School of Energy and Environment
香港城市大學
City University of Hong Kong

APR 2022

NEWSLETTER

In this issue...

Dean's Message

By the time you are reading this issue of our newsletter, we hope that the pandemic threat will have passed so that we can all resume our roles and help restore Hong Kong to its energetic path.

Despite the gloomy environment under the pandemic, it brings us much pleasure to witness the excellent academic and research performance of our School. According to metrics compiled by Stanford University, 15 SEE faculty members are among the **top 2% of the world's most highly cited scientists** (in their areas of specialty). They are (in alphabetical order) Dr. Alicia An, Prof. Johnny Chan, Dr. Liang Dong, Prof. Alex Jen, Prof. Michael Leung, Dr. Carol Lin, Dr. Chunhua Liu, Dr. Yun Hau Ng, Dr. Edwin Tso, Prof. Wen-Xiong Wang, Dr. Wei Wu, Prof. Angus Yip, Dr. Denis Yu, Dr. Lin Zhang and myself. In addition, three research projects led by our faculty members have received grants from the inaugural **Green Tech Fund** of the Environmental Protection Department, HKSAR Government.

Even more delightful is that a couple of our PhD and undergraduate students have shone in sizable competitions. A team of PhD students and postdoctoral fellow participated in the **2021 International Invention Innovation Competition in Canada (iCAN 2021)** and won the **Gold Medal, Canadian Special Award,** and **Best Invention Video Award** against fierce international competition with their invention "An Intelligent and Thermally Responsive Window (ITRW) for Indoor Thermal Management and Energy Saving in Buildings". Another undergraduate student team comprising delegates from the SEE Student Chapter took part in the City I&T Grand Challenge with their project "Kind'erGarden – A Novel Technology to Reduce Single-Use Utensils and Containers". The team, after a stringent selection process, was shortlisted to enter the **Grand Pitch for the City I&T Grand Challenge**. It is truly gratifying that our students are ambitious enough to develop innovative solutions to promote sustainability and solve the pressing environmental problems.

Our faculty members are dedicated educators who aspire to improve students' learning experiences. Since the viral outbreak, the SEE family has been working hard to overcome the new challenges it has brought. The COVID-19 pandemic has changed how we operate in many facets of life. To provide our students with the same learning experience even when social-distancing restrictions are in place, we have spent the past year creating **online laboratory modules**. This initiative was supported by a Teaching Development Grant from CityU, and now allows our students to participate and interact with the instruments regardless of their location.

Apart from laboratory learning, we understand that there has been a growing demand for Environmental, Social, and Governance (ESG) practitioners in the fields of energy, environment, and sustainability. To open up more possibilities for our students, SEE has introduced a **new ESG course** for our undergraduates. To offer more learning resources to our future leaders, CityU is honoured to have received a donation from Ove Arup & Partners Hong Kong Ltd (Arup) to establish the **Arup Outstanding Student Scholarship** to reward SEE students with outstanding academic performance and promising attributes.

We will not let the turmoil of this public health crisis hold us back from meaningful pursuits. We are thankful that we are still able to pursue new opportunities and developments.

Best,

Prof. Chak K. Chan
Dean of School of Energy and Environment
City University of Hong Kong

Staff Development

Welcome Dr. Xin Xiaying!

Visiting Assistant Professor

Dr. Xin Xiaying recently joined the State Key Laboratory of Marine Pollution (SKLMP), CityU, as a Research Assistant Professor. She also holds a concurrent appointment as a Visiting Assistant Professor in SEE.

Dr. Xin's research interests pertain to water pollution, with a particular emphasis on emerging pollutants and toxicity, ecological risk assessments, and environmental remediation. She has published over 20 articles in the peer-reviewed literature on environmental toxicity and remediation. Her expertise lies in synchrotron-based technologies, nanotechnologies, biotechnologies, ecological risk assessments, chemical analyses, and environmental system modelling.

Welcome Dr. Jian Wang!

Assistant Professor

Dr. Jian Wang obtained his PhD in Mechanical Engineering from The Hong Kong University of Science and Technology (HKUST). Before joining CityU, he was a Science Fellow Researcher at Seoul National University. Dr. Wang's research focuses on the conversion of sustainable energy and storage devices – such as fuel cells, electrolysers, and batteries – with a particular interest in the dynamic electrochemical energy process. He has published over 40 peer-reviewed articles in high-impact journals, including *Nature Catalysis*, *Nature Energy*, and *Advanced Materials*.

CityU Long Service Award 2021

SEE is delighted to extend our warmest congratulations to Dr. Patrick Lee, Associate Professor, and Miss Michelle Wong, Executive Officer I, for their recent Long Service Awards, which were presented by the Human Resources Office on behalf of the CityU.

The award presentation ceremony was not conducted due to the need to reduce social contact amidst the COVID-19 pandemic. Prof. Chak K. Chan, Dean and Chair Professor of Atmospheric Environment, presented the souvenirs to the awardees.

Spotlight

Dr. Theodora Nah
Assistant Professor

Biography
Dr. Theodora Nah received her Hon. BSc in Chemistry and Mathematics from the University of Toronto, and her PhD in Chemistry from the University of California, Berkeley. Prior to joining CityU, she was a postdoctoral fellow at Georgia Institute of Technology.

Research Interests
Current and past rapid expansion of human economic activity and population growth in coastal megacities have led to severe air and water pollution in marine and coastal environments. This has created pollution hotspots such as those commonly seen in the Pearl River Delta region including Hong Kong. Heavily polluted coastal megacities have negative consequences on climate, air and water quality, human and ecosystem health.

Dr. Nah's research interests are in environmental chemistry, with a focus on understanding chemistry important to atmospheric particulate matter (aerosols) and dissolved organic matter in aquatic ecosystems. Research in the Nah group utilises a combination of fundamental laboratory studies, field measurements and theoretical modeling to provide a quantitative and molecular-level understanding of how air and water pollutants are produced, transformed within and removed from marine and coastal environments.

1. Congratulations to the recent grant achievements. You have been receiving three General Research Fund (GRF) consecutively (2020/21/22), Environment and Conservation Fund (ECF) grant, The National Natural Science Foundation of China (NSFC) grant, and a recent Green Tech Fund (GTF). What drives you to this success?

Academic research is exciting but it is also very expensive. I need grants to facilitate and advance my research.

2. Your research interests are in environmental chemistry. Is there a specific focus and why are you so interested in it?

My research revolves around understanding the chemical transformations of organic pollutants in the environment through the improved characterisation of the sources, evolution, and sinks of these organic pollutants. At present, my research focuses primarily on the chemical transformations of atmospheric organic aerosols. I am interested in it because organic aerosols comprise a large fraction of particulate matter, and their chemical transformations have serious implications for human health and climate.

3. What has been the most difficult part of your research journey? How did you overcome it?

I would consider moving to Hong Kong to start my independent research career as the most challenging part of my research journey thus far. When I started my postdoc, my goal was to start my independent research career in the US because that was where my professional and personal relationships were. However, it also felt like a good time to move back to Asia after 13 years abroad. My first few months in Hong Kong were tough because of the culture shock, language differences, and I did not know anyone here. Things got better as I established relationships with the people here and got used to working and living here.

