

NEWSLETTER

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Dean's Message

A warmest welcome to the new academic year and another edition of the newsletter. Regardless of the difficulties imposed by the challenges of the pandemic, my colleagues have spared no effort in providing the best learning and research experiences to our students.

It is excited to share with you that SEE has just **concluded a MOU with New World Development Company Limited to accelerate the common ambition to achieve Science Based Targets by 2030 and Net Zero Carbon by 2050**, echoing the HKSAR Government's own green target. Now, we are teaming up to co-develop net zero carbon related technologies in the areas of energy efficient design, renewable energy, building materials with low embodied carbon, waste management, emissions trading, and health and wellness – as well as providing pilot opportunities to realise research ideas.

In keeping with our drive to achieve a sustainable future with the latest technologies, our faculty members dedicated their very best in research and innovation. I take great pleasure in sharing with you our **success in the 2021/22 funding exercise of the General Research Fund (GRF)/Early Career Scheme (ECS)**. SEE has successfully obtained grants for a total of 12 projects.

At the Commencement in May, we celebrated the accomplishments of 132 graduates. It brings us particular pride to witness **our first cohort of students from the BEng in Environmental Science and Engineering graduating**. The growth in our graduate population implies that more 'new blood' now enters the fields of energy engineering, environmental engineering, and sustainability, to contribute to a more sustainable environment for Hong Kong and the region.

Over the years, we have witnessed the burgeoning of our students' talents and ambitions. Recently, our PhD students and a postdoctoral fellow participated in the **Climate Action Recognition Scheme 2020/21**, and won the **Start-up Fund** in the 'under the idea stage programme'. Meanwhile, students at the undergraduate level also presented their **award-winning final-year projects** to a leading consultancy company in the environmental sector. Both the competition and opportunity to share ideas with the industry are

essential for our students, who are always encouraged to venture beyond their classrooms to learn.

The success of our educational initiatives has not arrived in a day. My colleagues are the ones who take ideas from scratch and see them to fruition. With great pleasure, I would like to share with you that **Dr. Patrick Sit** has recently taken up the role as Associate Dean (Undergraduate Studies), while **Prof. Wen-Xiong Wang** will continue to serve as Associate Dean (Research and Postgraduate Studies) in 2021/22. Special thanks must go to **Dr. Patrick Lee**, who served as Associate Dean (Undergraduate Studies) in the past four years. Dr. Lee's many significant contributions include the responsibilities he shouldered in the launch of the environmental programme, the HKIE accreditation of our BEng programmes, the introduction of the SEE Industry Ready Programme, and the creation of the 'eSTAR' stream (one of CityU's talent programmes).

It is also with mixed feelings that we bid farewell to **Prof. Johnny Chan**, who retired in June. Prof. Chan was the Chair Professor of Atmospheric Science and founding Dean of the SEE. During his nearly 32 years of service at the University, Prof. Chan made tremendous contributions to education, research, and professional services. His leadership has laid a solid foundation for the SEE's stable growth throughout his deanship and to this day. Although Prof. Chan may not be around as often, he will continue his association with SEE and CityU, with his recent conferment as Emeritus Professor.

We are thankful, during these challenging times, that we are still able to secure new opportunities and witness positive developments. Let's get prepared for the new academic year ahead!

Best,



Prof. Chak K. Chan

Dean of School of Energy and Environment
City University of Hong Kong



Staff Development

Prof. Johnny Chan

Retirement and Conferment to Emeritus Professor

Prof. Johnny Chan, Chair Professor of Atmospheric Science, retired after serving CityU over 30 years. He has recently been conferred the title of Emeritus Professor.

Over the past three decades, Prof. Chan has made significant contributions to the University. As the Founding Dean of the School of Energy and Environment, Prof. Chan has made tremendous contributions that have laid a solid foundation for the School's development.

Prof. Chan is pleased to continue his association with SEE and CityU in the new role of Emeritus Professor.



Dr. Patrick Sit

Associate Dean (Undergraduate Studies)



Message from Dr. Sit

As the new Associate Dean (Undergraduate Studies) of SEE, I will be responsible for enhancing and maintaining the integrity of our undergraduate education. Our mission is to equip our students with the knowledge and skills they need to meet the increasing demand for professional practitioners in the energy, environment and sustainability fields.

Together with the undergraduate team, I will introduce and implement various initiatives to develop the curricula of our undergraduate programmes, as a robust curriculum is crucial for preparing students for future study and employment. Recently, the 'Building Services' option was introduced to enhance students' knowledge on building-related topics, and the eSTAR stream was established to provide advanced training to students via research projects and a minor study programme. The undergraduate team and I will continue to devote our efforts to ensuring our curricula are sufficiently deep and broad to give our graduates the tools and knowledge they need to face future challenges in the engineering world.

The undergraduate team will also collaborate closely with the industry through our unique Industry Ready Programme. Students will gain important real-world engineering skills from participation in intensive workshops and internships. We will also strongly emphasise the importance of developing transferable skills, via training on careers, communication and professionalism. These unique programmes and co-curricular opportunities will form an ideal environment in which our students can identify their interests, establish their career plans, and pursue their goals.



Spotlight

Prof. Johnny Chan
Emeritus Professor
Founding Dean of SEE



Message from Prof. Johnny Chan: SEE – The First Six Years

How It All Started...

The story begins in August 2008, when President Way Kuo brought in four distinguished scientists from around the world to discuss the best way for CityU to provide leadership in addressing the issues of energy, the environment and climate change. Shortly afterwards, I was asked to help establish the School of Energy and Environment (SEE). I accepted the challenge without much hesitation, as these issues have affected, and will continue to affect, not only humankind but our entire planet. Despite such urgency, not many universities are willing to go beyond their traditional academic turfs to form an interdisciplinary academic unit to tackle these pressing issues. Doing so, therefore, represents an opportunity for CityU to create something unique, at least in Hong Kong. After lengthy consultations with many academics, government officials and industry leaders, and with the enthusiastic support of the University Council, SEE was founded in July 2009.

Given the severe shortage of space at CityU at the time, SEE had to be set up outside the main campus. Its first physical home was established within the Hong Kong Science and Technology Park in March 2010. With the infrastructure in place, recruitment of faculty as well as office and technical staff began in earnest. We were fortunate enough to have many great people who happened to be on sabbatical leave (Prof. Dennis Leung of the University of Hong Kong (HKU), Prof. Joe Clarke of the University of Strathclyde and Prof. S K Chou of the National University of Singapore) and some who recently retired (Dr. Josie Close and Mr. Robert Gibson) to help us. We were also joined by several young overseas scientists who wanted to pursue an exciting academic career in the areas of energy and the environment. Within two years of its founding, the School was already endowed with eleven faculty and six office and technical staff.

Biography

Prof. Johnny Chan obtained his bachelor and master degrees in physics from the University of Hong Kong and his Ph.D. in atmospheric science from Colorado State University in the US. After two years as a US National Research Council Post-Doctoral Research Associate at the US Naval Postgraduate School, he stayed there as an Adjunct Research Professor for one year. He then returned to Hong Kong and joined the then Royal Observatory Hong Kong as a Scientific Officer. In 1989, he began his academic career as a Senior Lecturer at the then City Polytechnic of Hong Kong (now the City University of Hong Kong) where he retired as Chair Professor of Atmospheric Science and Director of the Guy Carpenter Asia-Pacific Climate Impact Centre in June 2021. He was also the Founding Dean of the School of Energy and Environment of City University of Hong Kong, serving from the founding of the School in July 2009 to July 2015. Between 2002 and 2008, he was also the Director of the Shanghai Typhoon Institute of the China Meteorological Administration.

Prof. Chan is internationally renowned in the research areas of typhoons and monsoons. In the last two decades, he has been working on the problem of global warming and its relationship with typhoon activity, as well as on tropical cyclone and monsoon climate. He has published over 250 international journal articles and given close to 300 invited talks and conference papers. According to the Essential Science Indicators, he ranks the top in the world in the number of SCI-listed journal articles related to tropical cyclones, and is the ninth most-cited author in this field during the 1996-2006 period.

Prof. Chan was a member of the Tropical Meteorology Research Working Group of the World Meteorological Organization and the Chair of its Tropical Cyclone Panel between 2012 and 2018. He is also an associate editor of three journals: *International Journal of Climatology*, *Atmospheric and Oceanic Science Letters* and *Acta Meteorologica Sinica*, and a member of the Editorial Board of *World Scientific Series on Earth System Science in Asia*. In Hong Kong, he is a member of the Science Advisory Committee of the Hong Kong Observatory, and an advisor of the GreenPlus Programme and was a member of the Advisory Group on Advanced Metering Infrastructure, both of China Light & Power Company Limited.

Prof. Chan's honours include Honorary Fellow of the UK Energy Institute, Fellow of the American Meteorological Society, recipient of the International Journal of Climatology Award of the Royal Meteorological Society, Distinguished Meteorologist awarded by the Hong Kong Observatory, and a Senior Research Fellowship awarded by the Croucher Foundation.

Research Interests

- Tropical Meteorology
- Climate Diagnostics and Modeling
- Air Pollution



(Right) Prof. Johnny Chan, Fellow of the American Meteorological Society

Our Tireless Efforts in Introducing New Programmes

SEE's major mission is to nurture the next generation of scientists and engineers capable of tackling the most pressing issues of our time—energy, the environment, climate change and sustainability. With this in mind, we developed the Master of Science in Energy and Environment (first intake in September 2011) and the Bachelor of Engineering in Energy Science and Engineering (first intake in September 2012). They were the first such academic programmes in Hong Kong and among only a handful of similar programmes around the world. Both programmes are unique in the sense that, while the main focus is on science and engineering, they also include required courses in policy and economics intended to train students in the various issues pertaining to the implementation of energy and environmental technologies. With the full support of industrialists and the government, these two programmes were quickly accredited by professional bodies: the Master programme by the UK Institution of Gas Engineers and Managers and the Bachelor programme by the Hong Kong Institution of Engineers (HKIE). In fact, the HKIE established a new academic discipline of Energy to cater for our undergraduate programme. Here, I must acknowledge the invaluable help of Mr. James Kwan, formerly of Hong Kong and China Gas Company Limited, and Dr. C W Tso, formerly of Hong Kong Electric Company Limited. With their wholehearted support, the accreditation processes proceeded without a hitch.

To facilitate daily interaction with students and make them feel like they had a home, the School moved its office and some of its laboratories back to the main CityU campus in March 2013. To “walk the talk” and set an example in championing energy savings, our new offices were constructed with opaque glass walls to bring in natural light, and motion sensors were installed to turn off lights automatically in offices with no activity. Both of these design features were the first for CityU. Of course, we had already adopted environmentally friendly practices from the beginning, such as the use of paperless communication whenever possible and default double-sided printing and the non-use of bottled water.

Our Faculty Members and Students

Since joining SEE, our energetic faculty, especially the younger members, have been doing excellent research. In addition to publishing articles in top-tier academic journals, they have sought to apply their research findings in real-world settings in collaboration with local and overseas industries and governments. Thanks to their efforts, SEE has been recognised as the leading academic institution in Hong Kong in the areas of energy, the environment and climate change.

