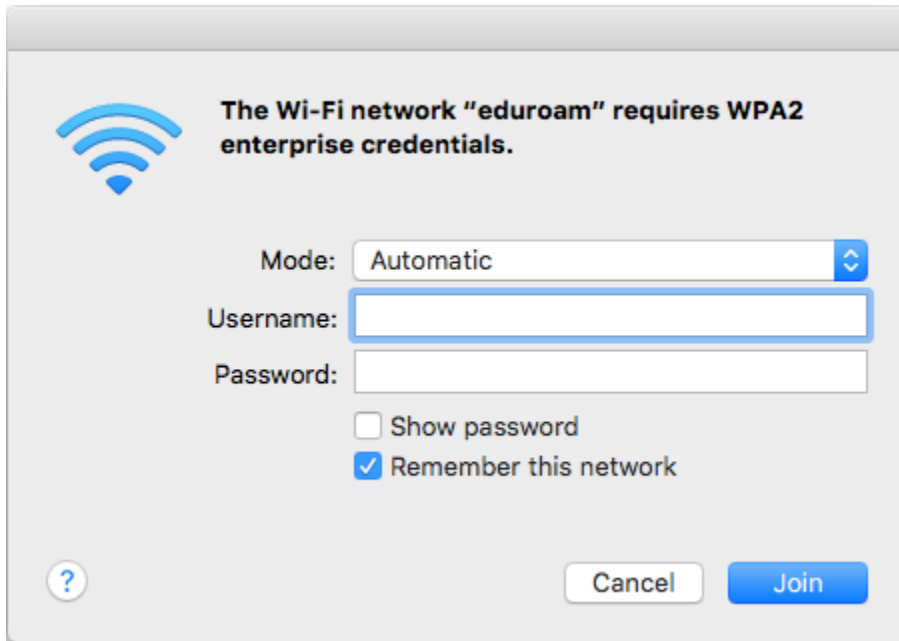


- Select **eduroam**



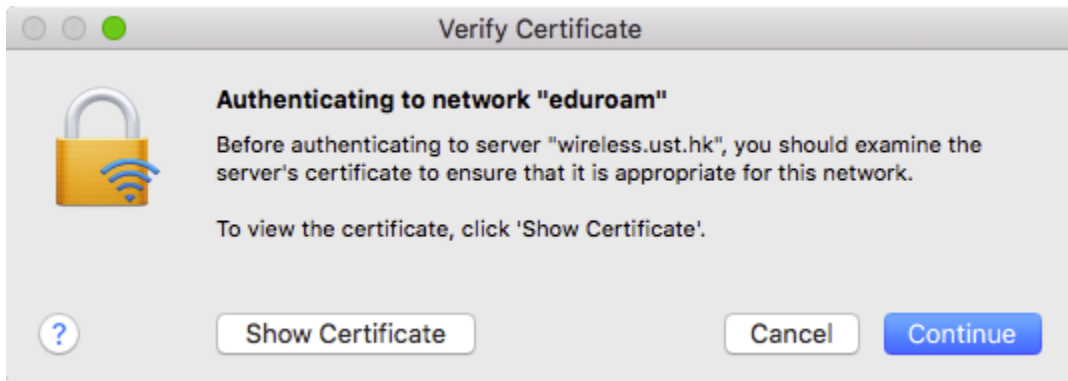
Step 2: Enter User Name and Password

- a. Enter your "aotule2016" in **Username** field
- b. Enter your "seng@hkust" in **Password** field
- c. Click **Join**



Step 3: Verify Certificate

- a. Click **Show Certificate**



- b. Make sure **Thawte Primary Root CA - G3** and **wireless.ust.hk** are shown
- c. Click **Continue**



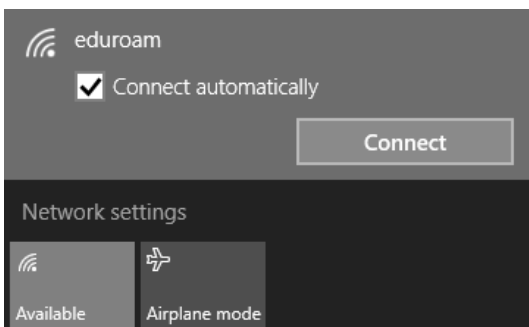
Setting up Windows 10 Device to Access eduroam

This page provides sample instructions for **visitors** to set up **Windows 10 devices** to connect to **eduroam**.

