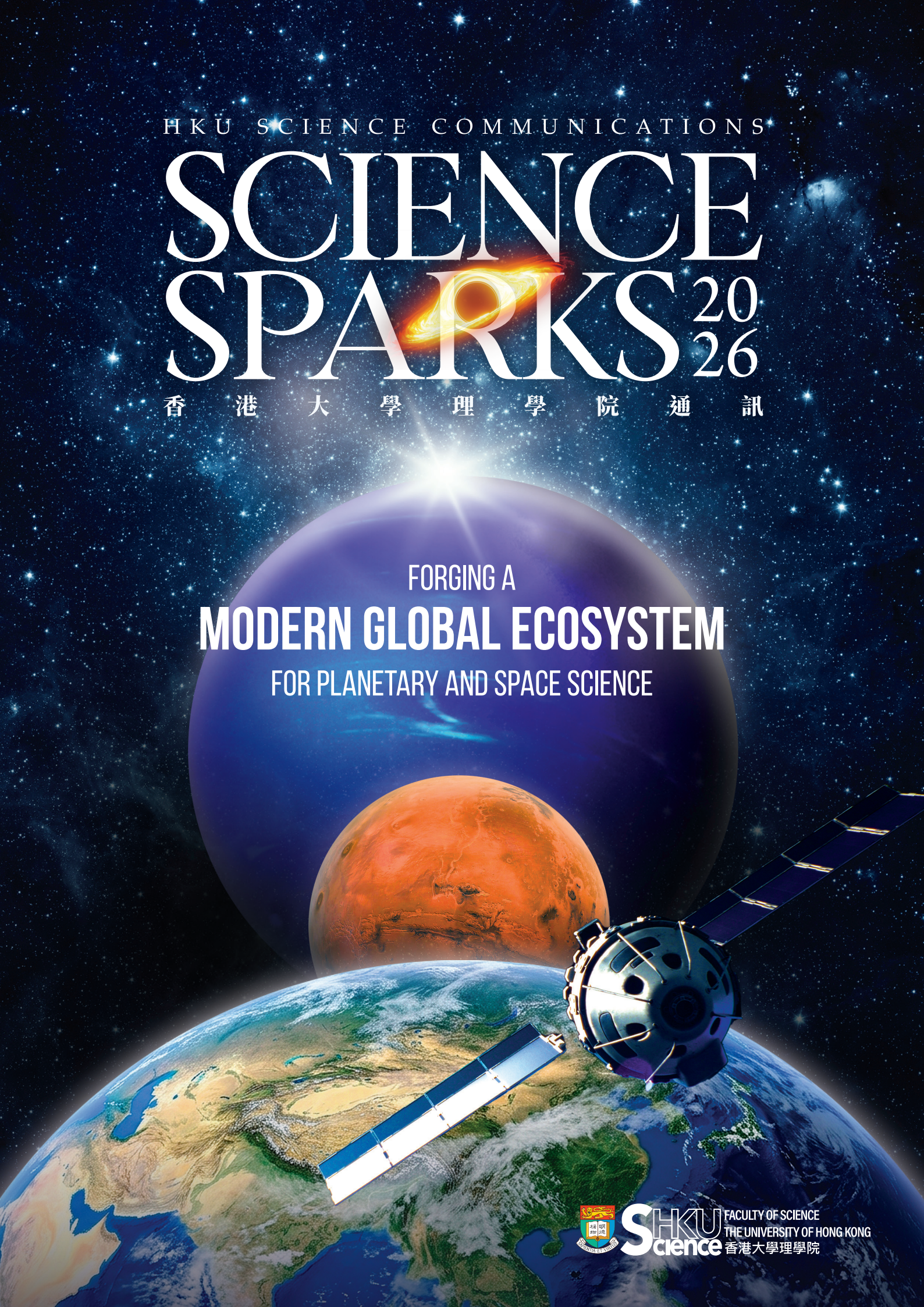
HKU SCIENCE COMMUNICATIONS

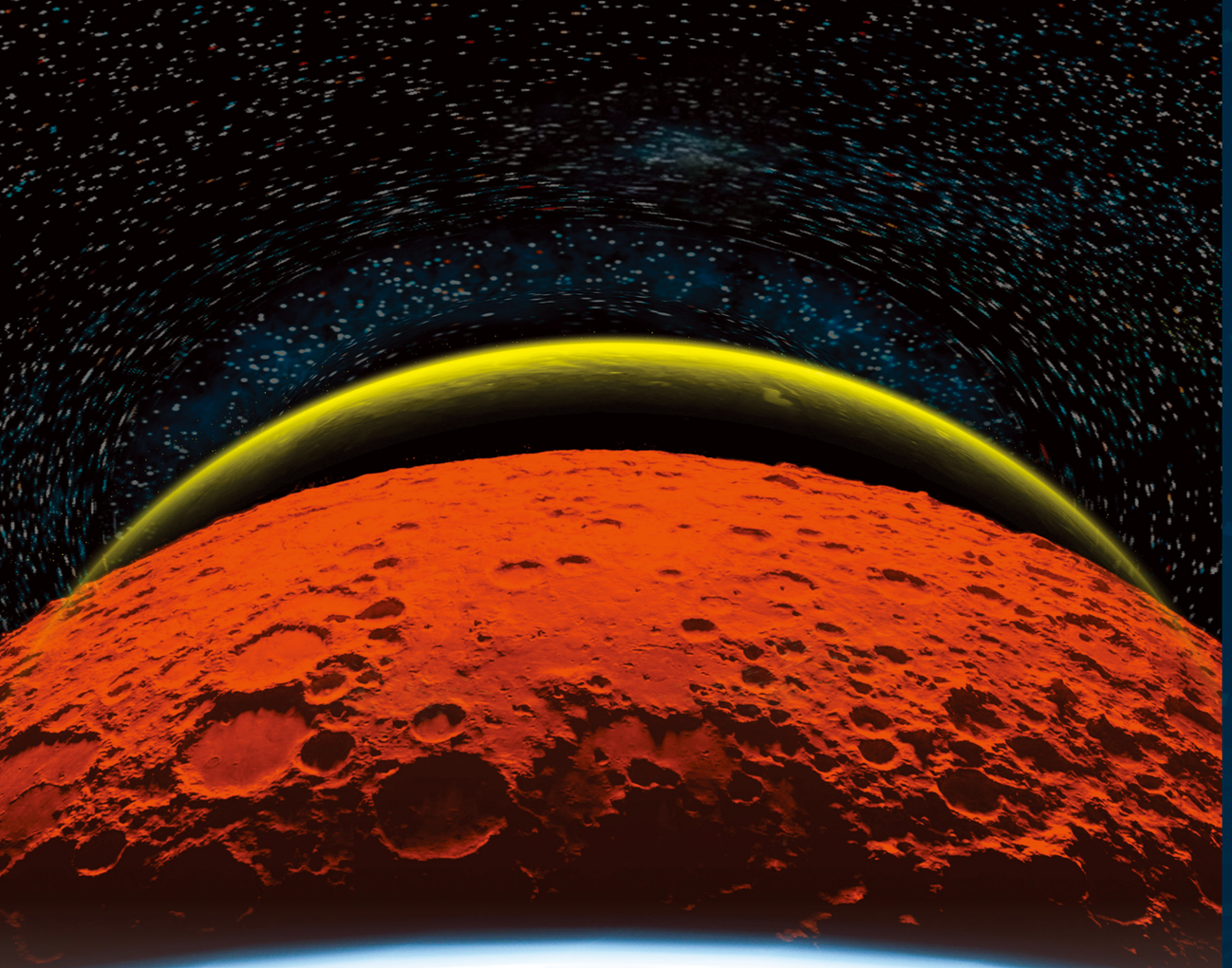
SCIENCE SPARKS 2026

香 港 大 學 理 學 院 通 訊

FORGING A MODERN GLOBAL ECOSYSTEM FOR PLANETARY AND SPACE SCIENCE



FACULTY OF SCIENCE
THE UNIVERSITY OF HONG KONG
香港大學理學院



VISION OF HKU FACULTY OF SCIENCE

The Faculty of Science aims to be pre-eminent in Hong Kong, leading in Asia and highly competitive globally across research, teaching and knowledge exchange.

MESSAGE FROM THE DEAN

People as the Core Asset

Our community is the core of the Faculty of Science, and we remain dedicated to recruiting world-class scholars who bring fresh and diverse perspectives to our mission.

Recently, we welcomed 16 outstanding academics from across the scientific spectrum, and more experts are expected to join us in the near future. Some highlights of our recent recruitment efforts include the appointments of several Chair Professors: Professor Nicolas DAUPHAS in the Department of Earth and Planetary Sciences; 2010 Fields Medalist Professor Bảo Châu NGÔ and Professor Hà Văn VŨ in the Department of Mathematics; and Nobel Laureate Sir Andre GEIM, Nobel Laureate Professor Ferenc KRAUSZ, and Professor Bing ZHANG in the Department of Physics. Their presence on our campus reflects our commitment to excellence at the highest level and serves as a genuine inspiration for our students and staff. We believe that by investing in our people, we are enabling the scientific breakthroughs of tomorrow.

Embracing the Era of Intelligence

The recent period has been a transformative time for the Faculty as we fully engage with the era of artificial intelligence (AI). The rapid evolution of AI is no longer just a technological backdrop but a central force for innovation within our departments. We have proactively integrated AI into both university education and administrative management by using these tools to refine assessment and tailor learning to the unique needs of every student. To further strengthen this effort, we have also injected extra funding to support AI-related teaching and learning initiatives through the Faculty of Science Teaching Innovation Fund. To further advance AI-driven research and innovation, the Faculty organised an "AI for Science Mini-Symposium" in early 2026, offering an excellent opportunity to share insights and foster collaborations at the intersection of AI and basic science. As we navigate a complex technological and geopolitical landscape, our focus remains on promoting the resilience of HKU Science to ensure that we stay at the forefront of global scientific progress.

Research Excellence and Funding Success

The strength of our research is evident in our success in securing competitive funding even as the environment becomes more demanding. Our proposal of the Centre of Functional Materials for Energy and Sustainability (CFMES) has been officially approved for admission to the third InnoHK research cluster, SEAM@InnoHK, which focuses on sustainable development, energy, advanced manufacturing, and materials.

We have maintained a strong position by winning substantial grants across several prestigious schemes. Notably, the official renewal of the State Key Laboratory of Synthetic Chemistry and the official establishment of the State Key Laboratory of Optical Quantum Materials further solidify our leadership in frontier scientific domains. Our colleagues have secured multiple Collaborative Research Fund (CRF) awards, achieved success with the Research Impact Fund (RIF), and excelled in the RAISe+ Scheme. Furthermore, our researchers were awarded the National Natural Science Foundation of China/ Research Grants Council (RGC) Joint Research Scheme and RGC Research Fellowships, which highlight the excellence and competitiveness of our academic staff.

Another major milestone is the establishment of the Hong Kong Institute for Astronomy and Astrophysics (HKIAA), now an affiliated Institute of our Faculty. As a premier hub dedicated to advancing astrophysics in Hong Kong and beyond, HKIAA strengthens our research landscape and underscores the transformative potential of our work.

Our commitment to research is also recognised through the numerous international and local honours our scholars receive. Many of our staff continue to appear on the Clarivate Highly Cited Researchers and the world's top scientists' lists. Our academics across various fields are regularly elected as Fellows of major local and global scientific societies, ensuring that our work helps shape the global scientific narrative.

Advancing Science Education

Our academic programmes continue to attract the world's elite young talent. The Science Master Class (BSc&MRes) and BSc&LLB programmes maintain their strong reputations and admit students who are ready to tackle complex global challenges. In the latest intake of our BSc programme, we saw a strong preference among students for fundamental subjects such as mathematics and physics, suggesting a renewed interest in the core pillars of science.

We have seen remarkable expansion at the postgraduate level. Taught Postgraduate (TPG) programmes, including new offerings such as the MSc in Chemical Technologies for Health and Materials and the MSc in Integrative Marine Ecology and Conservation, have proven highly successful and attracted strong interest. Our Research Postgraduate (RPG) community has also grown substantially. The academic calibre of our new cohort of postgraduate researchers remains outstanding, with approximately one-third hailing from the world's top 100 universities.

Interdisciplinary Innovation and Outreach

The growth of interdisciplinary units established in collaboration with our partner Faculties has created vital hubs for collective innovation. The School of Computing and Data Science (SCDS), the School of Innovation (I-School), and the School of Biomedical Engineering (SBME) have become incubators for collaboration. These schools help bridge the gap between pure science and practical application, ensuring that our research leads to real-world solutions. By working across traditional boundaries, we are preparing our students for an increasingly interconnected professional world.

Beyond our research, we are committed to promoting scientific literacy and engaging with the wider community. The Faculty has grown its digital presence on platforms such as YouTube and Instagram to make scientific knowledge more accessible. Alongside our bi-monthly e-newsletter, this third issue of our annual publication, *Science Sparks*, serves to highlight the major achievements and milestones of our Faculty. Our outreach also focuses on the next generation through initiatives like the Junior Science Institute (JSI) and the TouchStart Science Summer Programme, which give young learners their first experience of scientific inquiry.

Strengthening Partnerships and Looking Ahead

As a global Faculty, our strength lies in meaningful connections that bring together people, ideas, and institutions. We continue to deepen partnerships with leading universities and research centres, both locally and internationally, advancing joint research and academic exchange. At the same time, we are actively reconnecting with distinguished alumni and engaging graduates who have excelled as entrepreneurs to ensure that their experience can be translated into mentorship and career opportunities for our students.

Looking ahead, having completed the Research Assessment Exercise (RAE) 2026, we await the results with confidence and a clear sense of our strategic direction. Building on this foundation, we will continue to prioritise strategic hiring to attract and retain outstanding scholars, while fostering interdisciplinary collaboration to address complex global challenges. We are also exploring the development of dual bachelor's degree programmes with prestigious institutions in the Chinese Mainland, broadening our academic offerings and enhancing our contributions to the nation's scientific and technological development. Supported by the Tech Landmark Development Project, which will provide state-of-the-art facilities for the next generation of research and innovation, we remain committed to being an inclusive and vibrant intellectual community for scholars from around the world.

I warmly invite you to join us in shaping a future in which science plays a leading role in advancing knowledge and improving society.

Qiang ZHOU
Dean of Science
Chair Professor
School of Biological Sciences

Key Milestones and Achievements of the Faculty of Science 2025-2026

New Talents: Welcomed 16 new professorial staff across a wide range of disciplines, including Biological Sciences, Chemistry, Earth and Planetary Sciences, Mathematics, and Physics, strengthening our academic expertise and research capacity.

Global Recognition: 6 scholars ranked among the top 100 scientists worldwide in their respective fields by Research.com; 9 scholars were named to Clarivate Analytics' Highly Cited Researchers 2025 list, reflecting exceptional research influence and impact; Professor Ferenc KRAUSZ (Physics) was elected as an international member of US National Academy of Sciences; Professor Xuhua HE (Mathematics) was elected as a member of the Hong Kong Academy of Sciences; Professor Dong LI (Mathematics) was named a fellow of the American Mathematical Society; Professor Binzheng ZHANG (Earth and Planetary Sciences) and Professor Zhiwen ZHANG (Mathematics) secured the highly competitive RGC Research Fellow Scheme (RFS) for 2025/26.

Achievements in Research: Secured 4 Collaborative Research Fund (CRF) awards, out of only 13 funded projects at HKU, totalling over HK$20 million; obtained a HK$4.16 million grant from the Research Impact Fund (RIF) 2025/26 exercise, along with further funding awarded by the ITC RAISe+ scheme; the renewal of the State Key Laboratory of Synthetic Chemistry and the official establishment of the State Key Laboratory of Optical Quantum Materials, and the Centre of Functional Materials for Energy and Sustainability (CFMES) under SEAM@InnoHK.

Interdisciplinary Collaboration: Supported the successful establishment and operation of new interdisciplinary Schools, including the School of Computing and Data Science (SCDS), the School of Innovation (I-School), and the School of Biomedical Engineering (SBME).

Undergraduate Admission Intake: Our BSc programme attracted applicants with the strongest academic credentials among pure science programmes at local universities; our flagship dual-degree programmes also continued to draw top-tier talent; the BSc & MRes programme admitted 39 students, with Best 5 HKDSE scores ranging from 32 to 42.5, IB scores from 42 to 45, and GCE A-level/IAL results from 4A* to 5A*; the BSc & LLB programme admitted 25 students, with Best 6 HKDSE scores ranging from 31.5 to 42, IB scores from 42 to 44, and GCE A-level/IAL results of 4A*.

Postgraduate Student Populations: Research Postgraduate (RPG) student population increased by 16.5%; Taught Postgraduate (TPG) intake rose by 32%, expanding our advanced training and research community.

Global Mobility and Exchange: Facilitated outgoing exchange/ visiting study for 145 students and welcomed 106 incoming exchange/ visiting students, enriching cross-cultural learning and international partnerships.

