

Press Release

The Hong Kong Institution of Engineers Grand Award Presentation

(9 March 2023, Hong Kong) The Hong Kong Institution of Engineers (HKIE) Grand Award Presentation Ceremony was held today, recognising members' brilliant contributions in different aspects. We are honoured to have Ms Winnie Ho Wing Yin, the Secretary for Housing, as the Guest of Honour.

The HKIE Grand Award 2023 is a brand-new award of the Institution that aims to recognise the achievements and contributions of the engineering profession towards the development of Hong Kong. The HKIE Grand Award 2023 – Innovation Category followed the division of “The HKIE Innovation Award”, dividing into Sub-category I – An Invention and Sub-category II – An Innovative Application respectively. There are Young Member Groups under both sub-category which opens to members aged 35 or below.

President Ir Aaron K M Bok expressed his gratification at the various projects presented to the panel, “The winning entries cover three major categories of innovation, industrial and infrastructure. They bring benefits to public health, medical, construction and transportation infrastructure and beyond, showcasing how engineers contribute to the growth of society in different aspects.”

The HKIE Grand Award 2023 – Innovation Category

Grand Prize, Sub-category I – An Invention	Ir Dr Zhang Tong, Ir Dr Chui Ho Kwong Samuel and Ir Chui Si Kay Peter Awarded Project: A customisable in-manhole sampling robot for sewerage surveillance
Grand Prize, Sub-category II – An Innovative Application	Ir Prof Chung Kwok Fai Awarded Project: Innovative construction technology and application of high strength S690 steel in construction

The HKIE Grand Award 2023 – Industrial Category

Grand Prize	Ir Dr Tong Ka Shun Carrison and Ir Chan Cheuk Ming Oliver Awarded Project: 3D Printing Techniques in Healthcare: From High Risk Procedure Trainings to the era of Advanced Clinical Applications including Brain Aneurysm, Cranioplasty, Robotic Partial Nephrectomy, Vascular Cannulation, and Thoracentesis
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The HKIE Grand Award 2023 – Infrastructure Category

Grand Prize	Ir Ng Wai Hong, Ir Lo Kwok Chung David, Ir Mak Wai Lung and Ir Lee Shui Cheuk Patrick Awarded Project: Hong Kong – Zhuhai – Macao Bridge Hong Kong Port
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Awarded Projects of The HKIE Grand Award 2023

The HKIE Grand Award 2023 - Innovation Category

Sub-category I - An Invention

Awardees: Ir Dr Tong Zhang, Ir Dr Chui Ho Kwong Samuel and Ir Chui Si Kay Peter

Submission: A customisable in-manhole sampling robot for sewerage surveillance

A conventional sewage sampling device is designed to be installed on the ground and may cause inconvenience to road users. The newly invented in-manhole sampling robot is compact enough to be installed inside a manhole. In addition, the sampling time is programmable via a mobile app. Coupled with the Narrowband Internet of Things (NB-IoT), the sampling robot can achieve real-time operating condition through remote cloud monitoring. With this invention, sewage sampling can be carried out “anytime, anywhere” throughout the city’s sewerage network. It has been widely used in the SARS-CoV-2 virus sewage surveillance of Hong Kong during the past two years and has contributed significantly to the fight against COVID-19.

With its potentials to survey different biomarkers in sewage enable public health monitoring, and detect emerging infectious diseases, this device may prove essential to our smart city development in the future.

Sub-category II - An Innovative Application

Awardee: Ir Prof Chung Kwok Fai

Submission: Innovative construction technology and application of high strength S690 steel in construction

In order to improve productivity of the construction industry in Hong Kong, Chinese National Engineering Research Centre for Steel Construction (Hong Kong Branch) (CNERC) conducted an extensive programme on research and technology transfer over the past seven years to achieve:

- an innovative construction technology using high-strength S690 steel with proven structural adequacy and improved structural economy for construction;
- development of effective welding on sections of high-strength S690 steel using a robotic welding system which ensures little or virtually no reduction in mechanical

- properties of 10-to-70 mm thick steel plates after welding;
- rationalised methods for structural design of welded sections, connections and joints of high-strength S690 steel which conform to current engineering practice in Hong Kong; and
- innovative applications of high-strength S690 steel in building and civil engineering projects.

Our innovation enables a modern construction technology using high-strength S690 steel to achieve significant reductions in construction materials, manpower and carbon footprint. Typical applications include long-span roof structures and footbridges, large-scale noise closure, piles supporting heavily loaded structures and buildings, and supporting members in road bridges.

Ir Prof Chung is Professor of Department of Civil and Environmental Engineering and the Director of CNERC at The Hong Kong Polytechnic University.

The Merit of Sub-category I went to Ir Cheung Sau Cheong Andrew (Submission: AIMER - Artificial Intelligence on Modified Exhaust Recognition); Ir Tse Mau Kay Keith and Ir Cheung Chris (Submission: Novel extendable deep mixing rod for low headroom (4-Stage Extendable Rod System, ERS⁴)).