Automatic Setup

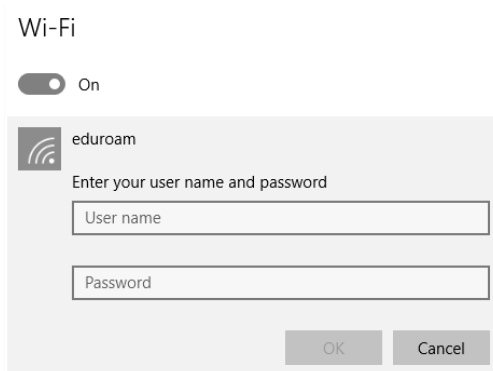
Step 1: Bring Up Wireless Network Connection Menu

- Click **Network** icon in the system tray (located at bottom right corner normally)
- Select **eduroam**
- Tick **Connect automatically** (*Note: If you don't want to store the password, please untick it*)
- Click **Connect**



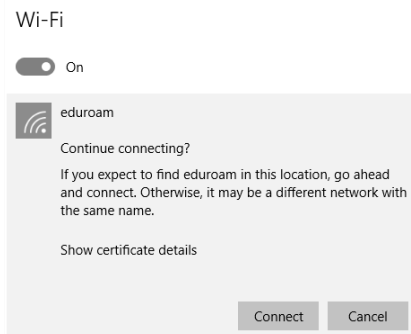
Step 2: Enter User Name and Password

- Enter your **"aotule2016"** in **User name** field
- Enter your **"seng@hkust"** in **Password** field
- Click **OK**

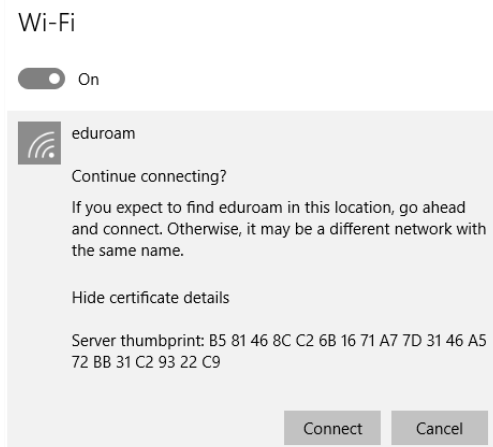


Step 3: Verify Server Identity

- Click **Show certificate details**



- Make sure
 - Server thumbprint is **B5 81 46 8C C2 6B 16 71 A7 7D 31 46 A5 72 BB 31 C2 93 22 C9**
- Click **Connect**



About Hong Kong

Situated on the southeast coast of China, Hong Kong's strategic location on the Pearl River Delta and South China Sea has made it one of the world's most thriving and cosmopolitan cities. It remains as one of the most traveled place in the entire Asia. Despite its small size, it is packed with a unique blend of eastern and western influences, matched by diverse attractions, stunning harbor and natural beauty in the country side. The bustling city offers you rich experience in restaurants, entertainment, and shopping.

Hong Kong is compact, so visitors are never too far from shopping and major sights. Public transportation via bus or train is efficient, relatively inexpensive and user-friendly. Mass Transit Railway system is convenient and covers extension areas of Hong Kong with signs in English and Chinese. The streets are safe. English is widely spoken.

A look at the city's history could give a strong impression that change is the only constant here. However, despite all its reinventions, Hong Kong's spirit has never changed. In fact, the same energy and dynamism that turned a group of sleepy fishing villages into a crossroads of international trade is now taking Asia's world city into the 21st century. Experience that spirit and Hong Kong's story yourself by exploring the city's rich culture and heritage.

