



Issue 48 (October 2023)

Faculty Achievement



Department of Materials Science and Engineering

A team led by Prof CHEN Furong and Prof Johnny HO published a paper entitled Multislip-enabled morphing of all-inorganic perovskites in *Nature Materials*. Inorganic lead halide perovskites (CsPbX₃) are promising for energy conversion and optoelectronics. The findings of the research team demonstrate that single-crystal CsPbX₃ micropillars can be morphed into different shapes without damage, thanks to the slips of partial dislocations. This suggests their potential use as deformable semiconductors for advanced optoelectronics and energy systems.

Faculty Achievement



Department of Materials Science and Engineering

Prof HE Qiyuan and his team published a paper entitled On-chip electrocatalytic microdevices in *Nature Protocols*. They explained the use of on-chip electrocatalytic microdevices (OCEMs) for studying nanocatalysts at a microscopic level, the measurement of electrocatalytic hydrogen evolution reaction on 2D nanosheets and the factors affecting measurement accuracy. It also includes in situ electrical transport measurement which aims to promote the adoption and development of OCEMs.

Faculty Achievement



Department of Materials Science and Engineering

Prof LEI Danyuan and his research team published a paper titled Super-resolution multi-colour fluorescence microscopy enabled by an apochromatic super-oscillatory lens with extended depth of focus in *Nature Communications*. Researchers have developed an apochromatic binary-phase super-oscillatory lens (SOL) using a multi-objective genetic algorithm optimisation approach. The lens achieves sub-diffraction-limit imaging with a prolonged depth of focus, customised working distance, and minimised main-lobe size. The experimental implementation enables three-dimensional super-resolution multi-colour fluorescence imaging, providing a viable approach for advanced imaging systems.

Faculty Achievement



Department of Materials Science and Engineering

Prof LIU Bin and his team published a paper entitled Atomic metal-non-metal catalytic pair drives efficient hydrogen oxidation catalysis in fuel cells in *Nature Catalysis*, where they present their research on atomically dispersed iridium-phosphorus (Ir-P) catalytic pairs. These pairs exhibit strong electronic coupling, enabling efficient hydrogen oxidation reactions (HOR) in fuel cells. The Ir-P catalysts outperform commercial platinum-based catalysts, achieving high power density and mass activity. This work contributes to the advancement of anodic catalyst development for fuel cells and establishes a design principle for multi-intermediate catalysis.

Faculty Achievement



Department of Mechanical Engineering

Prof ZHU Pingan and his collaborators published a paper entitled Suppression of hollow droplet rebound on super-repellent surfaces in *Nature Communications*. The study proposes a method to prevent droplet rebound on super-repellent surfaces by introducing bubbles into the droplets. The bubbles counteract the capillary effects, reducing the momentum required for take-off. This double-spring system explains droplet behaviour, with single-phase droplets being a special case within this framework.

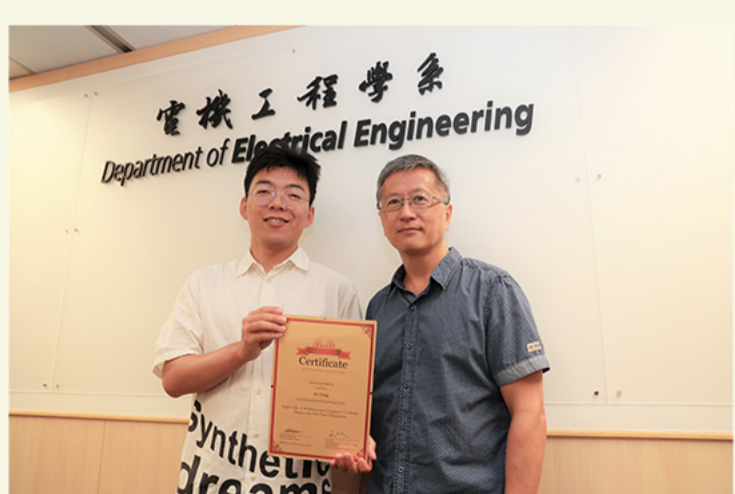
Student Achievement



Department of Electrical Engineering

Three PhD students, Mr MAO Gaoyu, Mr LI Guangyan, and Ms ZHANG Zhewen, have been awarded the First Prize in the 2023 Cross-Strait and Hong Kong-Macao College Students Integrated Circuit and Electronic Design Invitational Competition. Their exceptional project, titled RISC-V Based Lightweight Public-key Cryptosystem Design and Applications, was supervised by Prof Ray CHEUNG and Dr YAO Liu, a PhD graduate who now holds the position of Assistant Professor at Sun Yat-sen University.

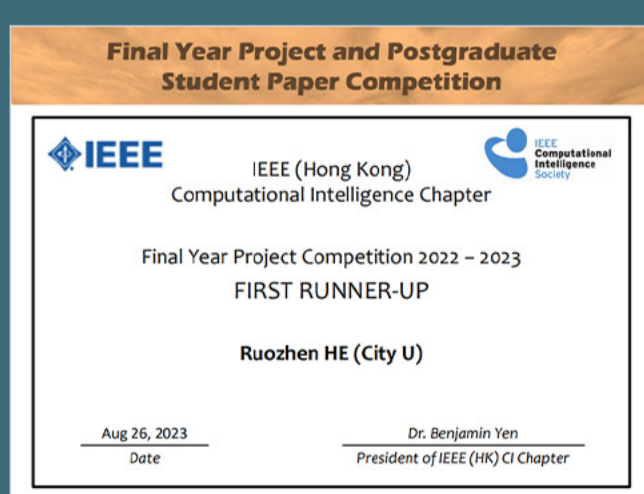
Student Achievement



Department of Electrical Engineering

The paper titled A Wideband and Compact 3 × 3 Nolen Matrix with Flat Phase Differences by Mr YANG Ye, under the guidance of Prof W S CHAN, has been honoured with the Third Prize, the Best Student Paper Award in the Antennas and Microwave Technologies category at the Photonics & Electromagnetics Research Symposium (PIERS) 2023.

Alumni Achievement



Department of Computer Science

Ms HE Ruozen, a 2023 graduate, achieved the First Runner-up position in the IEEE (Hong Kong) Computational Intelligence Chapter's Final Year Project Competition. Under the supervision of Prof Rynson LAU, her accredited project titled Weakly-Supervised Camouflaged Object Detection with Scribble Annotations introduced a groundbreaking method for camouflaged object detection using only scribble annotations. Additionally, this award-winning paper and her other paper on efficient mirror detection were both accepted as Oral Papers for presentation at the 37th AAAI Conference.