

## Highlights of Activities and Achievements in 2019-2020

The 2019-2020 academic year was unprecedented, as both the campus and the student body went through turbulent times due to social movements and the pandemic. Nevertheless, teaching, learning and innovative efforts still go on under these challenging and constrained environments. We are delighted to report here the activities and awards achieved by our students and staff. The students continued to apply knowledge they learned in classroom through tremendous dedication to their aspirations. The teaching staff members have earned international recognition for their research excellence.

Below are excerpts from news/articles in the departmental website ([www.mech.hku.hk](http://www.mech.hku.hk)). Please scan the QR Codes to read more details concerning these items.

ME = Mechanical Engineering

### Department

#### Centenary recognition of HKU Mechanical Engineering degree by IMechE

The year of 2019 marked the centenary of professional recognition of the Mechanical Engineering Bachelor degree programme of the University of Hong Kong (HKU) by the Institution of Mechanical Engineers (IMechE) of UK since 1918. The IMechE recognition of the ME programme back in 1918 was the first of its kind in Hong Kong and China, and probably the first such recognition in the whole world. It was a very important monument for engineering education in our part of the world.



Mr. Terry Spall, President of IMechE (right) presented to Prof. Alfonso Ngan, previous Head of the Department of the Mechanical Engineering of HKU (left) a commemorating certificate and "An Engineering Archive" by IMechE about the historical engineering works.

### Achievements of our undergraduate students

#### Second and third place awards at international HVAC Design Competition

A group of 5 mechanical engineering students were awarded the 2<sup>nd</sup> place in the HVAC System Selection Category and the 3<sup>rd</sup> place in the HVAC Design Calculations Category of the ASHRAE 2020 Student Design Competition. The 2020 competition adopts a storage and archive centre located in Mumbai, India as the model building for the competitors.



Revit® model of the Storage and Archive Centre

#### Guinness World Record for "The Fastest 50 m Swim by a Robotic Fish"



The VAYU Project set the new Guinness world record.



Supported by the Tam Wing Fan Innovation Wing (Inno Wing), a VAYU robotic fish project developed by a student team from the Faculty of Engineering at the University of Hong Kong (HKU) set the Guinness World Record of 26.79 seconds for "The Fastest 50m Swim by a Robotic Fish" on January 23, 2020.



The team (From left to right: Alam Ibnul, Liu Qimeng, Ng Tim, Shen Zhong, Gupta Sidhant) had worked on the project for four years.



#### Four HKU ME students won in the Smart Cooling Challenge at HACK ASIA 2019, Singapore



Four of ME undergraduate students won an award at Hack Asia 2019 in the Smart Cooling Challenge event (one of the six themes) in Singapore. The Smart Cooling Challenge this year aims to increase the temperature of return chilled water in a high-rise commercial building. 100s teams participated in this years' Hack Asia. Six finalist teams were then invited and sponsored to participate in the two-day Hack Asia event in Singapore.

Four of ME undergraduate students (From left to right: Chan Ka Man, Chan Ka Ho, Yum Ka Lok, Cheng Yiu Him) won Hack Asia 2019 in the Smart Cooling Challenge in Singapore.



## Powering a sustainable generation scholarship by CLP - student exchange in Princeton: Erica Kong

Ms. Erica Kong participated in the Visiting Student Programme at Princeton University, USA and studied at the Department of Mechanical and Aerospace Engineering with the support of Powering a Sustainable Generation Scholarship by the China Light & Power Company (CLP). She has taken courses related to thermodynamics, renewable energy and electricity market. In her free time, she joined a student-led climate initiative and an a cappella group.



She had a very rewarding and fulfilling exchange experience and enjoyed very much the time with brilliant professors and students at Princeton.

## Student exchange in University College London (UCL): Fung Cheuk Yiu

Mr. Fung Cheuk Yiu joined the faculty exchange program to University College London in semester 1, 2019. Completing the courses' assignments, he worked with students from different countries and gained experience in collaborating with people from diverse cultural backgrounds. Besides, he seized a valuable chance to visit a renowned firm in aeronautical industry, which introduced the latest technology and development in aeronautical engineering. This exchange experience broadened his horizons and furthered his whole-person development.



## Student exchange

**"Internationalization", a strategic theme in the mission of HKU, is demonstrated concretely through the exchange visits of our undergraduates, in which 17 students participated in academic programmes at universities overseas for one semester or a whole year in 2019-2020.**

**8 exchange students from these overseas institutions came to study in the Department in 2019-2020.**

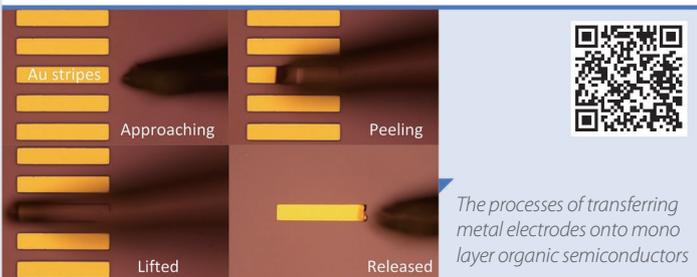
Albert-Ludwigs University Freiburg	Germany	Northeastern University, USA	U.S.A.
Embry-Riddle Aeronautical University	U.S.A.	Princeton University	U.S.A.
Glasgow (University of)	U.K.	Salzburg (University of)	Austria
Harbin Institute of Technology	China	Sydney (University of)	Australia
Hawaii (University of) at Manoa	U.S.A.	Technical University of Denmark	Denmark
Humboldt-Universität zu Berlin	Germany	University College London	UK
Korea University, Seoul	South Korea	Western Ontario (University of)	Canada