4. What advice would you give to SEE students who aspire to be engineers, especially to the female students?

Don't hesitate to go after that the opportunities that you want or you feel that you deserve. It is normal to have periods of self-doubt but don't let the challenges surrounding these opportunities stop you from taking the leap.

Research Success

Fifteen SEE faculty members are listed among the top 2% of the world's most highly cited scientists

According to metrics compiled by Stanford University, fifteen SEE faculty members are listed among the top 2% of the world's most highly cited scientists (top 2% in the world in their own areas of specialty), reflecting the high academic standard of our faculty and our excellent research performance. They are (in alphabetical order) Dr. Alicia An, Prof. Chak K. Chan, Prof. Johnny Chan, Dr. Liang Dong, Prof. Alex Jen, Prof. Michael Leung, Dr. Carol Lin, Dr. Chunhua Liu, Dr. Yun Hau Ng, Dr. Edwin Tso, Prof. Wen-Xiong Wang, Dr. Wei Wu, Prof. Angus Yip, Dr. Denis Yu, and Dr. Lin Zhang.

The list was prepared by a team of experts from Stanford University and it identifies scientists and social scientists who have demonstrated significant and broad influence, reflected in the publication of multiple papers frequently cited by their peers during the last decade.

This publicly available database provides continually updated information on the work of the world's top scientists including standardised information on citations, h-index, co-authorship-adjusted hm-index, citations of papers in different authorship positions, and a composite indicator.

The Green Tech Fund Success

Four research projects led by scholars at CityU have received grants worth a total of HK$20.26 million from the inaugural Green Tech Fund of the Environmental Protection Department, HKSAR Government.

(From left to right) Prof. Chak K. Chan, Prof. Alex Jen, Dr. Yun Hau Ng

Three of the winning projects are led by SEE faculty members, namely, Prof. Chak K. Chan, Dean and Chair Professor of Atmospheric Environment; Prof. Alex Jen, Lee Shau Kee Chair Professor of Materials Science, Director, Hong Kong Institute for Clean Energy, Chair Professor of Chemistry and Materials Science; and Dr. Yun Hau Ng, Associate Professor.

Approved Projects

Project Title	Principal Investigator
Portable and Low-cost Sensors for the Ambient Air Monitoring of BTEX and Other Volatile Organic Compounds	**Prof. Chak K. Chan** Dean of the School of Energy and Environment and Chair Professor of Atmospheric Environment
Development of Printable Perovskite Solar Cells for Transformative Clean Energy and Sustainable Society	**Prof. Alex K. Y. Jen** Lee Shau Kee Chair Professor of Materials Science Director, Hong Kong Institute for Clean Energy Chair Professor of Chemistry and Materials Science
Turning Water into the Source of Solar Hydrogen via Photocatalyst Panel	**Dr. Yun Hau Ng** Associate Professor

Established with an allocation of HK$200 million from the government's 2020/21 budget, the Green Tech Fund aims to boost the research and development of applications for decarbonisation and green technologies. To help expedite Hong Kong's transformation to low-carbon, CityU has partnered with local industries and government departments to address issues on decarbonisation, energy efficiency, green transport, and air quality.

Prof. Alex Jen awarded Green Tech Fund to expedite decarbonisation in Hong Kong

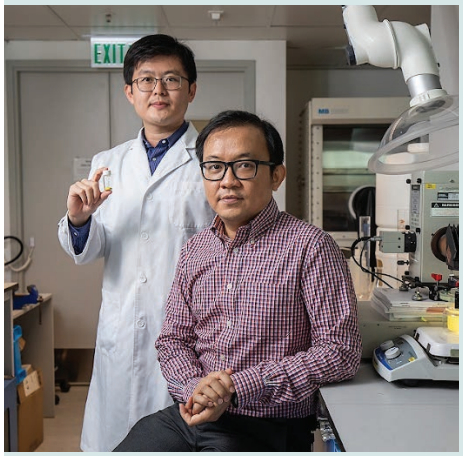
Prof. Alex Jen and his team have been developing printable perovskite solar cells for transformative clean energy that will facilitate a sustainable society. The success of this project will provide universal access to efficient, scalable and environmentally friendly energy production.

The outstanding work of Prof. Jen highlights the exciting research at SEE, to develop green technologies and clean energy that will expedite decarbonisation in Hong Kong.

SEE faculty members develop sensors to speciate atmospheric volatile organic compounds

Prof. Chak K. Chan, Dr. Chunhua Liu, Dr. Theodora Nah, Dr. Yun Hau Ng, and Dr. Jin Shang have received over HK$5 million from the Green Tech Fund. Their 3-year research project, titled "Portable and Low-cost Sensors for the Ambient Air Monitoring of BTEX and Other Volatile Organic Compounds", will develop sensors to speciate atmospheric volatile organic compounds. The sensors will help identify the sources of ozone formation and contribute to improvements in air quality in Hong Kong and the Greater Bay Area.

(From left to right) Dr. Chunhua Liu, Dr. Yun Hau Ng, Prof. Chak K. Chan, Dr. Theodora Nah, Dr. Jin Shang



Dr. Yun Hau Ng develops porous photocatalyst-producing hydrogen from water splitting

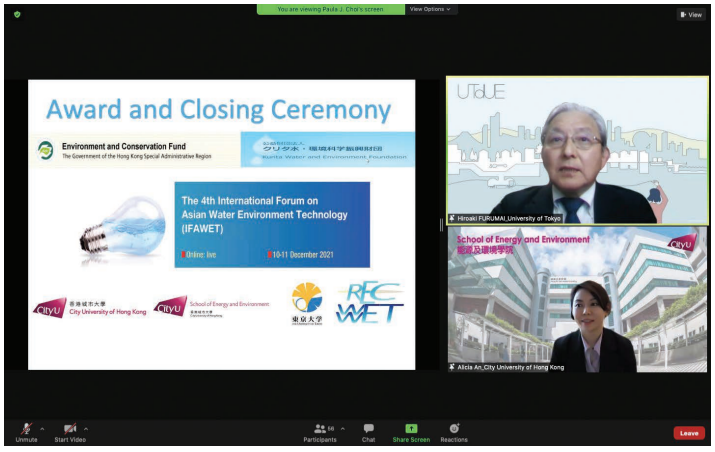
A research team led by Dr. Yun Hau Ng, recently discovered a quantum confinement effect in a photocatalyst of a 3D-ordered macroporous structure. The quantum confinement effect was found to facilitate the production of hydrogen under visible light. Their study represents a fundamental step in understanding charge transport in metal oxide semiconductors and highly ordered porous structures. The findings can help to address pressing energy and environmental challenges.

These findings have been published in the scientific journal *ACS Energy Letters*, in an article titled "Unveiling Carrier Dynamics in Periodic Porous BiVO4 Photocatalyst for Enhanced Solar Water Splitting" (DOI: 10.1021/acsenergylett.1c01454).

