



School of Energy and Environment

Newsletter

September 2018 Issue



香港城市大學
City University of Hong Kong
專業 創新 胸懷全球
Professional-Creative
For The World

能源及環境學院
SCHOOL OF ENERGY
AND ENVIRONMENT

Dean's Message

In this September issue, we are glad to update you on latest developments in the School of Energy and Environment (SEE), including administration, research and academic developments, student achievements and industrial networks.



It is a pleasure to share with you that Dr. Walid Daoud has been appointed Associate Dean (Research and Graduate Studies) and Dr. Patrick Lee will continue to serve as Associate Dean (Undergraduate Studies). The School is grateful to Professor Michael Leung for his contribution over the past years as Associate Dean (Undergraduate Studies) and Associate Dean (Research and Graduate Studies).

We would also like to congratulate Dr. Denis Yu who has recently been promoted to Associate Professor. In addition, we are pleased to welcome Dr. Theodora Nah, Dr. Yun Hau Ng, Dr. Edwin Tso and Dr. Wei Wu. I believe the new blood will further strengthen our research in a range of areas.

While we are much encouraged by the good news, it is with mixed feelings that we say farewell to Dr. Zhi Ning, Dr. Ian Ridley, Dr. Masaru Yarime, Ms. Alice Wong and Dr. Kenneth Chu. The three former faculty members are devoted to nurturing future leaders in energy and the environment. Ms. Wong served as the School Secretary since the School was established while Dr. Chu was our Senior Technical Officer who contributed to the laboratory establishment in Science Park and renovation of new laboratories on campus. I wish them all every success in their future endeavours. We also welcome Miss Estella Tong, Director of Administration, who has recently joined the School. Miss Tong will oversee the administrative office.

The School is committed to provide the best education and research environment to our young generations. Lately, the Hong Kong Institution of Engineers (HKIE) Accreditation Board has confirmed that full accreditation would be granted for the Bachelor of Engineering in Energy Science and Engineering programme for a period of five years, and that provisional accreditation would be granted for the Bachelor of Engineering in Environmental Science and Engineering until 2021. Full

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accreditation will then be considered after a full visit with the first cohort of students graduate.

There are more good news to share with you in this issue. Enjoy reading!

Best,
Chak
Professor Chak K. Chan
Dean of School of Energy and Environment
City University of Hong Kong

New Faculty

Dr. Theodora Nah, *Assistant Professor*



Rapid expansion of human economic activity and population growth have led to increased levels of air and water

pollutants in marine and coastal environments. This has resulted in adverse effects on air and water quality, the climate and human and ecosystem health. Developing a comprehensive understanding of the multiphase chemistry underlying

the formation and evolution of these pollutants will allow for better assessment, mitigation and control of their environmental impacts. The overarching theme behind my research programme is to elucidate the chemical complexity and multiphase reactivity of air and water pollutants in coastal megacities. Of specific interest are the multiphase chemistry of atmospheric particles (termed "aerosols") and dissolved organic matter, which are known air and water pollutants respectively. My programme

has three central research areas: 1) trace gas and marine aerosol interactions, 2) the chemistry of particulate metals in marine aerosols and their roles in biogeochemical cycles, and 3) the degradation of organic matter in aquatic systems and their exchange at the air-sea interface. These research areas will be investigated using a combination of laboratory experiments, field work and theoretical modelling studies. I look forward to developing collaborations with, and learning from, the existing research groups at CityU.

Dr. Yun Hau Ng, *Associate Professor*

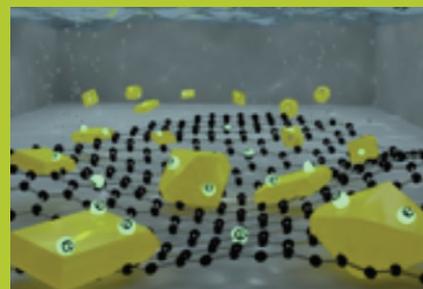


I believe in solar energy. Solar is the most abundant energy resource on our planet. It dwarfs most of the other renewable

energy resources combined. However, the intermittent nature of solar energy (day-night cycle and weather variations) poses fundamental limitations. Therefore, solar energy storage is needed.

Chemical fuels, such as hydrogen, have the highest energy- and power-density. They are suitable for long-term energy-intensive applications and can be conveniently distributed. For

other applications that are not necessarily as energy-intensive and geographically localised, batteries may be easier to use. Currently, commercial technologies that combine solar energy conversion and storage include the use of a mature photovoltaic (PV) and a battery or electrolyser. I am very much dedicated to realising the harvesting-conversion-storage of sunlight energy by integrating the functionalities of photoactive semiconductors into one single device. Over the past ten years, I have been working in the field of semiconductor photoelectrochemical systems. The main objectives of my research have been two-fold: 1) investigating the fundamental aspects (specifically, charges, transportation and interactions)



of photoactive semiconductors, which will lead to 2) development of an affordable and efficient device for photoelectrochemical energy conversion and storage. The success of this research will not only be appreciated in scientific and/or engineering communities, it will also bring us closer to the realisation of a total renewable-based economy.

Dr. Edwin Tso, *Assistant Professor*



The abundance of year-round sunlight in tropical and sub-tropical climates causes significant solar heat gain in buildings. To

ensure the comfort, good health and productivity of the occupants, air-conditioning (AC) is extensively used. In Hong Kong (HK), for example, more than 60% of the total energy for end-use is consumed by buildings, over 30% of which is used for AC

systems and refrigeration. To effectively address this challenge, various measures have been taken, not only to reduce energy consumption in buildings, but also to improve indoor thermal comfort. My research in general covers the areas of energy efficient building technology, energy conversion in a built environment, thermofluid and heat transfer, and energy engineering.

