

Croucher Foundation presents research awards to nine distinguished scholars

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Recipients of Croucher Tak Wah Mak Innovation Awards 2022 and the Guest of Honour Professor Mak Tak-wah.



Recipients of Croucher Senior Research Fellowships 2022 and the Guest of Honour Professor Mak Tak-wah.



Recipients of Croucher Senior Research Fellowships 2023 and the Guest of Honour Professor Mak Tak-wah.



(From left) Professor Yeung Ying-yeung (CUHK), Dr Berthold Jäck (HKUST), Dr Tan Yen Joe (CUHK), Professor Li Quan (CUHK), the Guest of Honour Professor Mak Tak-wah, Professor Wang Zuankai (PolyU), Dr Tang Jinyao (HKU), Professor Huang Mingxin (HKU) and Professor Jensen Li (HKUST).

The Croucher Foundation today (8 December) presented Croucher Tak Wah Mak Innovation Awards 2022 and Croucher Senior Research Fellowships 2022 and 2023 to nine distinguished scholars from The Chinese University of Hong Kong (CUHK), The University of Hong Kong (HKU), The Hong Kong University of Science and Technology (HKUST) and The Hong Kong Polytechnic University (PolyU) for their outstanding scientific research achievements.

This year, two awardees were presented with Croucher Tak Wah Mak Innovation Awards 2022, four with Croucher Senior Research Fellowships 2022 and three with Croucher Senior Research Fellowships 2023. The list of the awardees is as follows:

Croucher Tak Wah Mak Innovation Awards 2022

Dr Berthold Jäck

Assistant Professor, Department of Physics, HKUST

Dr Tan Yen Joe

Assistant Professor, Earth System Science Programme, Faculty of Science, CUHK

Croucher Senior Research Fellowships 2022

Professor Huang Mingxin

Professor, Department of Mechanical Engineering, Faculty of Engineering, HKU

Professor Jensen Li

Professor, Department of Physics, HKUST

Dr Tang Jinyao

Associate Professor, Department of Chemistry, Faculty of Science, HKU

Professor Yeung Ying-yeung

Professor, Department of Chemistry, Faculty of Science, CUHK

Croucher Senior Research Fellowships 2023

Professor Li Quan

Professor, Department of Physics, Faculty of Science, CUHK

Dr Stephanie Ma

Associate Professor, School of Biomedical Sciences, Li Ka Shing Faculty of Medicine, HKU

Professor Wang Zuankai

Professor, Department of Mechanical Engineering, PolyU

Biographies of Croucher Tak Wah Mak Innovation Awards 2022 recipients

Dr Berthold Jäck, Assistant Professor, Department of Physics, HKUST

Dr Jäck's research focuses on the fabrication and characterization of novel quantum materials that could facilitate energy-efficient electronic devices and new types of quantum computers. Placed at the interface of condensed matter physics and material science, his research aims to augment the microscopic interactions between charge carriers and magnetic moments through judicious materials design resulting in novel quantum phenomena. To this end, Dr Jäck combines thin film material growth using molecular beam epitaxy with the microscopic and macroscopic material characterization using scanning tunnelling microscopy and electrical transport measurements, respectively. Developing novel microscopy methods to study charge carrier dynamics with high spatial and temporal resolution, Dr Jäck's ultimate research goal is exploring new frontiers in quantum materials research. (Please click [here](#) for Dr Berthold Jäck's biography)

Dr Tan Yen Joe, Assistant Professor, Earth System Science Programme, Faculty of Science, CUHK

Dr Tan's research focuses on earthquakes and volcanoes. Axial Seamount, a submarine volcano in the North Pacific Ocean, has a simple structure and is frequently active. A cabled observatory was established in 2015 and has since recorded more than 100,000 earthquakes. The volcano has already erupted once and is expected to erupt again within the next few years. This September, Dr Tan completed a research cruise with researchers from three U.S. universities, deploying ocean-bottom seismometers and a hydrophone to collect real-time data. Dr Tan will leverage this unique dataset to study volcano structure and the fundamental

physics underlying earthquakes and volcanic activities. The research will help improve the ability to forecast eruptions, allowing for timely emergency response. (Please click [here](#) for Dr Tan Yen Joe's biography)

Biographies of Croucher Senior Research Fellowships 2022 recipients

Professor Huang Mingxin, Professor, Department of Mechanical Engineering, Faculty of Engineering, HKU

Professor Huang's research mainly focuses on the development of high-performance metals. Professor Huang's team invented the Super Steel. It creates two world-records for strength-ductility and strength-toughness combinations, and invented the world's first anti-COVID-19 stainless steel that has been licensed to industry for production of daily products. He will continue to research on high-performance alloys including lightweight magnesium alloys for potential automobile and aerospace applications, which is financially supported by this Croucher Award. (Please click [here](#) for Professor Huang Mingxin's biography)