The 4th International Forum on Asian Water Environment Technology

Dr. Alicia An, in collaboration with The Research Centre for Water Environment Technology, The University of Tokyo, Japan, organised The 4th International Forum on Asian Water Environment Technology (IFAWET-2021) from 10 to 11 December 2021. The conference aimed to share the most recent technological advancement in the areas of membrane technology for the treatment of water and wastewater and resource recovery; emerging organic contaminants, such as antibiotic-resistant bacteria, and genes conferring antibiotic resistance in the water environment; water-based epidemiology, with particular emphasis on the fate and impact of the novel coronavirus SARS-CoV-2 in wastewater; and strategies for water disinfection and water management.

The conference was hosted by three keynote speakers: Prof. Shane Allen Snyder, Executive Director of the Nanyang Environment & Water Research Institute, Nanyang Technological University, Singapore; Prof. Ho Kyong Shon, Director of the ARC Research Hub for Nutrients in a Circular Economy, University of Technology Sydney, Australia; and Dr. Shuhei Tanaka, Associate Professor at the Graduate School of Global Environmental Studies, Kyoto University, Japan. In addition, 16 young stellar researchers from prominent institutes in China, South Korea, Thailand, Japan, Australia, and Hong Kong introduced their research contributions to combat emerging environmental challenges.



At the interactive poster session, 32 young researchers presented their research findings. The researchers of selected high-quality works were invited to submit their findings for publication in prominent peer-reviewed journals, such as Desalination (Impact Factor 9.501) and Journal of Water Process Engineering (Impact Factor 5.485). Several candidates were also shortlisted for the "Best Poster Presentation" in recognition of their distinguished performance. The IFAWET-2021 attracted more than 200 participants around the globe.

The HK Tech 300 Seed Fund Success

HK Tech 300 is a large-scale flagship innovation and entrepreneurship programme organised by CityU to support aspiring entrepreneurs to launch start-ups and begin their entrepreneurship journey. The programme provides support to CityU students, alumni, and research staff as well as other members of the University.

The project "A Novel Reusable Antivirus Non-toxic Visible-light Driven Photocatalytic ZIF-8 Loaded Fabric for Air Cleaning" led by Dr. Jiaxin Guo, postdoctoral fellow, has been awarded the HK Tech 300 seed fund.

The outbreak of the COVID-19 pandemic has made the use of air cleaning and disinfecting products routine, escalating the demand for materials capable of removing atmospheric particulate matter, bacteria, and viruses. This increasing use and disposal of single-use and non-reusable products incurs heavy economic costs and negatively affects the environment. Moreover, insufficiently stringent air cleaning methods can lead to adverse health effects that increase the risk of infections during the pandemic. Secondary contamination can be caused by residue pollutants – airborne respiratory pathogens that settle on the outer surfaces of used air cleaning products. Hence, there is a need to develop better raw materials for the manufacture of air cleaning products, such as multi-functional fabrics that are self-cleaning, non-toxic, reusable, and with strong protective functions.

About the Team

Advisors	Team
Dr. Alicia An Dr. Jin Shang	Dr. Jiaxin Guo, Postdoctoral Fellow Dr. Mingzhe Sun, Postdoctoral Fellow Mr. Pak Wai Wong, PhD Student Mr. Jiawei Sun, PhD Student

The award-winning project aims to develop a novel nanofiber-based auto-sterilising photocatalytic fabric that provides protection against harmful airborne pollutants, such as bacteria, viruses, and particulate matter. The project team will use electrospinning to fabricate photocatalyst-loaded nanofibers. This method will achieve rapid fabrication of nanofibers at low cost, while providing precise control over the composition of the fabricated nanofibers. Using the fabricated nanofibers, the project team will then manufacture multi-functional nanofiber fabrics with features that provide effective protection against air pollutants, bacteria, and viruses.

Under the supervision of Dr. Denis Yu, a cross-disciplinary team comprised of undergraduates from the Department of Economics and Finance and the Department of Mechanical Engineering won the HK Tech 300 seed fund for the project that aims to develop low-cost rechargeable Zn-MnO2 batteries.

Zinc (Zn) and manganese dioxide (MnO2) are active materials that are commonly used in primary alkaline batteries. Such batteries can be produced at low cost and are widely used in small electronic devices (e.g., remote controls, clocks, and toys). However, they are not rechargeable and are usually disposed of after use. Hence, the current use of primary alkaline batteries not only wastes valuable resources and makes the technology unsustainable but also pollutes the environment.

The project team aims to turn primary alkaline batteries into rechargeable Zn-MnO2 batteries. The team will then use the new batteries in electric motorcycles in place of lead-acid batteries, which are more expensive and harmful to the environment.

About the Team

Advisor	Team
Dr. Denis Yu	Mr. Shu Xue (Department of Economics and Finance) Mr. Defei Wang (Department of Economics and Finance) Miss Yuanwen Luo (Department of Economics and Finance) Mr. Taorui Wang (Department of Mechanical Engineering) Mr. Yingxin Zhu (Department of Mechanical Engineering)

Led by PhD students Miss Shirley Du and Mr. Martin Zhu, i2Cool was granted HK$100,000 seed fund. The innovation is about the creation of "novel energy-free passive radiative cooling paint" that is environmentally friendly. The paint, which has high thermal emission and high solar reflection, can be applied to the exterior or roofs of buildings, aims to save energy use from air conditioners. The team would explore more uses of the cooling paint, such as combining it with solar panels to increase power generation.

Dr. Chunhua Liu received the Collaborative Research Fund 2021/22

Dr. Chunhua Liu recently received funding from the Collaborative Research Fund 2021/22 for his research proposal "Development of Novel Integrated Wireless Motor Drives for Cordless Joints of Robotics". The project received HK$5,509,700 in funding.

The proposed project will aim to develop a novel wireless motor-and-drive system for cordless robotic joints by incorporating wireless power transfer into the design of a synchronous motor. The outcome of this project will trigger transformative innovations in robotic actuators and revolutionise the cordless operation of robotic joints. The research findings will be of significance to the academic community as well as the industry and educational sectors in Hong Kong, the Greater Bay Area, and even the world.

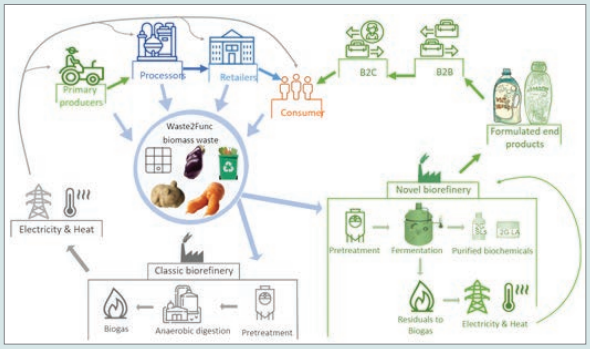
Dr. Carol Lin funded by The EU–Hong Kong Research and Innovation Cooperation Co-funding Mechanism of the RGC

Dr. Carol Lin has been awarded HK$2,682,810 by the Research Grant Council (RGC) via the European Union (EU)-Hong Kong Research and Innovation Cooperation Co-funding Mechanism. It is a part of European Horizon 2020 research and development project titled, "Lactic Acid and Biosurfactants Sourced from Sustainable Agricultural and Industrial (Food) WASTE Feedstocks as Novel FUNCtional Ingredients for Consumer Products" (acronym: WASTE2FUNC).

