Appendix

RGC Senior Research Fellow Scheme (SRFS)

Awardee (in alphabetical order)	Project title	Introduction
Professor Chen Shih-chi, Professor, Department of Mechanical and Automation Engineering	Closed-loop High-throughput Super-resolution Two-photon Lithography	The fabrication of arbitrary 3D structures at the nanoscale has long been a sought-after goal in nanotechnology. This project aims to address major challenges, including rate, resolution and reproducibility, in ultrahigh-resolution photopolymerisation processes (a technology used in 3D-printing where a liquid material is transformed into a solid through exposure to light) via two-photon lithography (TPL). It will also enable large-scale applications of TPL with many new functions for the first time, such as optical part repair and modification. The research outcomes will outperform all current high-resolution photopolymerisation-based 3D printing solutions, generating significant impact in the nanomanufacturing and nanotechnology industry.
Professor Pang Lai-kwan, Choh-Ming Li Professor of Cultural and Religious Studies	An Interdisciplinary Approach to Explore the Rise of the Modern Chinese Subject in Late Qing China	This project examines the development of a new sense of self, or the formation of a modern subject, in Late Qing and Early Republican China, during the country's pivotal transition towards a nation state. The modern subject that emerged during this period was characterised by significant anxiety, curiosity and uncertainty. The project studies a wide range of intellectual writings from leading thinkers of the time, the everyday lives of ordinary people and current international geopolitics. It combines intellectual, social and cultural history to analyse the interactions among various forces and actors within China and globally. This research benefits not only scholars focusing on the Late Qing period but also offers a non-Western perspective on modern subject formation, potentially reshaping existing theories and shedding light on ongoing global changes.
Professor Xing Guoliang, Professor, Department of Information Engineering	Multi-modal Perception Fusion and Interaction for Infrastructure-assisted Driving Systems	Infrastructure-assisted driving systems present a promising paradigm to tackle vehicle safety challenges and enable vehicle automation, leveraging intelligent roadside infrastructure to provide vehicles with real-time services and information. This project aims to make major technical advancements, ranging from multi-modal perception fusion to an efficient, robust infrastructure-vehicle interaction mechanism. Leveraging the project team's pioneering work in infrastructure-assisted autonomous driving, and using real-world testing and collaboration with industry partners to explore technology transfer pathways, this project is expected to significantly advance the state of the art in collaborative fusion and vehicle-infrastructure interaction for next-generation autonomous driving systems.

RGC Research Fellow Scheme (RFS)

Awardee (in alphabetical order)	Project title	Introduction
Professor Martin Li Man-chun, Associate Professor, Department of Mathematics	Minimal Surfaces in Geometry, Phase Transition and General Relativity	This project studies the existence and regularity of minimal surfaces that arise naturally in the context of geometry, phase transition and general relativity. By employing novel variational methods and non-linear partial differential equation techniques, the research aims to give a mathematically rigorous construction of minimal surfaces and analyse their singularities using modern geometric analysis tools. While past studies have focused on interior aspects, this research delves into boundary effects, which are essential for developing a complete global theory. By applying state-of-the-art techniques, the project investigates how these surfaces evolve under physical laws and their impact on related fields like phase transitions, superconductivity and numerical relativity. The findings could help in visualising, for example, how shapes change over time and how trapped surfaces are formed in space-time according to Einstein's equation in general relativity.
Professor Maggie Wang Haitian, Associate Professor, The Jockey Club School of Public Health and Primary Care	Integrated Computational Platform for Antigen Design of Therapeutic Vaccines for HPV-mediated Cervical Cancer	Current HPV vaccines are only preventive. To address this gap, this project aims to develop a therapeutic HPV vaccine candidate to treat cervical intra-epithelial neoplasia (CIN) caused by HPV infections, using a computational platform that integrates novel technologies invented by the research team. The objectives of this project include characterising genomic variations of common HPV types in China, developing computational methods for T-cell epitope prediction to design epitope-enriched vaccine antigens, and optimising antigen sequences using the research team's proprietary protein codon optimisation (PCO) technology, which has higher potency than existing approaches, to generate the final candidate. Beyond this project, the platform it establishes could also be applied to design antigens for other virus-mediated diseases and holds significant translational potential in the pharmaceutical industry. With collaborative efforts, the outcomes of this project will facilitate future innovative vaccine development in Hong Kong.

Professor Philip Zhang Renyu, Associate Professor, Department of Decisions, Operations and Technology	Al-powered Data-driven Decision Making in Business	This project addresses the gap between state-of-the-art AI technologies and their adoption in business research. By using large language models (LLMs) to build AI agents that can simulate human decision making in business, the study aims to predict human responses to certain policy interventions accurately. By integrating AI into causal inference frameworks, personalised treatment effect estimations can lead to more precise policy evaluations and efficient optimisation for the policy of interest. Furthermore, the research delves into the economic and societal impacts of generative AI in business contexts, focusing on areas like algorithmic fairness and data privacy. Collaborating with industry partners and implementing the research in practice, this project seeks to enhance our understanding of AI-driven business decision-making, aligning with Hong Kong's strategic focus on AI and data science development.
Professor Zhou Renjie, Associate Professor, Department of Biomedical Engineering	High-sensitivity Morpho-molecular Microscopy for High-throughput Imaging Applications	Live-cell imaging techniques are crucial to advance our understanding of disease mechanisms and promote drug development. Meanwhile, nanomanufacturing is vital for the production of next-generation electronic devices but improving the production yield requires high-precision, high-throughput, noninvasive metrology tools. This project aims to develop a cutting-edge, high-sensitivity morpho-molecular microscopy (HM3) technique that can acquire multifaceted sample information, including morphology, material types, birefringence and dynamics. By developing phase amplification and synthetic aperture imaging strategies, it is expected to significantly improve the imaging contrast and spatial resolution. Through wavelength/polarisation multiplexing, the project seeks to extract molecular species and identify material types. The ultimate goal is to incorporate these innovations into HM3 and design user-friendly software, to benefit nanometrology and bioimaging applications. It is envisioned that HM3 will pave the way for future advancements in neuroscience, wafer manufacturing and early-stage disease diagnosis, with an enormous impact on both the scientific community and industry.