Furthermore, to promote our international image and provide our students with exchange opportunities, we actively visited overseas institutions and invited overseas academics to visit SEE. As a result of such outreach, our students now have the opportunity to study abroad in prestigious institutions around the world, including in North America, Europe, Asia and Australia. Such exchange agreements have also brought in students from these other places, creating a diverse academic environment that can broaden our students' horizons.

Internships represent another important learning activity for our students. To our great fortune, Dr. C. W. Tso helped us liaise with

various industries to provide internship positions for our undergraduate students. The internship placements are an example of a win-win collaboration, not only helping our students gain valuable work experience but also serving to connect our faculty with various industries.

Because most of our graduates will eventually work in industries, we also established a School Advisory Committee with members from the top management of various industries and government departments. The committee advises us on what courses we should offer to best prepare our students to enter the professional world. Some committee members also provided internships, employed our graduates, and collaborated with our faculty.

We are extremely proud of our students, whose achievements have brought distinction and glory to the School. They have won many local and overseas competitions and received numerous scholarships in recognition of their academic achievements. Particularly deserving of mention is the Hong Kong Innovation and Technology Scholarship. Two of our first cohort of undergraduate students, Mr. Harry Lam and Miss Zoe Lee, became the first in CityU to win this scholarship.

End of Deanship

On 31 July 2015, I finished my deanship, handing it over to Prof. Peter Brimblecombe as Acting Dean. Subsequently, Prof. Chak K. Chan took over as the Dean in December 2015. The six years of my deanship saw SEE grow from a fledgling school into a well-established, leading academic unit in Hong Kong specialising in energy, environment, climate change and sustainability. Such achievement was due to the tireless efforts of its dedicated faculty, staff and students, as well as the tremendous support of the University management. I would therefore like to take this opportunity to express my sincere gratitude and appreciation to all those who have helped SEE throughout its development. Their contributions have helped nurture our next generation of scientists and engineers and moved us toward achieving our mission of serving society in the areas of energy and environment.

Looking Forward...

Another six years have passed since my tenure as Dean ended. During these years, under the leadership of Prof. Chak K. Chan, the SEE has grown and improved even further. With my retirement and new status of Emeritus Professor, I am more optimistic than ever that SEE will continue to achieve its vision and become a leader in the Asia-Pacific region and perhaps beyond in education, research and technology transfer in the areas of energy, environment, sustainability and climate change. I feel honoured to have led the start of the SEE journey and proud to have been associated with some of the best faculty, staff, students and supporters one could hope for.

Last but not least, I would like to say a word to our students, our close companions throughout this journey. While the School marches on, our students join for a few short years and then move on to other chapters in their lives. Since the first cohort, hundreds of students have become SEE alumni, and to all of you, I feel grateful that our paths crossed during your brief stay. I hope you feel as proud as I do about your decision to study in SEE. The training you have received from our dedicated faculty will surely help you in your future endeavours and shape your aspirations. You will always remain part of the SEE family, and I believe I speak for all of the SEE faculty, staff and students when I ask you to stay in touch. We would love to hear from you.

All the best to SEE!

Happy Retirement, Prof. Chan!

On 30 June 2021, an internal retirement farewell party was held for Prof. Johnny Chan, Chair Professor of Atmospheric Science and founding Dean of SEE. The party was attended in-person or online by approximately 50 guests, comprising SEE faculty members, alumni, students, and administrative staff.

SEE sincerely thanks Prof. Chan for his significant contributions in laying a solid foundation for SEE's tremendous growth during his deanship. His professional dedication, academic achievements, and support of the sustainable development of the School and the University are remarkable. We wish Prof. Chan a happy retirement and all the best for the next chapter of his life!

We also offer our warmest congratulations to Prof. Chan for his being conferred the title of Emeritus Professor, in recognition of his distinguished contribution to the University! We are grateful that this emeritus position means that Prof. Chan's association with the SEE and CityU will continue after his retirement.



Prof. Chak K. Chan (right), Dean of SEE, presenting the souvenir to Prof. Johnny Chan (left).

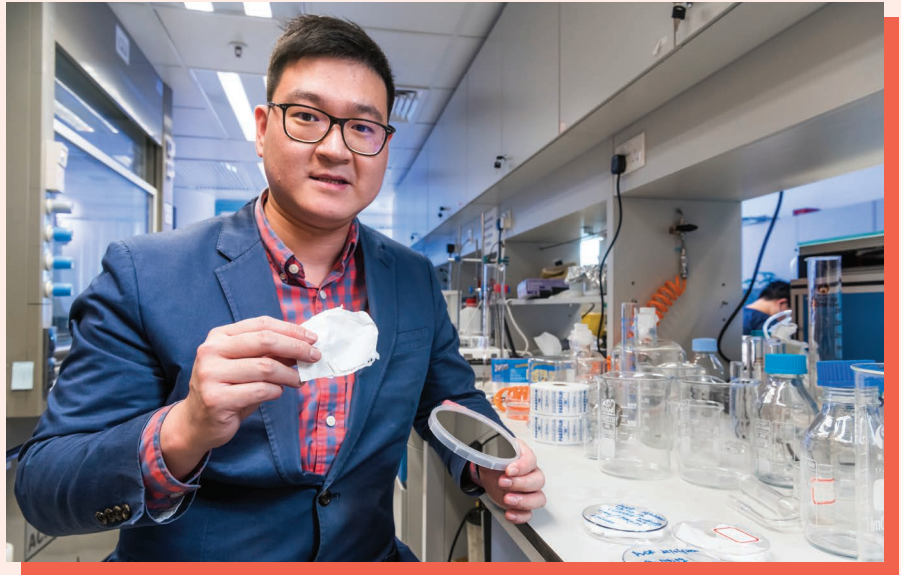


Dr. Edwin Tso *Assistant Professor*

Recipient of Gold Medal with Congratulations of the Jury at Inventions Geneva Evaluation Days 2021

1. Congratulations on receiving the Gold Medal with Congratulations of the Jury at Inventions Geneva Evaluation Days 2021. Why and when did you start your research on 'An Energy-Free, Low-Cost and High Cooling Performance Passive Radiative Cooling Technology for Building Applications'?

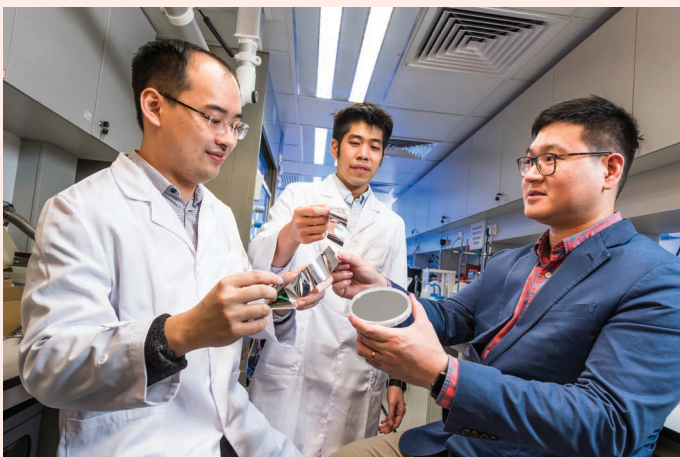
Hong Kong is well known for being hot and humid, and a substantial amount of energy (over 30% of the total energy consumption of buildings) is consumed by air-conditioning systems in buildings for thermal management and thermal comfort. With the goal of decarbonisation and saving energy, substantial efforts have been devoted to developing new technologies that mitigate energy consumption in buildings. One of my research interests is in using daytime passive radiative cooling to improve energy efficiency and to reduce the energy consumption of air-conditioning systems in buildings. In late 2014, while serving as a Fulbright Visiting Scholar at the University of California, Berkeley, I first encountered research on daytime passive radiative cooling. I realised that this technology would be very suitable for Hong Kong, a city with many high-rise buildings. Daytime passive radiative cooling effectively reduces the energy consumption of air-conditioning systems in buildings while requiring absolutely no electricity input and no refrigerants. In 2017, I published a journal article that was the first research paper on the topic of daytime passive radiative cooling in Hong Kong.



2. What has surprised you most about this research?

The daytime passive radiative cooler is green (refrigerant-free) and has zero electricity consumption. Conventional cooling systems are equipped with compressors that consume a lot of electricity; they also generate many pollutants because of the use of refrigerants. As such, conventional cooling systems contribute to ozone depletion and global warming. The daytime passive radiative cooler can be applied to a building's facade, thereby lowering the building's surface temperature and relieving the high cooling supply of air-conditioning systems. This technology has great

potential for reducing electricity consumption in air-conditioning systems and providing a thermal management scheme for smart-green buildings. Other applications of daytime passive radiative coolers include outdoor electronics, automobiles, textiles, and photovoltaics. The working principle of daytime passive radiative cooling is relatively simple: it reflects solar irradiance to reduce solar heat gain and selectively emits mid-infrared thermal radiation to the cold universe of ~ 2.7 K through the 8-13 μm atmospheric window. A net cooling result is achieved when the emission of infrared to the cold universe exceeds the absorption of sunlight



and environmental thermal radiation. Prior to researching daytime passive radiative cooling technology, I never imagined that this technology could achieve a cooling effect under direct sunlight during the day. Although the working principle of the daytime passive radiative cooler is simple, there remain a number of technological challenges that need to be addressed before the passive radiative cooling effect can be achieved. For instance, more research is needed to identify methods to enhance the solar reflectivity and mid-infrared emissivity of daytime passive radiative coolers. Overall, I am excited about the novelty of a cooler that provides cooling during the daytime without relying on the use of any refrigerants or compressors. To this end, I hope to promote the use of daytime passive radiative cooling in Hong Kong.

3. What has been the most difficult part of this research? How did you overcome that?

As mentioned previously, I started my research journey in daytime passive radiative cooling in the USA in 2014, when I discovered that sub-ambient cooling could be achieved easily owing to the dry weather there. However, when I returned to Hong Kong, I realised that it was difficult to achieve sub-ambient cooling with daytime passive radiative cooling technology because of the humid environment. To overcome this problem, I spent several years working to improve the performance of daytime passive radiative cooling. I discovered two areas that were critical to the performance of daytime passive radiative cooling: high solar reflectivity and selective thermal emissivity. In this context, 'selective' refers to the need for high thermal radiation emissive at the 8-13 μm wavelength atmospheric window. I have since developed several high-performance daytime passive radiative coolers and successfully demonstrated sub-ambient cooling in Hong Kong's hot and humid climate. Other challenges that I encountered while developing daytime passive radiative cooling technology pertained to the high cost of raw materials and the fabrication process. In the beginning, each wafer daytime passive radiative cooler (i.e., the first-generation prototype that we developed) cost around HK\$10,000. However, by optimising the materials and structures, we eventually developed a daytime passive radiative cooler in paint form that cost only a few hundred HK\$ per square meter, making it suitable for large-scale applications.

4. What advice would you give to SEE students who aspire to be researchers?

The first piece of advice that I would like to give to our SEE students is to manage their time well. I recommend that students spend a third of their time reading the literature to keep up with research developments, another third of their time conducting experiments or simulations to experience the necessary trials and errors in research, and the final third of their time practising their writing and presentation skills with the aim of presenting research outcomes in a concise but interesting manner.

My second piece of advice for students is to treasure their small discoveries. I believe that students undertaking research projects are likely to encounter many small observations that they find unique or even strange. I highly recommend exploring these observations further, and never letting them go because such circumstances can lead to novel discoveries.