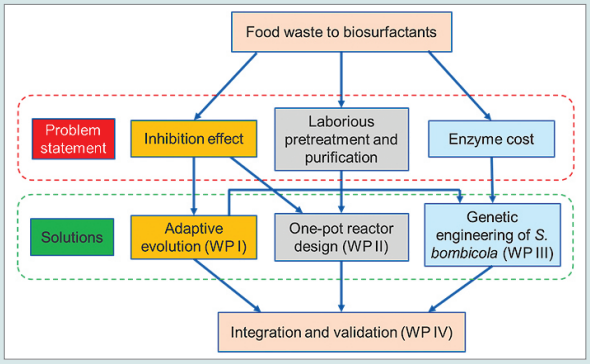
About the Project

The project "Development of One-step Food Waste Biorefinery via Novel Bioreactor Design, Functional Stain Adaptive Laboratory Evolution and Genetic Engineering" has been started in 2021 and is coordinated by the Bio Base Europe Pilot Plant of the Department of Biotechnology, Faculty of Bioscience Engineering, Ghent University, Belgium together with various academic and industrial partners. The proposed project will aim to develop a food waste-derived biosurfactant – via designing a novel fermenter and genetic engineering of a robust yeast – to explore the bioeconomic viability of waste biorefineries. It will carve out a new research direction for the field of heterologous enzyme expression using an unconventional yeast strain and the integration of hydrolysis–fermentation bioprocesses. The project will also evaluate the environmental and economic costs and benefits associated with the novel sustainable waste-based biorefinery production methodology.

Essentially, the project will aim to produce a modified Starmerella bombicola that can secrete hydrolytic enzyme(s), tolerate food waste inhibitors, and enhance the production of sophorolipids. Furthermore, the tailor-made bioreactor will enable the hydrolysis and fermentation of one-pot food waste. The proposed project will not only benefit the market by reducing the cost of sophorolipid production, but it will also lead to a carbon-neutral biorefinery that will benefit society.



Conceptual illustration of WASTE2FUNC, which will convert an existing green electricity biorefinery into a novel integrated self-sufficient (in terms of electricity and heating) biorefinery to produce second-generation lactic acids (2G LA) and second-generation biosurfactants (2G BSs) starting from food (crop) waste in a cascading approach.



Schematic diagram of the proposed WASTE2FUNC project

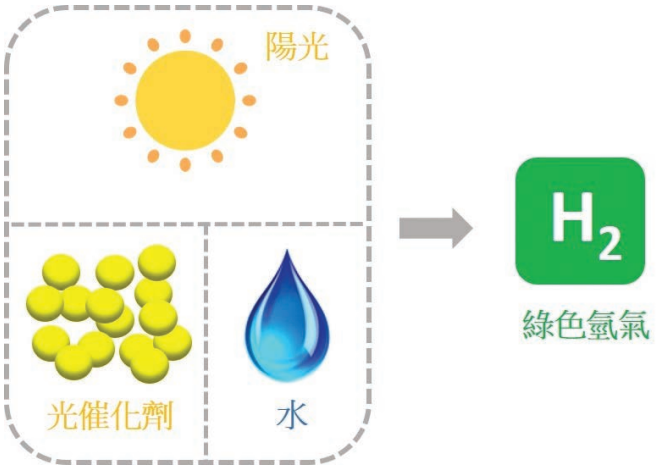
Research Stories

Zero-emission Power Generation: Splitting Water with Semiconductor Photocatalysis to Produce Hydrogen

— Dr. Yun Hau Ng, Associate Professor

Green hydrogen is an energy source that combines hydrogen with oxygen in a fuel cell to produce electricity. As it is a zero-emission fuel that does not emit any pollutants, green hydrogen is a source of clean energy with great development potential. However, hydrogen and oxygen do not exist naturally in the environment. So how can we efficiently produce green hydrogen in large quantities?

As we all know, water (H_2O) is composed of hydrogen (H) and oxygen (O). Dr. Yun Hau Ng has successfully made use of sunlight and compounds extracted from minerals to produce catalytic semiconductor powders (photocatalysts). These photocatalysts are then added to water to facilitate "artificial photosynthesis", a process that splits water (H_2O) into hydrogen (H_2) and oxygen (O_2). This technology for photocatalytic decomposition developed by Dr. Ng can absorb sunlight directly and initiate a reaction without generating any pollutants. The resultant hydrogen can be stored in fuel cells to generate the electricity that is needed to power hydrogen-fuelled vehicles, cargo ships, or airplanes. It can also be used as a raw material in various industrial processes, such as steelmaking and the production of vegetable oil. Dr. Ng's research will continue to explore the potential array of applications for photocatalytic decomposition technology, in the hope of promoting the development of technologies for sustainable energy both locally and globally.



Improving the Resilience of Infrastructure to Prepare for Extreme Weather

— Dr. Shauhrat Chopra, Assistant Professor

Due to climate change, occurrences of weather-related disasters have increased fourfold globally over the past 50 years. Located on China's southern coast, Hong Kong will inevitably face more typhoons, storm surges, and landslides in future.

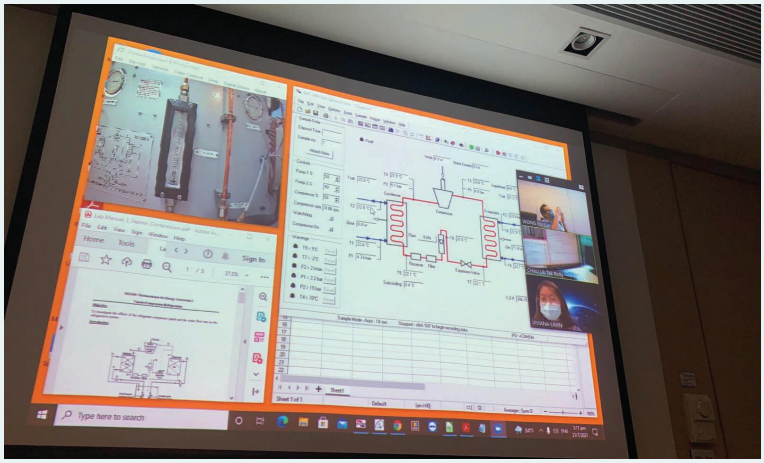
Hong Kong has the highest population density in the world, and thus it must accommodate a massive demand for public transportation and infrastructure. A disruption to just one sector of Hong Kong's infrastructure can trigger huge economic losses owing to a chain reaction. When super typhoon Mangkhut hit Hong Kong in 2018, the city's traffic was paralysed, and its transport and supply chains failed to resume their operations during the subsequent days. The economic losses resulting from this event were estimated at HK$4.6 billion.