At SEE, I will lead a group to pursue research in the following areas: 1) the development of a high performance passive radiative cooler with an



Fig. 1

asymmetric electromagnetic transmission window under hot and humid climate conditions [i.e., I have already successfully fabricated a biomimetic based passive radiative cooler (Fig.1) and its cooling performance has

been demonstrated in HK's climate (Fig. 2); 2) the development of a perovskite VO₂ thermochromic smart window for use in smart green buildings; 3) a study of a phase change thermal diode with coalescence-induced jumping droplets; and 4) a study of hybrid-nanofluids in superhydrophilic wick structure for heat transfer enhancement in an adsorption cooling and desalination system. The findings from these research activities

will allow us to achieve unprecedented efficiency in space cooling and improve both indoor thermal comfort and the environment, taking us closer to our goal of creating smart green buildings.

I look forward to working with my graduate students and collaborating with my colleagues at SEE to demonstrate useful thermal devices that solve real-world energy and sustainability problems.

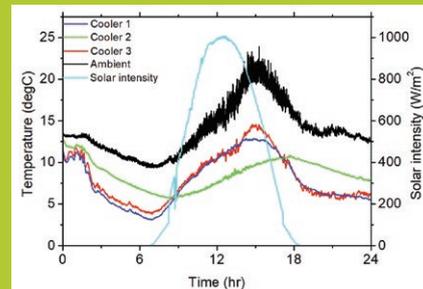


Fig.2

Dr. Wei Wu, Assistant Professor



I have very wide research interests, but all of them are focused on sustainable building energy technologies.

Aiming to reduce energy use and the environmental impact on the building sector (the largest energy consumer in Hong Kong and many other big cities) from widened and deepened perspectives, my research is conducted in a systematic and multi-level layout: (1) novel working fluid, (2) high-efficiency system, and (3) net-zero energy building.

At the fluid level, I have investigated natural and low-GWP refrigerants

for vapor-compression heat pumps and alternative working fluids for absorption heat pumps. At the system level, I have proposed a series of advanced technologies to improve the performance of building energy systems, including novel absorption heating cycles, novel ground source heat pumps, and hybrid heat pumps for renewable/waste energy utilisation. At the building level, I have focused on HVAC and PV design and optimisation for net-zero energy buildings in different climates.

In the future research, I plan to combine my academic experiences with Hong Kong situations, generating more innovative ideas and promising solutions for building energy efficiency in Hong Kong and similar regions. The basic



objectives is about achieving both energy-efficient and environment-friendly buildings with more emphasis on natural (renewable, waste and ambient) energy utilisation.

I look forward to collaborating with all the talented SEE staff, students, and partners to meet our future challenges on the academic long-march towards a sustainable society.

SEE Research Development

Research Grants

Success in GRF and ECS 2018-19

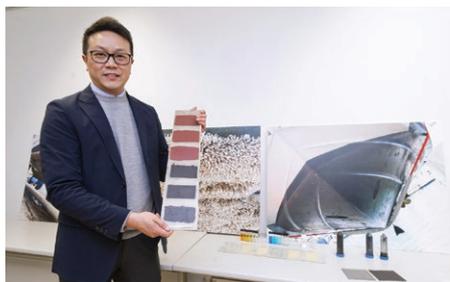
SEE strives for excellence in its research activities to enhance the sustainability and liveability of megacities such as Hong Kong, and to help them adapt to climate change. This is achieved holistically through the development of innovative energy and environmental technologies, that improve the resource management of megacities, including their water, energy and pollution, forecasting the impacts of climate change, and pursuing relevant policies. To facilitate our research, faculty members continue to participate in the General Research Fund (GRF) and Early Career Schemes (ECS) application exercise. Below is the list of SEE projects that have succeeded in obtaining GRF/ ECS status during the 2018-19 exercise.

| Project Title | Principal Investigator |
|--|------------------------|
| Heterogeneous reactions of monoethanolamine with atmospheric acidic aerosol particles | Professor Chak K. Chan |
| Dynamic interfacial mechanisms of long-term stable hybrid perovskite semiconductors for photovoltaic applications | Dr. Sam Hsu |
| Development of molecular encapsulation technologies for gas storage without sustained pressure | Dr. Jin Shang |
| Ab initio study of graphite intercalation compounds for dual-carbon battery application | Dr. Patrick Sit |
| Changing the face of battery chemistries: using dual redox sites to enable high capacity in sodium-ion cathode materials | Dr. Denis Yu |
| Anomalous photon transport induced asymmetric electromagnetic transmission for use in daytime passive radiative cooling in a humid climate | Dr. Edwin Tso |

Success in NSFC application 2018

SEE successfully obtained grants from National Natural Science Foundation of China for three different projects. The grant recipients are Professor Chak K. Chan, Dean and Chair Professor (Project Name in Chinese: 無機硝酸鹽對液相反應生成棕碳的影響), Professor Michael Leung, Professor (Project Name in Chinese: 微流體光催化燃料電池用於廢水資源化的機理及動力學研究) and Dr. Leung Yu Ting, Postdoctoral Fellow (Project Name in Chinese: 研究東亞大槽變異的能量轉換原因).