My third and final piece of advice is to maintain a keen eye on the phenomena occurring in our lives. I believe nature – which is the best teacher – can always inspire us to develop bionic works based on its mechanisms. In fact, our daytime passive radiative cooler was also inspired by the natural cooling strategy used by the Sahara Silver Ant. Finally, being a researcher is all about learning and practising — students should just go ahead and do it, and not be afraid of failure!



Biography

Dr. Edwin Tso received his Bachelor's degree in Mechanical Engineering (First class), MPhil degree in Environmental Engineering, and PhD degree in Mechanical Engineering from The Hong Kong University of Science and Technology (HKUST) in 2010, 2012, and 2015, respectively. He was awarded the Fulbright–Research Grant Council (RGC) Hong Kong Research Fellowship in 2014, and studied at the University of California, Berkeley (UC Berkeley) in 2015. Upon returning to Hong Kong from UC Berkeley, Dr. Tso worked as a Research Associate at the Department of Mechanical and Aerospace Engineering (MAE), HKUST from 2015–2016, before he was promoted to the rank of Research Assistant Professor (2016–2018). While at HKUST, Dr. Tso was also a Junior Fellow at the HKUST Jockey Club Institute for Advanced Study (2016–2018). In September of 2018, Dr. Tso joined CityU as an Assistant Professor. Dr. Tso's research interests include thermofluids, heat transfer, energy and the built environment, and energy-efficient building technologies. He has particular interests in the fields of adsorption technology, thermal diodes and switches, nanofluids and hybrid nanofluids, thermochromic smart windows, passive radiative cooling, numerical simulations, and advanced experimental techniques. Dr. Tso is also active in entrepreneurship and technology transfer, and has been involved in a start-up company since 2012. Dr. Tso's research focuses on understanding the fundamentals of heat transfer, energy conversion, and engineered materials. He strives to integrate theory and experiments to create innovative solutions for enhancing thermal management, built environments, space cooling and refrigeration, micro-droplet manipulation, and energy-efficient building technologies. He hopes his research in these areas will help address pressing and important issues.

Research Interests

Adsorption Cooling and Dehumidification Systems; Passive Radiative Cooling; Thermochromic Smart Windows; Transparent Wood; Thermal Rectification; Solar Energy and Water Harvesting; Nanofluids and Hybrid Nanofluids Heat Transfer; Thermal Management for High Performance Systems.

Research Success

SEE and New World Development Join Hands to Accelerate Net Zero Carbon By 2050

SEE and New World Development Company Limited ("NWD") concluded a MOU to accelerate the common ambition to achieve Science Based Targets by 2030 and Net Zero Carbon by 2050, echoing the HKSAR Government's own green target.

Now, SEE and NWD are teaming up to co-develop net zero carbon related technologies in the areas of energy efficient design, renewable energy, building materials with low embodied carbon, waste management, emissions trading, and health and wellness – as well as providing pilot opportunities to realise research ideas.



(From left to right) Ms. Ellie Tang, Head of Sustainability at NWD and Prof. Chak K. Chan, SEE Dean



(From left to right) Prof. Chak K. Chan, SEE Dean and Ms. Ellie Tang, Head of Sustainability at NWD

Dr. Adrian Cheng, Chief Executive Officer at NWD said, "We are committed to Creating Shared Value (CSV) for the community and all of our stakeholders. We understand that third party collaboration is essential in our global transition to a zero carbon future. Through this strategic partnership with CityU, we will jointly develop innovative technologies to address climate change and create a more sustainable future for the next generation."

Ms. Ellie Tang, Head of Sustainability at NWD said, "To further advance our decarbonisation efforts, we are taking systematic approaches to align our building portfolio decarbonisation efforts with the Paris Agreement. Now, in this crucial partnership with CityU, we will pool our resources to pilot new green technology and innovation that can help us reach our net zero carbon goals – and the world's – in pursuit of a greener and more sustainable building industry."

Prof. Chak K. Chan, Dean and Chair Professor of Atmospheric Environment of SEE added, "The faculty members of SEE have been conducting innovative research to facilitate the transformation to a carbon neutral economy. We are delighted to join hands with NWD to promote research and development of technology to drive net zero carbon innovations in the building and construction industry. Together we will bring positive impacts to our society."

Twelve SEE Faculty Members Awarded the General Research Fund (GRF) / Early Career Scheme (ECS) for 2021/22

The Research Grants Council (RGC) has just announced the results of the GRF and ECS exercises for 2021/22. SEE faculty members achieved an overall success rate of 48%, with 12 out of 25 applications awarded the GRF or ECS.

Prof. Chak K. Chan	Sulfate Formation via Photosensitized Reactions of Biomass Burning Compounds
Prof. Wang Wen-Xiong	Cellular Uptake, Dissolution, and Distribution of Cu and Zn Nanoparticles: Implications for Toxicity
Dr. Alicia An	Facile Fabrication of a Bioinspired Omniphobic-slippery Membrane for Robust Membrane Distillation with Real Time Monitoring for Wetting, Fouling, and Scaling
Dr. Walid Daoud	Understanding Ion Transport in Hydrogel Electrolyte and Charge Transfer on Electrode-hydrogel Interfaces for Wearable Zinc-ion Battery
Dr. Patrick Lee	Comprehensive Profiling of Hospital Air and Surface Microbial Communities Using Integrated Metagenomics and Metatranscriptomics Analyses
Dr. Yun Hau Ng	Understanding the Improved Photocharge Transportatio in Bismuth-based Photocatalysts via Defect and Structural Engineering
Dr. Shauhrat Chopra	Dynamic Life Cycle Assessment (dLCA) of Emerging Waste Valorisation Technologies: Guiding Sustainable Waste-derived Biosurfactant Production
Dr. Henry He	Aquatic Photooxidation of Organic Ultraviolet Filters and Their In Vitro and In Vivo Toxicity Assessments
Dr. Theodora Nah	Aqueous Secondary Organic Aerosol Formation and Transformation by Nitrate-mediated Photooxidation
Dr. Keith Ngan	Numerical Modelling of the Influence of Secondary Surface Roughness on Urban Turbulence and Ventilation
Dr. Edwin Tso	Thermochromic Transparent Wood Composites with Highly Efficient Broadband Optical Management Capability for Smart Window Applications
Dr. Wei Wu	Microchannel Membrane-based Ionanofluid Reactor with Machine-learning Optimization for High-density and Low-temperature Absorption Thermal Energy Storage

Dr. Alicia An, Dr. Wei Wu and Dr. Denis Yu Received the Teaching Development and Related Grants

Dr. Alicia An, Dr. Wei Wu and Dr. Denis Yu, received the Teaching Development and Related Grants (TDGs).



Dr. Alicia An

Discovery-based Learning Using Interactive Hands-on Methods for Engineering Innovative Water Treatments



Dr. Denis Yu

Developing Short Educational Videos and a Student Video Project to Enhance Physical and Online Teaching



Dr. Wei Wu

Learning Building Decarbonization Technologies Incorporating Daily Life Experiences

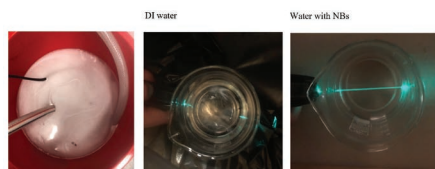
The University Grants Committee (UGC) supports the development of learning and teaching initiatives through the allocation of TDGs to tertiary institutions. The Grant aims to integrate and support institution-level initiatives and to promote innovations that enhance the quality of teaching for the better provision of quality education to students.

Dr. Alicia An's Project Funded by the Marine Conservation Enhancement Fund



Dr. Alicia An has recently received the Marine Conservation Enhancement Fund for the project 'Removal of Micro/Nano Plastic from Marine Environments Using Nanobubble'.

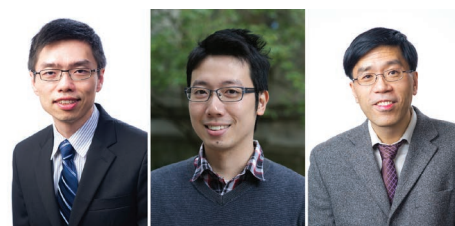
The increasing use of plastics has attracted significant attention in recent years due to their potential impacts on the marine environment. The proposed project aims to develop an efficient and environmentally sustainable solution for the removal of micro/nano-sized plastic particles in marine environments. The research will investigate the optimal treatment conditions for the segregation and removal of micro/nano plastics by applying nanobubble technology. Nanobubbles (NBs) are a facile and simple technology that can be used to float micro/nano particles, minerals, and aqueous pollutants from water bodies. Such plastics have already been found in the waters of Hong Kong; recent research has also documented significant levels of MPs near Lantau Island, with the suspected abundances of MPs in seashore organisms reaching 2.23 particles/g. As such, there is an urgent need for an efficient and economically viable solution for the removal of micro/nano plastics, which will help to protect the environment and human health.



Dr. Jason Lam, Dr. Patrick Lee, and Dr. Keith Ngan Received the UGC Special Grant for the Development of Virtual Teaching and Learning

Dr. Jason Lam, Dr. Patrick Lee, and Dr. Keith Ngan obtained the UGC Special Grant for the Development of Virtual Teaching and Learning (VTL).

Dr. Jason Lam	Harnessing VR and AR for VTL Course Enrichment
Dr. Patrick Lee	Virtual Laboratories and Multi-perspective Interactive Videos for VTL Lab-work, Practicums, and On-site Training
Dr. Keith Ngan	Generic and Targeted VTL for Self-access Learning



(From left to right) Dr. Patrick Lee, Dr. Jason Lam, and Dr. Keith Ngan

The UGC and the Quality Assurance Council (QAC) allocated additional funding to support the eight UGC-funded universities in their implementation of various initiatives (from 2021–2023) that will promote the strategic development of virtual teaching and learning (VTL) in the medium to long term.

Dr. Yun Hau Ng and Dr. Jin Shang Developed New Technologies to Tackle Air Pollution

New methods for reducing air pollution and generating solar fuels developed by scientists from SEE offer practical solutions to the energy shortage, environmental issues, and related public health risks that the world is currently facing.

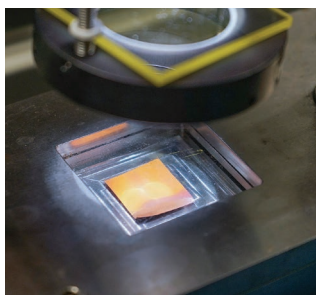
The research is the product of two projects led by Dr. Yun Hau Ng and Dr. Jin Shang. It has been published in the top chemistry journal *Angewandte Chemie*.

Dr. Ng and his team have designed a new solar-powered catalyst that can convert carbon dioxide (CO_2) into methane fuel through artificial photosynthesis. Their work has been published in a paper titled 'Metal-Organic Frameworks Decorated Cuprous Oxide Nanowires for Long-lived Charges Applied in Selective Photocatalytic CO_2 Reduction to CH_4 '.



(From left to right) Dr. Yun Hau Ng and Dr. Jin Shang have developed new technologies for generating sustainable energy and mitigating air pollution.

The other study, carried out by the team led by Dr. Shang, aims to control pollution resulting from nitrogen dioxide (NO_2), a major roadside pollutant causing photochemical smog and damage to the human respiratory tract. The team revealed a new class of robust adsorbent materials for capturing ambient NO_2 in a paper titled 'Transition-Metal-Containing Porphyrin Metal-Organic Frameworks as π -Backbonding Adsorbents for NO_2 Removal'.