LEADERSHIP

DEAN

Professor Qiang ZHOU

Chair Professor, School of Biological Sciences

ASSOCIATE DEANS

Professor Ho Yu AU-YEUNG

Associate Dean (Student Affairs)
Associate Professor, Department of Chemistry

Professor Benjamin Robert KANE

Associate Dean (Teaching and Learning)
Professor, Department of Mathematics

Professor Xuechen LI

Associate Dean (Research and Graduate Studies)
Morningside Professor in Chemical Biology & Chair Professor, Department of Chemistry

ASSISTANT DEANS

Professor Chi Bun CHAN

Assistant Dean (Graduate Studies)
Associate Professor, School of Biological Sciences

Dr Billy Chi Hang HAU

Assistant Dean (Taught Postgraduate Programmes)
Principal Lecturer, School of Biological Sciences

Professor Rachel Ka Wai LUI

Assistant Dean (e-Learning)
Senior Lecturer (Associate Professor of Teaching), Faculty of Science

Professor Edmund Chun Ming TSE

Assistant Dean (Outreach)
Associate Professor, Department of Chemistry

Professor Thiyagarajan VENGATESEN

Assistant Dean (Experiential Learning)
Professor, School of Biological Sciences

HEADS OF ACADEMIC DEPARTMENTS

Professor Timothy Carlton BONEBRAKE

Professor
School of Biological Sciences

Professor Xiaoyu LI

Professor
Department of Chemistry

Professor Zhonghui LIU

Professor
Department of Earth and Planetary Sciences

Professor Guangyue HAN

Professor
Department of Mathematics

Professor Shuang ZHANG

Chair Professor
Department of Physics

DIRECTORS OF AFFILIATED SCHOOLS

Professor Michael HÄUSSER

Chair Professor
School of Biomedical Engineering

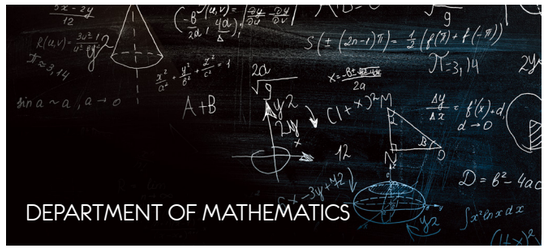
Professor Yi MA

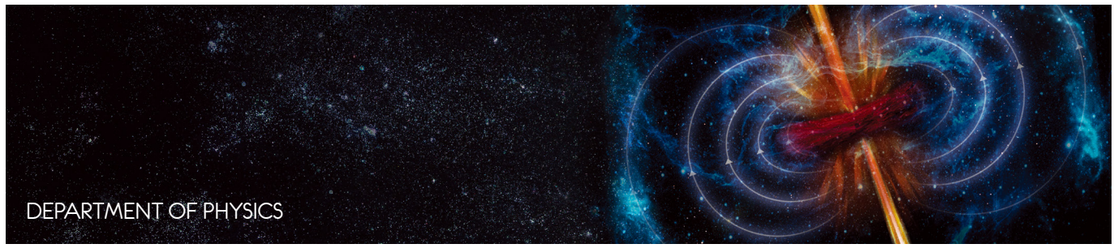
Chair Professor
School of Computing and Data Science

Professor Hayden SO

Associate Professor
School of Innovation

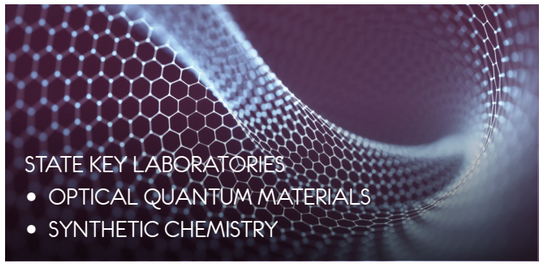
SCIENCE DEPARTMENTS

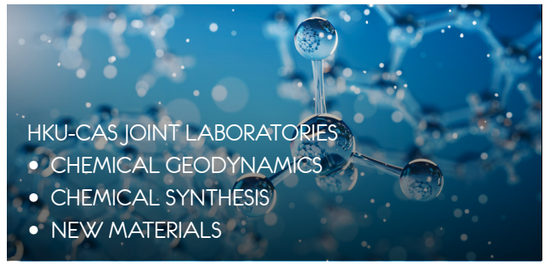


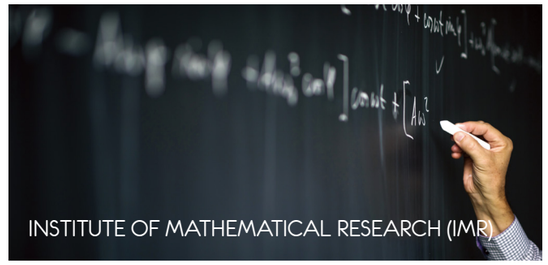


AFFILIATED SCHOOLS

AFFILIATED RESEARCH UNITS







INSTITUTIONAL REPUTATION & GLOBAL PRESENCE

HKU SCIENCE FAMILY

TEACHING STAFF	UNDERGRADUATE STUDENTS	RESEARCH POSTGRADUATE STUDENTS
>160	>3,120	~720

TAUGHT POSTGRADUATE STUDENTS	ALUMNI
~950	>30,870

UNIVERSITY RANKINGS

QS ASIA UNIVERSITY RANKINGS 2026	QS WORLD UNIVERSITY RANKINGS 2026
#1	#11

THE WORLD UNIVERSITY RANKING 2026	THE ASIA UNIVERSITY RANKINGS 2026	THE INTERDISCIPLINARY SCIENCE RANKINGS 2026
#33	#6	#32

RANKINGS BY SCIENCE SUBJECTS

#47	LIFE SCIENCES (THE WORLD UNIVERSITY RANKINGS 2026)
#37	PHYSICAL SCIENCES (THE WORLD UNIVERSITY RANKINGS 2026)
#28	LIFE SCIENCES & MEDICINE (QS WORLD UNIVERSITY RANKINGS 2026)
#58	NATURAL SCIENCES (QS WORLD UNIVERSITY RANKINGS 2026)

TOP-NOTCH SCHOLARS

20.8% of the professorial staff in our Science departments are classified as Top 1% Scholar's on average over the past decade (Clarivate Analytics' Essential Science Indicators)

7	Members of Chinese Academy of Sciences (CAS)
12	Memberships of Foreign Academies
5	Members of Hong Kong Academy of Sciences
24	Croucher Foundation Senior Research Fellows

RESEARCH EMINENCE

6 Areas of Excellence (AoE) projects

3 Theme-based Research (TRS) projects

2 State Key Laboratories

3 HKU-CAS Joint Laboratories

3 Government's InnoHK Research Clusters

8 RGC Collaborative Research Funds from 2022 to 2024

INTERNATIONALISATION

~ 35% Academic staff are from overseas

#4 THE The Most International University in the World in 2025

~ 53% Non-local students in the Faculty

#49 THE World Reputation Rankings 2025

TEACHING & LEARNING

Undergraduate Programmes	· 4 Key programmes by the Faculty and collaborators · 8 Programmes by affiliated Schools
Taught Postgraduate Programmes	· 8 Key Programmes by the Faculty · 5 Programmes by affiliated School
Research Postgraduate Programmes	· Master of Philosophy · Doctor of Philosophy

GRADUATE EMPLOYMENT

Essentially **100%** employment rate in the past decade (including further studies)

ADMISSIONS INTAKE FOR KEY UNDERGRADUATE PROGRAMMES

Highest scores for 2025/26 intake:

	JUPAS#	Non-JUPAS
6901 Bachelor of Science	36.5	45 (IB)/ 5A*(GCEAL)
6688 Bachelor of Science & Master of Research (Science Master Class)	42.5	45 (IB)/ 5A*(GCEAL)
6858 Bachelor of Science and Bachelor of Laws	36.4	44 (IB)/ 4A*(GCEAL)

* Best five subjects score

KNOWLEDGE EXCHANGE

Patent Applications Granted: **94** over the past three years

NURTURING THE NEXT GENERATION OF SCIENCE PROFESSIONALS

UNDERGRADUATE PROGRAMMES

KEY PROGRAMMES

- Bachelor of Science
- Bachelor of Science & Master of Research (Science Master Class)
- Bachelor of Science and Bachelor of Laws (5-year Double Degree Programme)

CO-HOSTED WITH OTHER FACULTY

- Bachelor of Education and Bachelor of Science (5-year Double Degree Programme)

OFFERED BY AFFILIATED SCHOOLS

1. SCHOOL OF BIOMEDICAL ENGINEERING
   - Bachelor of Engineering in Biomedical Engineering
2. SCHOOL OF COMPUTING AND DATA SCIENCE

   Computing and Data Science
   - Bachelor of Engineering in Artificial Intelligence and Data Science
   - Bachelor of Engineering in Computer Science

   Statistical Decision Sciences
   - Bachelor of Statistics

     Professional Cores in
     - Decision Analytics
     - Risk Management
     - Statistics
   - Bachelor of Science in Actuarial Science
   - Bachelor of Arts and Sciences in Applied Artificial Intelligence
   - Bachelor of Arts and Sciences in Financial Technology
3. SCHOOL OF INNOVATION
   - Bachelor of Science in Innovation and Technology

TAUGHT POSTGRADUATE PROGRAMMES

KEY PROGRAMMES

- Master of Science in the field of Applied Geosciences
- Master of Science in Artificial Intelligence
- Master of Science in the field of Chemical Technologies for Health & Materials
- Master of Science in Environmental Management
- Master of Science in the field of Food Industry: Management & Marketing
- Master of Science in the field of Food Safety & Toxicology
- Master of Science in Integrative Marine Ecology & Conservation
- Master of Science in the field of Physics

OFFERED BY AFFILIATED SCHOOL

SCHOOL OF COMPUTING AND DATA SCIENCE

- Master of Science in Computer Science
- Master of Data Science
- Master of Science in Electronic Commerce and Internet Computing
- Master of Science in Financial Technology and Data Analytics
- Master of Statistics

RESEARCH POSTGRADUATE PROGRAMMES

- Master of Philosophy
- Doctor of Philosophy

**All programmes are subject to change*

CONTENTS

MESSAGE FROM THE CHIEF EDITOR

It is a pleasure to welcome you to this year's edition of *Science Sparks*. Each issue offers us an opportunity to pause and reflect upon the transformative ideas, discoveries, and individuals that shape HKU Science. This year, the sense of collective momentum feels more palpable than ever.

Across the Faculty, our expertise in astronomy, planetary science, and space science has entered an exceptional period of growth. Through the concerted efforts of the Hong Kong Institute for Astronomy and Astrophysics (HKIAA), the Department of Physics, the Department of Earth and Planetary Sciences, and the Laboratory for Space Research (LSR), we continue to elevate Hong Kong's stature in global scientific discourse. Whether contributing to ambitious national initiatives or forging international collaborations, our researchers are exploring the cosmos with a spirit of partnership that is truly world-class.

This momentum is further boosted by the arrival of several distinguished scholars who enrich our academic tapestry. We are honoured to welcome two Nobel Laureates, a Fields Medalist, and several illustrious academics. Their presence underscores our commitment to global excellence. This issue proudly features interviews and insights from these luminaries, presented alongside the fresh perspectives of our innovative younger thinkers.

Such achievements are, of course, made possible only through the interdisciplinary rigour embedded across all our departments. From pioneering surgical innovations that offer clinicians "infrared vision" to vital research protecting the fragile biodiversity of our marine and rainforest ecosystems, our work reflects a profound connection to the global challenges of our time.

We remain steadfast in our commitment to teaching, learning, and knowledge exchange, ensuring our research transcends the laboratory to ignite curiosity in the world around us. Whether tracking transcontinental butterfly migrations, reviving our local pearl heritage, or applying scientific rigour to public health and physical fitness, our community reflects a united spirit of inquiry and tenacity. Central to this mission is the enduring success of our alumni and the vibrant energy of our students. They remain the heartbeat of our Faculty, carrying the torch of curiosity into the future.

As you turn these pages, you will encounter the diverse voices that continue to push the boundaries of what is possible. Thank you for journeying with us. I hope this issue of *Science Sparks* offers both excitement and inspiration as we look towards new horizons together.

Yours sincerely,

Professor Edmund Chun Ming TSE

Chief Editor, and Assistant Dean of Science (Outreach)

Associate Professor, Department of Chemistry

Forging a Modern Global Ecosystem for Planetary and Space Science

Hong Kong Institute for Astronomy and Astrophysics
Department of Physics
Laboratory for Space Research
Department of Earth and Planetary Sciences

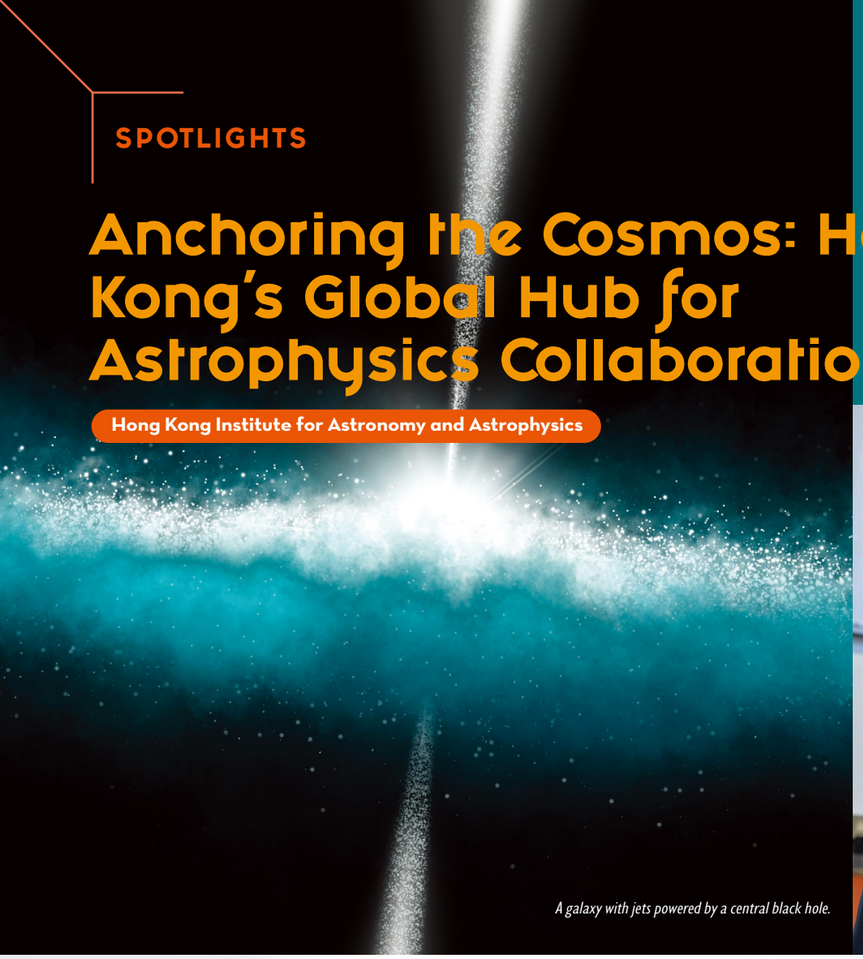
For as long as humanity has looked up at the night sky, we have been defined by the impulse to look beyond Earth. Long before the first spacecraft breached the atmosphere, curiosity compelled people to map the stars and trace the wandering planets, seeking to understand our place within the cosmic tapestry. Today, that same curiosity lays the foundation for a new global enterprise—one driven not by solitary pioneers but by collaboration, shared knowledge, and long-term partnerships grounded in trust.

At HKU Science, this passion fuels a flourishing ecosystem in planetary and space research designed for impact. The Hong Kong Institute for Astronomy and Astrophysics (HKIAA) serves as the region's intellectual anchor, convening global talent to create a strategic roadmap and command a leading role in high-level astrophysical discourse. Complementing this, the Laboratory for Space Research (LSR) acts as a mission-active connector and trusted partner in international projects, delivering high-impact scientific outputs and shaping the policy dialogues that govern future exploration. Our restructured Department of Earth and Planetary Sciences (DEPS) brings a fresh vision by uniting Earth, planetary, and space sciences, and by developing programmes and interdisciplinary initiatives aligned with global trends in planetary exploration and astrobiology. Alongside them, the Department of Physics plays a pivotal role in advancing fundamental research that underpins many of HKU's astronomy and astrophysics science endeavours.

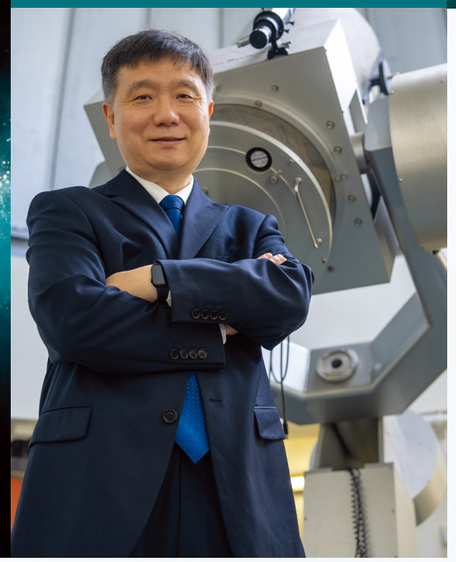
Together with frontier projects, from cosmological observations to contributions to major mission infrastructures, HKU is doing more than merely charting the next chapter of space discovery; we are actively writing it, carrying forward the same spirit of curiosity that first drew humanity to the stars.

Anchoring the Cosmos: Hong Kong's Global Hub for Astrophysics Collaboration

Hong Kong Institute for Astronomy and Astrophysics



A galaxy with jets powered by a central black hole.



Professor Bing ZHANG, Founding Director of HKIAA.

> "A great astronomy centre is not defined by a single telescope, but by its ability to connect people, ideas and discovery across institutions, borders, and generations."
>
> — Professor Bing ZHANG, Founding Director, Hong Kong Institute for Astronomy and Astrophysics

When Professor Bing ZHANG speaks about the future of astrophysics in Hong Kong, he does so with quiet conviction rather than grand declarations. The Founding Director of the Hong Kong Institute for Astronomy and Astrophysics (HKIAA) is acutely aware that the most enduring scientific institutions are not built overnight, nor are they defined by solitary breakthroughs. They are shaped by the ability to convene a global community around a shared intellectual purpose.