Professor Michael Leung's project received over HK\$2M from ITF



Professor Michael Leung has recently received over HK\$2M to conduct an ITF project on “High-efficacy, Environmental- and Eco-friendly Nano-photocatalytic Marine Antifouling Paint (Nano-MAP),” in collaboration with The University of Hong Kong, Techskill (Asia) and Aviva Yacht.

Hull fouling in marine transport increases frictional resistance, resulting in additional weight and poor fuel efficiency. Although the use of antifouling coating has been a common practice, fouling problems persist. Evidence indicates that the fouling costs extra 30-40% in fuel consumption. Conventional antifouling paints largely contain copper or zinc as the main biocidal agent to mitigate marine biofouling. The heavy metals are harmful to environment. The surrounding seawater and sediment at ship yards, aquaculture farms and marine industrial sites are seriously contaminated by heavy metals. Our recent measurements show that the concentration of heavy metal in the sediment exceeds the international permissible limit by 60 times.

Nano-MAP is an eco-friendly antifouling paint that can effectively prevent unwanted growth of microorganisms, commonly barnacles, tubeworms among other species, onto the coated surfaces in seawater. It has no adverse effect on the marine ecology while conventional antifouling paints contain harmful heavy metal. Nano-MAP has been successfully applied to solve the hull fouling problems for yachts. There are many other potential applications of Nano-MAP in the marine industries, e.g. shark nets, aquaculture facilities, offshore oil drilling rigs, etc., for better operational performance, prolonged equipment life, higher energy efficiency and marine environment protection. Our ongoing research aims to develop the technologies for broader applications in the marine industries. Nano-MAP clearly

realizes the success of Government-Industry-University-Research collaboration.

Dr. Alicia An's research work received over HK\$2M from ITF

- A novel membrane distillation-crystalliser (MDCr) for zero liquid discharge and valuable resource recovery



Dr. Alicia An's SEE research group has proposed a new paradigm shift in the water treatment industry. The objective is to move from water treatment to zero liquid discharge (ZLD) by developing “A Novel Membrane Distillation-crystalliser (MDCr) for ZLD and Valuable Resource Recovery”. The project won around HK\$2.43M from the **Innovation and Technology Fund (ITF) - Collaborative Research Project** from Innovation and Technology Commission (ITC) and Prime World Limited.

A promising hybrid separator, the novel Membrane Distillation-crystalliser (MDCr) could create integrated, sustainable water production that provides additional benefits such as resource recovery, reduced waste and increased yield. Membrane distillation technology offers us the ability to remove salt from seawater or brackish water using low-grade heat such as solar thermal energy or waste heat from industry. This study aims to develop an energy efficient MDCr process for use in desalination plants that will convert brine into an economically beneficial resource while producing an additional volume of valuable potable water and achieving near zero liquid waste discharge.

It is expected that MDCr will provide simultaneous solutions to the problems faced by desalination operations, including the environmental issues raised from brine disposal and the low water recovery factor. The current RO cannot go beyond 40% to 60% of the recovery factor due to salinity and pressure. MDCr's resource recovery, increased yield, and lower energy requirements

will allow desalination to become a more competitive and clean industry. This project will strengthen the scientific and technological contributions of industry to desalination and wastewater management and position Hong Kong as a leading international hub for zero liquid discharge.

Recent Research Highlights

Dr. Carol Lin's novel project won a Gold Medal in Geneva



Innovative green technology capable of recycling mixed textile waste into value-added products, such as synthetic fibre and bioplastics, has been developed by a research team from the SEE. The team recently won a **Gold Medal** at the **46th International Exhibition of Inventions of Geneva**.

The disposal of textile waste has become a global concern in recent years. In 2016, Hong Kong produced around 343 tonnes of textile waste a day, constituting 3.3% of the daily amount of local municipal solid waste that ended up in landfills. In 2014, 16 million tonnes of textile waste was generated in the US alone, and only 2.62 million tonnes was recycled, whereas around 10 million tonnes was sent to landfills.

“We urgently need a sustainable recycling method for diverting textile waste from landfills”, said Dr. Carol Lin, whose main research interests include biorefinery, green and sustainable chemistry, and food waste valorisation. Accordingly, she and her team began to study a biological method to recycle textile waste into commercially valuable products three years ago.

The new bioconversion process they developed consists of the following four main steps:

1. Pre-treatment

Textiles are usually composed of natural and synthetic fibres, such as cotton and polyester (PET) blends.

Their macro-structure prevents the biological catalysts (i.e. enzymes) from acting to degrade the natural components during hydrolysis. Thus, the research team developed a promising green pre-treatment method to modify the structure of textile waste with reusable chemicals. This treatment facilitates a reduction in the crystallinity of cellulosic fibre in textiles and enhances its susceptibility to the subsequent hydrolysis.

2. Enzyme production by fungal cultivation

To produce enzymes for textile waste hydrolysis, *Aspergillus niger* CKB is grown on the textile waste. Enzymes are actively secreted in situ by the fungus either through solid state fermentation or submerged fermentation. Microscopic pictures have shown that the fungus is able to grow on the surface of fibres in a 7-day cultivation at 28°C. The enzymes are then recovered and used in textile waste hydrolysis.

3. Enzymatic hydrolysis of textile waste

The enzyme solution is thoroughly blended with pre-treated textile waste and undergoes hydrolysis in a bioreactor. This process hydrolyses the cotton into soluble glucose, whereas the non-biodegradable material (e.g., polyester) remains intact and is separated as a solid form by filtration. Hydrolysis is carried out under mild conditions and is completed in 48 hours.

