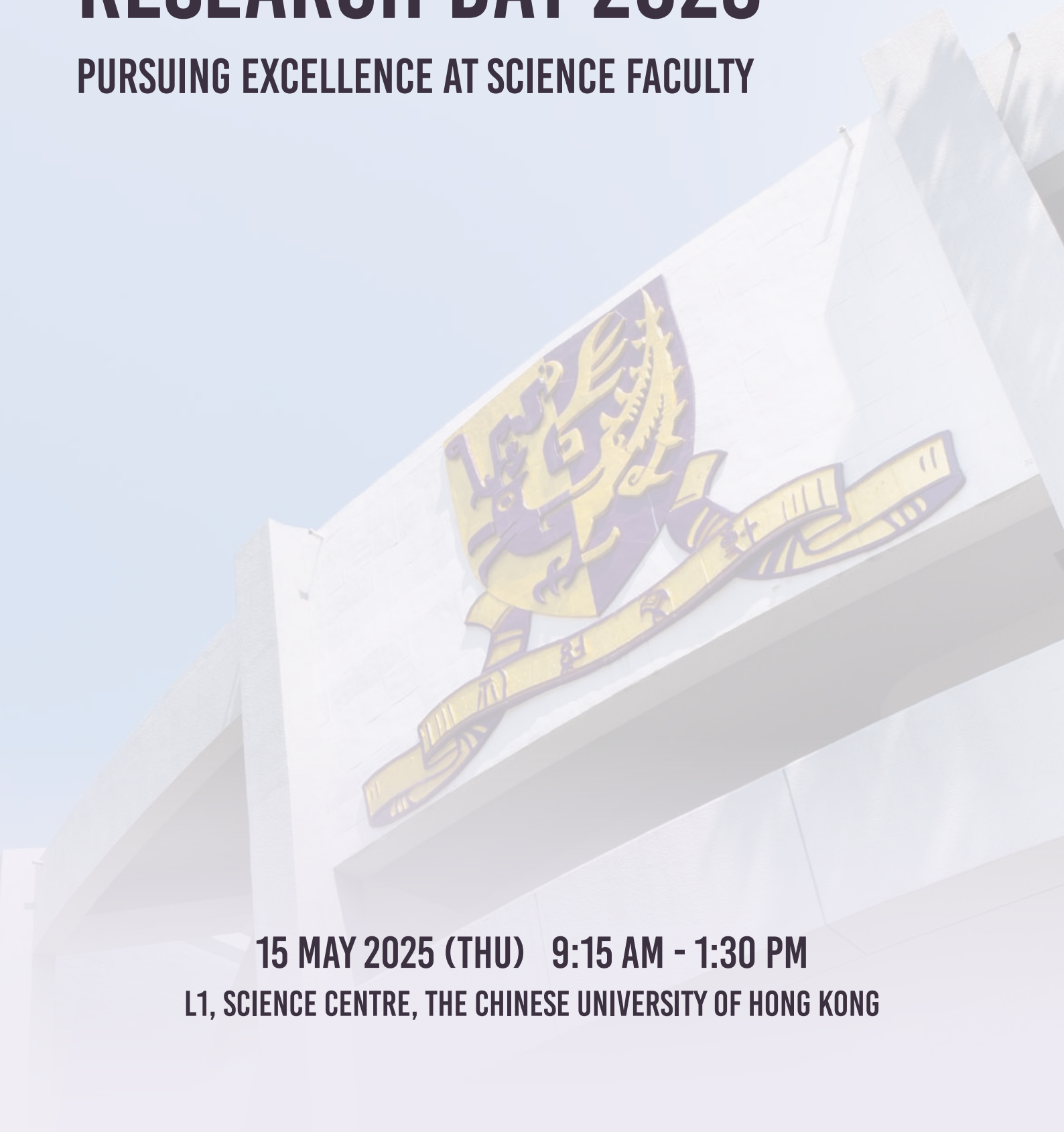
香港中文大學理學院
FACULTY OF SCIENCE
THE CHINESE UNIVERSITY OF HONG KONG