Professor Bing ZHANG and his team.

Established in 2025 under HKU, HKIAA represents a strategic leap forward: a new research hub designed not simply to advance astrophysics and space science, but to anchor Hong Kong within the global astronomical landscape at a moment of rapid expansion and transformation.

A Journey Full Circle

For Zhang, a Global STEM Scholar and Chair of Astrophysics in the Department of Physics, the creation of HKIAA marks a professional journey that has come full circle. His first encounter with Hong Kong dates back to 1996, when he attended an astronomy conference here as a doctoral student. Nearly three decades later, his return was prompted less by nostalgia than by a clear-eyed assessment of the city's untapped potential.

"Hong Kong has long enjoyed an outsized reputation in astronomy, thanks in no small part to the prestige of the Shaw Prize, the 'Nobel of the East'," he observes. "But our research community has historically lacked the critical mass seen in leading global hubs. That gap is precisely where growth can happen."

HKIAA was conceived to bridge this divide. By expanding the breadth of research and building a concentrated core of expertise in contemporary astrophysics, the Institute aims to transform Hong Kong from a city that celebrates scientific excellence into one that generates it.

A dramatic black hole merger, illustrating gravitational waves and deep-space phenomena.

An Institute Designed to Convene

What distinguishes HKIAA is its architecture—not of stone, but of collaboration. Rather than operating as a conventional, inward-facing unit, the Institute brings together astronomers from HKU Science, including the Department of Physics and the Department of Earth and Planetary Sciences, and connects them with multiple universities across Hong Kong, creating a shared platform for collaboration and exchange.

At its core, HKIAA is grounded in the fundamentals: theoretical modelling, numerical simulations, and complex data analysis. Nonetheless, this academic foundation is paired with an outward-looking ambition to shape the future of observation. The Institute is deeply involved in the design and development of next-generation facilities, both on the ground and in space.

"Modern astronomy is inherently a collective endeavour," Zhang notes. "Breakthroughs now occur at the intersection of institutions and borders. HKIAA is the catalyst that makes this interaction natural and sustained."

Through colloquia, symposia, international conferences and joint research proposals, the Institute functions as an intellectual commons where ideas circulate freely and collaboration forms a natural part of everyday practice.

Plaque-unveiling ceremony of the Hong Kong Institute for Astronomy and Astrophysics.

A Strategic Bridge to the Stars

HKIAA's role as a "convener" takes on profound significance given China's meteoric rise in space exploration. Today, some of the world's most ambitious observational facilities are located on the Chinese Mainland, and HKIAA researchers are not merely spectators but active contributors to these missions.

From the Five-hundred-meter Aperture Spherical Telescope (FAST), the world's largest filled-aperture radio telescope, to the Einstein Probe and the Chinese Space Station Telescope, HKIAA members play active roles in scientific planning and instrumentation. Formal partnerships with leading institutions such as Tsinghua University reinforce Hong Kong's status as a trusted scientific conduit.

"Basic science thrives on transparency and openness," Zhang remarks. "Hong Kong's unique position allows us to bridge the international community and the Chinese scientific enterprise in a way that is both natural and credible."

The Architecture of the Long View

For the next generation of researchers, HKIAA's impact is already tangible. Expanded academic curricula and exposure to emerging frontiers offer young scientists a broader horizon and a sense of belonging within a global field.

Looking ahead, the Institute's growth is characterised by a deliberate and patient selectivity. While major discoveries are expected from existing facilities over the next few years, future projects are evaluated with rigorous care.

"I am often approached by potential collaborators," Zhang reflects, "but true institution-building requires the courage to be discerning." Growth, in this view, is not a race for visibility, but a commitment to long-term scientific, institutional, and human value.

With a new physical home under development and continued support from the University, HKIAA is positioning itself for steady, meaningful expansion. It is an approach that favours depth over haste, and connection over scale. As Zhang summarises: "Growth is not about doing everything. It is about choosing the initiatives that will still matter twenty years from now."

◀ Website of HKIAA

Research in Action: Translating Vision into Discovery

Hong Kong Institute for Astronomy and Astrophysics

Department of Physics

Beyond building platforms and partnerships, HKIAA's convening role translates directly into frontier science. From patiently decoding fleeting radio signals to capturing the brief heartbeat of a newborn neutron star, its researchers are turning long-term vision into concrete discovery.

An artistic illustration of the "China Sky Eye" revealing the binary origin of fast radio bursts. Image credit: Y. LIU, X. YANG, Y. F. LIANG, W. L. ZHANG and Y. LI (PMO).

Revealing the Binary Origin of Fast Radio Bursts

One such pursuit focuses on fast radio bursts (FRBs), the universe at its most theatrical, appearing as brilliant millisecond flashes of radio light that erupt without warning from far-flung galaxies. For years, astronomers have been trying to answer a deceptively simple question: what, exactly, produces them? A global team featuring researchers from the Hong Kong Institute for Astronomy and Astrophysics (HKIAA) and the Department of Physics has taken a decisive step towards an answer.

Using China's colossal Five-hundred-meter Aperture Spherical Telescope (FAST), often called "China's Sky Eye", the world's largest single-dish radio telescope, the team spent nearly two years tracking the behaviour of a known repeating FRB source. What they found was extraordinary: a sudden, dramatic flare in the rotation measure, a twist in the polarisation of light caused by an intense plasma environment. Such a flare is not something an isolated star could easily produce.

Instead, the data point to a far more dynamic scenario, a magnetar locked in a binary system, its eruptions shaped by the winds and magnetic fields of a close stellar companion. This discovery, published in *Science*, not only provides the strongest evidence yet for a binary origin of repeating FRBs, but also propels Hong Kong researchers, including corresponding author Professor Bing Zhang, to the forefront of one of astrophysics' most competitive frontiers.

◀ Learn more about the research

Detecting the First "Heartbeat" of a Newborn Neutron Star

If FRBs are cosmic fireworks, gamma-ray bursts (GRBs) are full-scale detonations, the most powerful explosions known. Hidden within one such cataclysm, GRB 230307A, an HKU-led research team detected something astonishing: the first-ever "heartbeat" of a newborn neutron star.

Working with partners at Nanjing University and the Institute of High Energy Physics, CAS, the team analysed data from China's GECAM-B and GECAM-C satellites alongside NASA's Fermi Gamma-ray Burst Monitor. Buried in the millisecond glow was a rhythmic, 909-Hz signal lasting just 160 milliseconds, the telltale pulse of a millisecond magnetar spinning nearly a thousand times per second.

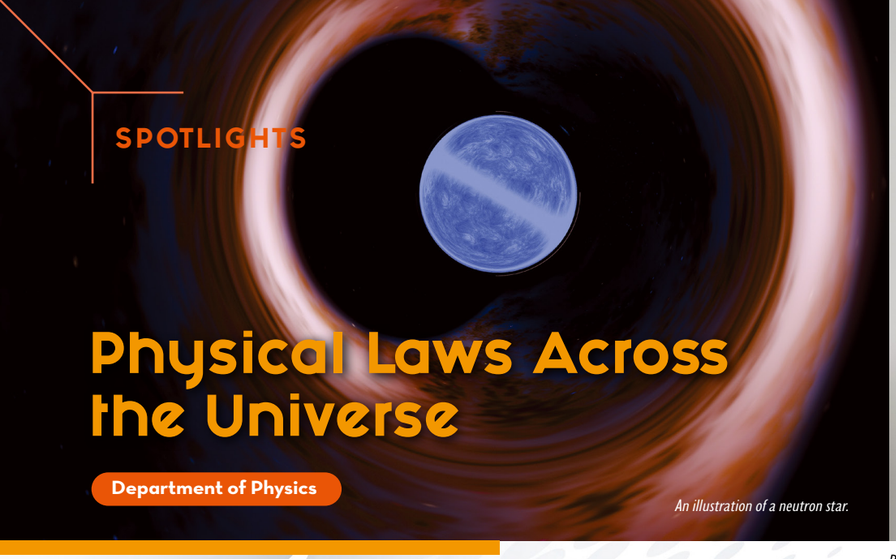
Published in *Nature Astronomy*, this result delivers the clearest evidence yet that some GRBs are powered not by instant black hole formation, but by the brief, intense life of a magnetar newly born from stellar collapse. For Zhang, whose team proposed such a mechanism more than a decade ago, the discovery is both a scientific milestone and a narrative moment: theory coming full circle, illuminated at last by data.

An artistic illustration of the magnetar and the gamma-ray burst jet in this work. Image credit: Yuja TIAN and Yuting WU, Nanjing Zhijiao Cloud Intelligent Technology Co., Ltd.; Scientific concept guidance: Runchao CHEN and Binbin ZHANG, Nanjing University.

◀ Learn more about the research

Physical Laws Across the Universe

Department of Physics



An illustration of a neutron star.

Professor Shuang ZHANG, Interim Head, Department of Physics.

Astrophysical and planetary science at HKU is underpinned by a discipline that illuminates the workings of the Universe at its most fundamental level: physics. As the language through which nature's laws are expressed, physics provides the conceptual scaffolding for understanding how planets and moons form, move and evolve as well as how matter behaves across a much broader range of astrophysical environments. Within the Department of Physics, this foundation becomes a distinct contribution to HKU's planetary and space-science ecosystem, one defined by analytical clarity, quantitative rigour and deep theoretical insight.

"When we study planetary systems and astrophysical phenomena, we are really studying the universal laws that govern all natural phenomena. This is where physics offers both clarity and coherence; it reveals the structures behind the complexity," says Professor Shuang ZHANG, Interim Head of Physics.

An abstract view of a nebula.

> "Physics gives us the language to understand every world, from the planets we know to those we have yet to imagine."
>
> — Professor Shuang ZHANG, Interim Head, Department of Physics

Decoding Planetary Systems

A core strength of the Department lies in planetary dynamics. Researchers investigate how planets and satellites interact within complex multi-body systems, examining orbital resonances, long-term stability and the emergence of chaotic behaviour. Through advanced numerical simulations, these studies span both our Solar System and a remarkable diversity of extrasolar planetary systems, revealing how planetary architectures form, transform and persist over cosmic timescales.

This work sits naturally at the boundary with astrophysics, where the same physical principles extend beyond planetary systems to more extreme cosmic environments. Investigations of planets in binary star systems, star–planet interactions and protoplanetary environments link planetary behaviour directly to stellar evolution. In this way, planetary systems are not treated as isolated objects but as parts of a continuous astrophysical landscape shaped by the stars they orbit and the environments in which they arise.

The Department's approach is defined by a close interplay between theory, simulation and observation. Physical models guide the interpretation of observational data and forecast system behaviour, while observations test and refine the underlying physics. This continual dialogue ensures that planetary research remains grounded in first principles while actively responsive to new empirical evidence.

Training Thinkers for a New Space Era

Education forms a central pillar of the Department's mission. Students are trained to think in terms of fundamental physical laws, building strong foundations in mathematics, mechanics, thermodynamics and computational methods, skills essential to modern planetary science. Undergraduate students are encouraged to engage with research early, gaining hands-on experience in modelling and data analysis. Postgraduate students pursue specialised projects within active planetary science and astrophysics groups, working closely with faculty members and international collaborators.

"Our goal is to equip researchers and students with the tools to think deeply and rigorously about the Universe. Whether they study planetary dynamics or astrophysics, the same principles guide them: curiosity, discipline and a commitment to understanding how nature truly works," remarked Zhang.

Within HKU's broader planetary-science landscape, the Department of Physics plays a complementary and indispensable role. By focusing on the physical principles that govern planetary systems and sustaining a training pipeline defined by analytical depth, the Department advances our understanding of how planets form, evolve and interact, ensuring that HKU's exploration of other worlds remains anchored in the fundamental laws that hold the cosmos together.

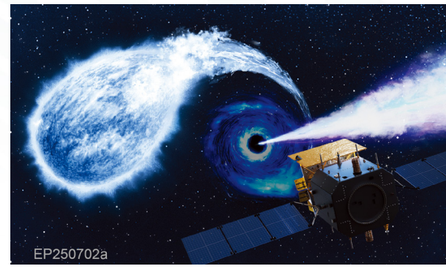
Probing Extreme Worlds and Cosmic Systems

Research in the Department of Physics applies fundamental physical laws to extreme astrophysical environments, extending HKU's planetary and space science from planetary systems to high-energy cosmic phenomena, such as black holes, neutron stars and dark matter. Through the close integration of theory, simulation and observation, physicists investigate how matter behaves under conditions far beyond those on Earth.

Catching a Black Hole Tearing Apart a White Dwarf

One recent example is the interpretation of an unusual high-energy transient detected in July 2025 by the China-led Einstein Probe. The space telescope recorded an exceptionally bright and rapidly varying X-ray source, EP250702a, which immediately stood out during a routine sky survey and triggered worldwide follow-up observations.

Astrophysicists from the Department collaborated closely with the Einstein Probe science team to analyse the event. By combining observational data with theoretical modelling, the team proposed that the signal may represent an intermediate-mass black hole tearing apart a white dwarf star. Key theoretical insights provided by Professors Jane DAI and Bing ZHANG were instrumental in interpreting the event's extreme energy output and rapid evolution. Their findings were published in *Science Bulletin*. If confirmed, the observation would provide rare evidence for a long hypothesised population of intermediate mass black holes.

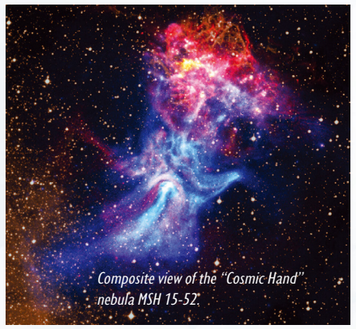


Artist's impression of the Einstein Probe satellite catching an intermediate black hole, tearing apart a white dwarf, and producing a relativistic jet. Image credit: Einstein Probe Science Center, National Astronomical Observatories, CAS / Sci Visual.

◀ Learn more about the research

Unmasking the Cosmic Hand with High-Resolution Radio Vision

In a separate study, an international team led by Professor Stephen NG used high-resolution radio observations to investigate the "Cosmic Hand" nebula, MSH 15-52, a vast structure powered by a rapidly spinning neutron star. While the nebula resembles a human hand in X-ray images, radio data revealed a markedly different morphology, dominated by fine filaments and a highly ordered magnetic field. The findings suggest that different particle populations shape the nebula at different energies and indicate an interaction between the associated supernova remnant and a dense surrounding hydrogen cloud.



Composite view of the "Cosmic Hand" nebula MSH 15-52.

Image credit: X-ray: NASA/CXC/HKU/S. ZHANG et al.; Radio: ATNF/CSIRO/ATCA; H-alpha: UK STFC/Royal Observatory Edinburgh; Image Processing: NASA/CXC/SAO/N.Wolk.

Together, these studies highlight how physics-driven research at HKU uncovers hidden structures and extreme processes across the Universe, from brief cosmic transients to the long-term evolution of energetic astrophysical systems. The study was published in *The Astrophysical Journal*.

▲ Learn more about the research

Experts in Focus

Professor Bing ZHANG

Gamma-ray bursts, fast radio bursts, electromagnetic counterparts of gravitational waves, multi-messenger astrophysics

Professor Jane DAI

Black hole accretion disks and jets

Professor Stephen NG

Neutron stars, pulsar nebulae, supernova remnants

Professor Jeremy LIM

Star formation, stellar activities, evolved stars, external galaxies, and radio interferometry

Professor Yiliang LI and his collaborators were conducting fieldwork to identify potential landing sites for the Chinese Mars Sample Return mission. Image credit: Yiliang LI

From Earth to Other Worlds: How Planetary Science Took Root at HKU

Department of Earth and Planetary Sciences

Professor Zhonghui LIU, Interim Head of the Department of Earth and Planetary Sciences.

Planetary science is often associated with spacecraft, missions and distant worlds, yet at its core it is built on Earth science. Understanding other planetary bodies begins with understanding rocks, processes and histories closer to home. This perspective has long shaped planetary science at HKU Science and is now reflected in the establishment of the Department of Earth and Planetary Sciences (DEPS).

In 2025, the former Department of Earth Sciences was formally renamed the Department of Earth and Planetary Sciences, marking the consolidation of a direction that had been developing steadily over many years. As Professor Zhonghui LIU, Interim Head of the Department, explains, "The renaming reflects what we have already become. Planetary science is no longer an addition to Earth science here—it is part of how we teach, conduct research and train our students."

Supported by growing participation in planetary exploration programmes and international collaborations, planetary science has become embedded in the Department's teaching, research profile and staffing. The new name recognises this evolution and places planetary science firmly within the Department's academic identity.

Earth as the First Classroom

The roots of DEPS lie firmly in Earth science education. Established in the mid-1990s as Hong Kong's first formal university unit dedicated to Earth sciences, the Department was created to train geoscientists capable of addressing geological, environmental and urban challenges in a rapidly developing city. From the beginning, its curriculum emphasised strong foundations in geology, tectonics, geochemistry and Earth history.

As Earth science advanced globally, the Department's work expanded naturally towards planetary science, including comparative studies of Earth, the Moon and Mars, and research on planetary surfaces, interiors and environments. Research on early Earth evolution and pre-plate tectonic processes provided a natural conceptual bridge to understanding other terrestrial bodies.

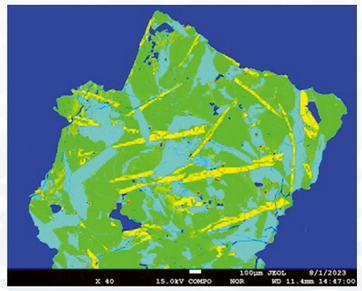


Image of the lunar sample captured by the Electron Probe Microanalyzer (EPMA) at the Department of Earth and Planetary Sciences.