Professor Jensen Li, Professor, Department of Physics, HKUST

Professor Li's research revolves around various extraordinary optical phenomena given by metamaterials, with prominent examples such as invisibility cloaking and super-resolution imaging. His current interests are in transformation optics, metasurfaces, non-Hermitian optics and complex media. Metamaterials promise to provide exotic material properties based on tailor-made resonating micro-structures to provide material parameters that do not exist in conventional approaches. With the Croucher Senior Research Fellowship, he will explore new dimensions in constructing and applying metamaterials using non-Hermiticity from material gain and loss, time-varying capability of material parameters, currently known as time-varying metamaterials and applications of metamaterials in the quantum optical regime. These metamaterials can be applied to create very sensitive sensors, to achieve non-reciprocal signal communications and to develop new techniques in quantum imaging. (Please click [here](#) for Professor Jensen Li's biography)

Dr Tang Jinyao, Associate Professor, Department of Chemistry, Faculty of Science, HKU

As a physical chemist and material scientist, Dr Tang synergised the power of chemistry, nanotechnology, and soft matter physics, as well as synthesised a series of nanorobots that can be powered, guided, and programmed by chemical reactions, which may find applications in healthcare and new functional materials. Dr Tang's team will develop new synthetic and physical tools to understand how to integrate individual nanorobot into intelligent materials, where many unique properties that were previously only possible in the living system can be realised and exploited for new applications. (Please click [here](#) for Dr Tang Jinyao's biography)

Professor Yeung Ying-yeung, Professor, Department of Chemistry, Faculty of Science, CUHK

Professor Yeung is dedicated to the development of new organocatalysts. He has developed a number of new organocatalysts for metal-free reactions that can be applied to the synthesis of valuable drug intermediates to facilitate the synthesis and development of new medicines, as well as increasing the efficiency at which biodiesel is produced. Professor Yeung plans to develop new catalytic protocols which are metal-free and efficient for a variety of applications, by linking chiral and achiral organocatalytic components through non-covalent interactions. They allow users to easily obtain various compounds for synthesis, like building blocks, that will be useful in the production of fuels, chemicals, pharmaceuticals, dyes, pigments and functional materials. This research will not only contribute to the fundamental understanding of catalysis, but will also provide efficient access to many value-added compounds. (Please click [here](#) for Professor Yeung Ying-yeung's biography)

Biographies of Croucher Senior Research Fellowships 2023 recipients

Professor Li Quan, Professor, Department of Physics, Faculty of Science, CUHK

Professor Li's multidisciplinary research focuses on energy materials and devices, and nano-bio interfaces. Diamond-based quantum sensing offers high sensitivity, versatility and sensor stability, holding great promise for applications in many disciplines including energy and biomedicine. Professor Li will develop a novel platform to address the bottleneck problems in bio-mechanics study of life systems. It synchronises the atomic force microscopy (AFM) indentation and diamond-based quantum sensing to allow for precise monitoring of evolving systems, such as the deformation of live cells, and differentiate the stimuli-induced mechanical response of AFM indentation from the evolution of cells. The research will not only enable bio-mechanical study of live cells, but will also contribute to the development of functional nanomaterials, cancer therapeutics and tissue engineering. (Please click [here](#) for Professor Li Quan's biography)

Dr Stephanie Ma, Associate Professor, School of Biomedical Sciences, Li Ka Shing Faculty of Medicine, HKU

Dr Ma's research focuses on understanding how phenotypic plasticity and cancer stemness contribute to therapy resistance and tumour recurrence, primarily using liver cancer (hepatocellular carcinoma, HCC) as a model system. Her team has contributed to the identification of liver cancer stem cell (CSC) markers, intrinsic regulators and signalling pathways as well as the role of various tumour microenvironmental factors in allowing HCC tumours to maintain a more stem/progenitor state. With the Croucher Senior Research Fellowship, she and her team will explore the mechanisms of T cell immune evasion and their link with cancer stemness in HCC by employing interdisciplinary approaches that cover CRISPR screening, high-throughput organoid-based immune-drug profiling, and single-cell/spatial transcriptomics. (Please click [here](#) for Dr Stephanie Ma's biography)

Professor Wang Zuankai, Professor, Department of Mechanical Engineering, PolyU

Many biological systems have evolved and orchestrated elegant surface properties to process and manage information and energy using the least materials while ensuring high efficiency. Inspired by the biological system, Professor Wang's research lies in bridging the gap between nature-inspired innovations with fundamental understanding of surface science towards developing nature-inspired functional surfaces for scientific challenges and various engineering implementation. Scientifically, his team answered three century-old scientific questions—what is the shortest contact time between solid and liquid, how to steer directional liquid flow, and how to overcome the Leidenfrost effect first observed in 1756. Technologically, his team explored the innovative applications of nature-inspired surfaces in fluid transport, reversible underwater adhesion, phase change heat transfer, and energy harvesting. (Please click [here](#) for Professor Wang Zuankai's biography)

About the Croucher Tak Wah Mak Innovation Awards/Croucher Senior Research Fellowships

The Croucher Tak Wah Mak Innovation Awards (formerly known as Croucher Innovation Awards) and Croucher Senior Research Fellowships represent the Croucher Foundation's most prestigious awards, granted only after a robust process involving a paper selection exercise, detailed international peer review and long discussions between Trustees. The total value of each Innovation Award is HK\$5 million. The value of each Senior Research Fellowship, including the cost of a replacement teacher, is about HK\$3 million.

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