The catalyst developed by Dr. Ng's team can convert CO_2 into methane fuel.

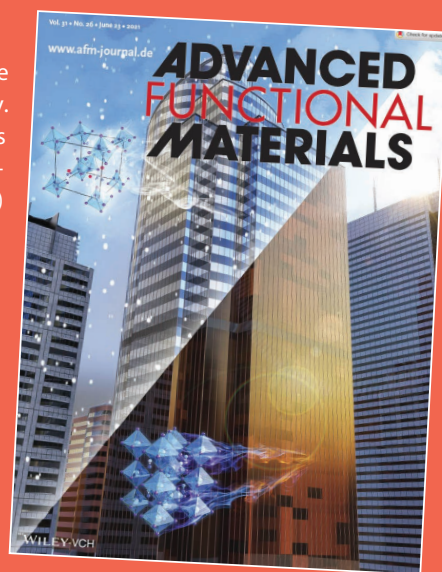


The new adsorbent materials developed by Dr. Shang's team can capture ambient NO_2 .

Dr. Edwin Tso's Research Featured on the Inside Front Cover of *Advanced Functional Materials*

Dr. Edwin Tso's group recently developed a hydrated $\text{MAPbI}_{3-x}\text{Cl}_x$ thermochromic perovskite smart window that demonstrates a smart and thermally responsive optical regulation ability. Notably, the smart window achieves a low transition temperature, narrow transition hysteresis width, and short transition time; it therefore has great potential for applications in energy-efficient buildings. The results have been published (<https://doi.org/10.1002/adfm.202010426>) and featured on the inside front cover of *Advanced Functional Materials* (IF: 16.836) (<https://doi.org/10.1002/adfm.202170186>).

Thermochromic smart windows have been investigated as a potentially novel energy-saving glazing technique for buildings because of their low cost and passive controllability of solar irradiance. Very recently, organic hybrid halide perovskites have been found to show thermochromism with good optical performance. However, these perovskites have several shortcomings in thermochromic performance (e.g., long transition times, high transition temperatures, and a large transition hysteresis width). Dr. Tso's group developed a new thermochromic perovskite smart window (i.e., Hydrated $\text{MAPbI}_{3-x}\text{Cl}_x$), which undergoes a reversible transition between a transparent state and a dark reddish-brown tinted state that has a high solar modulation ability, and which possesses excellent transition properties. When fitted to a model house in Hong Kong, the smart window also demonstrates a reduction in indoor air temperature that is 3.5 °C lower than the temperature achieved when a quartz glass window is used. This research provides new insights into the development of next-generation energy-efficient windows for green buildings.





Dr. Lin Zhang Received the Outstanding Paper Award from the CICC Global Institute

Dr. Lin Zhang's working paper entitled 'Do We Still Need Carbon-intensive Capital When Transitioning to a Green Economy' has been awarded the Outstanding Paper for Sustainable Paths Toward Carbon Neutrality by the CICC Global Institute.

Jointly authored by Prof. Wei Jin from Tianjin University and Prof. Frederick van der Ploeg from the University of Oxford, the paper focuses on identifying a new role for carbon-intensive capital in the process of green economic transition. It is argued that if climate regulations induce stepping-up of carbon-free capital to offset the damages from global warming, the economic value of carbon-intensive capital can be protected and the running down of carbon-intensive assets can be mitigated. The use of carbon-intensive capital gives the economic means to enhance clean capital accumulation and sustain endogenous growth. Both carbon-intensive and carbon-free capital may thus be needed for an efficient transition to green growth.



Dr. Lin Zhang received the Outstanding Paper Award from the CICC Global Institute.

Collaborative Research Fund (CRF) Kick-Off Meeting for the One-Off CRF Coronavirus Disease 2019 and Novel Infectious Disease Research Exercise

Project Title

Reducing transmission of novel coronavirus and other infectious diseases using food waste-derived medical textiles via electrospinning for healthcare apparel and personal protective equipment

The first CRF Monthly Meeting was held at CityU on 2 June 2021. All CRF Co-Principal Investigators and their research team members participated in the meeting.

This Kick-off Meeting provided a great platform for the exchange of views, visions and research experiences pertaining to the FIVE major tasks. It also provided a unique opportunity for young scientists and researchers from various disciplines to tackle the grand challenges and public health problems by developing new solutions involving the use of food waste-derived, non-woven medical textiles produced via electrospinning for healthcare apparel. These solutions aim to limit the airborne transmission of COVID-19 and other novel infectious pathogens, and thus protect patients and healthcare workers.

After the meeting, the group enjoyed a short trip in the afternoon to the Nano and Advanced Materials Institute (NAMI) in the Hong Kong Science Park. This trip had been pre-arranged by Mr. Johnny Lo (a PhD student of Dr. Carol Lin).



(From left to right) Dr. Walid Daoud, Dr. Ben Leu, Dr. Shauhrat Chopra, Prof. Chak K. Chan, Dr. Carol Lin, Prof. Christopher Chao, Dr. Edwin Tso. Prof. Shixing Tang and Dr. Zhi Ning participated via Zoom.



Dr. Carol Lin and her research team members chaired the research presentation by a Task 3 team member.



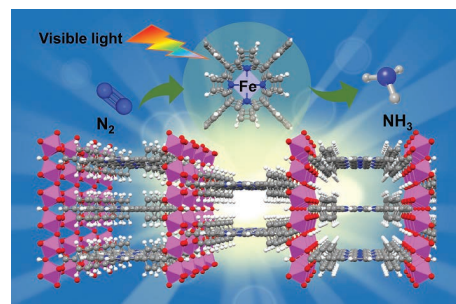
Dr. Shauhrat Chopra (left) and Dr. Ben Leu (right) participated in a research discussion session during the Kick-Off Meeting.

SEE's Synergistic Research led to Artificial Nitrogen Fixation on Magic Porous Solids

The fixing of atmospheric nitrogen into ammonia is essential for sustaining life on earth. Today, nitrogenase, which occurs naturally, supplies half of such fixed nitrogen; the other half is supplied by the industrial Haber–Bosch process that occurs at elevated temperatures and pressures. However, the Haber–Bosch process is not sustainable, as it uses hydrogen sourced from steam reforming of methane to reduce nitrogen, and consumes large amounts of fossil fuels while producing massive carbon dioxide emissions.

To help secure a sustainable production of ammonia, two SEE research groups, led by Dr. Jin Shang and Prof. Michael Leung, joined efforts to develop a porous biomimetic photocatalyst capable of achieving artificial nitrogen fixation powered by sunlight at ambient temperatures and pressure, using water as the reducing agent. The results were published in *ACS Nano* (<https://doi.org/10.1021/acsnano.0c10947>).

Inspired by natural processes such as in nitrogenase, where iron binds favourably and activates nitrogen, and photosynthesis, where the porphyrin moiety in chlorophyll effectively harvests sunlight, the team developed an iron-metalated porphyrin-based metal-organic framework (MOF) as a photocatalyst for nitrogen fixation. Given that ammonia is both an essential chemical commodity and a promising carbon-free energy carrier, its sustainable production will advance the development of the future nitrogen economy. The team hopes that this synergistic and pioneering research will unlock a new toolbox for scientists and engineers in the field of catalysis, one that will facilitate the exploration and development of porous MOFs-based biomimetic photocatalysts for catalysing difficult reactions at ambient temperatures and pressure, and that is not limited to artificial nitrogen fixation.



Dr. Jin Shang (left) and Prof. Michael Leung (right) collaborated to conduct research on artificial nitrogen fixation in magic porous solids.

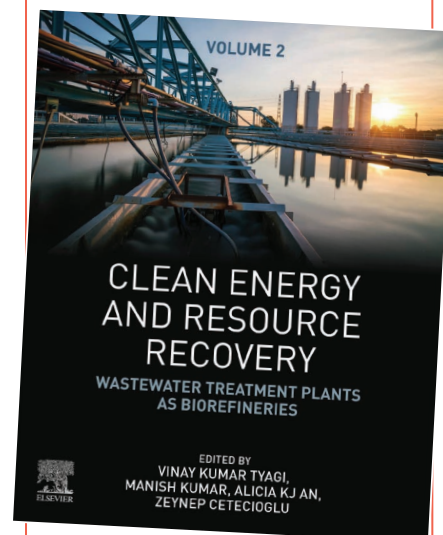
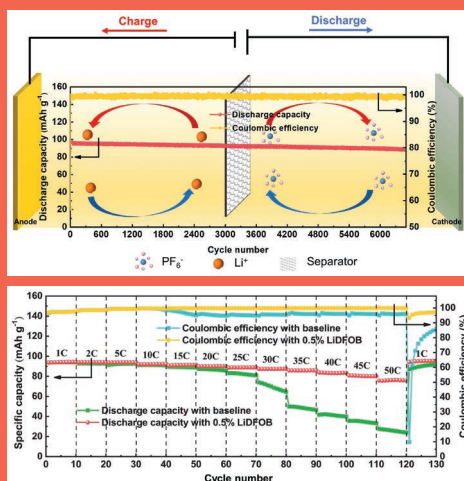
Dr. Denis Yu's Research on New Dual-ion Battery Published in *Advanced Functional Materials*

Lithium-ion batteries are indispensable in our daily lives: we use them all the time for storing energy in cell phones, laptops, and even electric vehicles. Most of us have probably experienced the anxiety of having our cell phone battery running low and wishing that the battery could be charged within minutes.

The research team led by Dr. Denis Yu has developed a novel dual-graphite battery system that allows for over 90% of the battery's capacity to be charged within three minutes. Their findings, titled 'Ultrafast Charging and Stable Cycling Dual-Ion Batteries Enabled via an Artificial Cathode–Electrolyte Interface', have been published in the scientific journal *Advanced Functional Materials* (<https://onlinelibrary.wiley.com/doi/abs/10.1002/adfm.202102360>).

'Dual-ion batteries use both cations and anions inside the electrolyte to store and release energy. They can react faster than conventional lithium-ion batteries and also store more energy than conventional supercapacitors,' said Dr. Yu. 'This type of battery is suitable for applications where both a high power and high energy are required.'

The team discovered that a salt additive (LiDFOB) can form a thin robust layer on the surface of the graphite active material. By suppressing electrolyte decomposition and side reactions, this protective layer allows the rapid transport of anions into and out of the graphite layers within minutes. The graphite electrode can also be cycled more than 6000 times with only a minimal loss in battery capacity.



Dr. Alicia An Edited a Book with Elsevier

Dr. Alicia An has edited the book *Clean Energy & Resource Recovery: Wastewater Treatment Plants as Biorefineries*, which is currently in press with the publisher Elsevier.

Research Stories

An Alternative to Deep-Sea Fish Oil

— by Dr. Carol Lin

The demand for health products among people in Hong Kong is growing, and taking health supplements has become a common habit. Omega-3 fatty acid supplements are particularly popular among consumers, as they help improve blood circulation, widen blood vessels, and keep the heart healthy.