Dr. Shauhrat Chopra believes that extreme weather causes serious damage to infrastructure. To address this problem, Dr. Chopra proposes that it is essential to assess and improve the resilience of infrastructure. Dr. Chopra and his team have designed a systematic set of indicators that provide a quantitative evaluation of the resistance of various infrastructures to the impacts of natural disasters and epidemics. They have also studied Hong Kong's complex transportation networks. Their interim findings suggest that the ability to transfer across different means of transportation is the key to enhancing the resilience of Hong Kong's public transportation system.

Academic Development

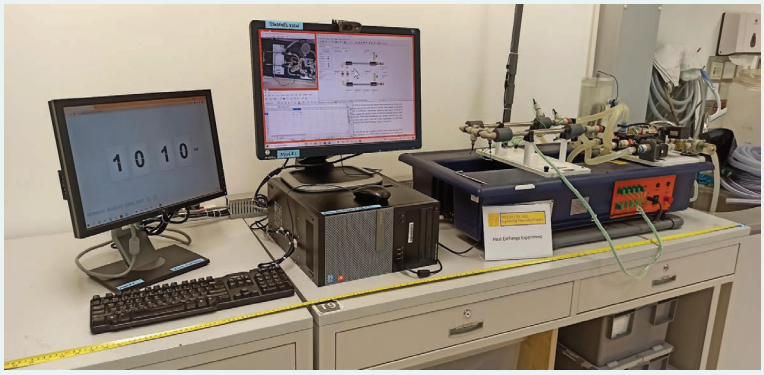
Performing Laboratory Anywhere

The COVID-19 pandemic has changed how we operate in many aspects of our life. Since February 2020, lectures at SEE have been successfully delivered online via Zoom, and we now can switch between the modes of in-person and online teaching in response to the pandemic. Whereas lectures can be delivered online relatively easily, the online delivery of laboratory classes is more challenging. To provide our students with the same learning experience even when social-distancing restrictions are in place, we have spent the past year making some laboratory modules operational online, so that students can still participate and interact with the instruments regardless of their location. The project to bring our laboratory modules online is supported by a Teaching Development Grant from CityU.



Student's view of the Vapor Compression Refrigeration Experiment Station

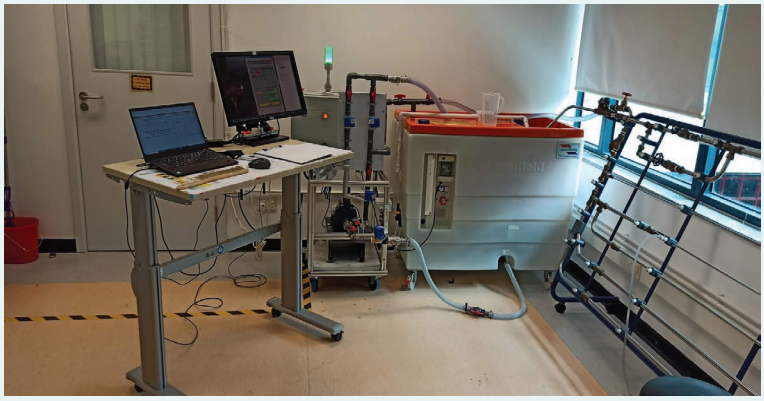
After extensive re-wiring, installing sensors and electric valves, and building a virtual instrument interface, three laboratory modules of the core courses SEE2101 Engineering Thermofluids I and SEE3101 Engineering Thermofluids II – which are both taken by all SEE undergraduate students – can now be deployed online. The modules are Heat Exchange Experiment Station, Vapor Compression Refrigeration Experiment Station, and Fluid Mechanic Station.



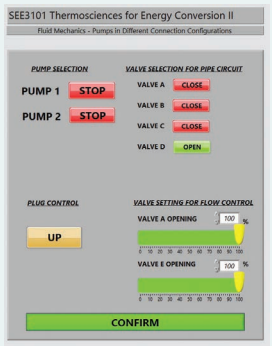
The setup of the Heat Exchange Experiment Station

To provide a more comprehensive learning environment for the online delivery of laboratory modules, we have converted the relevant instruments into IoT devices, and set up a standardised Zoom platform for all laboratory modules. This will allow our students to easily operate the instruments. The online platform fully mimics the in-person learning experience and ensures that students will not miss out on any learning components even if they are not physically in campus.

The automated online laboratory module provides many advantages to teaching. For instance, it allows students to view multiple parameters simultaneously and focus their attention on data interpretation. Instructors can also monitor their students' progress and address their questions at any time. With the success in the initial phase of developing the online laboratory modules, transformation of several other modules is now underway. We believe that digitalisation and the remote control of instruments will be important components of teaching and learning in future. To this end, the experience of learning in an online laboratory module will further enhance our students' capabilities.



A portable online lab station connected to the console for controlling the Fluid Mechanic Experiment Station



A customised control interface for the Fluid Mechanic Experiment Station

As of February 2022, Hong Kong is experiencing a significant surge in the number of Omicron infections. Due to the severity of the situation, online teaching has to be implemented. However, with the availability of the online laboratory modules, students in *SEE2101 Engineering Thermofluids* I can remotely carry out their laboratories as scheduled and learning continues as usual!

Career Opportunities in ESG

Environmental, Social, and Governance (ESG) measures assess the social and ethical impact of investments and incentivise businesses to do the "right" thing. Due to the growing interest in sustainability in business, there has been a high demand for ESG practitioners with training and technical knowledge in Energy, Environment, and Sustainability. In this regard, ESG represents a promising career prospect for both ESE and EVE students.

To equip students with knowledge that is relevant to business and finance, SEE is now offering an elective course on ESG. The course is taught by Dr. Thomas Tang, who has over 25 years of extensive experience in advising the public and private sectors on issues relating to sustainable change and innovation.

Dr. Thomas Tang

SEE also invited multiple ESG practitioners from the banking industry and consultancies to share their experiences and insights in the "Dialogue with Professionals" series. ESE and EVE students who are interested in a career in ESG are strongly encouraged to participate in these upcoming talks and internship opportunities!

Arup Outstanding Student Scholarship

To nurture young leaders in the fields of energy, environment and sustainability, Ove Arup & Partners Hong Kong Ltd (Arup) has kindly agreed to donate a scholarship to the University in order to reward SEE student with outstanding academic performance and promising attributes with effect from the 2021/22 academic year.

Apart from outstanding academic performance, the student awardee is expected to have possessed and demonstrated the SEE-expected seven attributes upon graduation, namely, technically competent, interdisciplinary, innovative and entrepreneurial, problem solvers, effective communicators, life-long learners, leaders with a global vision.

