Appendix

RGC Senior Research Fellow Scheme (SRFS)

Awardee (in alphabetical order by surname)	Project title	Introduction
Professor Liao Wei-Hsin **Choh-Ming Li Professor of Mechanical and Automation Engineering, Department of Mechanical and Automation Engineering**	Auxetic Structures for Energy Harvesting and Absorption	This project develops innovative multifunctional structures that can both absorb mechanical energy and harvest electrical energy, improving safety, efficiency and sustainability in engineering applications. By leveraging auxetic structures – advanced materials that expand laterally when stretched – the research enhances impact resistance while simultaneously converting mechanical deformation into usable electrical power. The technology is designed for both one-time impact events, such as crash protection systems, and reusable applications that harvest energy from repeated impacts or vibrations. Potential uses include self-powered impact warning devices, wearable sensors, health-monitoring systems and smart infrastructure. Combining advanced materials design, additive manufacturing, computational modelling and machine learning, the project aims to create next-generation structures that provide mechanical protection while generating renewable energy, opening new opportunities for resilient and sustainable technologies.
Professor Michael Zhang Xiaoquan **Wei Lun Professor of Business AI, Department of Decisions, Operations and Technology**	Toward a Holistic Understanding of Distributional Uncertainty	As artificial intelligence and data analytics play an increasingly important role in healthcare, finance and public decision-making, understanding uncertainty has become more critical than ever. This project addresses a major limitation of current analytical models: their inability to account for ambiguity, or uncertainty about the underlying probability distributions behind predictions. The research will develop a comprehensive framework to measure and manage this often-overlooked source of uncertainty, helping users better assess the reliability of forecasts and AI-generated insights. Early findings suggest that ambiguity can significantly distort risk estimates, undermine diversification strategies and contribute to rare but high-impact “black swan” events. The project will deliver practical tools for finance, healthcare, insurance and AI governance, supporting more robust decisions and reducing the risk of costly or catastrophic failures.
Professor Zou Jun **Choh-Ming Li Professor of Mathematics, Department of Mathematics**	A General Framework for Iterative Sampling-Type Methods and Mathematical Justifications for	This project develops advanced mathematical and computational methods for solving complex inverse problems, which arise from wide applications such as sonar, radar and medical imaging, seismic exploration and non-destructive testing. These problems are challenging both mathematically and numerically because of limited and noisy measurement data available in real applications. The

	Recovering Moving Inhomogeneous Inclusions in Acoustic Wave Scattering Problems	research will develop a novel time-domain mathematical and numerical framework that can efficiently recover key internal features of those moving inhomogeneous inclusions from limited and noisy measurements while remaining robust to uncertainty and noise. By combining mathematical theory with innovative numerical methods, the new sampling-type approach aims to deliver accurate numerical reconstructions using limited measurements and low computational efforts. The technology could improve the speed, reliability and scalability of imaging and sensing systems in healthcare, engineering and geoscience, while also supporting the development of next-generation scientific computing and data analysis tools.

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Professor Dou Qi **Associate Professor, Department of Computer Science and Engineering**	Advancing Robotic Surgery Autonomy from Basic Actions to Complex Manipulations in Dynamic Endoscopic Environments	This project aims to advance the next-generation autonomous surgical robots by integrating cutting-edge artificial intelligence and robotics technologies. While current surgical robots require extensive human control, the proposed system will enable robots to perform longer and more complex surgical tasks with greater autonomy, adaptability and safety. The research combines advanced computer vision, large AI models and intelligent planning algorithms to give robots real-time awareness of surgical procedures and the ability to respond to changing conditions. A strong emphasis is placed on safety and effective human-robot collaboration to ensure clinical reliability. The technology will be validated through preclinical and early human studies, with the ultimate goals of enhancing surgical precision, reducing healthcare disparities and expanding access to high-quality surgical care worldwide.
Professor Duan Liting **Associate Professor, Department of Biomedical Engineering**	From Static to Tunable: An Ambient Light-Gated Gene Therapy Platform for Glaucoma	Glaucoma is a leading cause of irreversible blindness, and current treatments cannot fully prevent the progressive loss of retinal nerve cells that leads to vision impairment. This project aims to develop a novel ambient light-controlled gene therapy that uses safe, low-intensity visible light to activate protective signals in retinal cells, helping to slow neurodegeneration and preserve vision. Unlike conventional approaches, this therapy can be switched on, adjusted, or paused at different stages of disease progression to enable personalised treatment. This programmable

		platform offers a promising strategy for halting disease progression, laying the groundwork for a new precision treatment for glaucoma and potentially other neurodegenerative eye diseases.
Professor Liu Ruixuan **Associate Professor, Department of Decisions, Operations and Technology**	Deep Generative Modeling Meets Causal Inference	This project advances causal inference – the science of understanding cause-and-effect relationships – by integrating it with state-of-the-art artificial intelligence and machine-learning techniques. While traditional methods often struggle to evaluate complex policies or interventions that evolve over time, the research leverages deep generative models, including transformer-based and diffusion-based approaches, to analyse high-dimensional data and estimate dynamic treatment effects more accurately. The framework enables researchers to assess "what would have happened under different decisions or policies" in complex real-world settings, such as online consumer behaviour, business strategy and public policy. By providing more reliable evaluation of long-term and personalised interventions, the project will strengthen evidence-based decision-making, improve policy design, enhance business outcomes and accelerate the practical application of AI in economics and social science research.