California (University of), Santa Barbara	USA
Institut National des Sciences Appliquées de Toulouse	France
Navarra (University of)	Spain
Technical University of Denmark	Denmark
Technische Universität Darmstadt	Germany

## Achievements of our academic staff

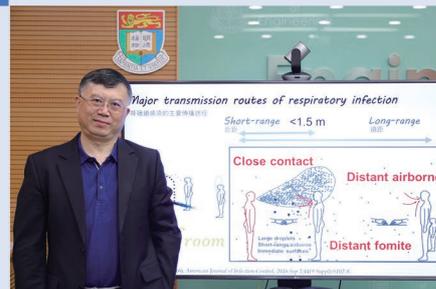
### Dr. Paddy Chan: A breakthrough in developing staggered structure monolayer organic field effect transistors

Dr. Paddy K.L. Chan and his team have successfully developed staggered structure monolayer organic field effect transistors (OFETs) with a record low width normalized contact resistance down to 40 W-cm. This low contact resistance achievement is a critical cornerstone to miniaturize the OFETs for the advanced applications.



The processes of transferring metal electrodes onto monolayer organic semiconductors

### Prof. Y. Li: Opportunistic COVID-19 airborne transmission with insufficient ventilation



In collaboration with the Guangdong CDC, Hunan CDC, Sun Yat-Sen University and Southeast University, Prof. Yuguo Li and his team conducted a series of epidemiological and environmental studies on three important Covid-19 outbreak cases in Mainland China and Tokyo, and revealed that poor air ventilation plays a key role in its spread in indoor environments.

### Prof. L.X. Huang: Novel silencer design by AA-Lab finds application in large-scale project



The Laboratory for Aerodynamics and Acoustics (AA-Lab) at the Department is one of the first three units established at the HKU Zhejiang Institute of Research and Innovation (ZIRI) and is led by Prof. Lixi Huang. Recently, a novel design of acoustic silencer (patent pending) has been delivered to its industrial partner, Huadian Heavy Industry Co. Ltd (HHI), for the first large-scale application in Hangzhou where the Asian Games 2022 will be held.



New design of fan-powered cooling renovation tower with silencer installation (red arrows).

### Dr. S.C. Fu: Handy thermography fever detection system for public transportations

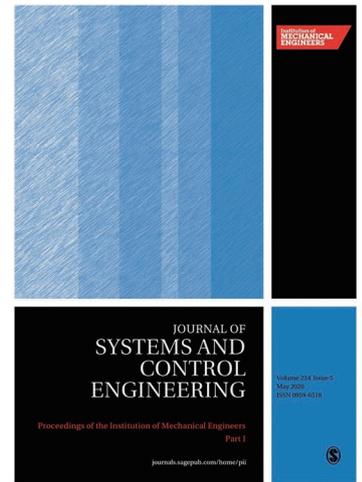
A multidisciplinary group of researchers led by Dr. S.C. Fu has recently explored a low-cost thermography fever detection system which is portable and can be easily accessed and mastered by users. The research team hopes that this portable thermography fever detection system can be applied in public transportation, such as taxis, shuttle buses and minibuses, and will be widely in Hong Kong in the future.



A demonstrator in a university shuttle bus.

### Prof. James Lam: Editor-in-Chief of Proceedings of the Institution of Mechanical Engineers

Prof. James Lam becomes Editor-in-Chief of Proceedings of the Institution of Mechanical Engineers, Part I: Journal of Systems and Control Engineering.



### Prof. M.X. Huang: Research breakthrough in a super hard and tough steel



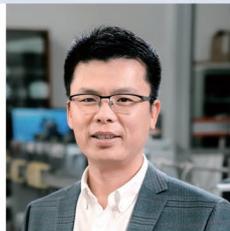
The Super Steel project led by Prof. Mingxin Huang with collaborators at the Lawrence Berkeley National Lab (LBNL), has made important breakthrough in its new super D&P steel (produced using a new deformed and partitioned method) to greatly enhance its fracture resistance while maintaining super strong in strength for advanced industrial applications.



Prof. Mingxin Huang (right) and his PhD student Miss Liu Li (left).

### Prof. M.X. Huang: Award of RMB\$11.07M funding from NKPs

Prof. Mingxin Huang has recently secured RMB\$11.07 million funding in the second round of the National Key Research & Development Programmes (NKPs) of the PRC's Ministry of Science and Technology (MOST) that is open for researchers in Hong Kong and Macau.



### Prof. James Lam: The Second Class Natural Science Award

Prof. James Lam was awarded the Second Class Natural Science Award by Chinese Association of Automation in 2019 for the project entitled "Control Theory and Applications of Positive Systems."