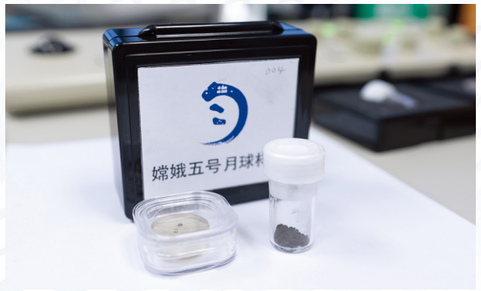
"Planetary science, in many ways, is Earth science extended," Professor Liu notes. "The questions we ask about other planets are grounded in the same physical and geological principles we use to understand our own."

Education at the Core

Education remains central to the Department's role, with planetary science sustained through academic programmes. At the undergraduate level, the Department offers degree programmes in Geology, Earth System Science and Environmental Science, including an intensive track for professional geologists. Fieldwork, laboratory training, internships and exchange opportunities are core elements of learning.

Planetary science is integrated into this framework. Students study the Moon, Mars and planetary systems using the same scientific approaches applied to Earth, including stratigraphy, remote sensing, geophysics, geochemistry and numerical modelling.

DEPS offers research-based PhD and MPhil degrees, alongside a coursework-based Master of Science in the field of Applied Geosciences, which focuses on the application of geology and mechanics in geotechnical practice and the development of professional skills. Building on its collaboration with Physics, the Department is strengthening its teaching capacity in planetary science, with new academic appointments and additional undergraduate courses underway.



The geology team at HKU became the first in Hong Kong to retrieve lunar samples.

Research Supporting Teaching

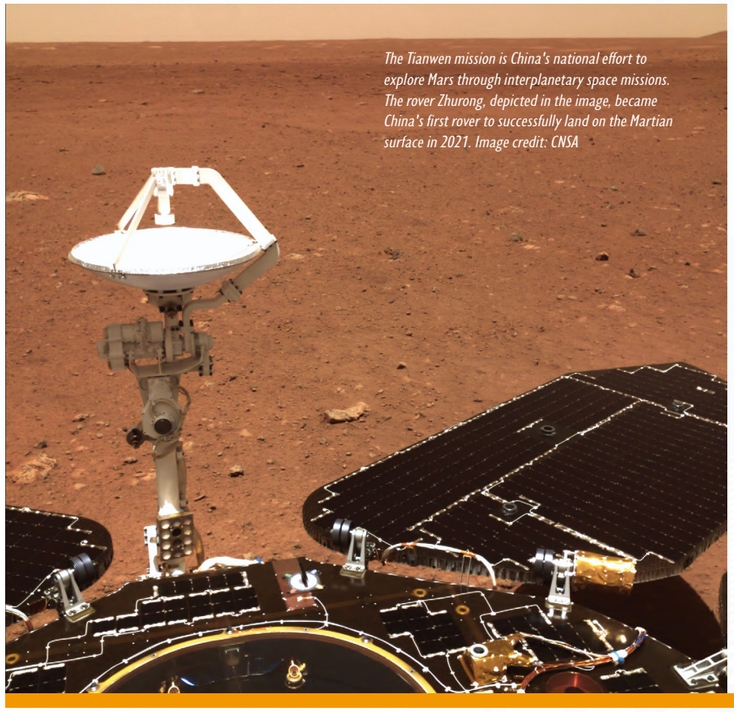
Teaching at DEPS is sustained by an active and increasingly planet-focused research portfolio. Research strengths span the planetary geology of the Moon and Mars, planetary dynamics and exoplanetary systems, space physics and planetary environments, planetary modelling and simulations, and astrobiology.

These activities remain closely linked to the Department's long-standing strengths in solid Earth and Earth history, as well as global change and environmental science, and applied and urban geosciences. Together, they allow planetary questions to be examined across scales, from Earth's early evolution to planetary surfaces and environments.

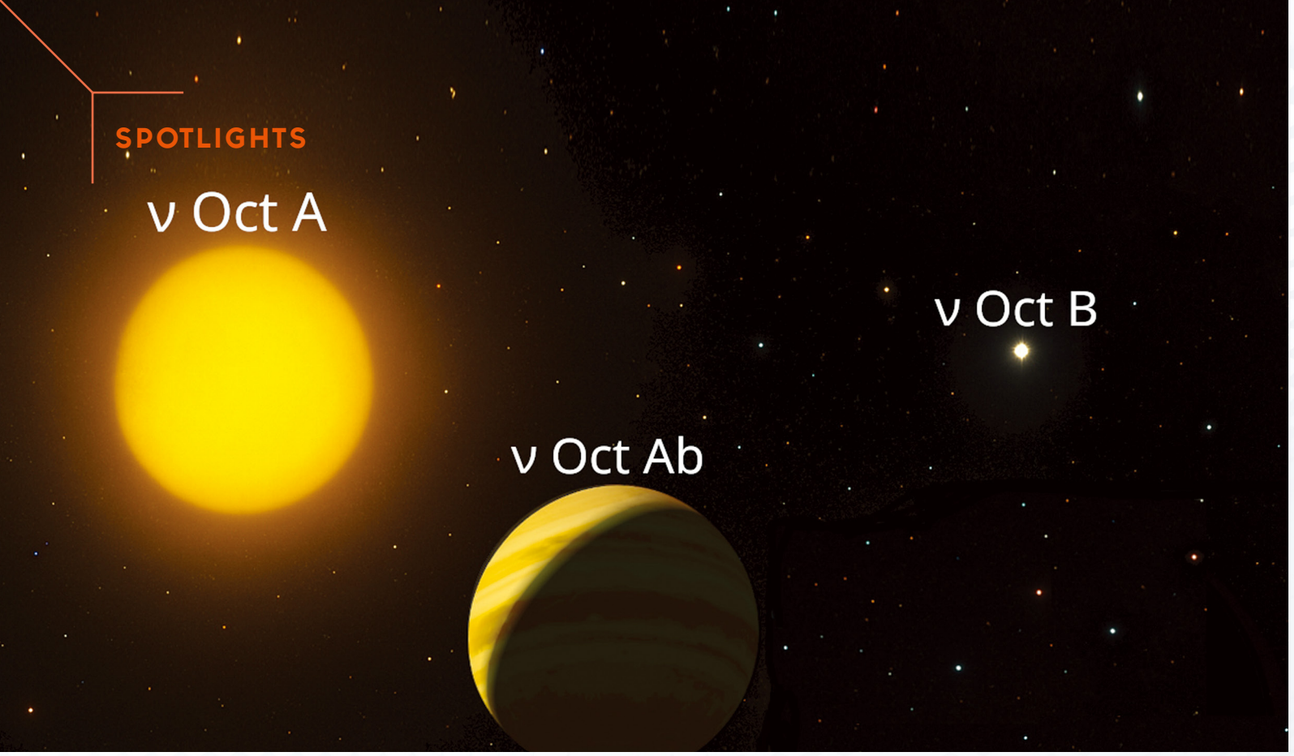
This shift is also evident in the Department's research composition. Over time, the proportion of research activity related to planetary sciences has grown substantially, from roughly 30% to around 60%, reflecting a structural transition rather than isolated projects.

DEPS has also become a recognised contributor to planetary exploration efforts. It is the first institution in Hong Kong to acquire lunar soil samples from both the Chang'e-5 and Chang'e-6 missions. Faculty members have served on advisory committees for China's Tianwen programme, and departmental research has contributed to Mars landing-site selection. These roles reflect sustained scientific credibility built through long-term engagement.

Within HKU's planetary science landscape, DEPS occupies a foundational position, demonstrating how planetary science takes root most securely when it is built on first principles and sustained through education and basic research.



The Tianwen mission is China's national effort to explore Mars through interplanetary space missions. The rover Zhurong, depicted in the image, became China's first rover to successfully land on the Martian surface in 2021. Image credit: CNSA



Earth-Based Tools, Planetary Questions

The Department's research can be illustrated through recent studies spanning deep time, the search for life, planetary interiors and space environments, extending Earth-based methods to the exploration of other worlds.

A Planet that Should not Exist: Retrograde World Discovered in Nu Octantis

In most binary star systems, the gravitational pull of a nearby companion star is expected to disrupt planet formation or eject the planets. Yet in the ν Octantis system, our astronomers have uncovered a planet that not only survives in this hostile environment, but orbits in the opposite direction to the stars themselves.

This rare retrograde orbit, long considered unlikely, has now been confirmed by a team led by Professor Man Hoi LEE. Their findings, published in *Nature*, resolve nearly two decades of uncertainty surrounding the system.

The binary consists of a primary subgiant star about 1.6 times the mass of the Sun and a secondary companion orbiting every 1,050 days. A periodic signal first detected in 2004 hinted at a giant planet orbiting the primary star, but its existence was heavily debated. The orbit appeared too wide to remain stable, unless the planet was moving in a retrograde direction, a configuration with no clear precedent.

To test this, the team analysed 18 years of radial velocity data, including new high-precision observations from the HARPS spectrograph at the European Southern Observatory. The results confirmed not only the planet's existence, but also that its orbit is indeed retrograde and nearly aligned with the plane of the binary.

The study then turned to the nature of the companion star. Using the SPHERE instrument on ESO's Very Large Telescope, the team did not detect the secondary, strong evidence that it is a faint white dwarf rather than a normal star. This implies the binary star has undergone significant evolution, with the companion shedding most of its mass before collapsing into a dense stellar remnant.

Professor Man Hoi LEE, Professor of Department of Earth and Planetary Sciences.

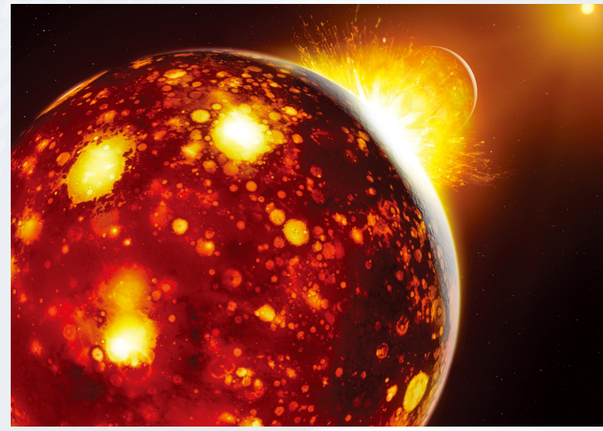
This evolutionary history reshapes the origin story of the planet. The team's modelling shows it could not have formed alongside the stars. Instead, it may be a "second-generation" planet, either formed from material expelled by the dying companion or later captured into its unusual orbit.

Rather than a system that defies theory, ν Octantis may point to a broader reality: planet formation is more flexible and more resilient than previously assumed, even in environments once thought too unstable to host planets at all.

◂ Learn more about the research

The Moon's Violent Birth, Revisited

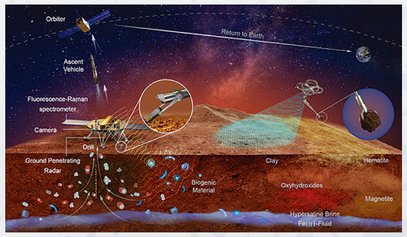
The giant-impact theory proposes that the Moon formed when the early Earth collided with a Mars-sized body known as Theia. Although this scenario is widely accepted, a key uncertainty has persisted: did Theia originate in the distant outer Solar System or form close to Earth? A recent study led by Professor Nicolas DAUPHAS investigated this through iron isotopic signatures preserved in meteorites and lunar samples. These isotopes act as geological fingerprints, revealing where planetary building blocks formed in the early Solar System. By analysing material returned by the Apollo, Luna and Chang'e missions, the team found that Earth and the Moon share virtually identical iron isotopic compositions, a pattern consistent with rocky matter that formed near the Sun."Our results show that the Moon-forming impactor came from nearby. While theory allows for it to have come from afar, the measurements tell a different story. The ingredients that built our planet, and made it habitable, came from our neighbourhood," said Nicolas Dauphas, who recently joined the Department of Earth and Planetary Sciences (DEPS) at HKU as Chair Professor of Geochemistry and Cosmochemistry. A French-American planetary scientist and isotope geochemist, Professor Dauphas specialises in isotope cosmochemistry, using isotopic signatures to trace the origin and evolution of planetary materials. He previously spent over two decades at the University of Chicago and was elected to the National Academy of Sciences in 2024. The results suggest that Theia was not an icy visitor from afar, but a local body that developed alongside Earth. This refines the giant-impact model and implies either a shared source of material or extensive mixing during the collision. More broadly, the findings support a view of the early Solar System as relatively orderly, with terrestrial planets growing largely in place rather than through large-scale migration. The findings have already been published in *Science*.



An artist's impression of the Earth–Theia impact, with the Sun in the background, illustrating the idea that Theia originated close to the Sun. Image credit: MPS / Mark A. GARLICK.

Professor Nicolas DAUPHAS, Chair Professor of Geochemistry and Cosmochemistry.

◂ Learn more about the research



Schematic of the Chinese Mars Sample Return mission, in which the lander will drill 2 metres deep to collect samples and scoop surface material using a robotic arm and drone.

Image credit: CNSA.

Searching for Life on Mars

In a *Nature Astronomy* article, Professor Yiliang LI contributed as an astrobiology specialist to shaping the scientific framework for China's Mars Sample Return mission, Tianwen-3. Rather than reporting a single discovery, the paper focuses on how evidence for life on Mars should be sought and evaluated with scientific rigour. The authors outline conditions most likely to preserve biosignatures, highlighting ancient environments that once hosted liquid water, essential nutrients and minerals capable of protecting organic molecules. The article also stresses the risk of false positives and proposes criteria to distinguish between biological signals and geological mimics.

Professor Li's role centres on astrobiological assessment and sampling strategy, providing guidance on landing-site priorities, drilling depth and the types of materials most suitable for return to Earth. The study further addresses planetary-protection requirements, emphasising secure handling and quarantine of returned samples and establishing a methodological foundation for testing whether Mars ever supported life.

◂ Learn more about the research

Why Earth Is Tectonically Alive

Planetary science also seeks to explain why Earth evolved so differently from its neighbours. A striking contrast lies in tectonics: Earth's active plate system versus the largely stagnant behaviour of Mars and Venus.

In a study led by DEPS researchers, including Professors Guochun ZHAO and Man Hoi LEE, advanced numerical modelling was used to classify planetary tectonic behaviour for the first time. The team identified six regimes and discovered a new one—the "episodic-squishy lid"—characterised by alternating mobility and stability. This framework helps explain how planets transition between states and why Earth developed sustained plate tectonics.

The findings have been published in the journal *Nature Communications*.

◀ Learn more about the research

Powering the Auroras: A Space "Battery" Revealed

If tectonics explain how worlds evolve from within, space physics reveals how they interact with their cosmic surroundings. In a study co-led by HKU and UCLA scientists, Professor Zhonghua YAO of DEPS helped uncover the mechanism that sustains the powerful electric fields above Earth's auroral regions. Published in *Nature Communications*, their findings showed that Alfvén waves, plasma waves travelling along magnetic field lines, act like a natural space battery, continuously transferring energy to charged particles and accelerating them into the atmosphere.

Analysis of satellite data confirmed that this energy persists in the auroral acceleration zone rather than fading away, resolving a long-standing question in geospace science. The results indicate that similar processes may operate on other magnetised planets, linking Earth's auroras to the wider comparative planetary processes across magnetised worlds.

DEPS shows how planetary science can grow from strong Earth science roots. Teaching, fieldwork and laboratory work remain the core, while new missions and collaborations extend that knowledge outward. The Department's journey reflects a simple idea: to understand other worlds, start with the one beneath our feet.

Comparative schematic of auroral acceleration processes on Earth and Jupiter. Image credit: S. TIAN and Z. YAO.

◀ Learn more about the research

Experts in Focus

Professor Guochun ZHAO
Early Earth; pre-plate tectonics; planetary geology; comparative planetology

Professor Yiliang LI
Astrobiology

Professor Zhonghua YAO
Terrestrial and giant planetary space sciences

Professor Jian ZHANG
Precambrian geology, tectonics, planetary tectonics

Professor Man Hoi LEE
Formation and dynamics of planetary systems (Joint appointment with the Department of Physics)

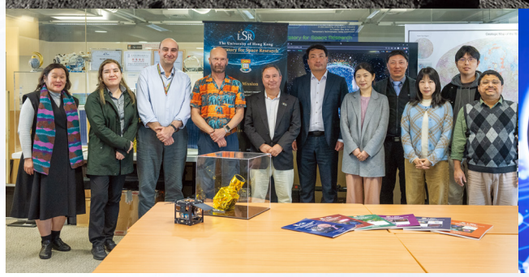
Professor Joseph MICHALSKI
Planetary geology, mineral exploration, and astrobiology

Professor Binzheng ZHANG
Planetary and geospace environment, space plasma physics
(Affiliated with Department of Physics by courtesy)

Connecting International Frontiers with a Mission-Driven Trajectory

Laboratory for Space Research

AI-generated image illustrating what the HKU Chang'e-7 lunar lander wide-field telescope camera may observe in November 2027.



Professor Quentin PARKER and his team.

LSR hosted APRIM 2026 and welcomed internationally renowned astronomers, including Nobel laureate Brian Schmidt, to speak at the event.

Professor Quentin PARKER, Director of Laboratory for Space Research.

Space science today is defined not only by discovery, but by delivery. As exploration extends beyond observation to sustained presence, modern space research demands far more than curiosity and insight. It requires integration into complex mission architectures, the ability to operate across borders, and a reputation built on reliability, openness, and trust.