The Merit of Sub-category II went to Ir Wong Chi Wai Tommy, Ir Chan Yam Ming, Ir Choy See Mun Celia and Ir Prof Ge Ming (Submission: 3S Tunnel Defect Inspector); and Ir Chen Che Kong, Ir Lee Sing Tim Wallace, Ir Pak Kan Ming Eddie and Ir Dr Zhang Tong (Submission: Territorial sewage surveillance in Hong Kong with engineering and IT applications).

Besides, the Merit of Sub-category II (Young Member Group) went to Ir Ho Ka Kit (Submission: Application of advanced technologies in condition survey for drainage and sewerage systems)

The HKIE Grand Award 2023 - Industrial Category

Awardees: Ir Dr Tong Ka Shun Carrison and Ir Chan Cheuk Ming Oliver

Submission: 3D Printing Techniques in Healthcare: From High Risk Procedure Trainings to the era of Advanced Clinical Applications including Brain Aneurysm, Cranioplasty, Robotic Partial Nephrectomy, Vascular Cannulation, and Thoracentesis

During the COVID-19 pandemic, global supply chain disruptions varied dramatically. In-house manufacturing is a possible solution to the uncertainty over the delivery of imperative advanced medical items such as neurosurgical implants and the maintenance of healthcare provisions. Apart from developing cutting-edge technology that allows patient-centred care during surgical intervention, urgency exists for various kinds of medical professional training.

By analysing numerous medical images, the team applied the data to modify the 3D printing technique. Engineers are able to make diverse products, including patient-specific implants and disease models for pre-operative planning for complex surgeries, for patients and healthcare professionals in a hospital environment within a short time. The wide range of in-house developed products are now applied to different specialties in our hospital, including intensive care, neurosurgery, surgery, medicine and radiology.

Ir Dr Tong is formerly a medical physicist of the Pamela Youde Nethersole Eastern Hospital. Ir Chan is currently a biomedical engineer in the Hospital Authority. The design of various products has already obtained patent protection. The team will continue to work with other healthcare professionals to develop further products that support the needs of individual patients.

Besides, the Merit went to Ir Dr To See Yuen Anthony (Submission: MVN – The Natural Wastewater Treatment System); Mr Pang Kai Fai Andy and Mr Kwong Ka Ming Kelvin (Submission: Data-driven Smart Maintenance in Permanent Way); Ir Lee Tak Yan Darkie, Ir Wong Kwok Chi Thomas and Ir Chuang Tat Tang Anthony (Submission: Automated System for Concrete Cube Testing); Ir Chow Chee Ping Jude (Submission: Food Transmarter); and Ir Dr Tang Chun Ming Llewellyn (Submission: Llewellyn and Partners Company Limited).

The HKIE Grand Award 2023 - Infrastructure Category

Awardees: Ir Ng Wai Hong, Ir Lo Kwok Chung David, Ir Mak Wai Lung and Ir Lee Shui Cheuk Patrick

Submission: Hong Kong – Zhuhai – Macao Bridge Hong Kong Port

The HZMB Project, with the HKP as the hub, is the gateway to the Greater Bay Area (GBA), the engine for economic growth in South China.

To overcome constraints of space and time, the project team applied innovative designs to create a legendary landmark with the following outstanding features:

- Superb and aesthetically pleasing architecture of the Passenger Clearance Building, the HKP's emblem;
- The roof fabrication and erection methods are the first of their kind. All roof segments with fittings and building services were fabricated off-site using MiC. Installation was by lifting and then horizontal jacking with the heaviest segment weighing 680 tonnes; and
- The District Cooling System annually saves 3.5 million KWh of electricity and reduces CO₂ emissions by 2,500 tonnes.

The HZMB project will bring about significant economic benefits by reducing travel time to the GBA's western part from over four hours to just 40 minutes. With the concerted efforts of all parties involved in the construction, the HKP was completed in an amazing four-year period.

Ir Ng is the Deputy Project Manager and Ir Lo is the ex-Principal Project Coordinator of the Highways Department. Ir Mak is the Vice President of AECOM and Ir Lee is the Principal Resident Engineer.

Besides, the Certificate of Merit went to Ir Dr Tsang Kwok Chu Matthew, Ir Dr Wong Shao Young, Ir Chan Wai Fun Alice and Ir Kwok Wai Ching Vincent (Submission: Admiralty Station extension: the only mega station in MTR network with four-line interchanging); Ir Leung Chung Lap Michael, Ir Dr Sham Siu Hung Robin and Ir Kan Jun (Submission: Cross Bay Link, Tseung Kwan O).

Engineering profession is essential in driving the progression of the society. The Institution hopes awardees can continue to make good use of their professional knowledge and power of innovation to contribute to Hong Kong's future development.

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Ir Aaron K M Bok, President of the HKIE, giving an address



Ms Winnie Ho, the Secretary for Housing, giving an address



HKIE President Ir Aaron K M Bok (13th right) and Guest of Honour Ms Winnie Ho, the Secretary for Housing (14th right) with awardees of the Grand Awards