At present, most consumers increase their intake of omega-3 by taking deep-sea fish oils. However, such consumers face limited choices among products that have problems with heavy metal accumulation or strong fishy aromas. In collaboration with the team of Prof. Hongye Li from Jinan University, the research team of Dr. Carol Lin developed a method for efficiently producing omega-3 fatty acids. Using biotechnological techniques, they introduced the synthetic omega-3 fatty acid genes of marine microalgae into yeast cells. Omega-3 fatty acids could then be produced by controlling the fermentation process in these yeast cells. The omega-3 fatty acids produced from this research constitute a vegan product with the potential to replace deep-sea fish oil as a new omega-3 fatty acid supplement in the health supplement market. The team will continue to devote its efforts to technology transfer and the launch of the product in the market with the aim of providing society with better alternatives to deep-sea fish oil.



Shedding New Light on the Role of Ambient Ammonia in PM_{2.5} Pollution in Hong Kong

— by Dr. Theodora Nah

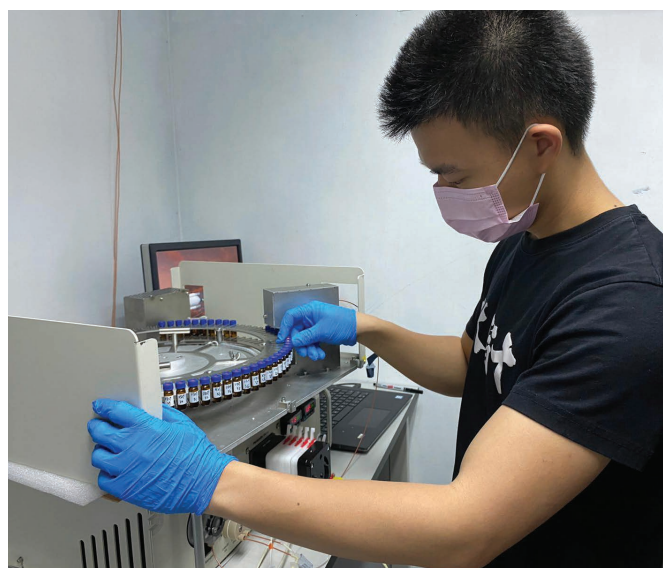
Particulate matter is a serious public health issue in Hong Kong, which can potentially lead to increased morbidity and mortality. Ammonia is the most important basic gas in the continental troposphere. It reacts with nitric and sulfuric acids in the air to form nitrate and sulfate, which are the key components of fine particulate matter

(PM_{2.5}). Ammonia emissions are typically associated with agricultural activities. However, there is growing evidence that non-agricultural sources such as vehicular emissions, energy generation, urban green space, and waste management can emit large concentrations of ammonia. As ammonia is not one of the air pollutants measured by the air quality monitoring network, of Environmental Protection Department, HKSAR Government, there is currently limited information on ambient concentrations of ammonia in various environments in Hong Kong. This limits our ability to predict whether ammonia emission controls could significantly reduce PM_{2.5} pollution in Hong Kong.

Dr. Theodora Nah's current project, funded by the Environment and Conservation Fund, is focused on characterising the spatial and seasonal distributions of ambient ammonia, and its relationship with PM_{2.5} pollution in Hong Kong. This project addresses the following air-quality policy-related questions:

1. What are the Hong Kong public's levels of exposure to ammonia?
2. How important is the role played by ammonia in Hong Kong's air quality and PM_{2.5} pollution?
3. To what extent does ammonia contribute to PM_{2.5} production?
4. To what extent will ammonia emission controls mitigate PM_{2.5} production?

To address these questions, Dr. Nah's team of three SEE undergraduates (Mr. Lam Yin Hau (Graduate Class of 2021), Mr. Siu Wing Hei, and Miss Leung Ka Yan) has been performing ammonia and PM_{2.5} measurements in a year-long field study at various locations in Hong Kong. The students are gaining first-hand experience in conducting field measurements while applying the knowledge gained from the undergraduate study to characterise the mass concentration and composition of PM_{2.5}. These PM_{2.5} measurements will ultimately be correlated with ammonia measurements to answer the above-mentioned questions and provide new insights into the role of ammonia in PM_{2.5} pollution in Hong Kong.



Mr. Lam Yin Hau performing PM_{2.5} measurements using a Particle-Into-Liquid Sampler (PILS).



Ammonia measurements will be performed at several locations (CityU, Cape D'Aguilar, Tsuen Wan, Tseung Kwan O, Central, and Yuen Long) using passive sampling devices. This will allow Dr. Nah's team to characterise the spatial distributions of ambient ammonia concentrations in Hong Kong over land used for various purposes.

Combining Microbiology and Atmospheric Chemistry to Investigate How Bacteria on Indoor Surfaces Influence Indoor Air Quality — by Dr. Patrick Lee and Dr. Theodora Nah

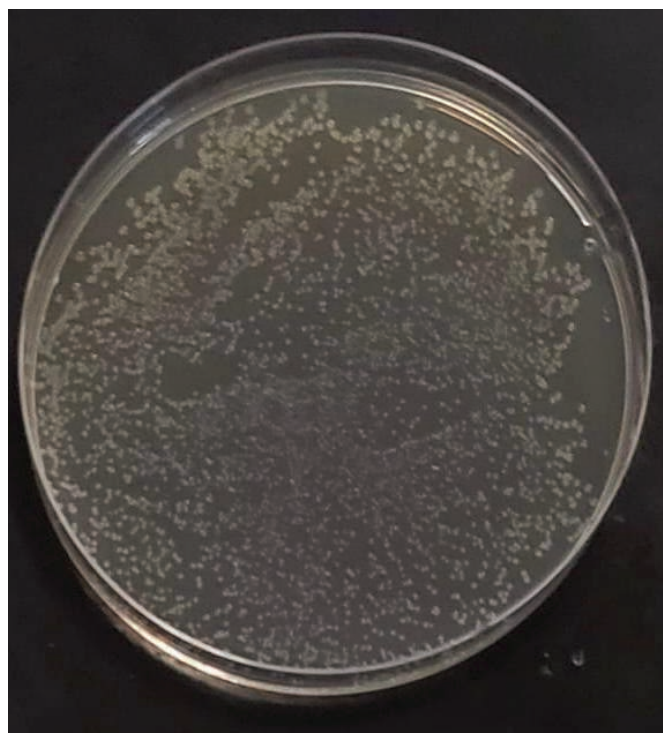
We spend an average of 90% of our time indoors, where we are exposed to various indoor-air pollutants that can have adverse effects on our health and well-being. Bacteria abound in indoor environments, and some species can form biofilms on indoor surfaces. In addition, bacteria are creative chemists that can create and emit a variety of chemicals as they grow and form biofilms on indoor surfaces. Bacterial biofilms are a major public health problem because they are a common cause of persistent infections. However, the indoor environmental factors that affect the formation of bacterial biofilms are not currently understood.

Dr. Patrick Lee (Microbiology) and Dr. Theodora Nah (Atmospheric Chemistry) have teamed up on a project to investigate the formation of biofilms by different bacterial species commonly found indoors. This project will address the following questions:

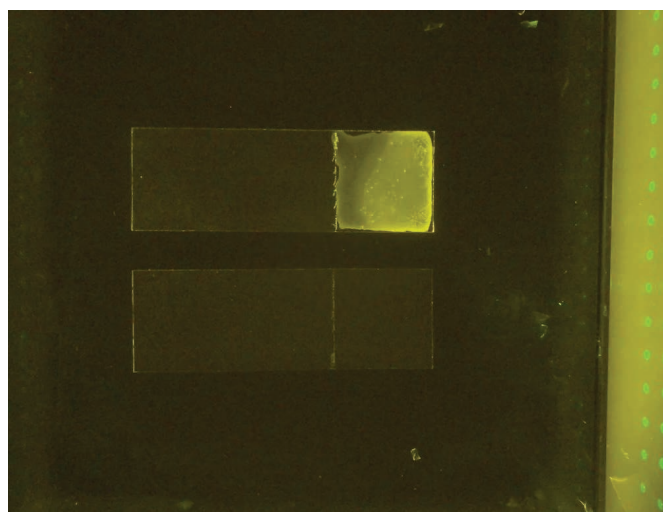
1. Under what conditions (for example, moisture and light) are bacteria on indoor surfaces active and able to form biofilms?

2. What kinds of chemicals are created or emitted by bacteria as they grow and form biofilms? How do these chemicals contribute to the formation of the volatile compounds found in indoor air?
3. What are the by-products formed when bacteria on indoor surfaces consume common indoor chemicals (e.g., human skin oils and plasticisers)?

Their approach will culture various bacterial species on glass slides and under different levels of moisture and light, and then expose these species to a range of chemicals commonly found on indoor surfaces. They will then measure the rates at which biofilms grow, and the types of chemicals that are created or emitted by the bacteria during biofilm formation. They will also use novel analytical techniques to

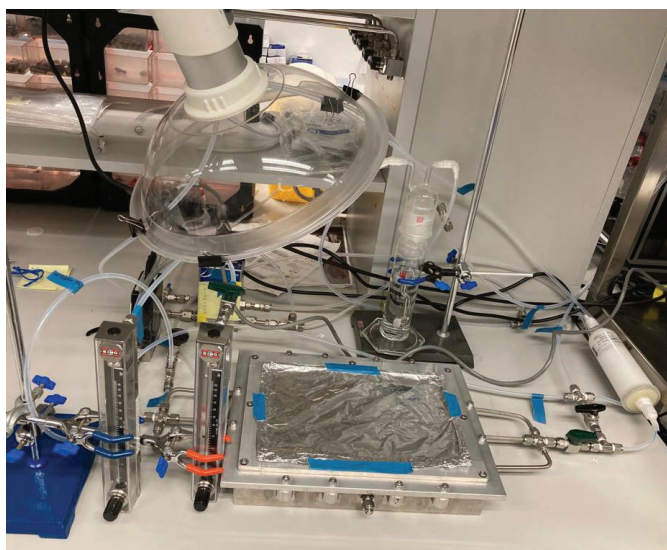


A variety of bacterial species can grow and form biofilms on indoor surfaces under certain conditions.



(Top slide) Presence of a biofilm (Bottom slide) Absence of a biofilm.

characterise chemicals emitted by bacteria, and combine their results with microbiological approaches to study how bacteria behave on indoor surfaces. Thus, this project has the potential to transform our understanding of how bacteria influence indoor-air quality.



A custom-built stainless-steel reactor is used to expose bacteria cultured on glass slides under different amounts of moisture and light to various chemicals commonly found on indoor surfaces.

Saltwater-based Energy Storage and Refrigeration for Green Cooling

— by Dr. Wei Wu

In Hong Kong, air-conditioning accounts for nearly half of the electricity consumption of buildings, which in turn accounts for more than 90% of the city's total electricity consumption. Conventional air conditioners consume a huge amount of energy, and the refrigerants used also damage the environment. Research on green-cooling technology is therefore of great significance to the realisation of low-carbon buildings and low-carbon cities.

Although solar refrigeration can effectively save energy and reduce emissions, the supply of solar energy is unstable, as it is influenced by the weather and sunshine duration. In light of this, the research team of Dr. Wei Wu has developed a new technology that can store solar energy for refrigeration. This technology uses saltwater (sodium chloride, calcium chloride, lithium bromide, etc.) to store excess solar energy during the day and releases energy to cool the building during rainy days or at night. By storing energy with saltwater – an economical and environmentally friendly resource – this technology greatly reduces the power consumption and carbon footprint of air-conditioning in buildings while providing a stable supply of solar energy and meeting the cooling needs of different time periods. Dr. Wu's team will continue with the research and transfer of this new form of cooling technology in the hope of promoting the development of energy-efficient and low-carbon buildings and contributing to Hong Kong's goal of carbon neutrality by 2050.