4. Product refining

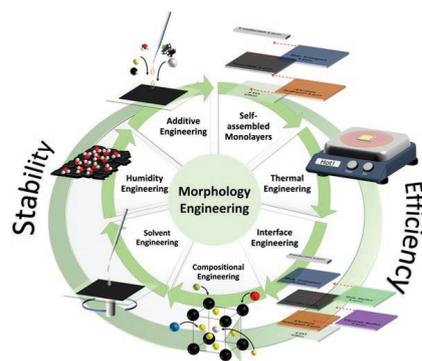
The polyester recovered from hydrolysis is re-spun into polyester fibres which have satisfactory properties for application to the textile industry, and the hydrolysate is purified by activated carbon to become a glucose-rich syrup. The glucose can be successfully converted into different bio-based products, such as bio-plastics, bio-surfactants (used in cleaning agents), and bio-chemicals through industrial biotechnologies.

Dr. Lin said the major difficulty in textile waste recycling has been that varied compositions are used, which limit regenerated products to low-value applications, (e.g., second-hand clothing and basic fibre content). However, the biorefinery strategy that she and her team have proposed can recycle most

textiles such as cotton, polyester, jeans and cotton-polyester blend textiles. In addition, the bio-based products derived from textile waste have the potential to replace fossil fuel resources. According to Dr. Lin, "This new bioconversion process can not only help address the waste problem but also create a sustainable and circular economy".

The 46th International Exhibition of Inventions of Geneva, held from 11 to 15 April 2018, was organised under the patronage of the World Intellectual Property Organisation, the Swiss Government and the City of Geneva, Switzerland. It is recognised as the world's most prestigious innovation exhibition. This year it showcased 1,000 innovations and inventions with more than 800 exhibitors from 40 countries and regions taking part.

Dr. Sam Hsu's paper highlighted as a Hot Article in Journal of Materials Chemistry A



Dr. Sam Hsu's review paper, titled "A review on morphology engineering for highly efficient and stable hybrid perovskite solar cells" has recently been highlighted as a Hot Article in the *Journal of Materials Chemistry A*.

After three generations of photovoltaic development, including silicon-based solar cells, inorganic thin film solar cells and organic material heterojunction solar cells, scientists are striving to find new materials that are stable, low-cost and environment-friendly.

The game has changed until 2009, hybrid perovskites have been highlighted as an important material in the field of solar cells, and hybrid perovskite solar cells (HPSCs) were recognised as the fourth generation of solar cells. Researchers all over the world made significant efforts to boost

the efficiency of HPSCs close to the record for thin film solar cells. Many methods were adopted to improve the quality of HPSCs, however, there was no such review discussing the morphology engineering of HPSCs.

Given that the publications related to HPSCs had grown to over 9000 by July 2018, a review article was needed to summarise similar ideas. In response to this, Dr. Sam Hsu defined several widely established methodologies, such as additive engineering, self-assembled monolayers (SAMs), solvent engineering, solvent annealing, thermal engineering, compositional engineering and humidity engineering and coordinated these chaotic puzzles into a complete picture. Researchers will now find it more convenient when they try to make comparisons between these methods.

Dr. Shauhrat Chopra's project published in Nature Nanotechnology

Dr. Shauhrat Chopra's research project, titled "A framework for sustainable nanomaterial selection and design based on performance, hazard, and economic considerations", was recently published in *Nature Nanotechnology*.

Engineered nanomaterials are being exploited for application to numerous fields, including medicine, consumer electronics, and many others. Although these materials have been engineered with function and cost in mind, early in the design process there has been no consideration of the long-term environmental impacts associated with them.

Lack of understanding over the adverse effects has often resulted in material choices with unintended consequences, which could cause bigger problems than the ones researchers intended to solve in the first place.

To address this, Dr. Chopra and his collaborators developed a nanomaterial-screening tool based on the Ashby material selection strategy for environmentally benign material selection. By adding data to this tool, researchers working on different materials have been able to inform decision-making for the sustainable use of nanomaterials, and avoid the unintended results from their widespread applications.

Opinion Column

Analysis of Energy Efficiency and Energy Savings at CityU **Dr. Lin Zhang, Assistant Professor**

Over the past 10 years, the drastic increase in Hong Kong's energy consumption has emerged as an important issue together with the depletion of energy resources. Because this trend is projected to continue, various management trials have been implemented to cope with energy issues. The Hong Kong government has mainly adopted two approaches: reducing energy intensity and increasing energy efficiency. The building sector accounts for over 90% of the total electricity usage in Hong Kong. This has driven the Hong Kong government to focus on improving building energy efficiency.

Many governments and researchers have suggested that the buildings of educational institutions should be major targets for sustainability. Universities are major stakeholders in a sustainable future because they educate and train the future professionals who will play a prominent role in society. Universities are long-term and owner-oriented, and they have a social responsibility to pursue a sustainable low carbon economy. Therefore, universities can be sustainability innovators through their research activities and act as models for the community in terms of their physical operations.

From 2011 to 2015, CityU consumed 57.3 M kWh of energy on average, saving around 1697.78 MWh annually. In terms of its final energy use, we identified four major sub-users: general lighting/AC, chiller plant, lab equipment and others. The energy consumed for general operations (general lighting/AC, chiller plant) and research (lab equipment) was considerable. The general lighting/AC sector, (the biggest stakeholder), used 34.5% on average, with an increasing tendency. The chiller plant sector used 32.3% with a slightly decreasing trend. The lab instrument

sector exhibited a continuous increasing tendency over time, taking up 14.5% of the total energy on average. The remainder ("others") was 18.6% and showed a decrease in 2015.