Website: www.discoverhongkong.com

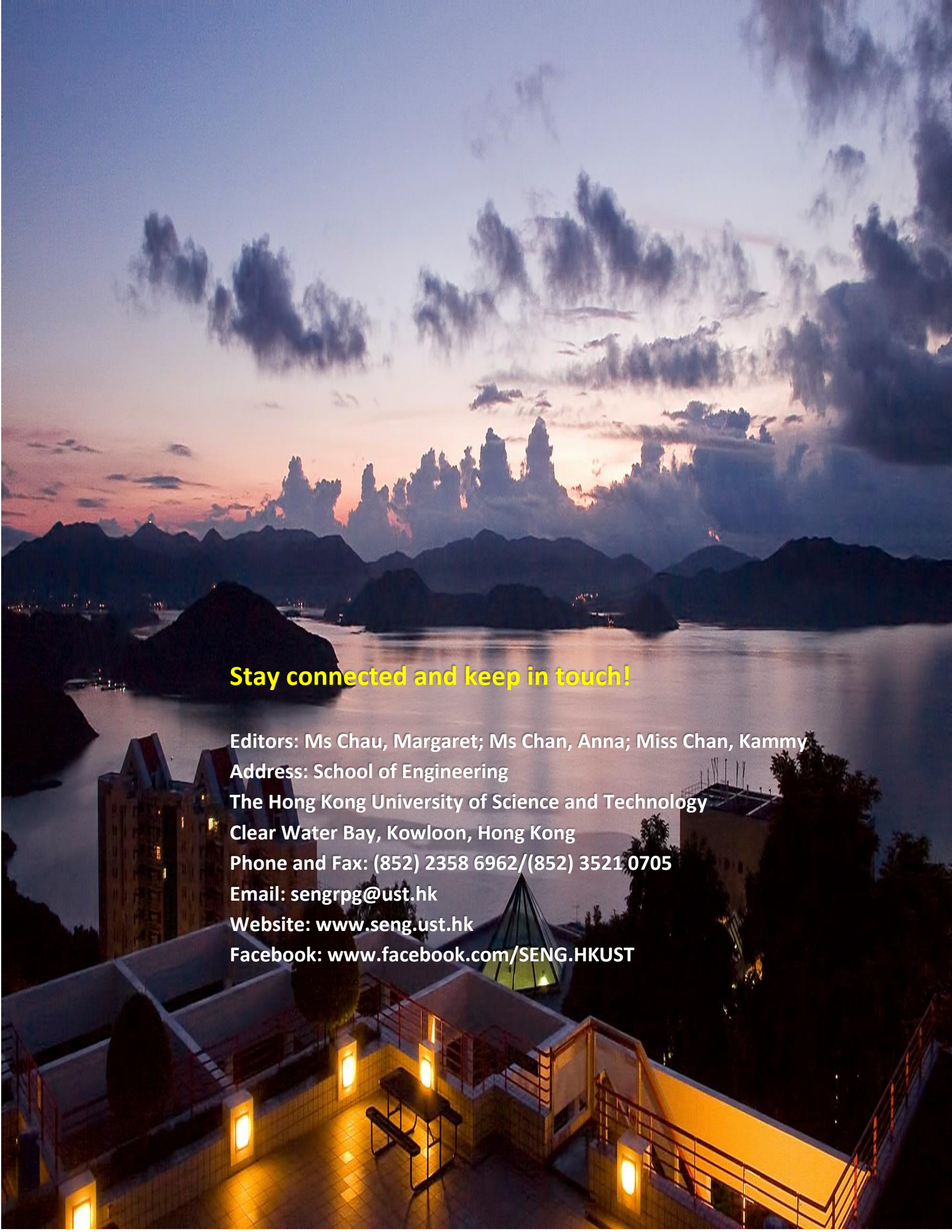
Money

The legal tender in Hong Kong is the Hong Kong dollar (HKD), which is pegged to the US dollar at a rate of about 7.80 HKD to 1 USD, although exchange rates may fluctuate slightly. ATMs can be found almost everywhere. Many take international cards and some HSBC 'Electronic Money' machines provide 24-hour cash withdrawal (HK\$) facilities for Visa and MasterCard holders.

Emergency

Emergency services (police, fire, ambulance) : 999

- ❖ Police Hotline : +852 2527 7177
- ❖ Hong Kong Tourism Board Visitor Hotline : +852 2508 1234
- ❖ Hong Kong International Airport : +852 2181 8888
- ❖ Hong Kong Immigration Department : +852 2824 6111

A scenic view of a bay at sunset. The sky is filled with dark, dramatic clouds, with a bright orange and yellow glow from the setting sun breaking through in the center. In the background, a range of dark mountains stretches across the horizon. The water in the bay is calm, reflecting the light from the sky. In the foreground, a building with a tiled roof and a glass dome structure is visible, illuminated by warm, yellow lights. The overall atmosphere is serene and picturesque.

Stay connected and keep in touch!

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