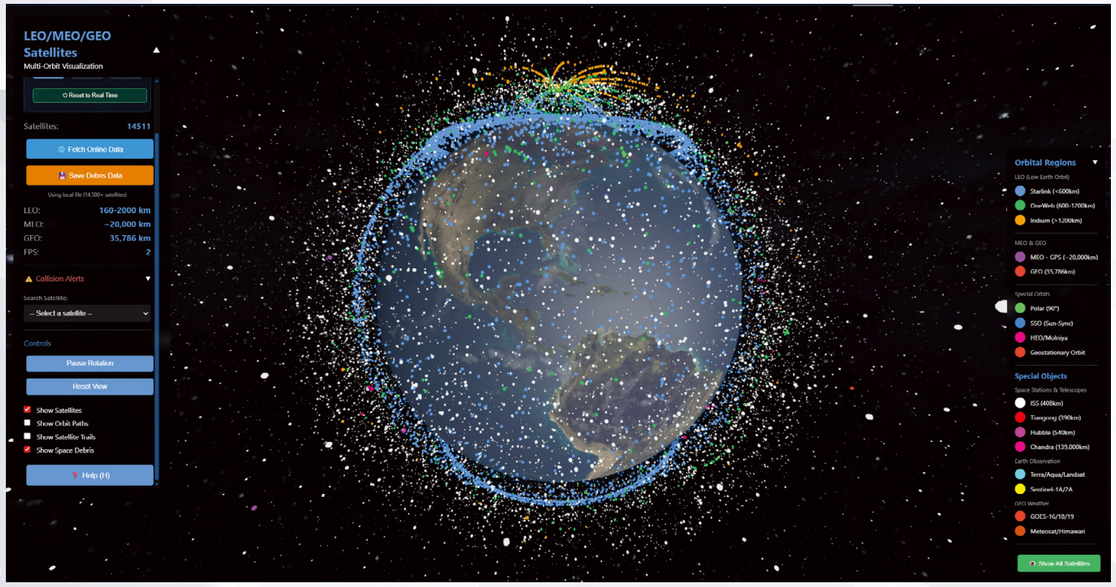
At HKU, the Laboratory for Space Research (LSR) has evolved precisely along this trajectory. From its origins in fundamental astrophysics, the Laboratory is now embedded in major space missions, international scientific infrastructure, and policy-relevant dialogue.

A Platform Trusted by the Global Community

In a field defined by collaboration, credibility is measured not by visibility alone but by peers' confidence. LSR's standing as a trusted international partner was clearly demonstrated when it hosted the 7th China-Chile Bilateral Conference for Astronomy in January 2026, followed shortly by the Asia-Pacific Regional IAU Meeting (APRIM) in early May 2026.

As one of the largest gatherings under the auspices of the International Astronomical Union (IAU), APRIM brought together leading scientists, policymakers, and industry participants from more than 40 countries across the Asia Pacific, including Nobel, Shaw and Gruber Cosmology Prize laureates, to explore developments in astrophysics, deep space exploration, and the emerging space economy, with space sustainability featured as a dedicated parallel meeting. More than a scientific conference, APRIM served as a "vote of confidence" in Hong Kong and HKU-LSR as an effective, neutral and reliable venue for international scientific engagement, reinforcing LSR's role as a place where global conversations can unfold with openness, rigour and mutual trust.

◀ Learn more about Aprim 2026



The distribution of satellites and space debris in Low Earth Orbit. Objects are shown greatly enlarged to visualise their locations; in reality, most are far smaller. Image provided by Dr Andy Chung To KONG.

Embedded in Space Missions

LSR's ambitions have also extended to involvement in a range of international space missions. Through a partnership with the International Lunar Observatory Association (ILOA) in Hawaii, it contributed critical design expertise and principal funding for a wide-field optical telescope built by the Beijing Institute of Space Mechanics and Electricity (BIMSE). Scheduled for deployment near Shackleton Crater at the lunar south pole aboard the Chang'e-7 mission in November 2026, the instrument will conduct astronomical observations from a highly advantageous vantage point.

LSR has also been selected as a co-principal investigator organisation for an international payload on the Tianwen-3 Mars Sample Return mission, working alongside partners from COSPAR in France and Shenzhen University. These roles reflect recognition that LSR can integrate seamlessly into complex, multi-partner missions and contribute effectively under demanding conditions.

Infrastructure for the Ages

Sustained scientific impact also depends on durable research infrastructure. A defining example is the Hong Kong/ AAO/ Strasbourg Hα Planetary Nebula Database (HASH), developed in collaboration with international partners and hosted by LSR, now used by more than 1,200 researchers in over 60 countries.

To ensure its permanence, the database is being integrated into the Centre de Données astronomiques de Strasbourg (CDS), the world's premier astronomical data system. By embedding this resource within a permanent global framework, LSR ensures that its commitment to open science will serve generations of explorers yet to come.

Where Science Meets Society

As space activity accelerates worldwide, scientific questions increasingly intersect with sustainability, governance and economic development. In response, LSR has convened international discussions on space sustainability and orbital debris, examining risks that could shape the future of space exploration itself.

LSR has also engaged in dialogue on the emerging aerospace and NewSpace economy, exploring how Hong Kong's strengths in professional services, finance and international connectivity can complement scientific and technological advances, in alignment with China's strategic national priorities. A recent policy workshop co-organised by LSR brought together leaders from industry and academia, resulting in a series of recommendations to the HKSAR Government on positioning Hong Kong within the global space economy.

"I think Hong Kong has an ace card in the NewSpace economy," Parker observes. "Its role is not in building satellites, but in acting as a scientific and mission connector. China is emerging as a major space science power, and these activities, many of them of strong public interest, are driving technological innovation at the highest levels of our universities."

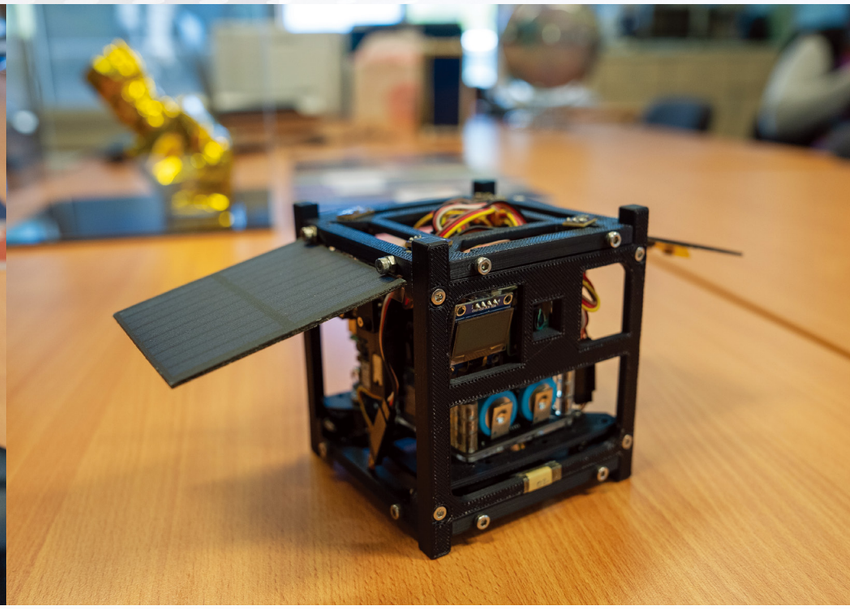
A Global Outlook

The trajectory of the LSR is clear. Through mission leadership, enduring data infrastructure, large-scale international engagement and policy dialogue, LSR exemplifies an outward-looking, trusted and operationally grounded model. As Parker put it simply, "Our role is to provide services to this global endeavour—to act as an international super connector and reach out to the world."

◄ Website of LSR

> "Only by building trust through international cooperation and working together can we achieve breakthroughs in space exploration."
>
> — Professor Quentin PARKER, Director, Laboratory for Space Research

The ILO-C small wide-field telescope, developed by HKU LSR and ILOA, will capture images of the Galactic plane from the Moon on the Chang'e-7 mission.



CubeSat prototype. A 1U CubeSat is a standard 10 × 10 × 10 cm miniature satellite capable of carrying payloads such as cameras and other sensors for space exploration. Prototype created by Dr Andy Chung To KONG, LSR.

Professor Sir Andre GEIM (Physics)

Professor Ferenc KRAUSZ (Physics)

Professor Bảo Châu NGÔ (Mathematics)

Professor Hà Văn VŨ (Mathematics)

New Minds, New Frontiers

There are years that simply pass, and then there are years that define. This past year has marked a defining moment for the Faculty of Science with the arrival of several distinguished scholars. Their ideas and leadership are poised to shape the Faculty's future trajectory in the years ahead.

In the previous section, we explored the scientific journeys and research visions of Professors Nicolas DAUPHAS and Bing ZHANG, whose work in astrophysics and planetary sciences continues to expand our understanding of the Universe and its origins. The Faculty's recent wave of distinguished appointments also extends well beyond these fields, bringing together scholars whose ideas are reshaping how we understand data, matter, and even human health.

In the following pages, we turn to several of these newly appointed Chair Professors and global scientific leaders. Within the Department of Physics, Nobel Laureate Sir Andre GEIM celebrated for the discovery of graphene, continues to push the boundaries of condensed-matter physics through bold, curiosity-driven experimentation that has reshaped our understanding of materials at the atomic scale. Nobel Laureate Professor Ferenc KRAUSZ is pioneering ways to harness attosecond light to detect the earliest molecular signatures of disease, opening new possibilities for preventive medicine.

In the Department of Mathematics, Fields Medalist Professor Bảo Châu NGÔ, whose proof of the Fundamental Lemma transformed the Langlands programme, represents one of the most influential intellectual forces in contemporary mathematics, advancing deep connections across number theory, geometry, and representation theory. Professor Hà Văn VŨ utilises combinatorics, probability, and random matrix theory to explore how structure emerges from noisy data, addressing the fundamental questions that underpin modern algorithms and artificial intelligence.

This new cohort of scholars does more than strengthen a spectrum of disciplines. They bring fresh ideas and ambitions that will lead the way into the Faculty's next phase of intellectual growth.

The Atomic Architect and the Age of Two-Dimensional Materials

When Professor Sir Andre GEIM walks through the corridors of HKU's Department of Physics, he does so not merely as a Nobel Laureate, but as a scientist whose work challenged long-standing assumptions about what was possible. For decades, the consensus in theoretical physics was adamant: two-dimensional materials, those just one atom thick, could not exist because thermal vibrations would inevitably shake their crystal lattices apart. Yet, Geim looked at the mundane trace of a pencil and saw a frontier that had been hiding in plain sight for half a millennium. Now, as he joins HKU Physics, he brings a philosophy that is as irreverent as it is profound: that the most disruptive technological revolutions often begin with "the courage to be simple".

Professor Sir Andre GEIM (left) in conversation with Professor Ferenc Krausz and other distinguished scholars at HKU@Shanghai's "Meet Great Minds" discussion, sharing insights on scientific discovery as part of the University's 115th anniversary celebrations.

The story of graphene is now a cornerstone of scientific folklore, but Geim recounts it with a characteristic lack of pretension. It was not a multi-billion-dollar particle accelerator that isolated the world's first stable 2D material, but a piece of humble adhesive tape used to peel layers from a block of graphite, the same material found in a standard pencil. "Beauty is in simplicity, and in this case, we use a simple sticky tape," he reflects.

The Radical Simplicity of Graphene

By thinning out the "chicken wire" hexagonal lattice of carbon atoms, Geim and his colleagues revealed a material that defied every expectation. Graphene proved to be stronger than diamond, more conductive than copper, and the thinnest material ever discovered. For discoveries that followed this "Eureka" moment, they were awarded the Nobel Prize in Physics in 2010.

"Graphene was in front of our eyes for hundreds of years, in every pencil trace, and we simply didn't realise it," says Geim. For him, the lesson for HKU's aspiring researchers is clear: the most profound discoveries are not always buried in complexity; they are often right in front of us, waiting for the right question to be asked.

Despite the global fame his discovery brought, Geim admits to a slight irritation at being pigeonholed as solely the "Father of Graphene". He has long since moved past that initial breakthrough into what he terms "Graphene 3.0". If graphene was the first tool, Geim's work now focuses on building the entire toolbox.

"We know that graphene is not alone, that it has many sisters and brothers," he explains. His current work explores a growing family of two-dimensional materials, assembling them layer by layer in carefully designed structures, almost like atomic-scale construction. By stacking different atom-thin crystals together, researchers can create "designer" materials with properties that do not exist in nature.

At HKU, he intends to continue this role as an atomic architect. He believes we are witnessing a fundamental shift in technological capability comparable to the transition from the Stone Age to the Bronze Age. "Human progress has often been defined by the materials we use," Geim reflects, suggesting that we may be entering what he calls the "age of two-dimensional materials".

> "Forbidden in nature doesn't mean that we can't trick around and make those materials."
>
> — Professor Sir Andre GEIM, Chair Professor in the Department of Physics, and Nobel Laureate in Physics 2010

Professor Sir Andre GEIM

- Chair Professor, HKU Department of Physics
- Nobel Prize in Physics 2010
- Knight Bachelor, 2012 New Year Honours, for services to science
- Fellow of the Royal Society, UK
- Foreign Member of the Chinese Academy of Sciences
- Member of the National Academy of Sciences, USA

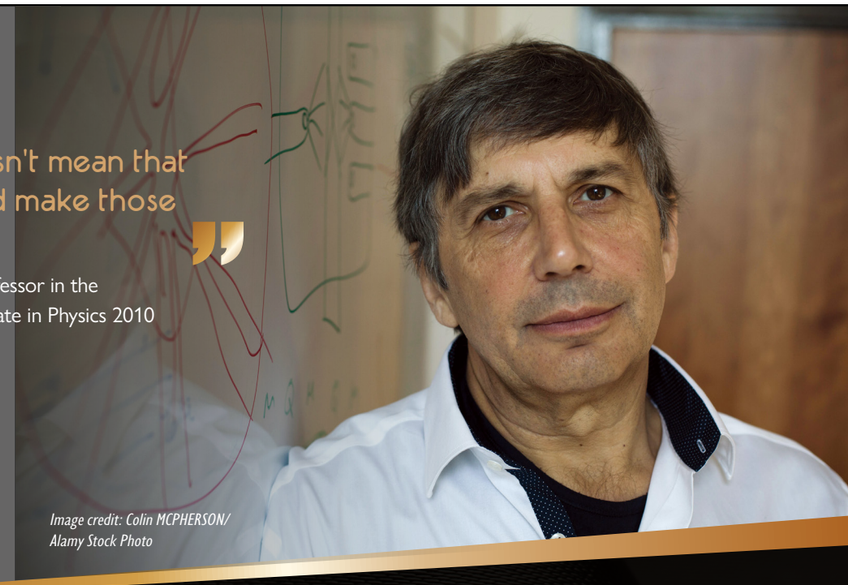


Image credit: Colin MCPHERSON/ Alamy Stock Photo

The Modern Philosopher's Stone

Geim remains a vocal critic of "tinkering at the edges" of established technologies, warning that without truly disruptive breakthroughs, the global economy faces stagnation. He advocates for science that addresses "grand challenges" such as sustainability and resource scarcity.

To illustrate the tangible power of 2D materials, he points to a recent breakthrough using graphene flakes to extract gold from electronic waste. By dissolving e-waste in acid and filtering it through a graphene membrane, gold precipitates while other metals pass through. "In a sense, it's kind of a philosopher's stone at long last," he quips. This ability to engineer systems with such precision is why Geim views graphene and its "siblings" as the best bet for the next technological revolution.

Curiosity Without Permission

What truly sets Geim apart is his commitment to intellectual freedom, embodied in his "Friday Night Experiments". These are informal, high-risk sessions designed for "the soul" rather than a specific grant or publication. These sessions famously led to the demonstration of a levitating frog, showing how magnetic fields could cancel gravity, and the development of a gecko-inspired adhesive tape.

As he settles into his new role, his message to the next generation of HKU scientists remains steadfastly humble. "There are still a lot of things to be discovered," he says, "discoveries even the wisest people have never imagined." Within the traces of a pencil or the ordinary objects around us, the next scientific revolution may already be waiting for someone curious enough to look again.

Professor Andre GEIM was awarded the 2010 Nobel Prize in Physics by King Carl XVI Gustaf of Sweden during the Nobel award ceremony in the Concert Hall of Stockholm Sweden. Image credit: TT News Agency/ Alamy Stock Photo.

About Professor Sir Andre GEIM

Professor Ferenc KRAUSZ

- Professor, Chair of Laser Physics, HKU Department of Physics
- Nobel Laureate in Physics 2023
- International Member of National Academy of Sciences, USA
- Professor of Experimental Physics, Ludwig-Maximilians-Universität München, Germany
- Director of the Attosecond Physics Division, Max Planck Institute of Quantum Optics, Germany
- Scientific Director & CEO, Center for Molecular Fingerprinting, Hungary

Reinventing Healthcare Through the Light of Attoseconds

> "I would like to create a bridge between physics and medicine, transforming healthcare from a reactive mode into a future proactive mode."
>
> — Professor Ferenc KRAUSZ, Chair of Laser Physics in the Department of Physics, and Nobel Laureate in Physics 2023

Professor Ferenc KRAUSZ presenting his gift to the Nobel Museum's collection during a gathering of 2023 Nobel Prize laureates. Image Credit: Anna Svanberg/ Nobel Prize Outreach

When Professor Ferenc KRAUSZ, 2023 Nobel Laureate in Physics and one of the world's foremost pioneers in ultrafast laser science, arrived at HKU to assume his new position as Chair Professor of Laser Physics, he brought with him not only a distinguished scientific legacy but also a quietly evolving vision. His work, once focused purely on capturing electron motion at the attosecond scale, is now turning toward something profoundly human: understanding how light might help reveal the earliest molecular signs of disease hidden within a drop of blood.