Based on sub-use data, we observed a drastic increase in energy consumption in 2013, which can be explained by the completion and operation of the new academic building. The general lighting/AC section shows a continuous increase in energy consumption, which has persistently expanded over the past five years. This illustrates that the most dominant section is general lighting/AC, because it has had a significant impact on total energy consumption.

The energy efficiency of the campus was estimated using stochastic frontier analysis. A seasonal cycle can be observed in the efficiency tendencies, explained by the three major energy uses at CityU: general lighting/AC, chiller plant and the lab instrument sector. Because higher temperatures increase the demand for cooling services for people and lab instrument maintenance and the need for chiller plant operation, the campus energy efficiency decreased during the seasons with higher temperatures. In 2013, a new academic building also came into operation. The inefficient use of the new building's facilities led to a drop in energy efficiency and a significant increase in total energy consumption. However, the efficiency score shows an increasing tendency after 2013, achieving a similar level in 2015, with higher energy consumption compared with 2012.

The energy efficiency and performance score, in terms of savings, have improved since the introduction of the new academic building in 2013. Our decomposition analysis and sectional analysis of energy consumption suggests that CityU should provide policy guidance

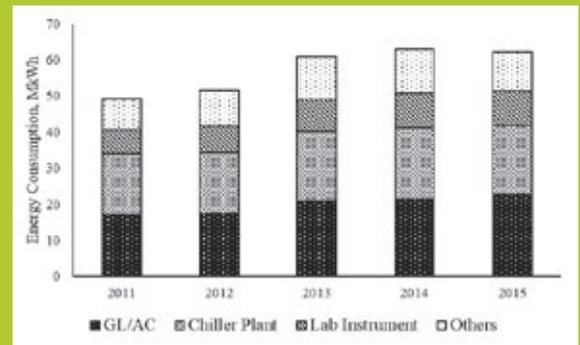


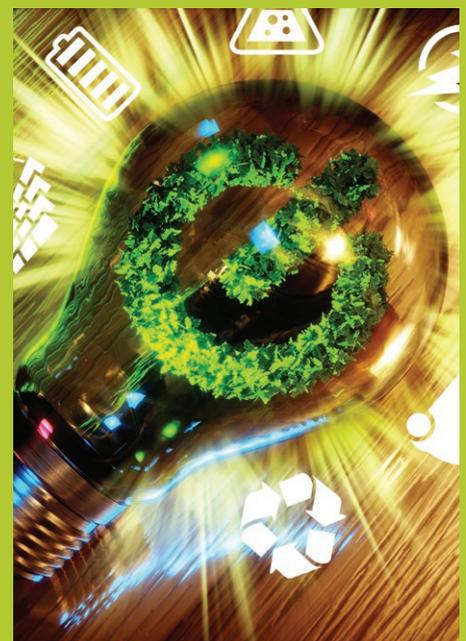
Fig 1: Annual energy consumption and by end-use in CityU



Fig 2: Energy efficiency and performance score of CityU over time

for the research sector, because it shows a considerable impact on the energy intensity of CityU, and highly affects energy use in the lab instrument sector.

Acknowledgment: The work described in this short article was fully supported by the Campus Sustainability Fund of the City University of Hong Kong (Project No. 6986045).



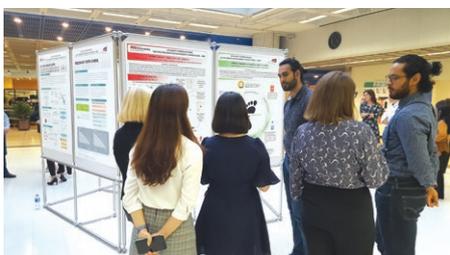
Academic Development

HKIE accreditation for undergraduate programmes

After its accreditation visit in January 2018, in May 2018, the Hong Kong Institution of Engineers (HKIE) Accreditation Board confirmed that full accreditation would be granted for the Bachelor of Engineering in Energy Science and Engineering programme for a period of five years, and that provisional accreditation would be granted for the Bachelor of Engineering in Environmental Science and Engineering until 2021 (the first cohort of graduates). Full accreditation will be considered after a full visit, when the first cohort of graduates is produced.

Joint SEE-ASU summer course

An intensive GE course, *GE2261 Urban Sustainability in Hong Kong*, was successfully delivered from 3 to 15 June 2018 by Arizona State University (ASU) and SEE in a joint operation. Twenty-one students coming from the two universities worked together in cross-cultural teams on the major sustainability challenges to Hong Kong, including air pollution, energy, housing, waste management, and water. They participated in lectures by academic researchers and government officials, took field trips and engaged in on-site discussions with industry practitioners and the public sector. At the end of the summer course, each group delivered a poster presentation demonstrating their understanding of the structure of the sustainability challenge they had chosen, and proposed a policy-focused solution considering the complex nature



of the challenge. Throughout the course, the students acquired a solid understanding of sustainability concepts and methodologies to address the critical challenges to moving towards sustainability in Hong Kong and beyond. The opinion piece of a CityU student enrolled in the course was published in a local newspaper, the *South China Morning Post*.