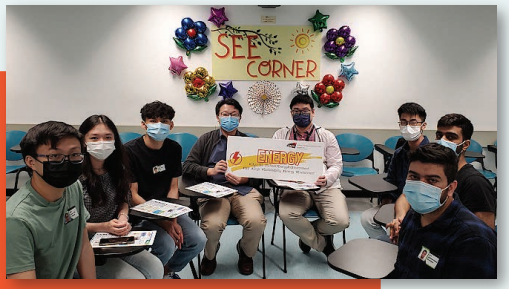
Arup Outstanding Student Scholarship

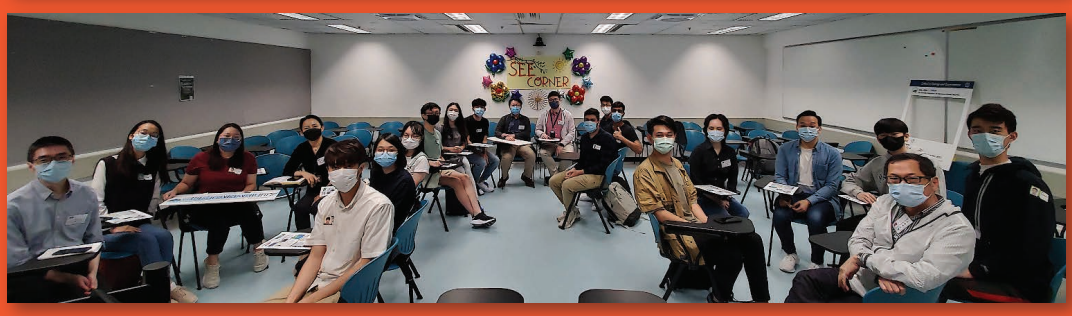
Welcome to SEE Corner!

From 20 to 21 October 2021, SEE successfully organised its first-ever SEE Corner – two identical mingling sessions that were attended by approximately 40 freshmen in total. Through the SEE Corner, the School hopes to nurture close bonds between faculty members and freshmen, and to support freshmen in planning for their 4-year programmes and subsequent careers by helping them to identify co-curricular activities at an early stage.

In addition to the participants' casual conversations in small groups, Dr. Patrick Sit, Associate Dean (Undergraduate Studies), presented various key milestones that were recommended for all SEE undergraduate students. The sharing of experiences by Mr. Chan Dick Long (final-year ESE student), Mr. Choi Man Ho (third-year EVE student), Mr. Kioex Felix (second-year ESE student), Miss Lam Kam Sze (final-year ESE student), Mr. Leung Cho Fung (third-year ESE student), and Mr. Wong Yiu Lun (final-year ESE student) also presented the freshmen with a clear picture for achieving the expected attributes of SEE graduates through the different milestones.

Noting that most freshmen would probably be unsure about their future at the beginning of their studies in university, Prof. Chak K. Chan, Dean, suggested that SEE freshmen should immediately start planning for their careers and take up the diverse learning opportunities offered by the School. Prof. Chan also encouraged freshmen to talk to the faculty members whenever they encountered any problems.





Staff Achievement

Highly Cited Researchers 2021

Prof. Alex Jen, Prof. Angus Yip, and Dr. Yun Hau Ng have been being listed as Highly Cited Researchers 2021 by Clarivate.

Clarivate identifies the world's most influential researchers who have been most frequently cited by their peers over the last decade. Being listed demonstrates the significant influence that a researcher has had in their field through the publication of multiple highly cited papers during the last 10 years. In 2021, about 0.1% of the world's researchers earned this exclusive recognition. These achievements of SEE's researchers reflect the impactful work being conducted at SEE. The School congratulates all professors on this achievement.

SEE faculty members won the HKIE Best Transactions Paper Prize 2021

Prof. Michael Leung, Dr. Edwin Tso, and Dr. Wei Wu won the HKIE Best Transactions Paper Prize 2021. They jointly published a paper titled, "Chillers of Air-conditioning Systems: An Overview" in the journal *HKIE Transactions*. In discussing the technical details of the latest chiller technologies, the award-winning paper helps engineers design air-conditioning systems that possess high energy efficiency and that are sustainable. Two SEE postdoctoral fellows, Dr. Zhanying Zheng and Dr. Jingyu Cao, were co-authors of the paper.

Dr. Yun Hau Ng won the Kataoka Lectureship Award for Asian and Oceanian Photochemist 2021

Dr. Yun Hau Ng received the Kataoka Lectureship Award for Asian and Oceanian Photochemist 2021, from the Japanese Photochemistry Association. This annual award is presented to one eminent scientist from the Asian and Oceanian region for their outstanding research in the study of photochemistry.

At the award ceremony held in September 2021, Dr. Ng delivered a lecture on the topic of harvesting energy from sunlight to generate solar and clean fuels. The photocatalytic system his team developed at CityU converts water and carbon dioxide into the sustainable chemical fuels of hydrogen and methane under sunlight. The research aligns with Hong Kong's goal of achieving complete decarbonisation. Dr. Ng's research over the years has advanced fundamental knowledge on photocharge transportation, which regulates the overall performance of semiconductor photocatalysts. The award is a recognition of Dr. Ng's long-lasting contributions to the field of photochemistry.

Dr. Edwin Tso introduces the thermochromic smart window on TVB "Innovation GPS" programme

Dr. Edwin Tso, was interviewed by TVB about the thermochromic smart window he invented. The interview was aired on TVB's Finance & Information Channel (Channel 85) in the programme "Innovation GPS" on 8 September 2021.

Hong Kong is a hot and humid city that consumes large amounts of energy to support its air conditioning systems. Buildings in Hong Kong use passive radiative cooling technology, which provides an electricity-free and refrigerant-free cooling strategy that promotes energy savings. However, this technology cannot mitigate the undesirable cooling that occurs during cold weather. To address this critical issue, Dr. Tso developed a game-changing thermochromic passive radiative cooling paint. This paint can automatically change its colour in response to the ambient temperature, allowing it to intelligently regulate the power generated to cool buildings.

Hong Kong's air-conditioning systems consume large amounts of energy due to their high window-to-wall ratios, which influence the gain and loss of heat via windows. Dr. Tso and his group have developed a thermochromic smart window that smartly regulates the amount of indoor heat gained from solar energy. This will help significantly reduce the energy consumption of buildings while simultaneously allowing them to maintain excellent indoor thermal comfort.

Dr. Jason Lam explained different waste problems in Hong Kong on TVB Pearl

Dr. Jason Lam, was interviewed by TVB Pearl on his views about the challenges posed by wood waste and e-waste in Hong Kong. The interview was broadcast on TVB Pearl (Channel 84) in the programme "Pearl Magazine" on 21 November 2021.

Hong Kong discards hundreds of tonnes of wood waste in its landfills every day. Due to its high lignin content, wood waste can require a long time to decompose in landfills. However, if recycled properly, wood can be upcycled into various useful products as well as chemical feedstock to mitigate the dependence on fossil fuels.

Besides wood waste, Hong Kong also generates a substantial amount of e-waste annually. Despite the Basel convention and the operation of WEEE-Park, most electronics discarded in Hong Kong continue to be shipped to developing countries. Such e-waste is likely to be processed with sub-standard practices, such as open burning, generating highly persistent toxic compounds, such as dioxin or various brominated polyaromatics.

In this interview, Dr. Lam shared his views about the disposal of wood waste in Hong Kong's landfills, as well as the environmental consequences of the improper disposal of e-waste.