SCIENCE FACULTY
RESEARCH DAY 2025

PURSUING EXCELLENCE AT SCIENCE FACULTY



15 MAY 2025 (THU) 9:15 AM - 1:30 PM

L1, SCIENCE CENTRE, THE CHINESE UNIVERSITY OF HONG KONG

Science *Empowers* Your Dreams

Learn Science to *Better* the World

PROGRAMME

9:15 - 9:30 am	**Welcoming Remarks** ***Professor Chunshan SONG*** Dean of Science
9:30 - 10:15 am	Keynote Lecture: **Creating a Sustainable Supply Chain of Chemicals and Fuels Using Carbon Dioxide Towards Carbon Neutrality** ***Professor Chunshan SONG*** Dean of Science
10:15 - 11:15 am	**Sharing on Successful Applications for RGC Grants** ***Professor Dennis Kee Pui NG*** Department of Chemistry ***Professor Alex Tat Shing CHOW*** Department of Earth and Environmental Sciences ***Professor Xinhui LU*** Department of Physics
11:15 - 11:45 am	**Tea Reception**
11:45 - 12:45 pm	**Sharing on Successful Applications for NSFC Grants** ***Professor Hoi Ying WONG*** Department of Statistics ***Professor Renjun DUAN*** Department of Mathematics ***Professor Sijie CHEN*** School of Life Sciences
12:45 - 12:50 pm	**Closing Remarks** ***Professor Chunshan SONG*** Dean of Science
12:50 - 1:30 pm	**Lunch & Mingle**

Message from the Dean of Science

Welcome to the Science Faculty Research Day 2025 at The Chinese University of Hong Kong (CUHK). Each year, the Faculty hosts this event to bring together researchers to showcase innovative research, new discoveries and foster collaborative discussion both within the Faculty and across CUHK. Research is essential in cultivating creative minds and addressing scientific and societal challenges. This year's theme, "Pursuing Excellence at Science Faculty," highlights the Faculty's achievements through the insights of our distinguished researchers.

There are exciting new research initiatives ongoing at CUHK Science Faculty. Under the support of the university, our Faculty has been leading the CUHK efforts to establish the new Joint Institute of Advanced Materials and Green Energy Research (JIAMGER) with Great Bay University under the support of Municipal Government of Dongguan City, for which the Inauguration Ceremony was held on 26 Nov 2024. The Ministry of Science and Technology recently approved a new batch of National Key Laboratories (NKL) in Hong Kong. The Faculty is pleased to announce that a new "National Key Laboratory for Quantum Information Technologies and Materials" will be hosted under our Faculty at CUHK with Prof Renbao LIU as the Director starting 1 July 2025. The Faculty is home to three National Key Laboratories from 2025. The Faculty also helped our university to establish the new "Zhizhen School of Interdisciplinary Mathematical Sciences" at CUHK in Feb 2025 through close collaboration with Qiuzhen College of Tsinghua University under the leadership of Prof. Shing Tung YAU. Many academic staff in our Faculty have won the highly competitive NSFC grants including Distinguished Young Scholars, Excellent Young Scientists Fund, and Young Scientists Fund and NSFC/RGC Joint Research grants in addition to several types of major RGC grants in 2024-25. There were many recent awards and honours recognising the staff members and students of our Faculty. These achievements underscore the Faculty's commitment to striving for research excellence and making significant contributions to the region and the nation. We are confident that our commitment to research excellence will further benefit Hong Kong SAR, China and the global society.

In line with the strategic goal of the regional and national plans to reach Carbon Neutrality in 2050-60, I am pleased to present a Keynote Lecture at this year's Research Day titled "Creating a Sustainable Supply Chain of Chemicals and Fuels Using Carbon Dioxide Towards Carbon Neutrality." Achieving carbon neutrality and net zero carbon dioxide (CO_2) emissions has become increasingly important globally in the 21st century, yet it remains a significant challenge. This lecture will share my dream or vision for creating a sustainable supply chain of synthetic fuels, chemicals and materials using CO_2 and water, first published in 1995, and focus on the capture and conversion of CO_2 through novel approaches with renewable energy sources. Notably, this is my first time being invited by the Faculty to share my research interests with all staff and students at an official Faculty event.

Helen KELLER once said, "*Only through experience of trial and suffering can the soul be strengthened, vision cleared, ambition inspired and success achieved.*" While applying for grants through preparing research grant proposals can be challenging, it is a necessary process for every academic researcher. We have invited six excellent researchers who have successfully secured competitive research grants from the NSFC and RGC, including Prof. Sijie CHEN in life sciences, Prof. Dennis Kee Pui NG in chemistry, Prof. Alex Tat Shing CHOW in earth and environmental sciences, Prof. Renjun DUAN in mathematics, Prof. Xinhui LU in physics and Prof. Hoi Ying WONG in statistics to share their experiences regarding the preparation and application process.