JUPAS admission interview

During 4 – 5 July 2018, selected JUPAS applicants attended an admission interview arranged by the School. Panels comprising our faculty members interviewed the applicants in groups, with self-introductions by the applicants and discussions on issues related to energy and the environment. Immediately after the interviews, the applicants were invited to casually speak with our current students in our chat room. It was definitely a special occasion for them to learn more about the School and our undergraduate programmes.



Delegation visit to Shenzhen

A group of SEE faculty members and students (undergraduates and PhD students) visited the Shenzhen Association for Science and Technology, Shenzhen Solar Energy Society and other well-established companies in Shenzhen from 14 to 15 August 2018. The HKIE was the co-organiser of the field trip with a representative joining the trip. In addition, Dr. Otto Poon from the SEE Advisory Committee was part of the delegation.



Possible collaboration on smart cities and solar applications within the Greater Bay Area, in addition to student learning and internship opportunities, were discussed. The participating students also learned more about energy- and environment-related societies.

SEE summer programme 2018 Hanyang International Summer School 2018

Cheng Nga Chi, Cheung Tsz Hang Eugene, Chow Shuen, Luk Hung Sum, Lai Pui Ka Bettina, Lai Chun Chi, Lau Wing Gee, Leung Chi Hung, Lin Cheuk Ying, Pang Kin Wai, Tse Wai Hong, Wong Ho Hin, Yam Wing Yan

We, a group of twelve students from SEE, studied in Hanyang University (South Korea) for a summer programme in July. We decided to make good use of the summer to study abroad and experience different culture.

With multiple interesting courses and extracurricular activities offered by the Hanyang International Summer School, such as the Nanta Show, Mud Festival, Everland and boat cruise, we were able to interact with students from various countries and broaden our horizons. It was also very kind of our Korean professors to teach us basic Korean language during our lessons, enabling us to efficiently blend in with the local culture.

We would like to offer our greatest thanks to Hanyang University, our home university and SEE for offering us such an unforgettable experience. Once again, we appreciate the effort our school makes to promote different kinds of





study activities to enrich our learning, and we value this pleasant and fruitful journey.

INNOV@INSA 2018

Fritz George Deden



During the summer I took part in a one-month summer programme at Institut National des Sciences Appliquées de Lyon (“INSA Lyon”), Lyon, France, where I took two courses. The first was French Language, Cross Cultural Communication and Industry and Society which we learned basic French, increased cross-cultural awareness and studied the impact of different industries on modern societies. In the second course, Management and Innovation in Europe, our class was divided into teams and we were challenged to create an innovative product or service for the French market, from which we acquired new entrepreneurial skills. Both courses conducted field trips for us to observe the lesson content.

In addition to our classes and field trips, as part of our programme we toured Lyon with a student association from INSA Lyon. We visited the old and

modern parts of the city, some local attractions and two rivers, the Saône and the Rhône. We also toured Annecy a small town in the Rhone-Alpes region of France with castles, cathedrals and a big lake. We visited Chamonix, a small town near the border of France, Italy and Switzerland, where we had the chance to go up Aiguille du Midi, a mountain in the French alps 3842 meters high.

Overall this programme was spectacular. The classes worked well in tandem with each other to provide a good study life, and the field trips and tours gave students the opportunity to experience and deepen their understanding of the classes, culture, customs and lifestyle of France and Europe.

Student internship

*Chan Chung Yin,
Alaya Consulting Limited*



I was the associate consultant intern at Alaya Consulting. During the two-month internship, I was responsible for Environmental, Social and Governance (ESG) research for the top 200 listed companies in Hong Kong. I was required to look into the annual reports published by the companies to see whether they had complied with “Comply or Explain” provisions, based on 12 Key Performance Indicators formulated by HKEX, and to carry out the ESG performance analysis. In addition, I gave presentations on the ESG performance of the targeted companies. In this way, I not only learned ESG reporting techniques, but also effective presentation skills. This experience broadened my knowledge of sustainable development on an industry specific basis.

*Ng Kin Chung,
Harbour City Estates Limited*

Working in Harbour City Estates Limited as an industrial trainee helped me understand building energy



management. I visited Chiller Plants and Solar Energy Systems to learn how energy management is implemented in Harbour City. After the site visit, I was asked to produce a cooling profile. It was challenging because the task involved sorting a huge amount of data to determine the peak cooling load at different times using different calculations. I am pleased to report that I overcame all difficulties with the help of colleagues and the knowledge acquired from SEE. It was a wonderful experience working as an intern at Harbour City!

*Poon Ying Tao,
Jacobs China Limited*

I joined Jacobs China Limited as a Student Engineer intern in the Division of Electrical and Mechanical.

During my internship, I carried out inspections for lift and escalator installations at the West Kowloon Terminus, conducted an energy simulation for a KFBG project and used Revit for Building Information Modelling (BIM).

This internship allowed me to understand more about the development of the industry and the way it works.

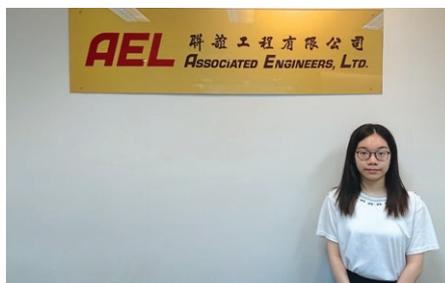


*Lee Wai Ting,
Associated Engineers, Limited*

I joined the Waste and Recycling Unit of Associated Engineers, Limited as a summer intern. It opened my eyes when I realised there were not only regular recycling bins, but also mini food waste machines in the company. I was

also impressed by the great sense of environmental awareness of the staff.