Using High-efficiency Catalytic Materials to Convert Solar Energy into Hydrogen Energy

— by Dr. Sam Hsu

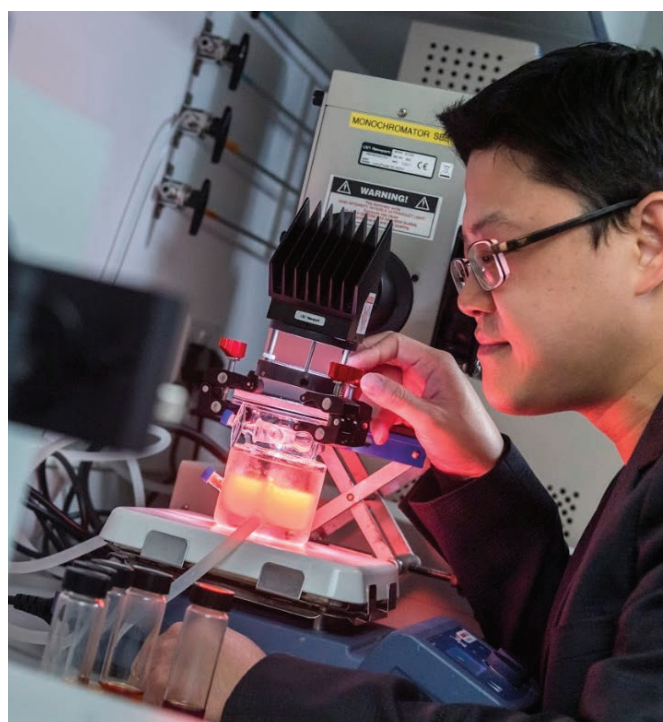
Energy shortages, environmental pollution, and sustainable development are issues with significance to everyday life. Since the 1970s, the scientific community has proposed to use electricity generated from renewable energy sources to decompose water into hydrogen and oxygen, and to use the hydrogen obtained to replace petroleum for power generation. Hydrogen is an environmentally clean fuel, as its combustion does not emit greenhouse gases and suspended particles.

Currently, hydrogen is mainly mass-produced by reforming coal and natural gas. This not only wastes non-renewable energy but also severely pollutes the environment. Hence, the use of inexhaustible sunlight to mass-produce hydrogen is a research direction that has attracted much attention in recent years.

The research team led by Dr. Sam Hsu successfully converted solar energy into hydrogen energy by using a composite perovskite material with a special structure as a catalyst. The hydrogen energy produced by this perovskite material triples that of ordinary perovskite materials. The reduction reaction catalysed by sunlight is relatively simple and more cost-effective.

This research was published on the cover of the internationally renowned academic journal *Advanced Functional Materials*.

In the next stage of research, Dr. Hsu will attempt to increase the volume of hydrogen produced by the new technology. 'In the long run, hydrogen energy will become one of our main energy sources,' he says.





Academic Development

SEE Industry Ready Programme — Tremendous Support from the Industry to Create Internship Jobs and Intensive Training Workshops

In January 2021, SEE established the Industry Ready Programme (IRP), a unique programme in which industry partners provide intensive training workshops for students on topics that are relevant for practitioners. Upon completion of the training, most student participants are placed in different companies for a two-month internship in areas relating to energy, environment, or sustainability.

The training workshops and internships are arranged according to the following three tracks: Energy/Building Energy Efficiency, Environment, and Sustainability. In May and June 2021, the following workshops for students and the workshops were taught by senior practitioners in their fields.

Track	Training Workshop
Energy/Building-energy Efficiency	<ul style="list-style-type: none"> Retro-commissioning Training by Hong Kong Green Building Council (2 sessions)  <ul style="list-style-type: none"> WELL Training by Allied Environmental Consultants Limited (3 sessions)
Environment	<ul style="list-style-type: none"> Comprehensive Liquid Waste Management – Innovation, Technology and Practical Operation Workshop – by Dunwell Petro-Chemical Company Limited (1 session)  <ul style="list-style-type: none"> Introduction to Green Building, Simulation, Building Services and CAP601 – by Telemax Environmental and Energy Management Limited (3 sessions)
Sustainability	<ul style="list-style-type: none"> WWF-HK Sharing Session on Environment and Sustainability (1 session)

We currently have 10 strategic partners who are offering training workshops and over 28 partners offering student internships. In the summer of 2021, we saw a record high of 60 students gaining internship placements, with a substantial number of these affiliated with the Industry Ready Programme!

Acknowledgement of Support

SEE would like to thank the following parties (in alphabetical order) for their support to the Industry Ready Programme in 2021!

- Alaya Consulting Limited
- Allied Sustainability and Environmental Consultants Group Limited
- Arup
- Baguio Green Group Ltd.
- BEAM Society Limited
- BillionGroup Technologies Ltd.
- BUDA Surveying Limited
- Building Services Operation and Maintenance Executives Society
- Carnot Innovations
- Cathay Pacific
- China Dynamics New Energy Technology Company Limited
- Chinese YMCA of Hong Kong
- CLP Power Hong Kong Limited
- Dunwell Technology (Holdings) Ltd.
- EcoSage Limited
- Federation of Hong Kong Industries (Group 26) (Environmental Industries Council)
- Green Energy Engineering Consultancy Ltd.
- Harbour City Estates Limited
- Hong Kong Green Building Council
- Hong Kong Institute of Qualified Environmental Professionals Limited
- Hong Yip Service Co. Ltd.
- Kellon Energy Performance Contracting Limited
- Keysen Property Management Services Limited
- New Charm Management Limited
- PCCW Limited
- REC Engineering Company Limited
- Schneider Electric
- Telex Environmental and Energy Management Limited
- The Hong Kong and China Gas Company Limited
- The Hongkong Electric Co., Ltd.
- Urban Property Management Limited
- Vineberg Property Management Limited
- World Wide Fund For Nature Hong Kong (WWF-HK)
- WSP

Sharing from IRP Student Participants

Miss Kirupakaran Shruthe *BEng in Environmental Science and Engineering @ Cathay Pacific*

Through the SEE IRP, I had various training sessions and was given a summer internship at Cathay Pacific. Each training session covered different aspects of our studies. Telex Environmental and Energy Management Limited's training on green building taught us about innovative technology. WWF covered field studies related to habitat protection and biodiversity, and showed us the type of experiences we could gain from such work. The training given by Dunwell was eye-opening, especially its training on the use of vibrating membranes for filtration to reduce fouling. During each presentation, I could feel the passion and dedication the speakers had for his/her work, which was inspirational.

As a Sustainability Intern at Cathay Pacific, my work is research based, and includes working on UN Sustainable Development Goal (SDG) mapping and global benchmarking for four subsidiaries. The scope of my work creates many learning opportunities on a daily basis, from understanding how companies

integrate SDGs into their business models, to learning the innovative engineering approaches taken by industry leaders. Every day is a new challenge, but my supervisors are always there to guide me, which makes for a meaningful and enjoyable experience.



Miss Lee Tsz Yan *BEng in Environmental Science and Engineering @ Dunwell Petro-Chemical Company Limited*

It is my honour to be a summer intern at Dunwell Petro-Chemical Company Limited. I was extremely fortunate to have an opportunity to chat with Ir. Prof. Daniel Cheng, the Managing Director. He told engaging stories, and reminded me that 'opportunity-seeking for others' is crucial in the business field.

When I sought advice from my supervisor on how to prepare for this internship, he told me to be proactive. During my internship, I was assigned to work in the laboratory and learn about experiments on oil and water samples. Thanks to Bianca, the laboratory technician, I learned about and performed numerous experiments on oil quality, flash points, COD, TSS, KH, GH, viscosity testing, and other aspects. I also learnt about oil mixing and benchmarking the suppliers for a project with a listed company. I will always stay proactive and do my best to learn as much as possible!



Staff Achievement

SEE Faculty Members and Teams Shine in the HKIE Environmental Paper Award 2020/2021

The Hong Kong Institution of Engineers (HKIE) Environmental Division organised the Environmental Paper Award 2020/2021 to encourage environmentally friendly projects from engineers, scholars, and researchers.

Dr. Edwin Tso and his team (Miss Yuwei Du, Miss Siru Chen, Mr. Luke Christopher Chao, Mr. Kaixin Lin, Dr. Hau Him Lee, and Dr. Tsz Chung Ho), together with Prof. Michael Leung, participated in the competition and won the **Champion Prize (2020/2021)**. Their winning paper, 'An Energy-free and Low-cost Daytime Passive Radiative Cooling Paint for Energy Saving in Buildings and Decarbonisation', illustrated the working principle and fabrication method of a novel daytime passive radiative cooling paint and demonstrated its cooling performance and energy-saving potential in real building applications.

Another publication authored by a team of SEE researchers led by Dr. Wei Wu, Dr. Lin Zhang, and Dr. Denis Yu on 'The Effect of Humidity on Indoor Air Quality (IAQ) – Comparisons of HVAC Systems Using Condensation Dehumidification and Desiccant Dehumidification in Hong Kong' won the **Certificate of Merit (2020/2021)**. This paper was based on a year-long investigation on indoor air quality in a variety of buildings in Hong Kong by the SEE team. Both measurements and simulations were conducted to study the energy consumption of traditional HVAC and desiccant dehumidification systems. The results highlighted the importance of controlling humidity in buildings in Hong Kong. In particular, the data on indoor thermal comfort in two buildings – the headquarters of the Hong Kong and China Gas Co. Ltd and the Four Seasons Hotel Hong Kong – showed that desiccant dehumidification systems consume less energy than overcooling and reheating dehumidification systems under the same level of dehumidification. The paper included a discussion of the life cycle costs of dehumidification schemes based on an economic analysis.



Ir. Dr. Anthony Ma (Chairman of the Environmental Division, HKIE; third from the left), Dr. Edwin Tso (fourth from the left) and his PhD students, postdoctoral fellows, and research assistants who participated in the Environmental Paper Award 2020/2021.



From left to right: Ir. Dr. Anthony Ma (Chairman of the Environmental Division, HKIE), Mr. Xiaojun Yu, Dr. Lin Zhang, Mr. Don Cheng (Hong Kong and China Gas Company Limited), Dr. Wei Wu, Mr. Zhixiong Ding, Ir. Dr. Raymond K L Chan (HKIE Committee Member – Continuing Professional Development Committee Representative), and Mr. Sammy Kong (Hong Kong and China Gas Company Limited)

Dr. Denis Yu Won the Innovative CityU-Learning Award

Dr. Denis Yu won the Innovative CityU-Learning Award (Semester B, 2020/21) with his idea for 'allowing students to put theories into practice, and to examine the physical world by bringing hands-on experiments and projects to their homes'.

Online classes have broadened the scope and flexibility of teaching and learning. Dr. Yu's learning initiative takes online learning one step further, as students can put their knowledge into practice by conducting hands-on experiments and projects at home. Specifically, students can design their own experiments and carry them out by using readily available items at home such as their cell phones and objects commonly found in the kitchen. They can analyse the data obtained so that they can advance their understanding, and learn to explain real-life and physical phenomena.