We are confident that the exchange of ideas, presentations, and discussions centred around the theme of Pursuing Excellence at the Science Faculty during Research Day 2025 will foster impactful research and inspire our researchers to pursue excellence through collaboration. This aligns with our Faculty's motto, "Science empowers your dream. Learn Science to Better the World." I look forward to an engaging day filled with insightful learning and vibrant discussions, and I hope all participants enjoy their experience at Research Day 2025.

Prof. Chunshan SONG
Dean of Science and
Wei Lun Professor of Chemistry

Keynote Lecture:

Creating a Sustainable Supply Chain of Chemicals and Fuels Using Carbon Dioxide Towards Carbon Neutrality

Professor Chunshan SONG

- Dean of Science
- Wei Lun Professor of Chemistry
- Fellow, American Chemical Society (ACS)
- Fellow, Royal Society of Chemistry (RSC)

There are great needs to develop a sustainable supply of chemicals and fuels. Global societies still rely heavily on carbon-based primary energy (~80%) from the fossil and natural resources for the transportation and industrial manufacturing along with residential and commercial heating. Reaching carbon neutrality with net zero carbon dioxide (CO_2) emissions has become globally important in the 21st century but still very challenging. On the other hand, if we could develop chemicals, fuels, organic and inorganic materials from CO_2 and water using renewable energy, we may be able to create a new, green and sustainable supply chain that allows the global societies to continue economic development based on the fuels, chemicals and materials all made from CO_2 and H_2O with renewable energy while reaching carbon neutrality. We will discuss the capture and separation of CO_2 using novel approaches (including solid "molecular basket" sorbents) and chemical conversion of CO_2 based on catalysis and non-thermal plasma catalysis and outline the progress through research and pilot-scale development in our laboratory since 1990s and related R&D worldwide.

Biography

Prof. Chunshan SONG is the Dean of Science and Wei Lun Professor of Chemistry at The Chinese University of Hong Kong. He is a Distinguished Professor Emeritus in Fuel Science and Chemical Engineering and the former Director of EMS Energy Institute at the Pennsylvania State University where he was the founding Director of University Coalition for Fossil Energy Research consisting of 15 research universities funded by US Department of Energy. With PhD in Applied Chemistry from Osaka University, Japan and BSc in Chemical Engineering from Dalian University of Technology, China, Prof. Song's research focuses on heterogeneous catalysis and chemistry of energy and fuels including CO_2 capture and conversion. He has received many awards such as George A. Olah Award and Henry H. Storch Award from American Chemical Society, ACS Fellow, RSC Fellow, and Distinguished Fulbright Scholar Award (US-UK). He has published 530 journal papers with H-index of 111, along with 8 patents, 15 books and 35 book chapters. The 2024 study of Stanford University ranked Prof. Song 19th among 313,936 researchers worldwide in the subfield of Energy. In 2025, American Chemical Society journal "Energy & Fuels" granted Prof. Song the Pioneer in Energy Research (PIER) Award in recognition of his pioneering contributions to CO_2 capture and catalytic conversion.

Sharing on Successful Applications for RGC Grants

Application for Collaborative Research Fund – Experience Sharing

Professor Dennis Kee Pui NG

Professor, Department of Chemistry
Receipient of Collaborative Research Project Grant (CRPG)

Securing research funding is a pivotal milestone for any researcher, yet the process is often highly competitive and demanding. In this sharing session, I will discuss my experience in successfully obtaining a grant from the Collaborative Research Fund of RGC for my project "Advancing Photodynamic Therapy against Cancer through Bioorthogonal and Supramolecular Approaches". This project aims to enhance the efficacy and precision of photodynamic therapy by leveraging bioorthogonal chemistry and supramolecular strategies to improve tumour targeting and treatment outcomes. I will share insights into crafting a compelling proposal, addressing reviewers' concerns, and demonstrating the significance and feasibility of the research. Additionally, I will reflect on key lessons learned throughout the application process, including strategic planning, interdisciplinary collaboration, and persistence. It is hoped that this session can provide practical tips and inspiration for researchers aspiring to secure competitive funding for innovative scientific endeavours.