The company oversees many environmental projects and I am glad to have been part of the team so I could learn more and further equip myself for the future!



SEE mentorship programme 2018



In collaboration with the SEE Alumni Association and CityU DBA (Doctor of Business Administration) Community Limited, SEE has launched the first-ever “SEE Mentorship Programme”. On 20 July 2018, industrial mentors and mentees joined the official kick-off gathering that cemented the mentor-mentee relation.

Mentors

- Mr. Bryan Tsang (Deputy General Manager, CGN New Energy Holdings Co., Ltd.)
- Mr. Raymond Ng (CEO, Karin Technology Holdings Limited)
- Mr. M.F. Sham (Former Executive Vice President, ECO Environmental Investment Limited, Towngas Group)
- Ir. Dr. Barry Lee (Director, ATAL Engineering Limited)
- Mr. Jude Chow (Group Managing Director, Associated Engineers Limited)
- Mr. Rajeev Chib (Director and Regional Head, Client Facilitation and Business Unit Management for Investor Sales and Relationship Management for the Asia Pacific region, Citi)

SEE Tech Talk series

SEE recently launched the “Tech Talk Series” to share with the public the expertise of our faculty members in the energy and environment fields. The first talk in the series was held in April and there was another in June. Both talks were very well received by audiences from industry and academia.

SEE Tech Talk Series on Advanced Energy Technologies

In this SEE Tech Talk Series, Dr. Walid Daoud, Dr. Sam Hsu and Dr. Denis Yu presented their ongoing research on advanced energy technologies and potential applications for enhancing energy storage and renewable energy utilization. Discussion covered “Emerging Renewable Energy Technologies”, “Enhanced Performance and Stability for Hybrid Perovskite Solar Cells for Commercial Applications” and “Novel Fast Charging Sb Anode for Lithium-ion Battery Applications” respectively.



SEE Tech Talk Series on Advanced Environmental Technologies

In this SEE Tech Talk Series, Dr. Patrick Lee, Dr. Jin Shang and Dr. Zhou Wen presented their ongoing research on advanced environmental technologies for various hit-hot topics included “Solving Air, Water and Waste Problems with Bacteria”, “Adsorption Technology for Gas Separation and Storage” and “Understanding Regional Climate Change and Extreme Weather” respectively.



Workshop on energy conversion and storage

The Workshop on Energy Conversion and Storage with the theme “Energy Materials in Addressing Global Challenges” was hosted by SEE in August to promote and enhance the scientific knowledge on materials science, physical chemistry, and energy applications. The workshop covered topics on materials science and engineering, materials and devices, perovskite materials, photocatalysts, fuel cells, battery materials, molecular simulation, and so forth. Scholars and experts will share with the audience their expertise in materials science, physical chemistry and energy applications. Apart from presentation from SEE faculty members, scholars from other departments in CityU and local universities also shared their latest findings and insights with the audience. Guest speakers included Professor Aleksandra Djuricic (Professor, Associate Dean, Faculty of Science, Department of Physics, The University of Hong Kong), Dr. Yang Chai (Assistant Professor, Department of Applied Physics, The Hong Kong Polytechnic University), Dr. Steve Tse (Assistant Professor, Department of Chemistry, The Chinese University of Hong Kong), Dr. Stephen Tsang (Assistant Professor, Department of Materials Science and Engineering, CityU), Prof. Shao-Yuan Leu (Assistant Professor, Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University), Professor Feng Yan (Professor, Department of Applied Physics, The Hong Kong Polytechnic University).

Student Achievements

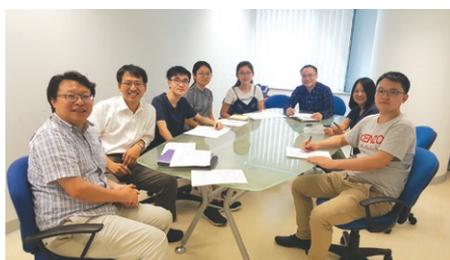
SEE students awarded in the 11th National University Student Social Practice and Science Contest on Energy Saving & Emission Reduction 2018



Year-2 and year-3 undergraduates Miss Zhou Yujing, Miss Xiao Lingran, Mr. Wan Ho Ching and Mr. Choi Lai Yun, formed into team and won Second Prize in “Technology Innovation” at the 11th Competition of National University Student Social Practice and Science Contest on Energy Saving & Emission Reduction held on 9 August 2018.

Organised by the Ministry of Education of the People’s Republic of China, since 2008 the competition has served as a platform for academic exchange among universities, and has provided an opportunity for undergraduate and postgraduate students to create innovative energy saving and emission reduction technologies.

Under the supervision of Dr. Chunhua Liu and his PhD student Mr. Xiao Yang, the four undergraduate students worked on the project “Development of Smart Air-Quality Monitoring System based on Drones and Renewables”. The student team designed a new air monitoring system that utilises drones, wireless power transfer technology, solar PV modules, and smart sensors for air-quality monitoring. The project aimed to provide accurate and real-time air-pollutant data, which can effectively track pollutant sources in a broader area by using re-chargeable drones. It well demonstrated the students’ capabilities in engineering design and innovative



ideas. Throughout the competition, the students gained valuable experience and bolstered their research interests and communication skills.