Despite his global stature, Krausz speaks with measured clarity rather than grandeur. What drives him is not the fame of discovery, but the deeper pursuit of questions capable of sustaining an entire lifetime.

"Scientific research often begins with the right questions—ones that can carry you for decades," notes Krausz. His fascination with the microscopic world began early, drawn to the worlds hidden beneath the limits of human perception. He credits an excellent early teacher with pointing him toward physics, but he is quick to note that it was the questions, not a singular moment of inspiration, that sustained his path. "I have always been fascinated by entering a world unknown to humans," he says, "where there is a chance to discover something new."

Capturing What Cannot be Seen

He often tells young researchers that perseverance is indispensable, as are curiosity and the resilience to embrace the setbacks that inevitably mark the frontier. "You often learn more from failures than from steps forward," he reflects. "They force you to rethink—and sometimes that rethinking is what moves you ahead." This quiet persistence would eventually reshape a field.

"Science owes something to the world, and perhaps one day, what we discover can serve everyone," says Krausz. Attosecond science, Krausz's domain, pushes the limits of measurement. Attosecond pulses, lasting billionths of a billionth of a second, allow scientists to observe the swift motion of electrons in real time. The first isolated attosecond pulses, generated by Krausz and his collaborators in the early 2000s, ushered in a new era of modern physics and earned him the Nobel Prize in 2023.

Professor Ferenc KRAUSZ after receiving his prize from H.M. King Carl XVI Gustaf of Sweden at Konserthuset Stockholm on 10 December 2023. Image credit: Nanaka ADACHI/ Nobel Prize Outreach

The breakthrough was anything but solitary. His attosecond work grew from collaborations across Austria, Germany, Hungary, and Canada, with partnerships he describes as essential in a world where advanced experiments demand expertise spanning physics, engineering, computing, and even life sciences.

"The laws of nature aren't restricted to a country or a continent," he says. "Science is inherently international, which is one of the most beautiful ways for people to connect."

Today, attosecond techniques continue to influence fields ranging from materials science to electronics. Nonetheless, their most unexpected potential lies beyond physics itself.

A Scientific Journey Turning Toward Healing

Around 10 years ago, Krausz began exploring whether ultrafast light could serve a more immediate human purpose. His team discovered that attosecond techniques could trace minute changes in the molecular composition of human blood, specifically subtle shifts reflected in what he calls an "infrared fingerprint". "With our dream teams in Budapest, Munich, and Hong Kong, we would like to create a bridge between physics and medicine, transforming healthcare from a reactive mode into a future proactive mode," Krausz says.

Over a decade of carefully accumulated results suggests that diseases, including cancers and chronic conditions, can alter this fingerprint in the early stages. The idea is still evolving, and Krausz emphasises that its full potential and its limits must be understood through rigorous study.

To that end, researchers in Munich, Budapest, and Hong Kong are preparing three coordinated, long-term cohort studies. Rather than promising medical transformation, the aim is to gather the evidence needed to test how well this approach works across populations.

Hong Kong's world-class clinical trial infrastructure and diverse community make it an ideal site for this next phase. The hope is that, over time, the findings may contribute to simpler, earlier ways of diagnosing diseases.

Beginning Again at HKU

Krausz sees his new role at HKU as a continuation rather than a reinvention. He plans to contribute to the University's strengths in physics and medicine, build a small research group, and mentor students interested in interdisciplinary work. "I look forward to collaborating with the University's brilliant minds to explore new frontiers, unlocking new possibilities in both fundamental discovery and technological innovation," says Krausz.

Reflecting on what drew him to Hong Kong, he says, "HKU is an excellent place to bring together different areas of expertise, and to see where those conversations might lead."

More than 800 participants from academic, policy, and student communities attended Professor KRAUSZ'S Inaugural Lecture at HKU.

He speaks warmly of the city's scientific openness, its global outlook, and its place at the crossroads of East and West, with qualities that align naturally with his belief that collaboration is essential to progress.

As he begins this new chapter, Krausz's work feels less like a dramatic leap and more like a measured extension of a lifelong pursuit: letting curiosity guide him toward questions whose answers may one day help illuminate the threshold between physics and health, and perhaps offer new ways of understanding, and ultimately protecting human life.

From the left: Secretary for Labour and Welfare Mr Chris Yuk-han SUN, President and Vice-Chancellor Professor Xiang ZHANG, Professor Ferenc KRAUSZ, Secretary for Education Dr Yuk-lin CHOI, and Vice-President and Pro-Vice-Chancellor (Academic Development) Professor Peng GONG.

Video Interview

Inaugural Lecture

About Professor Ferenc KRAUSZ

LAUREATES IN CONVERSATION

Professor Bảo Châu NGÔ
- Chair Professor, HKU Department of Mathematics
- Fields Medal 2010
- Clay Research Award 2004
- Knight of the Legion of Honour, France
- Fellow of the American Mathematical Society

Understanding Over Time: When Two Sides Finally Meet

Eighteen years in Vietnam. Eighteen years in France. Eighteen years in the United States.

For Professor Bảo Châu NGÔ, a life in mathematics has unfolded in long, deliberate chapters rather than sudden leaps. Each phase, from early training in Hanoi, to intellectual formation in France, to recognition in the United States, reflects not just a change in place, but a gradual deepening of perspective.

Now, as he joins HKU, this pattern shifts once more. The move is less a break than a continuation, shaped by a personal desire to return closer to Asia and a growing conviction about the region's future in science. "I began to believe that Asia would become a major centre for science and mathematics, with great opportunities to develop research," he says.

Hong Kong, for him, is both a practical and intellectual choice. "Coming back to Asia, I really want to help develop stronger mathematical connections across Asia," he adds. "There is a lot of room to build collaboration." He also sees HKU as a place with room to grow. "I would like to help the Department of Mathematics become a world-class centre, and I'm really eager to contribute to that effort."

> "Mathematics is, for me, one of the most human ways to make sense of the world. It is a process that unfolds over time."
>
> — Professor Bảo Châu NGÔ, Chair Professor in the Department of Mathematics, and recipient of the 2010 Fields Medal

From Hanoi to the World

Ngô's journey began in Hanoi, in a family steeped in academia. His father, a mathematician, and his mother, a physician, created an environment where ideas were part of everyday life. His path into mathematics, at first, was not entirely smooth: the mathematician who would later win the Fields Medal failed his first attempt to enter a specialised mathematics school. The setback left a strong impression. "It upset me very much," he recalls. "And I decided to study mathematics more seriously."

Progress came gradually rather than suddenly. Over time, Ngô found himself drawn to the challenge itself, the process of working through problems, refining methods, and arriving at solutions. "When I was in high school, I was more interested in mathematics than anything else," he recalls. From an early stage, he was already clear that this was the path he would pursue.

"I like the idea of finding solutions, being challenged and trying my best to overcome those challenges," he explains. "Sometimes you don't succeed the first time, but if the method is good, that is very gratifying."

A Problem Reimagined

At the heart of Ngô's work is a problem whose statement appears simple, but whose proof resisted mathematicians for decades. The Fundamental Lemma is, in essence, a statement that two

very different ways of calculating the same quantity, each involving long and complicated formulae, eventually lead to the same result.

What made it so important was not the calculation itself, but its role. Over time, it became a key missing step in the Langlands programme, a vast framework connecting different areas of mathematics. Without it, many results could not be fully confirmed.

For years, mathematicians tried to solve it through direct calculation, but the problem resisted every attempt. Ngô took a different approach. Instead of calculating more, he tried to understand the deeper structure behind the formulae, reinterpreting the problem in geometric terms.

In 2004, together with his former advisor Gérard LAUMON, he proved the result in a special case, earning the Clay Research Award. But extending it further proved far more difficult. After several years of trying, he reached a point where he believed the approach could not work.

The breakthrough came in 2006, during a conversation with mathematician Mark GORESKY, who pointed out a missing piece: an idea that had been noted years earlier but never fully developed. With this insight, the problem finally began to open up.

Ngô went on to complete the proof in 2008, resolving the problem in full. The result unlocked a wide range of developments across the field, and in 2010, he was awarded the Fields Medal, the highest honour in mathematics.

Yet he describes the process not as a moment of triumph, but as a progression of understanding. "It takes many years," he says. "You have to believe that it can be done."

For Ngô, mathematics is not defined by answers alone, but by the pursuit of understanding.

In a world increasingly driven by prediction, from financial models to artificial intelligence, he distinguishes between knowing what will happen and understanding why it happens.

"Some people are satisfied with predictions," he says. "But for me, that is not enough. I want to understand why things happen."

This perspective extends beyond mathematics itself. Questions about waves, flight, or natural phenomena may belong to physics, but they are ultimately expressed through mathematical structures. To understand those structures is, in part, to understand the world.

"I believe mathematics is an essential part of how humans make sense of the world," he says.

Teaching, Thinking, and Sharing

At HKU, Ngô's focus extends beyond research to how mathematics is taught and understood. He is critical of approaches that reduce the subject to formulae and procedures. "For a long time, we have been teaching mathematics in a very mechanical way, but that is not the best way to teach," he notes.

Instead, he advocates an approach grounded in first principles—one that encourages students to understand ideas rather than apply them. "Once you understand something, you can do basic calculations, and then new questions arise. That's how mathematics grows, from one question to another. For me, that is what we should learn from mathematics."

Underlying this is a broader belief that mathematics should not be confined to specialists. Everyone, he argues, should be comfortable with a certain level of understanding. "More advanced mathematics is for professionals, but everyone should at least be able to make sense of the world through mathematics."

This conviction has also shaped his outreach beyond academia, including co-authoring a children's book that introduces mathematical ideas through storytelling.

A Life of Ideas and Exchange

Outside mathematics, Ngô's life is quietly consistent with his intellectual values. He reads extensively, enough to fill several walls of bookshelves, and finds increasing enjoyment in conversations with others.

"In the past few years, I really enjoy talking to people about their lives," he says. Even in teaching, his preference reflects this emphasis on process and exchange. Despite technological advances, he still favours the blackboard. "It's actually the best way to communicate mathematics," he explains. Watching an idea unfold step by step allows students to follow not only the result but also the thinking behind it.

In the end, his work, his teaching, and his daily habits all point in the same direction: a sustained commitment to understanding and to sharing it with others.

As he begins this new chapter in Hong Kong, the pattern continues, not as a departure but as part of a longer journey shaped by time, curiosity, and quiet persistence.

About Professor Bảo Châu NGÔ

Finding Structure in a Noisy World

For world-renowned mathematician Professor Hà Văn VŨ, the beauty of mathematics lies not in abstraction, but in its quiet presence everywhere. His work, spanning combinatorics, probability, and random matrix theory, might sound remote from daily experience, yet its fingerprints are all around us: navigation apps, recommendation engines, search algorithms, and the foundations of machine learning. His arrival at HKU marks both a professional turning point and a personal return to Asia.

Rather than viewing mathematics as an esoteric pursuit, Vũ sees it as something woven into the fabric of modern life. "Probability is the mathematics of uncertainty," he begins. "Large language models are essentially learning probability distributions from data. Combinatorics, meanwhile, is the mathematics of structure and efficiency."

To the layperson, these fields can feel remote, but Vũ describes them as the foundation beneath countless modern systems: search engines, navigation tools, recommendation algorithms, and communication networks. Before an algorithm can optimise a network or interpret a data pattern, the mathematics of that structure has to be understood. "In everyday life, the impact of these areas of mathematics is often invisible, but they are everywhere," he says with a gentle shrug, as if stating the obvious.

It is this combination of modesty and clarity, a belief that complex ideas can and should make intuitive sense, that has shaped much of his career, from early breakthroughs to his recent move to Hong Kong.

A Career of Solving the Seemingly Impossible

Some mathematicians become known for depth, others for breadth; Vũ is unmistakably both. His career is defined not only by the problems he has solved, but by the way he approaches them. Among his best-known achievements is the proof of the Circular Law, a problem that sat unsolved for more than fifty years. The symmetric case had been settled by Nobel Laureate Eugene WIGNER in the 1950s, but the non-symmetric version resisted classical methods. To solve it, Vũ and his long-time collaborator Terence TAO ventured across mathematical landscapes seldom brought together: numerical analysis, combinatorics and additive number theory.

"It was an exciting and rewarding journey across very different mathematical worlds," he recalls. "It involved learning new techniques, making unexpected connections, and gradually watching the pieces of the puzzle come together."

This breakthrough, along with solutions to problems such as the Erdős–Folkman conjecture, the Four Moment Theorem, and advances in random graph theory, earned him international acclaim, including the SIAM Pólya Prize and the Fulkerson Prize, two of the highest honours in the fields.

Yet the way he speaks about these achievements is disarmingly modest. For Vũ, the real reward is the moment of clarity that emerges after long uncertainty, the instant when disparate ideas align, and something previously opaque becomes suddenly, beautifully comprehensible. In his words, it is the experience of "watching the pieces of the puzzle come together" that keeps his curiosity alive.

Decoding Noisy Data Through Mathematics

While many academics pivot toward application-driven research in the era of AI, Vũ sees deeper foundational questions emerging, particularly around noise. "Real-world data is noisy," he says. "I want to understand how that noise changes the output of the most important algorithms in practice. When decisions are made using only noisy observations of the ground truth, how accurate and reliable are those decisions?"

These questions, deceptively simple, touch the heart of modern society's greatest technological challenges. As models grow more complex and data grows more abundant, the reliability of algorithmic decision-making becomes ever more crucial: in healthcare, finance, infrastructure, and beyond.

In his view, this is where fundamental mathematics becomes indispensable. "In the era of AI and big data, fundamental mathematics will become even more important, not less," he says. Many industry leaders echo this sentiment, he notes, pointing out that as AI automates routine coding, deep mathematical understanding becomes the real differentiator.

"This is an especially exciting period," he reflects. "The way we learn and conduct research may change substantially."

Building a New Community

Vũ describes his early months at HKU with the freshness of someone still settling into new rhythms, albeit as a scholar whose standing and accomplishments are already firmly established. Hong Kong's proximity to Hanoi allows him to continue supporting educational initiatives in Vietnam, while HKU's growing strength in mathematics offers fertile ground for building something new.

"HKU is widely recognised as one of the leading universities in Asia," he says. "I hope we can build a strong and visible school of probability and combinatorics, one that attracts outstanding students from around the world."

His vision extends well beyond his own field. He speaks enthusiastically about forging closer collaborations among the computer science, engineering, and applied mathematics groups, drawing on experiences from Yale and the Yale Institute for the Mathematical Foundations of Data Science. As he speaks, ideas for joint seminars, collaborative programmes, and shared problem sessions surface effortlessly, each delivered with a quiet but unmistakable excitement.

Teaching is just as central to his mission. "Students should first understand the big picture," he explains. "Mathematics should feel meaningful. Once that perspective is in place, we focus on building the technical foundations that will serve them for years to come."

Throughout the conversation, this theme of the interplay between noise and structure keeps resurfacing. Whether speaking about his research, his teaching, or his hopes for Hong Kong, Professor Vũ returns to the same quiet conviction: that beneath the apparent disorder of modern life lies a deeper order waiting to be understood. And at HKU, he is ready to help uncover it.

About Professor Hà Văn VŨ

> "To understand the world, you must first understand its noise."
>
> — Professor Hà Văn VŨ, Chair Professor in the Department of Mathematics, and Recipient of the Delbert Ray Fulkerson Prize in 2012

Professor Hà Văn VŨ

- Chair Professor, HKU Department of Mathematics
- George Pólya Prize 2008
- Delbert Ray Fulkerson Prize 2012
- Invited Speaker, International Congress of Mathematicians 2014

RESEARCH STORIES

Science often advances quietly through careful observation, patient testing, and moments of insight that rarely make headlines. This feature invites you into those moments. Through a selection of research stories, it offers a closer look at how scientists explore the unseen, challenge assumptions, and turn questions into understanding. Read together, they reveal science as a living process with curiosity, creativity, and deep connection to the world around us.

▶ SURGICAL INNOVATION & MEDICAL IMAGING ◀

GIVING SURGEONS "INFRARED VISION" TO REDUCE RISKS IN ESOPHAGEAL SURGERY

Researchers // **Professor Hongjie DAI**, Sapientia Eminence Professor and Chair Professor of the Department of Chemistry

HKU Partnerships // Faculty of Engineering, Li Ka Shing Faculty of Medicine, Materials Innovation Institute for Life Sciences and Energy; School of Computing & Data Science, Faculty of Science

Professor Hongjie DAI

Esophagectomy is a highly complex operation, and one of its most dangerous complications, anastomotic leakage, happens when the reconnected tissue does not receive enough blood. It affects up to 30% of patients and can be life-threatening.