Examples:

- Using the camera/light sensor of a cell phone to explore the concepts of light and lighting
- Using the sound meter in the cell phone to explore the concepts of sound and noise
- Growing salt crystals at home to learn concepts in materials science relating to crystal lattice and structure, as well as their nucleation and growth processes
- A video project to demonstrate inversion symmetry of a molecule

The Award, introduced with the University's implementation of CityU-Learning, aims to recognise innovative approaches implemented towards enhancing the quality of online and/or hybrid learning at CityU. Three faculty members of CityU received the award.



International Exhibition of Inventions of Geneva Showcased Dr. Edwin Tso's Innovation

On 17 May 2021, the winning Hong Kong teams of the International Exhibition of Inventions of Geneva 2021 were invited to the Chief Executive's Reception at the Grand Hall of Hong Kong Science Park, where they received congratulations for their success. Among the attendees was Dr. Edwin Tso, the recipient of the Gold Medal with Congratulations of the Jury at Inventions Geneva Evaluation Days 2021. At the Reception, Dr. Tso explained his innovation, 'An Energy-Free, Low-Cost and High Cooling Performance Passive Radiative Cooling Technology for Building Applications', to Ms. Carrie Lam, HKSAR Chief Executive, and other guests.



CityU's President Prof. Way Kuo and Vice President for Research and Technology Prof. Michael Yang congratulated the teams for their brilliant performances. These high international awards demonstrate the excellence of the research carried out at CityU.

Dr. Edwin Tso was Invited to Present at the Briefing Session on Government Energy Performance Reporting and Monitoring 2021

Dr. Edwin Tso was recently invited by the Electrical and Mechanical Services Department (EMSD) of the HKSAR Government to give a presentation titled 'Daytime Passive Radiative Cooling in Hong Kong: Past, Present, and the Future' on 14 July 2021 at Hong Kong Science Museum. To promote awareness for energy saving and conservation, Dr. Tso introduced an advanced energy-saving technology for buildings known as 'daytime passive radiative cooling' to government officials from various bureaus and departments.

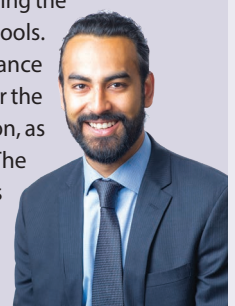


Dr. Shauhrat Chopra Delivered a HKIE Webinar

Dr. Shauhrat Chopra was invited by the Control, Automation & Instrumentation Division of HKIE to speak in a webinar titled 'Data-driven Waste Management and Resource Efficiency: Path to a Decarbonisation and Circular Economy' on 28 April 2021.

The Hong Kong Government has set the target of becoming carbon-neutral by 2050. The adoption of a circular economy over a traditional linear economy is one of the key routes for achieving a low-carbon future that can mitigate Hong Kong's waste management crisis. Despite the inherent benefits of the circular economy, its adoption is low because of the lack of data and tools for sustainable decision-making for resource-efficient waste management.

Dr. Chopra highlighted the utility of tools such as the Life Cycle Assessment for data-driven decision-making. The talk also showcased opportunities for the development of novel life cycle assessment models by leveraging the advances in Information and Communication Technologies tools. In particular, blockchain-enabled data-driven tools may enhance trust and transparency in supply-chain networks, platforms for the shared and performance economies, stakeholder participation, as well as the governance and management of organisations. The talk emphasised the value of data-driven tools and systems analytics for avoiding unintended negative consequences of engineering decisions on the environment.



Dr. Yun Hau Ng Talked About Clean Hydrogen at the Bilateral Energy Workshop (Electrical and Mechanical Services Department of the HKSAR Government and Energy Market Authority of Singapore) and Carbon Neutrality Task Force

The Electrical and Mechanical Services Department (EMSD) of HKSAR Government and the Energy Market Authority (EMA) of Singapore held a bilateral energy workshop on 11 May to strengthen energy cooperation. At the Workshop, Dr. Yun Hau Ng presented his research on clean hydrogen generation using an approach involving artificial photosynthesis. Mr. Eric Pang, Director of EMSD, expressed that the EMSD was looking forward to introducing a roadmap for carbon neutrality.

At the Carbon Neutrality Task Force held on 10 June 2021, Dr. Ng shared his research on hydrogen production, which involved the use of a photocatalytic water-splitting method. Around 40 participants from the Environmental Protection Department, Electrical and Mechanical Services Department, Fire Services Department, Planning Department, Transport Department, and Marine Department of the HKSAR Government attended the sharing

to learn about the latest advancements in green technology that will help Hong Kong achieve carbon neutrality in the coming years.



Prof. Wen-Xiong Wang Interviewed by TVB News

The Japanese government has decided to release treated radioactive water that has accumulated at the crippled Fukushima nuclear plant into the sea beginning in the year 2023. Prof. Wen-Xiong Wang, Associate Dean (Research and Postgraduate Studies) and Chair Professor of Environmental Toxicology, was recently interviewed by TVB News to share his views on the toxic elements that may be released and the potential risks to human health.



Student Achievements and Activities

2021 College/School Commencement



SEE celebrated the most significant accomplishment of 132 graduates at the Commencement on 23 May 2021.

At the ceremony, Prof. Chak K. Chan, Dean of SEE and Presiding Officer, congratulated the graduates on their success and shared with them the achievements of the School thus far. Prof. Chan reaffirmed the extensive support provided by the SEE for its graduates and shared that graduates would always be welcome to return and to share their ups and downs with the members of the SEE.

In addition to the presentation of the graduates and the Outstanding Final Year Project Awards (2020/21), Dr. Sun Mingzhe (postgraduate programmes) and Mr. Lam Yin Hau (undergraduate programmes) delivered speeches on behalf of their fellow graduates.

Our warmest congratulations to all graduating students!

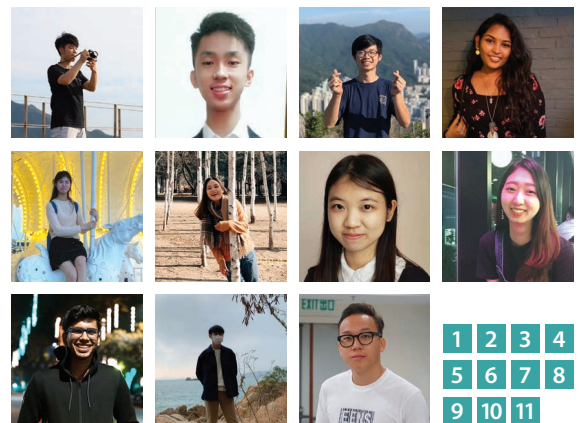


SEE Student Chapter 2021

SEE is pleased to announce the formation of the SEE Student Chapter. Under the SEE Student Chapter, a group of enthusiastic SEE undergraduate students are selected as SEE Student Delegates to take up important roles in competitions, SEE activities, as well as academic and outreach events. Under the supervision of Dr. Edwin Tso, the Student Chapter's Advisor, the delegates form into teams to participate in competitions on behalf of SEE. The delegates will also arrange a series of academic activities for fellow SEE students, and participate in outreach events.

To celebrate the establishment of the College/School-based Student Chapters, a Kick-off Ceremony was held on 26 May 2021 at the YMCA of Hong Kong. Prof. Way Kuo, President of CityU, was the guest of honour at the Ceremony. A leadership skills training workshop for student leaders was also arranged during the event. Together with Dr. Edwin Tso, Mr. Choi Man Ho, Mr. Felix Kioe, and Mr. Animesh Singh attended the ceremony on behalf of the SEE Student Chapter.

	Student Delegate	Major
1	Mr. Cheung Tim Yiu	Environmental Science and Engineering
2	Mr. Choi Man Ho	Environmental Science and Engineering
3	Mr. Kioe Felix	Energy Science and Engineering
4	Miss Kirupakaran Shrutha	Environmental Science and Engineering
5	Miss Lo Yee Lam	Environmental Science and Engineering
6	Miss Man Hiu Ching Flora	Environmental Science and Engineering
7	Miss Ou Sze Yiu Sylvia	Environmental Science and Engineering
8	Miss Park Minjee	Environmental Science and Engineering
9	Mr. Singh Animesh	Environmental Science and Engineering
10	Mr. Wong Sze Hang	Energy Science and Engineering
11	Mr. Wong Yiu Lun	Energy Science and Engineering



Start-up Fund Winners in Climate Action Recognition Scheme

Three PhD students and one postdoctoral fellow from the SEE, namely Ms Shirley Du, Mr Martin Zhu, Mr Johnny Lin, and Dr. Liam Lee, were awarded start-up funds in the Climate Action Recognition Scheme 2020-21 under the programme's 'idea stage'.

The team, supervised by Dr. Edwin Tso, proposed to launch a start-up company promoting a novel Sahara Ant-inspired cooler that is electricity-free and refrigerant-free (i.e., a passive radiative cooling paint that can be applied to the outer walls of buildings). They showcased their entrepreneurial spirit with a full-fledged business plan. If the team's proposal were to be implemented successfully, it could achieve reductions of over 50,000 tons of carbon emissions annually. The magnitude of this reduction in carbon emissions is equivalent to the effect of planting 350,000 trees in the Greater Bay Area annually. The team's idea thus represents an important step toward sustainable development and toward the mitigation of global warming and climate change.



Mr. Kam-Sing Wong (Secretary for the Environment of the HKSAR, second from the right), Dr. Edwin Tso (first from the right), and the PhD students and postdoctoral fellow who participated in the Climate Action Recognition Scheme 2020-21.

SEE PhD Students Received Second Prize of the Entrepreneurship Proposal Scheme in the 7th Hong Kong University Student Innovation and Entrepreneurship Competition

SEE PhD students Mr. Martin Zhu, Mr. Johnny Lin and Miss Kelly Chen obtained Second Prize in the entrepreneurship proposal scheme of the 7th Hong Kong University Student Innovation and Entrepreneurship Competition, which was organised by the Hong Kong New Generation Cultural Association.

The award-winning proposal is titled 'A Novel Energy Free and Environmentally Friendly Cooling Paint for Building Applications'. Supervised by Dr. Edwin Tso, the team aims to promote a novel energy-free and environmentally friendly passive radiative cooling paint product that will reduce the consumption of energy by air-conditioning in buildings.

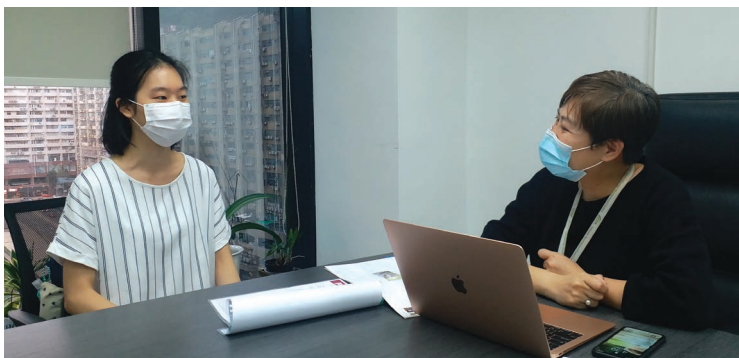


Telex Environmental and Energy Scholarship Recipient Meets with Donor



To nurture young leaders in the energy and environmental industry, Telex Environmental and Energy Management Ltd. (TEEM) has donated scholarships to the University that are awarded to students with outstanding academic performances and promising attributes. With the generous support from TEEM, the Telex Environmental and Energy Award, and Telex Environmental and Energy Scholarship have been established. In the 2020/21 round, Miss So Wai Ling, a final-year student of the BEng in Energy Science and Engineering programme received the Award; Mr. Chan Dick Long, Eddie, a Year-3 Student of the BEng in Energy Science and Engineering programme received the Scholarship.