Professor Dennis Kee Pui NG received his BSc and MPhil from The Chinese University of Hong Kong (CUHK). He then pursued his DPhil in Inorganic Chemistry at the University of Oxford. After spending one year at the California Institute of Technology as a Research Fellow, he returned to his alma mater in 1994. He is presently a Professor in Department of Chemistry of CUHK. His current research interests lie in the chemistry of functional dyes, focusing on their synthesis, bioconjugation, bioorthogonal chemistry, supramolecular chemistry, and applications in photodynamic therapy, bioimaging, logic devices, and renewable energy production. So far, he has published more than 270 papers in international journals with a h-index of 63.

Experiences Sharing for Collaborative Research Equipment Grant

Professor Alex Tat Shing CHOW

Chairperson and Professor, Department of Earth and Environmental Sciences
Receipient of Collaborative Research Equipment Grant (CREG)

I am humbled to share my reflections on being a recipient of the Collaborative Research Equipment Grant, a recognition made possible by the collaborative efforts of my esteemed long-term partners in this endeavour. During my presentation, I will delve into the meticulous planning and beneficial feedback received from peers that bolstered my grant application, while also acknowledging areas where further exploration is warranted. My aim is to impart the knowledge gained from the process of proposal writing and interview preparation, with the hope of aiding others interested in pursuing UGC funding opportunities. This narrative is not solely a tale of triumph, but rather an ongoing voyage of discovery, and I eagerly anticipate engaging in a dialogue with the audience to exchange ideas and insights.

Professor Alex Tat Shing CHOW is the chairperson and professor of the newly established Department of Earth and Environmental Sciences in The Chinese University of Hong Kong. Prof. Chow research programmein the Biogeochemistry of Aquatic and Terrestrial Organic Matter (ATOM) is to examine different climatic and anthropogenic impacts such as wildfire, hurricane, sea level rise, deforestation, and urbanisation on natural and anthropogenic organic carbon in terrestrial-aquatic ecosystems. Specifically, Prof. Chow applies molecular characterisation techniques, coupled with field studies ranging in complexity from simple microcosms, experimental plots, whole watershed scales, and real disaster cases, to identify labile, recalcitrant, and reactive carbon fractions and moieties that affect nutrient cycles and fate of pollutants in both natural and engineering environments. As a principal investigator, he has successfully acquired over $10 million US dollar funding from different funding agencies in the USA including NSF, NIFA, DOE, and EPA. Prof. Chow was also served as panel members in these funding agencies.

Insights from My Journey to the RGC Research Fellow Scheme

Professor Xinhui LU

Associate Professor, Department of Physics
RGC Research Fellow

Applying for the RGC Research Fellow Scheme can be a challenging yet rewarding journey. In this talk, I will share my experience of applying for this grant, offering insights and practical tips for prospective applicants. I will begin with an overview of the awarded project, highlighting the research vision, objectives, and anticipated impact. I will then delve into the application preparation process, covering key strategies for crafting a compelling proposal, preparing for the interview, and effectively communicating the significance of your research. A critical aspect of a successful application is the strength of your collaborations. I will discuss how to identify and engage with "good" collaborators who bring complementary expertise, share a commitment to impactful research, and can genuinely strengthen your proposal. The talk will also cover dos and don'ts for the application. I hope to inspire fellow researchers to apply for this grant with confidence and determination.

Professor Xinhui LU is currently an associate professor at the Department of Physics, The Chinese University of Hong Kong (CUHK). She earned her bachelor's degree from Nanjing University and her PhD degree from Yale University. Then, she worked as a postdoctoral researcher at Brookhaven National Laboratory before joining CUHK. She is a pioneer in developing innovative X-ray and neutron scattering techniques for studying the structure and dynamics of thin film optoelectrical materials, revealing the three-dimensional bulk heterojunction morphology of organic photovoltaics and the film formation mechanisms of perovskite solar cells, and establishing the correlation between processing, structure and device performance. She was recognized as a Clarivate Highly Cited Researcher, received CUHK Young Researcher Award in 2020 and NSFC Excellent Young Scientists Fund (Hong Kong and Macau) in 2021. She was elected as a member of the Hong Kong Young Academy of Sciences in 2024 and conferred the title of "RGC Research Fellow" in 2025.