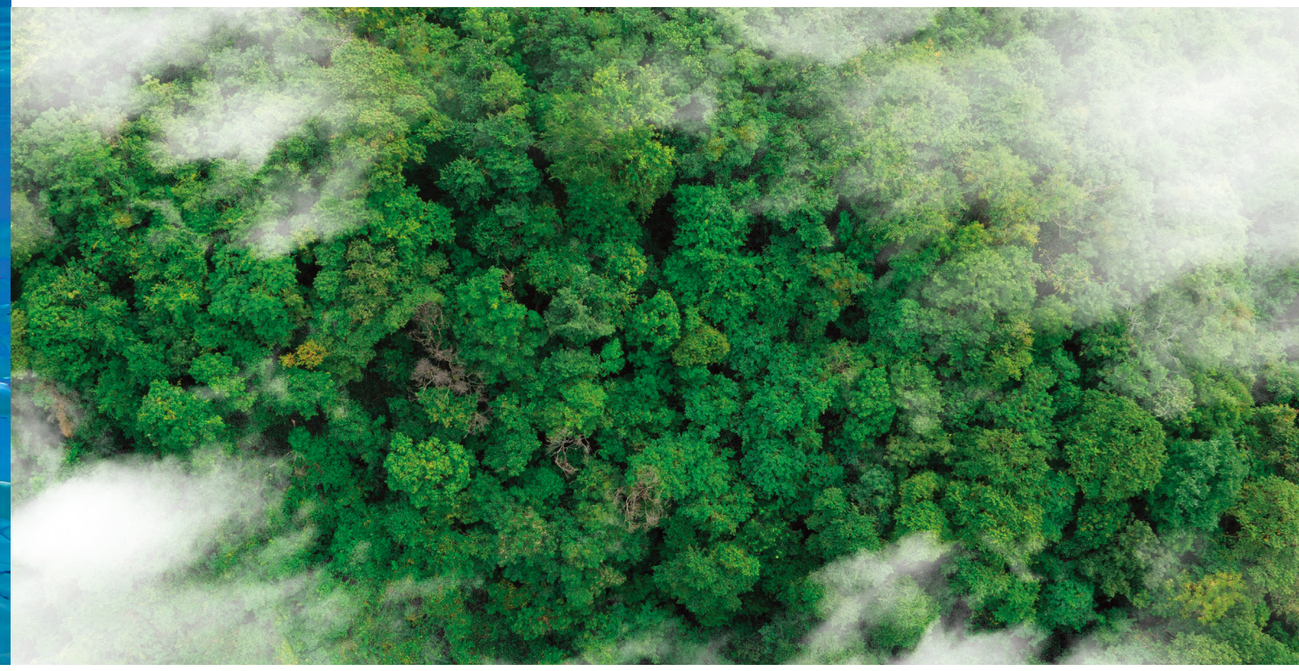
A cross-disciplinary research team has, for the first time, successfully brought near-infrared II (NIR-II) fluorescence video imaging into esophagectomy. Compared with conventional imaging, NIR-II technology offers deeper tissue penetration, higher resolution, and much lower background interference. By combining high-clarity NIR-II video imaging with rapid computational analysis, the technique clearly and automatically identifies areas of the reconstructed tissue with adequate and inadequate blood supply within one minute of dye administration. It rapidly identifies regions of the tissue with different blood perfusion patterns, i.e., poorly perfused, intermediately perfused and adequately perfused regions, thereby guiding surgical decisions. This provides more precise, objective guidance on where to remove damaged tissue and reconnect the esophagus.

Around 30 patients in Hong Kong have already benefited, with highly encouraging outcomes.

食道切除術是一項相當複雜的外科手術，其中最令人關注的併發症之一是「吻合口漏」，即食道與胃管縫合處發生的胃腸道缺損，此併發症的發生率約為 10–30%。港大跨學科團隊率先在臨床上應用紅外線二區螢光成像技術，結合高解析度的紅外線二區影像和快速電腦視訊分析，能夠客觀地劃分血供良好區和血供不良區，協助手術決策並降低吻合口漏的風險。目前本港約有 30 名病人已受惠於此新技術，初步成效理想。

◀ Learn more

Journal paper: Guiding Esophagectomy with Intraoperative NIR-II Fluorescence Video Imaging and Rapid Computation (published in Proceedings of the National Academy of Sciences, 2025)



MARINE SCIENCE

THE PREDATOR THAT DOES NOT BELONG

Researchers // **Professor Celia SCHUNTER**, Associate Professor and **Dr Arthur CHUNG**, Postdoctoral Fellow, School of Biological Sciences and the Swire Institute of Marine Science

Professor Celia SCHUNTER

Our ecologists have uncovered hidden risks linked to releasing hybrid groupers into Hong Kong's coastal waters, a practice sometimes carried out during religious mercy release rituals. The fish in question, a cross between the tiger grouper and the giant grouper, which grows quickly, reaches impressive sizes, and is widely sold in local markets. But once released into the wild, they do not simply disappear.

Using advanced DNA analysis, the research team examined what this hybrid species eats and found that it targets a wide range of prey, such as fish, crabs, and squid that native groupers rarely feed on. With no natural predators and access to underused food resources, it can easily become a dominant predator, reshaping local food webs.

The study warns that good intentions can still cause harm when non-native animals are introduced into the environment. Public awareness and better management are essential to protect Hong Kong's marine ecosystems before the balance shifts further.

Learn more

Photo credit: Arthur CHUNG

生態學家發現，宗教「放生」活動將混種石斑魚釋放至香港沿岸水域，可能對本地海洋生態構成嚴重風險。研究指出，這種混種石斑在本地海域缺乏天敵，且能捕食原本較少被本地魚類食用的獵物，因而更容易迅速壯大並改變食物網結構。

Journal paper: Distinct Resource Utilization by Introduced Manmade Grouper Hybrid: An Overlooked Anthropogenic Impact from a Longstanding Religious Practice (pubilshed in Reviews in Fish Biology and Fisheries, 2025)

ECOLOGY & BIODIVERSITY

WHEN THE RAINFOREST STARTS TO WHISPER

Researchers // **Professor Louise ASHTON**, Associate Professor; **Dr Adam SHARP**, Postdoctoral Researcher; **Professor Timothy BONEBRAKE**, Director and Professor; **Dr Xiaoyi ZENG**, Postdoctoral Researcher; **Yirong GUO**, Undergraduate Researcher; **Dr Michael BOYLE**, Research Assistant Professor, of the School of Biological Sciences.

Collaborator // Griffith University

Professor Louise ASHTON

In the tropics, a rainforest is never truly silent. Even at night, the air usually trembles with tiny lives—wings brushing past leaves, beetles ticking across bark, caterpillars quietly grazing in the dark. Nevertheless, in many places, that soft music is fading.

A new study led by HKU ecologists has uncovered a hidden decline in the insects and small creatures that hold these forests together. These arthropods, delicate spiders, bright beetles, patient ants, may be small, but they are the rainforest's heartbeat. They turn fallen leaves back into soil, feed birds and mammals, and keep the forest breathing.

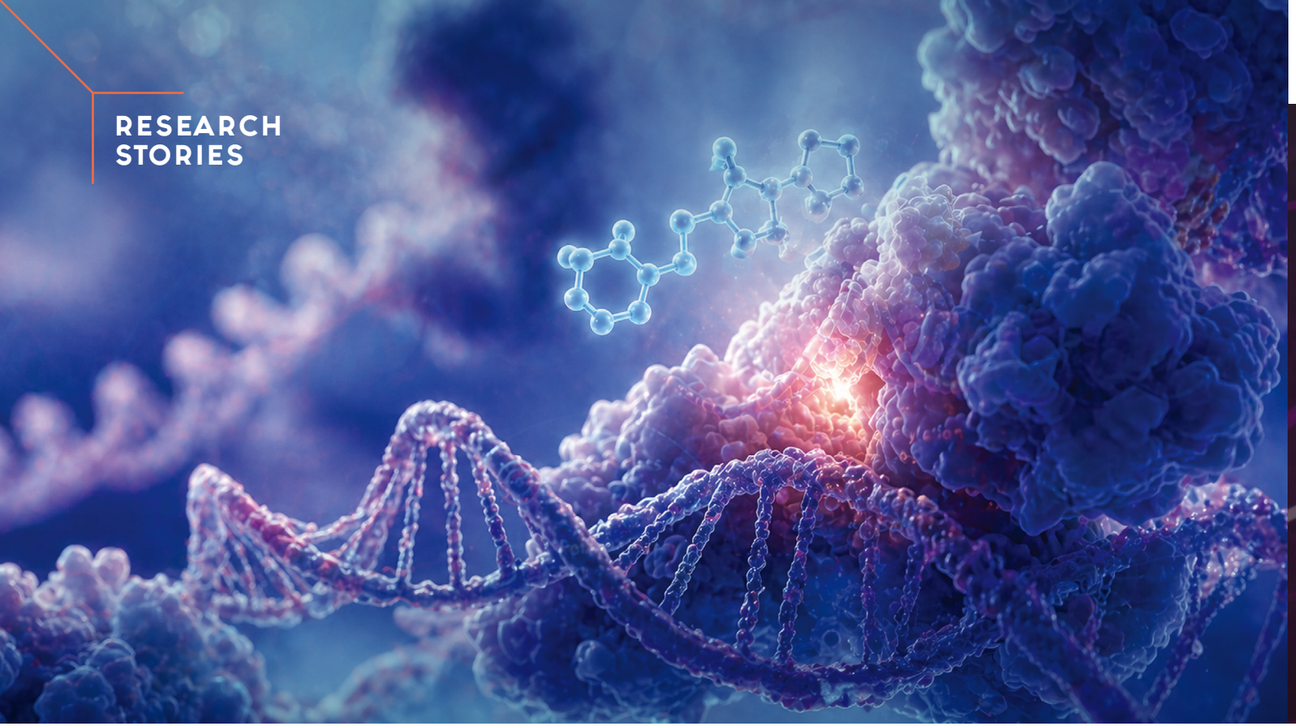
The scientists gathered evidence from more than 80 untouched rainforest sites and found the same quiet pattern: fewer species, year after year. Not because of habitat loss or pollution, but because the climate itself is shifting. Stronger and more frequent El Niño events are bringing heat and drought to places that once stayed cool and damp.

Even the deepest rainforests are no longer protected by their remoteness. The world is changing around them and the silence is the first warning.

在熱帶雨林深處，本應充滿細微而連綿不絕的生命聲響，如今卻悄然變得稀薄。我們的生態學家發現，即使是從未受人為破壞的原始森林，節肢動物的多樣性亦正持續下滑。這並非因為棲地流失或污染所致，而是日益頻繁而強烈的厄爾尼諾使雨林變得炎熱乾燥，令這些支撐生態循環的微小生命難以存活。這股無聲的改變，正悄悄改寫雨林的命運。

Learn more

Journal paper: Stronger El Niños Reduce Tropical Forest Arthropod Diversity and Function (published in Nature, 2025)



CHEMICAL BIOLOGY

SWITCHING OFF CANCER AT ITS SOURCE

Researchers // **Professor Xiang David LI**, Professor, his Postdoctoral Research Fellows Dr Sha LIU and Dr Yinqiao WU of the Department of Chemistry

HKU Partnership // Li Ka Shing Faculty of Medicine

Collaborators // Shenzhen Bay Laboratory, Tsinghua University

Cancer can begin with a simple mistake: the wrong genes being switched on at the wrong time. Inside our cells, chemical tags known as epigenetic modifications, such as histone acetylation, act like switches that control gene activity. When these switches malfunction, they can drive tumour growth.

Our research team has developed a new way to turn those switches off.

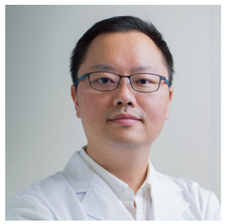
The team focused on the ATAC complex, a key regulator that activates cancer-related genes. Previous efforts to stop these cancer-promoting signals targeted its enzymatic subunit, GCN5, within the ATAC complex. However, GCN5 is also used by other essential cellular complexes, meaning such approaches could disrupt normal cell functions.

To overcome this, our researchers took a more precise route.

They designed and developed a first-in-class inhibitor, LS-170, which blocks YEATS2, a component unique to the ATAC complex. This allows the drug to selectively shut down cancer-driving signals without broadly affecting healthy cellular processes.

In laboratory studies and animal models of non-small cell lung cancer, LS-170 significantly suppressed tumour growth and spread. As the YEATS2 gene is also amplified in other cancers, including ovarian and pancreatic tumours, the approach may have wider therapeutic potential.

The study points to a new direction in epigenetic drug design, one that aims to treat cancer by precisely controlling the genetic switches that drive it.



Professor Xiang David LI

ATAC 複合物負責調控組蛋白乙醯化，屬於控制基因開關的重要機制；當其異常活化時，會促進致癌基因表達。過去研究多針對其核心酵素 GCN5，但由於該酵素同時存在於其他正常細胞複合物，容易影響正常功能。

本研究改為鎖定 ATAC 特有的 YEATS2 蛋白，大幅提升抑制的選擇性。實驗結果顯示，LS-170 能有效抑制腫瘤生長及擴散，為非小細胞肺癌提供嶄新治療方向，並有潛力應用於多種癌症。

Learn more

Journal paper: Complex-specific inhibitors for interrogating ATAC histone acetyltransferase complex (published in Nature Chemical Biology, 2026)

MOLECULAR MATERIALS

HOW FLEXIBLE NANOGRAPHENE DRIVES DIVERSE SUPRAMOLECULAR ARRANGEMENTS

Researchers // **Professor Junzhi LIU**, Associate Professor and his PhD student **Jian SUN**; **Professor David Lee PHILLIPS**; **Dr Ziqi DENG** of the Department of Chemistry

Professor Junzhi LIU

Tessellation means shapes fitting together perfectly with no gaps, like mosaics and tiled floors. In this work, our chemists achieved tessellation at the molecular scale. They designed a small, flexible carbon-based nanographene that contains three consecutive heptagons (seven-membered rings).

On its own, this molecule forms a square tessellation inside crystals. But when it co-assembles with spherical fullerenes (C_{60} and C_{70}), the pattern changes: with C_{60}, it becomes triangular, and with C_{70}, it becomes rhombic (diamond-shaped).

These are the first layered tessellated frameworks ever seen in fullerene chemistry. Previously, such “supramolecular tessellation” had only been observed in much larger ring-shaped molecules.

This study demonstrates that small molecular carbons can direct the formation of complex, repeating tessellated patterns, establishing a novel design strategy for creating two-dimensional molecular materials.

Learn more

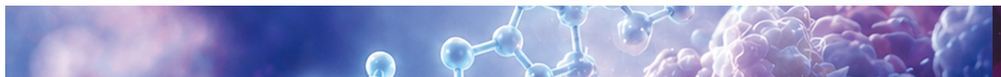
鑲嵌 (tessellation) 指的是形狀之間能無縫緊密拼合，就像馬賽克或地磚的圖案。本研究中，我們的化學家把這種鑲嵌帶到分子層次。他們設計了一種小巧、具柔性的碳基奈米石墨烯分子，當中由三個連續的七元環 (七邊形) 組成。

這個分子本身在晶體裏會排成方形鑲嵌；但當它與球形的富勒烯 (C_{60} 和 C_{70}) 一起組裝時，排列方式會跟着改變：1) 與 C_{60} 配對時，會形成三角形的晶格；2) 與 C_{70} 配對時，則變成菱形晶格。

這些發現是富勒烯化學中首次看到的層狀鑲嵌結構。以往類似的「超分子鑲嵌」只出現在體積較大的大環分子中。

這項研究顯示，即使是很小的碳分子，也能引導出複雜、規則的鑲嵌圖案，為設計新一代的二維分子材料帶來新的可能性。

Journal paper: Exploring Diverse Supramolecular Tessellation through Hierarchical Assemblies of Nonalternant Nanographene (published in Proceedings of the National Academy of Sciences, 2025)



GEOLOGICAL SCIENCES

HOW EARTH FORGED ITS FIRST CONTINENTS—FROM FIRE, NOT CRASHES

Researchers // **Professor Guochun ZHAO**, Mok Sau-King Professor and Chair Professor; **Professor Min SUN**, Emeritus Professor; **Dr Xiangsong WANG**, Research Assistant Professor; **Dr Dingyi ZHAO**, at the Department of Earth and Planetary Sciences

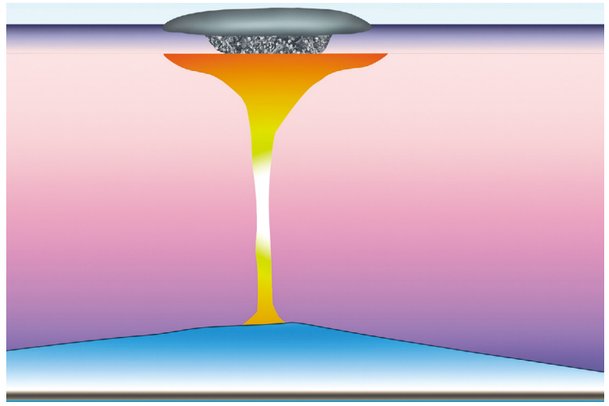
Collaborators // Monash University, University of Washington, Yangtze University

More than 2.5 billion years ago, Earth may have built its first continents not through crashing plates, but through immense heat rising from deep within the planet. Research conducted by our geologists shows that mantle plumes, towering columns of molten rock, likely played the starring role.

The team reached this view by analysing ancient TTG (tonalite–trondhjemite–granodiorite) rocks, which act like geological time capsules. Tiny zircon crystals inside them preserve water contents and oxygen isotopes that point to extremely hot and dry formation conditions, nothing like today's subduction zones, where plates dive beneath each other and create wet, compressed environments.

Professor Guochun ZHAO

The chemical clues reveal a dramatic two-stage process: thick piles of oceanic basalt formed first, then intense heat from a later plume partially melted their lower layers to produce TTG magmas. The findings suggest that mantle plumes and sagduction, rather than plate subduction and collisions, shaped Earth's first continents.



