

Appendix: PolyU research projects funded by NSFC/RGC

Collaborative Research Scheme:

Research Field	Project Title	PolyU Project Coordinator	Project Details*
Marine and Environmental Science	FRP-Reinforced concrete structures for marine environments: material and structural innovations for ductility enhancement and prefabricated construction	Prof. Yu Tao, Associate Head (Research) and Professor of the Department of Civil and Environmental Engineering	<p>This project aims to develop innovative prefabricated FRP-reinforced concrete structures (PFRSs) tailored for marine environments. Key objectives include:</p> <ul style="list-style-type: none"> • enhancing ductility and stiffness through hybrid FRP rebars; • designing two types of beam-column connections for seismic resilience and rapid assembly; and • establishing predictive models for long-term performance. <p>The research addresses urgent infrastructure needs in coastal/marine and earthquake-prone regions, offering corrosion-resistant, cost-effective solutions that improve safety, reduce maintenance and boost construction productivity. The project outcomes will support sustainable development of coastal and marine infrastructure in Hong Kong, the Nation and other densely populated coastal areas worldwide.</p>

Research Field	Project Title	PolyU Project Coordinator	Project Details*
New Materials Science	Development of high performance and durable solid oxide electrolysis cells (SOECs) for coupling with Fischer-Tropsch (F-T) reactor for green synthetic liquid fuel production	Prof. Ni Meng, Associate Dean (Research) of the Faculty of Construction and Environment, Head and Chair Professor of Energy Science and Technology of the Department of Building Environment and Energy Engineering	<p>This project aims to develop advanced solid oxide electrolysis cells for efficient co-electrolysis of water and carbon dioxide, enabling integration with Fischer-Tropsch reactors for green synthetic liquid fuel production. The research team will engineer novel perovskite cathode materials using entropy engineering and in situ nanoparticle exsolution, supported by machine learning and theoretical modelling. Multiphysics simulations will evaluate system performance under fluctuating renewable power input, and a coupled system will be developed to demonstrate fuel production.</p> <p>The project will support carbon neutrality by advancing renewable energy storage, carbon dioxide utilisation, and clean fuel technologies, contributing to sustainable energy development in Hong Kong, the Nation and globally.</p>

Joint Research Scheme:

Research Field	Project Title*	PolyU Project Coordinator
Medicine	Engineering Microbiota-feedback Bioorthogonal Labeling Toolkits to Realize Precision Imaging of Gastrointestinal Inflammation	Prof. Bengang Xing, Chair Professor of Chemical Biology, Department of Applied Biology and Chemical Technology

Research Field	Project Title*	PolyU Project Coordinator
Medicine	Mechanoageing in Metabolic Osteoarthritis: From Cartilage Degeneration to Immune Dysregulation	Dr Man-ting Au, Research Assistant Professor, Department of Biomedical Engineering
New Materials Science	Research on Novel Room-Temperature Mid-to-Long Wave Infrared Position-Sensitive Detection and Its Application in Visualized Trajectory Tracking	Prof. Yuen-hong Tsang, Professor, Department of Applied Physics
New Materials Science	Novel Superconducting Systems for Outer Space Exploration: From Materials, Modeling to Applications	Prof. Kwok-tong Chau, Chair Professor of Electrical Energy Engineering, Department of Electrical and Electronic Engineering
New Materials Science	Constructing multiscale polar architecture in relaxor ferroelectric single crystals for achieving both high phase transition temperature and superior piezoelectricity	Prof. Zibin Chen, Assistant Professor, Department of Industrial and Systems Engineering
New Materials Science	Interfacial ion/electron exchange and transfer mechanisms for zinc metal anodes: fundamental investigations and stabilization strategies	Prof. Zheng-Long Xu, Associate Professor, Department of Industrial and Systems Engineering
New Materials Science	Investigation on energy storage mechanism of rechargeable carbon-fixed Zn-CO ₂ flow battery based on nanoparticle suspension	Prof. Maochun Wu, Assistant Professor, Department of Mechanical Engineering
New Materials Science	Developing a database and computational platform to predict material properties of non-fullerene acceptors in organic solar cells	Prof. Chen Zhang, Assistant Professor, Department of Computing
Others	Robust GNSS Navigation with the Aids of Multi-Sensor Fusion for Urban Air Traffic Management	Prof. Li-Ta Hsu, Associate Professor, Department of Aeronautical and Aviation Engineering

Research Field	Project Title*	PolyU Project Coordinator
Others	Optimizing multi-modal coordination for urban rail network resilience	Prof. Anthony Chen, Associate Head (Teaching) and Professor, Department of Civil and Environmental Engineering
Others	Cyber-physical Coordinated Control and Defense Methods for Grid-forming Distributed Energy Resource Clusters in Greater Bay Area Megacities	Prof. Siqu Bu, Associate Head (Research) and Professor, Department of Electrical and Electronic Engineering

** Project titles were submitted by scholars*