### Prof. Anderson Shum: Rising Star Award of the Ton Duc Thang University Scientific Prize 2019

Prof. Anderson Shum has received the Rising Star Award of the Ton Duc Thang University Scientific Prize 2019 (The TDTU Prize) for his contribution in Microfluidics and Soft Matter. On Dec. 27, 2019, Professor Shum received an award certificate and delivered an award speech at the Award Ceremony held at the Ton Duc Thang University (TDTU) in Ho Chi Minh City, Vietnam.



### Dr. Tony Feng: Invention of novel direct thermal charging cell



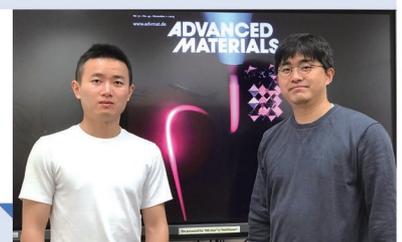
Dr. Tony Shien-Ping Feng and his team invented a Direct Thermal Charging Cell (DTCC) which can effectively convert heat to electricity, creating a huge potential to reduce greenhouse effects by capturing exhaust heat and cutting down primary energy wastage.



Dr. Tony Shien-Ping Feng (front) and his team (from left to right: Wang Xun, Huang Yu-ting and Mu Kai-yu).

### Dr. J.T. Kim: 3D Nanoprinting of perovskites

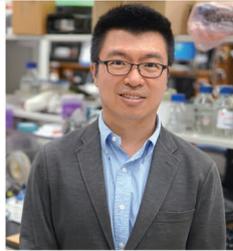
Dr. Ji Tae Kim and his student Mr. Mojun Chen have developed a 3D printing method for perovskites at the nanoscale for the first time, an invention which holds bright application potential in industries.



Dr. Ji Tae Kim (right) and his student Mr. Mojun Chen (left).

### Prof. Anderson Shum: Big attempts at micro level

Prof. Anderson Shum and his team have produced a new type of protein-based capsule, droplets capable of dividing into smaller droplets thereby mimicking biological cells, and electrified liquid jets with potential impact in printing and the formation of nanofibers.



### Prof. James Lam: IET Journal Outstanding Editor-in-Chief Award

Prof. James Lam is recognized as one of the editors and Editorial Board Members for particularly outstanding activities to maintain and further develop the high international standards and reputation of the IET's Research Journals.



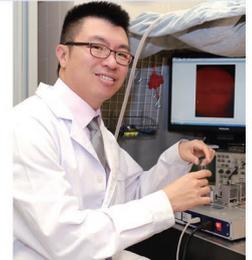
### Dr. Paddy Chan: Outstanding Young Researcher Award

Dr. Paddy Chan Kwok-leung received the Outstanding Young Researcher Award for 2018-2019 in recognition of his extremely high quality research.



### Prof. Anderson Shum: Senior Research Fellowship 2020 by the Croucher Foundation

Prof. Anderson Shum received Senior Research Fellowship 2020 by the Croucher Foundation. Professor Shum is internationally recognised for his works in microfluidics and soft matters, particularly on his pioneering contributions in combining all-aqueous formulations and droplet microfluidics.



## Achievements of our research post-graduate students and research staff

### Ms. Muyan Wu: Championship of the HKU Three Minute Thesis (3MT®) Competition

Ms. Melody Muyan Wu, PhD student of Prof. D.Y.C. Leung, has got the Championship of the HKU Three Minute Thesis (3MT®) Competition 2020 conducted on 23 June 2020. Her presentation thesis title is "An Efficient Way to Get Rid of Smells after Indoor Decoration".



### Dr. Ziyao Guo: An "EMTECH ASIA Innovator Under 35"

Dr. Z. Guo, PhD graduate, is a robotics scientist focused on innovating robotic devices for interventions requiring magnetic resonance imaging (MRI) guidance, e.g. stereotactic neurosurgery, and cardiac catheterization. She received B.Eng in vehicle engineering from Tsinghua University and pursued PhD in MRI-guided robotics in IRIS group under the supervision of Dr. Ka-Wai Kwok. Her work was recognised in several prestigious awards.



Innovator Under 35  
Asia Pacific



Ziyao Guo  
MEMBER OF IIRIS  
The University of Hong Kong  
Department of Mechanical Engineering



The HKU 3MT Competition organized by the Graduate School and the Knowledge Exchange Office (KEO)



(photo credit: HKEJ)

### Dr. Yu-ting Huang: Silver Award at the 2<sup>nd</sup> Asia Exhibition of Inventions Hong Kong

Dr. Yu-ting Huang, Dr. Tony Feng's PhD student, won Silver Award at the 2<sup>nd</sup> Asia Exhibition of Inventions Hong Kong with "Direct Thermal Charging Cell", a new invention which can effectively convert heat to electricity, creating a huge potential to reduce greenhouse effects by capturing exhaust heat and cutting down primary energy wastage.



Dr. Yu-ting Huang (right), received the Silver Award from Mr. David Taji (left).

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