SEE student awarded the Hong Kong Jockey Club Scholarship 2018



Miss Zhou Yujing, our Year-2 undergraduate student, was award the prestigious **Hong Kong Jockey Club Scholarship 2018**. When asked about her plans, Miss Zhou remarked, “The scholarship will support me to find out my vision and future path for university life in Hong Kong and my whole life. The lightened financial burden allows me to focus more on learning and contributing. The invaluable activities also broaden my horizon by listening to the thoughts of other scholars at social hotspots. Meanwhile, the chances to attend lectures will teach me how to understand local and international affairs and predict possible further developments”. Miss Zhou was presented the award on 10 July at the prize presentation ceremony.

SEE student awarded the CLP Engineering Studies Award 2018

Mr. Lee Yiu Ting, student from Cohort 2014, recently received the CLP Engineering Studies Award at the prize presentation ceremony on 29 August 2018 organised by China Light and Power Co Ltd. (CLP Holdings Ltd.). At the same ceremony, two of our first cohort of graduates in year 2016,

Miss Viki Tong and Miss Joyce Shum, who have commenced their career as Graduate Trainees with CLP Holdings Ltd. also obtained the graduation certificates for the completion of Scheme A training in Energy Discipline.



Dean’s List, Semester B, 2017-18

According to the University regulations, undergraduate students will be placed on the **Dean’s List** by earning 12 credit units or more with a grade point average of 3.7 or above and no failures over the previous semester. SEE is pleased to announce that the following undergraduates have been placed on the Dean’s List for Semester B 2017/18.

| Name | Cohort |
|---------------------------------------|--------|
| Tong Wing Yan | 2013 |
| Chan Xue Bin | 2014 |
| Lau Chi Chiu | 2014 |
| Lau Ngai Sze | 2014 |
| Law Tsz Kwan Violet | 2014 |
| Lin Yi Yun | 2014 |
| Tung Hiu Ching | 2014 |
| Wang Qi | 2014 |
| Wong Chun Ho | 2014 |
| Wong Siu Miu | 2014 |
| Chan Chung Yin | 2015 |
| Deden Fritz George | 2016 |
| Leong Lok Tong | 2016 |
| Leung Chi Hung | 2016 |
| Sabharwal Rohan | 2016 |
| Yam Wing Yan | 2016 |
| Zhou Yujing | 2016 |
| Chan Wing Yin | 2017 |
| Ezzat Yahia Hussein Mahmoud Rashad | 2017 |
| Gao Congyu | 2017 |
| Gao Yu | 2017 |
| Lam Yin Hau | 2017 |
| Leung Man Lap | 2017 |
| Li Zhuqing | 2017 |
| Ma Ruo Chen | 2017 |
| Xue Lichen | 2017 |

Join our Alumni Association!

With the expansion in SEE alumni family that now also includes graduates from Bachelor's degree programme, the alumni association will be renamed to The CityU Alumni Association of School of Energy and Environment Limited (CAASEE). It is an alumni group that contributes to encouraging all alumni to stay connected.

The missions are:

- strengthening bonds between alumni and SEE
- acting as a major platform for alumni engagement
- promoting the welfare of SEE by serving as advocates for the SEE
- establishing a mutually beneficial relationship between SEE and its alumni by providing tangible benefits including career services, networking opportunities, events, lectures, etc.

JOIN US!



CityU Alumni Association of School of Energy and Environment Limited

(Provisional)

Membership Application Form

General Information

Graduate Year: _____

Name of Most Recent Programme:

- Doctor of Philosophy (Ph.D.) Bachelor of Engineering (BEng) in Energy Science and Engineering
 Master of Philosophy (M.Phil.) Master of Science (MSc) in Energy and Environment

Personal Particulars

Name: _____ (English) _____ (Chinese as applicable)

Nickname: _____ Gender: _____ Mobile phone No.: _____

Email address: _____ WeChat ID: _____ (Optional)

Current Status

- Full-time employment Part-time employment Self-employment Employment seeking
 Further Studies Others (please specify): _____

Employment Status (if employed)

Name of employer: _____ Year of service: _____

Department : _____ Current job title: _____

I have read Personal Data (Privacy) Notice – Use of Personal Data and agree to those terms:

Applicant's signature: _____ Date: _____

Personal Data (Privacy) Notice – Use of Personal Data

People who supply data in their application to the CityU Alumni Association of School of Energy and Environment Limited are advised to note the following points, pursuant to the Personal Data (Privacy) Ordinance:

1. Personal data provided in this application form will, during the entire process, be used solely for this purpose, and in this connection, the data will be handled by the Association's staff or by any committee members of the Association who is directly involved in the administration of this application.
2. After the applications have been processed and the relevant exercise completed:
 - a. the application papers/eForm of successful candidates will become part of the file which the Association open for each member.
3. Under the provisions of the Personal Data (Privacy) Ordinance, applicants have rights to request access to, and to request the correction of, their personal data. Applicants wishing to access or make corrections to their data should send email to the see.enquiry@cityu.edu.hk

Declaration

1. I have noted the general points pursuant to the Personal Data (Privacy) Ordinance.
2. I authorize the CityU Alumni Association of School of Energy and Environment Limited or any other office that is directly involved in the administration of this application to use, check and process my data as required for my application.
3. I understand upon successful application, my data will become a part of my member record and may be used for all purposes as prescribed under relevant rules and regulations, as long as I remain member of this Association.

General Enquiry

Phone: +(852)-3442-2410 / 3442-2414

Fax: +(852)-3442-0688

Email: see.enquiry@cityu.edu.hk

Address: G5702, 5/F, Yeung Kin Man Academic Building, City University of Hong Kong, Tat Chee Avenue, Kowloon, Hong Kong SAR