On 14 April 2021, Wai Ling attended a casual meeting with Ir. Eagle Mo, Managing Director of TEEM, in which they discussed students' goals and aspirations. The meeting served as an excellent opportunity for Wai Ling to learn more about TEEM and to seek advice on matters pertaining to career and professional development.



Miss So Wai Ling (student awardee) and Ir. Eagle Mo, Managing Director of TEEM, shared views on students' goals and aspirations.

Binnies Hong Kong Limited Shared Important Views on Selected Final Year Projects

With its commitment to making the world a better place, Binnies Hong Kong Limited ('Binnies') has generously made a donation to the SEE in support of selected 2020/21 final-year projects (FYP) that focus on renewable energy and waste management. The following projects received the award:

Project Title	Student	Supervisor
Investigation of Electrochemical Impedance System for Early Wetting Detection in Membrane Distillation	Mr. Chan Ben Sun	Dr. Alicia An
Compact Wastewater-to-resource Facility	Mr. Cho Kam Tao	Dr. Alicia An
Bio-photoelectrochemical Hybrid Devices for Simultaneous Wastewater Treatment and Solar-fuel Generation	Mr. Chong Man Hin	Dr. Sam Hsu
Development of Copper-based Electrocatalyst for Nitrate Reduction to Ammonia	Miss Mak Wai Yu	Dr. Yun Hau Ng



The School is grateful to the delegates from Binnies, namely Ir. James Chan (Director), Ms. Christina Ko (Director of Projects), and Ir. Eric Lo (Director of Projects), for their visit and sharing of invaluable ideas with the Dean, FYP students, and supervisors on 29 April 2021. The delegates were greatly impressed with students' performances. In turn, the delegates shared many meaningful insights and thoughts that helped the students to reflect on how the projects that they had worked on could positively impact society.

The project presentation led by Ir. James Chan (Director) (back row, fourth from the right), Ms Christina Ko (Director of Projects) (back row, second from the right), Ir. Eric Lo (Director of Projects) (back row, first from the right), and senior management of Binnies inspired the students greatly.

Outstanding Final-Year Project Award (2020/21)

The following students received the Outstanding Final-Year Project Award.

Award	Student	Project Title	Supervisor
Winner	Mr. Xue Lichen	Improvement Design of a Smart Charging Pad for Multi-receivers	Dr. Chunhua Liu
1 st runner-up	Mr. Chong Man Hin	Bio-photoelectrochemical Hybrid Devices for Simultaneous Wastewater Treatment and Solar-fuel Generation	Dr. Sam Hsu
2 nd runner-up	Mr. Ching Man Kit	Guiding Sustainable Design of Emerging Technologies Using a Techno-Economic	Dr. Shauhrat Chopra
	Miss Mak Wai Yu	Assessment Approach Development of Copper-based Electrocatalyst for Nitrate Reduction to Ammonia	Dr. Yun Hau Ng

This Award is given to students who have achieved exceptional performance in their final-year projects in terms of (i) technical or scholarly quality, (ii) originality, creativity, and innovation, and (iii) impact. The award recipients were presented certificates at the 2021 College/School Commencement.



VTech Innovation & Sustainability Award (2020/21)

The 'VTech Innovation & Sustainability Award', established through a generous donation from the VTech Group of Companies (VTech), is intended for students who have demonstrated exceptional performances, as well as innovation and impact in their Final Year Projects (FYP) that relate to sustainability. The following students received the Award:

Award	Student	Project Title	Supervisor
Champion	Mr. Xue Lichen	Improvement Design of a Smart Charging Pad for Multi-receivers	Dr. Chunhua Liu
1 st runner-up	Mr. Ching Man Kit	Guiding Sustainable Design of Emerging Technologies Using a Techno-Economic Assessment Approach	Dr. Shauhrat Chopra
2 nd runner-up	Mr. Chong Man Hin	Bio-photoelectrochemical Hybrid Devices for Simultaneous Wastewater Treatment and Solar-fuel Generation	Dr. Sam Hsu
Honourable Mentions	Mr. Chan Ben Sun	Investigation of Electrochemical Impedance System for Early Wetting Detection in Membrane Distillation	Dr. Alicia An
	Miss Mak Wai Yu	Development of Copper-based Electrocatalyst for Nitrate Reduction to Ammonia	Dr. Yun Hau Ng

On 21 May 2021, at the VTech Headquarters, the awardees presented their projects to the judging panel, which comprised Dr. Allan Wong (Chairman and Group CEO of VTech), Dr. King Pang (Group President of VTech), Mr. Andy Leung (Executive Director and CEO of Contract Manufacturing Services of VTech), Mr. Andrew To (Associate Director of Development Office, CityU), and Dr. Patrick Lee, Associate Dean (Undergraduate Studies) of SEE. A prize presentation ceremony was held immediately after the presentations. SEE looks forward to collaborating further with VTech in nurturing the next generations of professionals in sustainability!

Back row (from left): Dr. King Pang, Ms. Shereen Tong (Group Chief Financial Officer of VTech), Mr. Andrew To, Dr. Allan Wong, Dr. Patrick Lee, Mr. Andy Leung, Ms. Queenie Wong (Development Officer of Development Office, CityU) listened to presentations by SEE students on their projects (front row).



Dean's List (Semester B, 2020-21)

In accordance with the University's regulations, undergraduate students who earn 12 credit units or more while maintaining a grade point average (GPA) of 3.7 or above and receiving no failures over the previous semester are placed on the Dean's List. The following undergraduate students have been placed on the Dean's List for Semester B, 2020/21.

Name	Cohort	Name	Cohort
Miss Cakin Ezgi	2017	Miss Xiao Jingyi	2018
Miss Chan Wing Yin	2017	Miss Xue Yujia	2018
Miss Choi Pui Ling	2017	Mr. Yu Cheuk Chun	2018
Miss Kan Ka Yan	2017	Miss Lo Yee Lam	2019
Mr. Lam Yin Hau	2017	Mr. Wang Ziyi	2019
Mr. Xue Lichen	2017	Mr. Jiang Yinuo	2020
Miss Fung Sze Tsing Jennies	2018	Mr. Kioe Felix	2020
Miss Park Minjee	2018	Miss Wang Yingyi	2020
Mr. Tong Chun	2018		

Students' Stories

Student Exchange - Student Exchange during the Pandemic

Mr. Eddie Chan, BEng in Energy Science and Engineering @ National University of Singapore



Thank you to NUS, CityU SEE and everyone else!

Time flies. It's hard to express how grateful I am to the SEE and NUS for preparing me for this exchange during the rapidly changing pandemic situation.

My courses on Water and Wastewater Engineering, Ecology, Geography, and The Environment at NUS were enjoyable and fruitful. The professors and local students are very kind and friendly, the school facilities are impressive, and the atmosphere is very cool. I learned so much about many different things over the semester!

As I was unable to travel to neighbouring countries, I had more time to appreciate Singapore. In addition to studying, I visited various green infrastructures, enjoyed food at local hawker centres, hiked trails, made friends with the locals and tried to speak Singlish. These experiences gave me a deep appreciation for this country and its Garden City.

I also learned many valuable lessons during my exchange. From the outset, we had to take care of all application matters – during our examination period, no less – and our application status changed daily throughout pandemic. Without perseverance and the teamwork with my exchange buddy, I don't think this exchange would ever have

happened. Moreover, at first I could only understand approximately 80% of the conversations in Singlish, but over time and by asking my Singaporean roommates and friends to explain, I came to understand almost everything. Another challenge was that there was no air-conditioning in our residence – but I actually found it quite comfortable, and as a student of SEE, I appreciated how environmentally friendly our residence was.

This exchange at NUS has helped me to refine my desired career path. I sincerely hope that the pandemic will end very soon, and that I will have more opportunities to explore the world.

Thank you, CityU, SEE, NUS and all those who supported me throughout the student exchange experience. Without you, my exchange would not have been so 'shiok!' (Singlish for 'very enjoyable or pleasing').



Forest sampling at the Bukit Batok Nature Park to study the biodiversity of trees.

Mr. Au Kwan Wah, BEng in Environmental Science and Engineering @ National University of Singapore

What a wonderful journey! It has not been easy to travel around the world during the pandemic. I knew that I was lucky to have the chance to stay at NUS for a semester. Therefore, I decided to make good use of my limited time to explore every part of Singapore, after being alone during the 14-day quarantine period. In addition to studying, it is important to enjoy the local culture, especially in a multicultural country like Singapore. My Singaporean friends are very friendly, and have shared many fun facts about Singapore and NUS with me, and showed me many interesting places.

Before travelling to Singapore, I was afraid that I might not be able to get used to living there, because I would have to leave home for a few months and take care of myself. However, I didn't feel lonely or homesick during the time spent with my roommates, because we explored Singapore every day – there was no time to be sad! This study-exchange experience has increased my respect for and willingness to talk to other people. More importantly, it has taught me that we should step out of our comfort zones, and that things turn out for the best provided we attempt to overcome challenges – even if these attempts are not successful.

Thank you for helping me during this wonderful experience!



Visiting Nanyang Technological University.

Alumni Sharing & Activities

Mr. Harry Lam, BEng in Energy Science and Engineering, Class of 2016

"What can I do to make the world a better place?"

What can I do to make the world a better place? After completing my studies at SEE, I began to search for more than a career. I wanted an opportunity to make a real difference in the world by helping to create a more sustainable planet.

I began my engineering career by focusing on designing environmental protection measures and pollution prevention controls for Hong Kong's water supply, waste and wastewater systems. Enabling sustainable infrastructure deployment and making the city more resilient to the impacts of climate change were fulfilling tasks.



Can I do more? Absolutely yes! With nations and corporates worldwide stepping up their game, I am hopeful that we can, with diligence and determination, eventually win this battle for future generations. I felt it was time for me to look at the close links between energy, climate and infrastructure systems through a holistic lens. My Master's studies at UC Berkeley gave me knowledge on various energy and environmental topics, and inspired me to pursue creative solutions that address overarching societal concerns, such as the mitigation of GHG emissions. It was both intriguing and alarming to realise we are lagging in this race to net zero.

Now what? The transportation sector is the single largest contributor of GHG emissions in many cities and nations. I believe that electrification is a crucial lever that we need to pull quickly to slash local and global emissions. I am currently working as an energy data analyst at an EV charge-management software company in California, U.S., where I serve and educate fleet operators on how transitioning to zero-emission vehicles makes more financial sense than they had realised.

I am glad that I now have a better answer to my initial question, and can see a concrete way to act. Late is better than never: please join me in this important endeavour!

Cleaning the Devil's Peak with SEE Alumni Association

Close to 40 SEE alumni, students, faculty members and staff, together with their family and friends walked up to Devil's Peak on 16 May 2021 to clean up the trail. The trip was organised by the SEE Alumni Association.

On the sunny and hot Sunday morning, the group climbed the hill and collected trash along the way. They were rewarded with excellent views of the Victoria Harbour and Tseung Kwan O.



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