Prof. Angus Yip elected as a member of the Hong Kong Young Academy of Sciences

Prof. Angus Yip has been elected as a member of the Hong Kong Young Academy of Sciences (YASHK) in 2022. Established in 2018 as a chapter of The Hong Kong Academy of Sciences (ASHK), the objective of the YASHK is to gather young scientists to jointly promote the development of science and technology with the ASHK. Throughout the years, the ASHK has gained an excellent regional and global reputation for its outstanding achievements in advancing technological development and popularising science in Hong Kong. The YASHK is expected to inject new energy into the work of the ASHK. Currently, 53 young scientists are members of the YASHK.

Student Achievements

PhD Students won Gold Medal and other awards in iCAN 2021

Dr. Edwin Tso and his research team (including PhD students Miss Shirley Du, Mr. Stanley Liu, and Mr. Martin Zhu as well as postdoctoral fellow Dr. William Lee) participated in the 2021 International Invention Innovation Competition in Canada (iCAN 2021) with their invention, "An Intelligent and Thermally-responsive Window (ITRW) for Indoor Thermal Management and Energy-saving in Buildings". The team won the Gold Medal, Canadian Special Award, and Best Invention Video Award from this fierce competition.

About the Award-winning Innovation

Nearly half of all thermal energy is gained or lost through windows. Consequently, large amounts of energy are wasted when air-conditioning systems are used to maintain comfortable indoor thermal environments. Inspired by the photonic structure of a chameleon's skin, this smart window can automatically change its colour in response to the ambient temperature. In cold weather, the smart window is transparent, allowing sunlight to pass through. When the ambient temperature increases above the window's transition temperature, the window will become opaque to reflect incoming solar irradiance. Hence, the smart window intelligently regulates the indoor thermal environment according to different weather conditions and saves around 10% of a building's total energy consumption. Importantly, this technology can contribute to Hong Kong's goal of carbon neutrality by 2050 and benefit both Hong Kong's environment and society.


CERTIFICATE OF AWARD

THIS CERTIFICATE IS PROUDLY PRESENTED TO

LIU Sai DU Yuwei LEE Hau Him
ZHU Yihao TSO Chi Yan
City University of Hong Kong

FOR THE ACHIEVEMENT OF

GOLD MEDAL

BY THE INVENTION · INNOVATION ENTITLED :

An intelligent and thermally-responsive window (ITRW) for indoor thermal management and energy-saving in buildings

AT THE 6TH ANNUAL INTERNATIONAL INVENTION INNOVATION COMPETITION IN CANADA, iCAN 2021

ORGANIZED BY TORONTO INTERNATIONAL SOCIETY OF INNOVATION & ADVANCED SKILLS (TISIAS)

HELD ON AUGUST 28TH, 2021 IN TORONTO, CANADA

MOONSUK CHANG ORGANIZING CHAIRMAN

BOB HUYBRECHTS CO-CHAIRMAN OF THE JURY


CERTIFICATE OF AWARD

THIS CERTIFICATE IS PROUDLY PRESENTED TO

LIU Sai DU Yuwei LEE Hau Him
ZHU Yihao TSO Chi Yan
City University of Hong Kong

FOR THE ACHIEVEMENT OF

BEST INVENTION VIDEO AWARD

BY THE INVENTION · INNOVATION ENTITLED :

An intelligent and thermally-responsive window (ITRW) for indoor thermal management and energy-saving in buildings

AT THE 6TH ANNUAL INTERNATIONAL INVENTION INNOVATION COMPETITION IN CANADA, iCAN 2021

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BOB HUYBRECHTS CO-CHAIRMAN OF THE JURY


TISIAS

certificate of achievement

SPECIAL AWARD

Presented to

LIU Sai DU Yuwei LEE Hau Him
ZHU Yihao TSO Chi Yan
City University of Hong Kong

in recognition of excellent invention/innovation of

An intelligent and thermally-responsive window (ITRW) for indoor thermal management and energy-saving in buildings

exhibited and presented at

The 6th International Invention Innovation Competition in Canada <iCAN 2021> held on August 28th, 2021 in Toronto, Canada

MOONSUK CHANG Chairman & Chief Exhibition Officer TIISIAS ~ Toronto, Canada

BOB HUYBRECHTS Chairman of the Jury iCAN ~ Toronto, Canada

SME Innovation and Entrepreneurship Global Contest (Global Finals) Runner-up Award

After emerging as the champions in the SME Innovation and Entrepreneurship Global Contest, the team supervised by Dr. Edwin Tso, comprising Miss Shirley Du (PhD student), Dr. William Lee (Postdoctoral fellow), Mr. Johnny Lin (PhD student) and Mr. Martin Zhu (PhD student), took part in the global finals of the same competition as the representatives of Hong Kong. The team won the runner-up award in the competition.

The team successfully outcompeted teams from Malaysia, the Czech Republic, South Korea, Japan, Greece, and other countries. Their award-winning project was titled, "A Novel Energy-free and Environmentally Friendly Cooling Paint for Building Applications". The team demonstrated an excellent case of knowledge transfer and attracted much interest from different international research parties.

Undergraduate Student Team entered the "City I&T Grand Challenge" Grand Pitch

A team comprising three undergraduate student delegates from SEE Student Chapter, Mr. Cheung Tim Yiu (Third-year EVE student), Miss Man Hiu Ching (Final-year EVE student), and Mr. Wong Yiu Lun (Final-year ESE Student) took part in the "City I&T Grand Challenge". Following a stringent selection process, the team's project "Kind'erGarden – A Novel Technology to Reduce Single-use Utensils and Containers" was shortlisted to enter the Grand Pitch for the City I&T Grand Challenge. In this project, the team aims to develop an innovative mobile application that will help reduce the use of single-use utensils and containers.

Organised by the Innovation and Technology Commission together with the Hong Kong Science and Technology Parks Corporation, Hong Kong's first ever City I&T Grand Challenge concluded its 2-day Grand Pitch and Finale at Hong Kong Science Park on 16 October 2021. The winners were selected by a judging panel that consisted of nine representatives from the government, industry, and academic and research sectors.

PhD Student awarded the First Student Best Poster Presentation Award

PhD Student Mr. Bowen Pak Wai Wong (supervised by Dr. Alicia An) received the First Student Best Poster Presentation Award from the editors of the journal Desalination at Membrane Desalination 2021, the 5th International Conference on Desalination Using Membrane Technology. This conference was held from 14 to 17 November 2021. Mr. Wang presented his PhD research titled, "Real-time Monitoring of Membrane Wetting Progression Using Impedance Spectroscopy".

PhD Students awarded Best Poster Presentation Awards

Supervised by Dr. Alicia An, PhD Student Miss Xinning Zhang received the Best Poster Presentation Award at the 4th International Forum on Asian Water Environment Technology held during 10-11 December 2021.

Miss Zhang presented her PhD research, "Development of High-performance Polyamide Thin Film Composite (PA-TFC) Membrane with Chlorine Stability". This research aims to advance existing techniques for preparing an aromatic polyamide thin-film composite-forward osmosis (TFC-FO) membrane to achieve better chlorine resistance. The research evaluates the desalination performance, chlorine resistance, water permeability, long-term stability at different pH values, surface structure, and morphology of the TFC-FO membrane.