Sharing on Successful Applications for NSFC Grants

Sharing Experience for NSFC/RGC Joint Research Scheme for a Non-experimental Science Proposal

Professor Hoi Ying WONG

Associate Dean (Student Affairs)
Professor, Department of Statistics
Receipient of NSFC/RGC Joint Research Scheme (JRS)

The NSFC/RGC Joint Research Scheme (JRS) supports research proposals jointly submitted by researchers from the Mainland and Hong Kong. For the standard JRS, a successful proposal will provide the Mainland researcher with research funding of around RMB 1 million and the Hong Kong researcher with around HKD 1.2 million. The six focus areas under the scheme include information technology, life science, new materials science, marine and environmental science, medicine, and management science. However, it also supports proposals beyond these focused areas. In this talk, the speaker will share his successful experience in non-experimental research areas. Unlike the GRF, the application for the JRS requires the Mainland and Hong Kong principal investigators (PIs) to submit two different but related proposals. The Hong Kong PI is required to prepare a preliminary short proposal for the screening stage. Only selected PIs will be asked to submit full proposals for further consideration in the second stage. The speaker will share his views on the selection of focus areas, the key aspects of writing the preliminary proposal, and communication with the Mainland collaborator.

Professor Hoi Ying WONG is a Professor at Department of Statistics, Outstanding Fellow, and Associate Dean of Science in Student Affairs at The Chinese University of Hong Kong. He is interested in mathematical finance, actuarial science, risk management and machine learning. he received 2024 Kan Tong Po International Fellowship by Royal Society of UK, 2018 Best paper prize of IMA Journal of Management Mathematics and VC Exemplary Teaching Awards in 2015 and 2020. Prof. Wong had consulting experience with Hong Kong Monetary Authority, commercial banks and a FinTech company. He was recently awarded the NSFC/RGC Joint Research Scheme.

Lessons from a Grant Application: Tips and Best Practices for Success

Professor Renjun DUAN

Professor, Department of Mathematics
Receipient of NSFC Distinguished Young Scholars

I am deeply honoured to reflect on my experience receiving the Distinguished Young Scholars Fund, which I must attribute to the invaluable contributions of my long-term collaborators involved in this project. In my talk, I will discuss how meticulous preparation and constructive peer feedback enhanced my application, while also acknowledging areas where I continue to seek deeper understanding. I hope that the insights I've gained regarding proposal writing and interview preparation could assist others interested in applying for NSFC funds. This is not merely a success story but rather an ongoing journey of learning, and I look forward to exchanging ideas with the audience.

Professor Renjun DUAN is currently a Professor in the Department of Mathematics at The Chinese University of Hong Kong (CUHK). He earned his PhD in Mathematics from the City University of Hong Kong in 2008. After graduation, he conducted postdoctoral research for two years at the Johann Radon Institute for Computational and Applied Mathematics (RICAM), part of the Austrian Academy of Sciences. In 2010, he joined CUHK, where he has been working ever since. His research focuses on the analysis of partial differential equations (PDEs), with a particular emphasis on the Boltzmann equation in kinetic theory and its connections to fluid dynamic equations.

Sharing Experiences and Tips for NSFC Application (EYS)

Professor Sijie CHEN

Vice-Chancellor Associate Professor, School of Life Sciences
Receipient of NSFC Excellent Young Scientists Fund

The Excellent Young Scientists (EYS) Fund, established by the National Natural Science Foundation of China (NSFC), has been open to scientists from Hong Kong and Macao since 2019, with an annual quota of 25 awards. The funding amount was recently raised to 2 million RMB for a three-year period and follows a lump-sum project-funding system, which has attracted many applicants. Starting from 2024, the quota limitation for scientists from Hong Kong and Macao has been removed, and the selection process is now merged with candidates from across the country. This change brings both new opportunities and challenges. In this sharing session, I will humbly share my personal experiences with the NSFC EYS application, including preparation, proposal writing, and the interview process. I hope my experiences and suggestions can provide helpful insights for others interested in applying.

Professor Sijie CHEN received her BSc in Biology from Wuhan University in 2009 and PhD in Bioengineering from Hong Kong University of Science and Technology (HKUST) in 2013. Subsequently, she undertook a postdoctoral position at HKUST, followed by an Endeavour Fellow position at the University of Melbourne. In late 2015, she joined Karolinska Institutet (KI) as a postdoctoral fellow. Between 2017 and 2023, she served as an Assistant Professor at Ming Wai Lau Center for Reparative Medicine, KI. In August 2023, she moved to The Chinese University of Hong Kong, where she currently holds the position of Vice-Chancellor Associate Professor. Dr. Chen's research focuses on fluorescent biosensors and fluorescence imaging.

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