Another PhD student Mr. Zubeen Hathi, under the supervision of Dr. Carrol Lin, won the Best Oral Presentation Award for the paper tittled "Enhanced production of poly (3-hydroxybutyrate-co-3-hydroxyvalerate) (PHBV) from food waste using Cupriavidus necator for large scale production of personal protective equipment to provide protection against COVID-19" in the International Conference on Biotechnology for Resource Efficiency, Energy, Environment, Chemicals and Health (BRE3CH-2021) jointedly organised by CSIR-Indian Institute of Petroleum and the Biotech Research Society, India (BRSI) at Dehradun, India during 1-4 December 2021.

Postdoctoral Fellow appointed to the early career editorial board for the *Journal of Water Process Engineering*

Dr. Jiaxin Guo has been appointed as an Associate Professor at Xi'an Jiaotong University (XJTU) through the "Young Talents Support Plan", and he has started the new chapter in early March 2022. XJTU is one of the founding members of Project 985 and Project 211, which are projects initiated to promote the development of higher education in China. As a member of the C9 League, XJTU has developed into a leading public research university. Besides, Dr. Guo has been appointed to the early career editorial board for the *Journal of Water Process Engineering* since 1 January 2022.

Dr. Guo, postdoctoral research fellow, focuses on research include technologies desalination and treatment of water and wastewater, technologies for the fabrication of advanced membranes by electro-spinning, membrane distillation, and conveyance systems for water and wastewater.

Champion in the Social Innovation Inventor Competition for Innovation Design 2020/21

Congratulations to SEE students on winning the Social Innovation Inventor Competition for Innovation Design 2020/21 organised by World Green Organisation!

About the Team

Miss Tsoi Wing Tung (Third-year EVE Student)
Mr. Shum Chak Pong (Third-year ESE Student)
Miss Ho Tsz Ying (Student from The University of Hong Kong)

About the Project

ENVTIN (源田) aims to create a safe and healthy place that provides residents with recreational facilities and an outstanding shopping experience. The team aims to create a comfortable market environment that addresses the needs of Hong Kong's citizens during the COVID-19 pandemic, by providing excellent management of crowd-flow in an environmentally friendly municipal building. The project is intended to protect citizens' physical and mental health and improve their quality of life through providing a more comfortable urban environment with improved hygiene conditions to reduce the spread of viruses.

Dean's List

According to the University regulations, undergraduate students will be placed on the Dean's List when they earn 12 or more credit units with a grade point average (GPA) of 3.7 or above and display no failures over the previous semester.

SEE is pleased to announce that the following undergraduate students have been placed on the Dean's List for Semester A, 2021/22.

Name	Cohort
Lam Kam Sze	2017
Fung Sze Tsing Jennies	2018
Tong Chun	2018
Wong Wai Ho	2018
Chan Wing Kei Vicki	2019
Chow Yee Man	2019

Name	Cohort
Lam Kai Hei	2019
Lo Yee Lam	2019
Ou Sze Yiu Sylvia	2019
Wang Ziyi	2019
Jiang Yinuo	2020
Kioe Felix	2020

VTech Innovation & Sustainability Award

Sharing by the Donor and Student Awardee

Back row (from left): Dr. King Pang, Ms. Shereen Tong, Mr. Andrew To, Dr. Allan Wong (Chairman and Group Chief Executive Officer of VTech Holdings Limited), Dr. Patrick Lee, Mr. Andy Leung, Miss Queenie Wong

Front row (from left): Mr. Chan Ben Sun, Mr. Ching Man Kit, Mr. Xue Lichen, Mr. Chong Man Hin, Miss Mak Wai Yu

Dr. Allan Wong, Chairman and Group Chief Executive Officer, VTech Holdings Limited (VTech)

VTech is deeply honoured to partner with City University of Hong Kong to organise "VTech Innovation & Sustainability Award" for the undergraduates of the School of Energy and Environment in 2020/21. Establishment of the Award aims to nurture a new generation of engineers with innovative solutions to produce clean energy, mitigate climate change impact and protect the planet for sustainable development.

Mr. Ching Man Kit, Assistant Sustainability Officer, VTech Corporate Services Limited

(Class of 2021; 1st Runner-up of VTech Innovation & Sustainability Award 2020/21)

I studied a wide range of sustainability-related topics including climate change and circular economy for my final year project, and realised that such issues have significant impacts on the long-term sustainability of any businesses. Thanks to VTech and CityU, I was given the opportunity to present my research results to the VTech management and was extremely honoured to receive the VTech Innovation & Sustainability Award.

The Award is a great recognition of my past efforts and has provided me tremendous confidence to work in the field of sustainability upon graduation. When a chance to work at VTech came out, I had no hesitation to accept it! I have the opportunity to assist in sustainability reporting and drive the achievement of sustainability targets, working on multiple aspects such as GHG emissions reduction and recyclable product materials. With my deep gratitude again to CityU and VTech, I have started my career in a promising corporation, full of challenges and excitements!

Alumni

Visits to Organic Farm

The SEE Alumni Association organised two visits to an organic farm managed by Towngas in September 2021. Led by Dr. Denis Yu and Dr. Henry He, a total of 40 students and alumni members joined the visits. The groups learnt new approaches and technologies for organic farming.

During the visits, volunteers from Towngas, including a farming specialist, introduced sustainable farming to the participants. The participants learnt about ways to reuse organic waste (e.g., coffee waste, residues from soya milk, weeds, and animal droppings) as fertiliser. They also observed a hydroponics system that achieved zero-energy input through the installation of a solar panel. The participants were divided into groups to harvest beans, remove weeds from the fields, and sow young plants into the hydroponics setup.

SEE Homecoming – Mix and Mingle

To connect members of the CityU community, CityU organized the "CityU Homecoming 2022" on 13 March 2022. SEE arranged the "SEE Homecoming – Mix and Mingle" Session particularly for SEE alumni, faculty members and students to meet and chat online. Over 30 SEE members joined the online mingling session on a sunny Sunday.

Dr. Yun Hau Ng and Miss Au Wing Chi (Third-year EVE student) shared with the audiences the recent development of the School and learning experience under the pandemic respectively. Miss Hayton Chan (Secretary, SEE Alumni Association; BEng ESE, Class of 2019) and Mr. Ben Lee (Vice Chairperson, SEE Alumni Association; BEng ESE, Class of 2019), also shared their career stories with their fellow students and faculty members through this precious online reunion.

CityU Alumni Association of School of Energy and Environment
Membership Application Form

General Information

Graduate Year: _____

Name of Most Recent Programme:

❍ Doctor of Philosophy (Ph.D.)
❍ Master of Philosophy (M.Phil.)
❍ Bachelor of Engineering (BEng) in Energy Science and Engineering
❍ 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 (optional)

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 Person 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: G5703, 5/F, Yeung Kin Man Academic Building, City University of Hong Kong, Tat Chee Avenue, Kowloon, Hong Kong SAR

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