地質學家揭示早期大陸地殼很可能由深層地球過程——地幔柱所形成，而非現今塑造大陸的板塊俯衝和碰撞過程。

Learn more ▶

Journal paper: A Two-stage Mantle Plume–sagduction Origin of Archean Continental Crust Revealed by Water and Oxygen Isotopes of TTGs (published in Science Advances, 2025)

MATHEMATICAL PHYSICS

ECHOES OF A CENTURY: UNRAVELING THE MYSTERY OF TRAPPED ENERGY IN WAVES

Researcher // **Professor Dong LI**, Chair Professor of the Department of Mathematics

Collaborators // Southeast University, Nanjing

Professor Dong LI

Imagine dropping a stone into a still pond. Ripples spread outward, growing weaker until the surface becomes calm again. This simple picture captures what we expect from waves: they disperse, and the energy eventually fades away.

But nearly a century ago, mathematician and physicist John von Neumann and theoretical physicist Eugene Wigner proposed a striking possibility: under certain conditions, wave energy might not disperse but remain trapped, hidden like a "spectral ghost" — a mysterious phenomenon defined as an embedded eigenvalue within a continuous spectrum.

For mathematicians, this raised an unsettling question. In one of the most important equations used to describe waves, the three-dimensional non-integrable nonlinear Schrödinger equation, could such ghosts exist, leaving hidden energy that prevents the system from fully settling? For decades, no one could give a definitive answer.

◀ Learn more

Our research team set out to resolve this mystery. Rather than trying to track these elusive "ghosts" directly, they approached the problem from a different angle. They asked: what would the system need, structurally, for such a hidden state to exist at all?

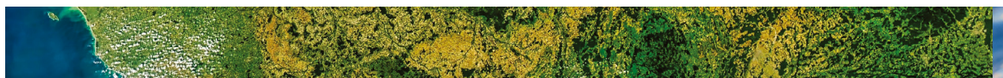
What they found was decisive. When the mathematics is carefully unfolded, the system simply does not have the capacity to support these trapped states. The "ghost" has nowhere to live. Their result shows that energy cannot remain hidden: every disturbance must either disperse or settle into a stable structure, with no third possibility. In a sense, the mystery dissolves not because the "ghost" was chased away, but because it was never there to begin with.

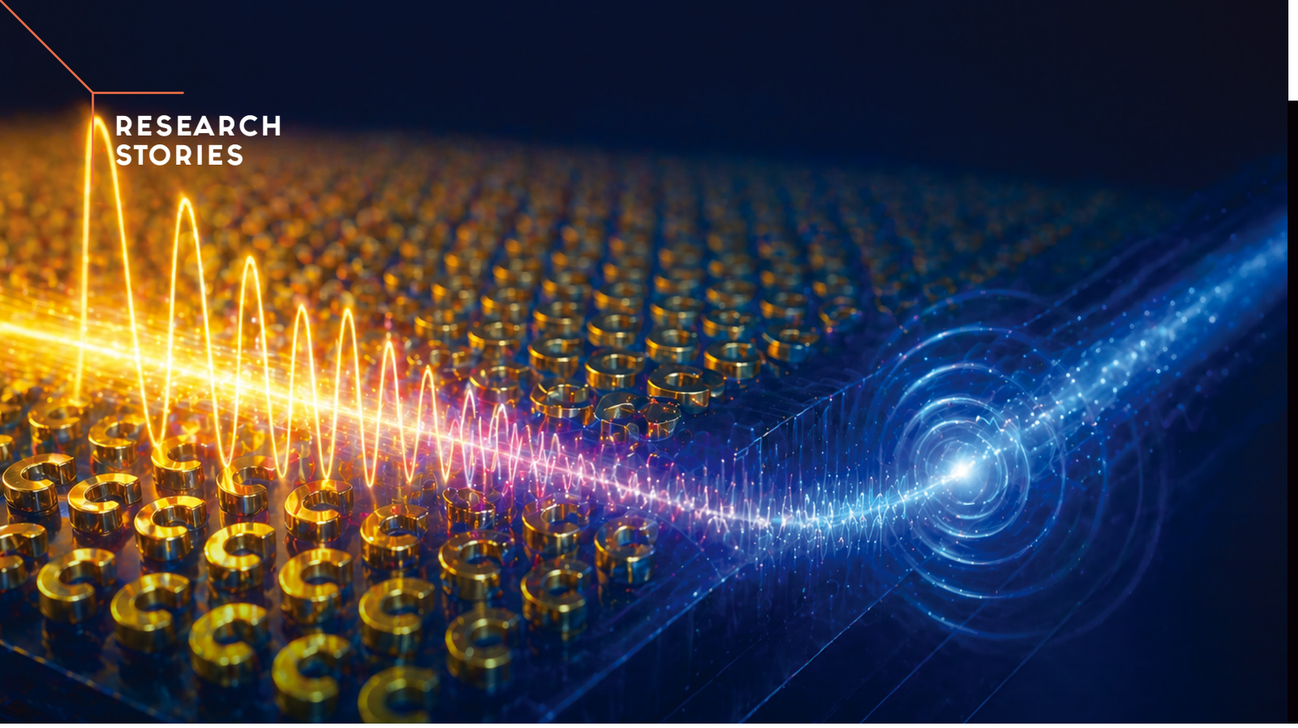
This work resolves a question dating back to early quantum theory and clarifies that, despite their complexity, these systems leave no hidden residue, only dynamics that settle in a predictable way.

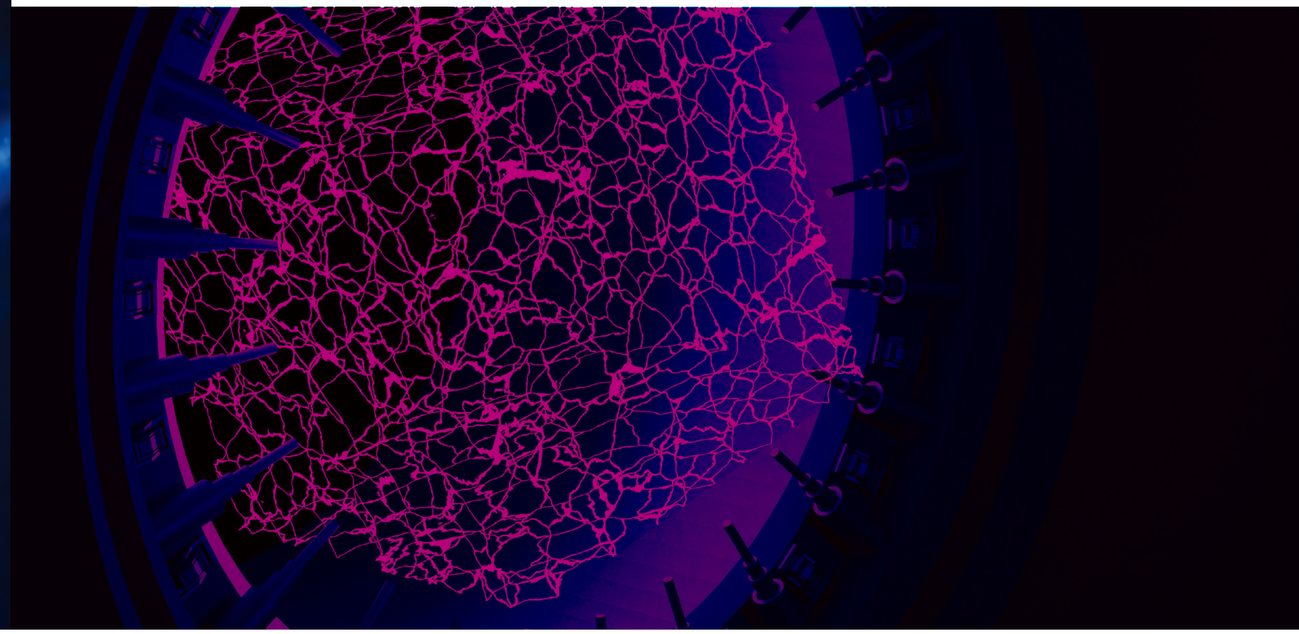
長久以來，數學界一直關注一個問題：在波動系統中，能量會否以某種不可見的方式被「困住」，而不隨時間逐漸消散。早於 1929 年，數學大師馮諾伊曼與物理學家維格納已提出這種違反直覺的可能性，認為波動中或存在類似「譜學幽靈」的現象，即本應消散的能量卻長期滯留，從而影響系統最終能否穩定下來。

本研究證明，在一個重要的數學模型中，這種情況並不存在。換言之，任何微小擾動隨時間推移，只會逐漸消散，或轉化為穩定結構，不會有能量長期隱藏或滯留。這一結果為理解波動如何趨於穩定，提供了更清晰且完整的理論基礎。

Journal paper: The Linearized Cubic NLS has no Embedded Eigenvalue (Published in Inventiones Mathematicae, 2026)







NANOPHOTONICS

MAKING LIGHT SIGNALS LAST LONGER TO OVERCOME OPTICAL LOSS

Researchers // **Professor Shuang ZHANG**, Chair Professor of the Department of Physics, and his Postdoctoral Fellow, **Dr Zemeng LIN** and former Postdoctoral Fellows **Drs Fuxin GUAN** and **Xinhua WEN**

Collaborator // Nanjing University

Professor Shuang ZHANG

One of the biggest challenges in advanced optical systems is simple: signals do not last. As light travels through materials, part of its energy is inevitably lost. This weakens signals, blurs images, and reduces the performance of high-tech sensors and devices.

This problem is particularly critical for metamaterials, engineered materials designed to precisely control how waves behave, where even small losses can significantly reduce their effectiveness.

To fight this, scientists previously developed a clever technique using specially shaped light pulses known as synthetic complex-frequency waves to help "cancel out" the losses. However, in materials with high losses, these pulses faded too quickly, leaving noisy and unclear results.

Now, researchers have developed a smarter version: high-order virtual gain light signals. These new signals are designed to fade away much more slowly. By lasting longer inside the material, they have enough time to properly counteract the losses and produce a clean, stable response.

In laboratory tests with plasmonic metamaterials, the new approach reduced unwanted noise by 20 times compared to the previous method. It successfully restored sharp, clear resonance peaks.

By extending how long light signals can survive inside materials, this work opens up new possibilities for clearer imaging, more sensitive biosensing, and improved photonic signal processing.

在光學成像與感測系統中，訊號在傳播過程中容易因能量耗散而迅速減弱，影響整體表現。為解決此問題，研究人員提出利用一種經過設計的「激發」（excitation），即將一些能驅動其產生反應的光學訊號打入材料，以提升損耗補償效果。

相較傳統方法，該研究透過調整訊號的時間衰減特性，減慢其衰減速度，使訊號能維持更長時間並達至穩定狀態。實驗顯示，在等離激元共振系統中，此方法可將雜訊抑制提升至約 20 倍，顯著改善訊號品質。這項技術有望應用於光學成像、生物感測及集成光子訊號處理等領域。

Learn more ▶

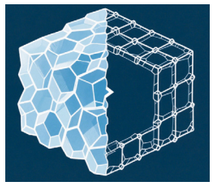
Journal paper: High-order Virtual Gain for Optical Loss Compensation in Plasmonic Metamaterials (Published in Nature Physics, 2026)

QUANTUM PHYSICS

THE SECRET SWITCH THAT DECIDES HOW QUANTUM MATTER CHANGES

Researchers // **Professor Zi Yang MENG**, Professor and his PhD student, **Menghan SONG**, Department of Physics

Collaborators // Chinese University of Hong Kong; Yale University; Ruhr-University Bochum; University of California, Santa Barbara; Institut für Theoretische Physik and Würzburg-Dresden Cluster of Excellence ct.qmat



Most phase transitions, like water freezing, follow well-known rules. Nevertheless, in quantum physics, there is a rare type of change where one ordered state turns directly into a different ordered state without becoming disordered in between. These unusual points are called deconfined quantum critical points (DQCPs), and their true behaviour has been debated for years.

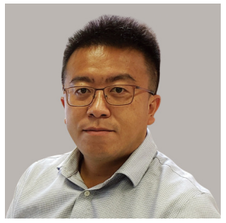
Physicists at HKU provide a clearer answer. Using large-scale quantum Monte Carlo simulations, the team examined entanglement entropy, which reveals how strongly different parts of a quantum system are linked beneath the surface.

◀ Learn more

The key result is that DQCPs do not behave the same in all systems. Their behaviour depends on a parameter called N, which describes the symmetry of the system:

- When N is large (above a critical threshold), the transition is smooth and continuous.
- When N is small, the transition shows more abrupt and unusual features instead of gradual change.

Identifying this threshold gives scientists a solid guide for when DQCPs behave predictably, paving the way for future research in quantum materials and technology.



Professor Zi Yang MENG

量子物理中存在一種罕見轉變，物質可在不經無序階段下，直接由一種有序狀態變成另一種有序狀態，稱為解禁閉量子臨界點。我們的物理學團隊利用大規模量子蒙地卡羅模擬，觀察糾纏熵的變化，發現其行為取決於系統對稱性的參數 N：當 N 較大時，轉變呈現平滑連續；當 N 較小時，則出現較突兀的異常特徵。此結果釐清解禁閉量子臨界點的關鍵分界，為未來量子材料與相關研究提供重要指引。

Journal paper: Evolution of Entanglement Entropy at SU(N) Deconfined Quantum Critical Points (published in Science Advances, 2025)

TWO ANNIVERSARIES, ONE LEGACY

In 2025, the Faculty of Science marked two milestones that, taken together, tell a larger story about how curiosity, environment, and people shape scientific communities over time. The Swire Institute of Marine Science (SWIMS) celebrated its 35th anniversary, while the Department of Earth and Planetary Sciences (DEPS) marked 30 years of teaching, research, and community-building. One looks outward to the sea, the other to the solid Earth and beyond, yet both share a common spirit: learning rooted in the natural world, sustained by long-term commitment.

SWIMS Turns 35 : Celebrating a Legacy of Marine Science and Conservation

Nestled along the shores of the Cape D'Aguilar Marine Reserve, SWIMS has grown from its founding in 1990 by Professor Brian MORTON as the Swire Marine Laboratory into an interdisciplinary hub for coastal and marine research. Today, it brings together researchers from Biological Sciences, Chemistry, Mechanical Engineering, and Earth and Planetary Sciences, alongside more than 50 PhD students and postdoctoral fellows. Over three decades, SWIMS has trained generations of scientists now working across academia, government, NGOs, and industry in Hong Kong and beyond.

Its 35th anniversary gala on 23 October brought together current and former members in a warm, collegial setting. More than 100 current and former members gathered, joined by University leaders and long-standing supporters, including Vice-Presidents and Pro-Vice-Chancellors Professor Peng GONG and Professor Jay SIEGEL, Dean of Science Professor Qiang ZHOU, Associate Vice-President Professor Pauline CHIU, the Chair of Swire Group Philanthropy Council Mr Richard SELL, and Director of the Agriculture, Fisheries and Conservation Department Mr Mickey Kin-ming LAI.

A Community, Then and Now

Speakers reflected not only on scientific achievements, but on culture and continuity. Dean Zhou described SWIMS as the Faculty's "crown jewel," where hands-on experience and regional relevance meet. Professor Siegel spoke of the ocean as a unifying force. Professor Gong highlighted Swire's century-long partnership with HKU, announcing the establishment of the Swire Professorship in Marine Conservation to strengthen conservation efforts in the Greater Bay Area. Mr Richard Sell, Chair of the Swire Group Philanthropy Council, reaffirmed Swire's long-term commitment to SWIMS' growing regional and global impact, and SWIMS Interim Director Professor David BAKER outlined a forward-looking vision focused on research excellence, education, and partnerships.

Alumni voices gave the evening its emotional weight. Dr Siu-fai LEUNG, one of SWIMS' earliest graduates and a former AFCD Director, described the institute as a "big family" he is always drawn back to. Professor Daniel PAULY of the University of British Columbia, a world-renowned fisheries scientist and current guest lecturer in SWIMS' Master's programme, spoke simply of his wish to return, noting that it is a pleasure to work at SWIMS. For many in the room, SWIMS was not just a workplace but a formative chapter of their lives.

As SWIMS embarks on its next chapter, former Director Professor Gray WILLIAMS reminded the SWIMS family of their mission: to harness new technologies and ideas to conserve Hong Kong's marine environment.

Full Story

DEPS at 30 : A Community Shaped by Earth, Bound by Curiosity

That same sense of belonging echoed a month later when DEPS marked its 30th anniversary. Founded in 1995 under the leadership of Professor John MALPAS, with generous support from the Hui family, the Department began with a clear purpose: to build geoscience expertise for Hong Kong, grounded in both fundamental geology and the applied challenges of a rapidly urbanising city. From the beginning, learning extended far beyond lecture rooms, into coastlines, hillsides, and field sites where Earth's history could be read directly from rock and strata.

"We've gone from tracing Hong Kong's bedrock to studying planetary formation and climate futures," Interim Head of DEPS Professor Zhonghui LIU reflected. "That's why our celebration theme, 'Beyond the Earth', feels so fitting. It captures not just our new scientific direction in space research, but the way this community has always tried to reach a little further than anyone expected."

A Homecoming Written in Memory

The celebrations began on 28 November with a reunion that drew nearly 50 alumni from across generations. Stories of first field trips, demanding assignments, and shared discoveries flowed easily, revealing how deeply the Department had shaped not only careers, but identities. The following day's anniversary symposium brought the focus forward, with 12 distinguished speakers and more than 100 participants reflecting on future research directions. At the same time, a keynote by Mr Tony Ying Kit HO, JP, connected scientific inquiry with public purpose.

The Celebration Ceremony that evening gathered more than 150 guests at Loke Yew Hall, including 17 academicians of the Chinese Academy of Sciences. Led by Professor Peng GONG, the distinguished guests officiated with a ceremonial balloon launch, marking both achievement and renewal. Warm reflections from University leadership honoured not just milestones, but the people who had sustained the Department across three decades.

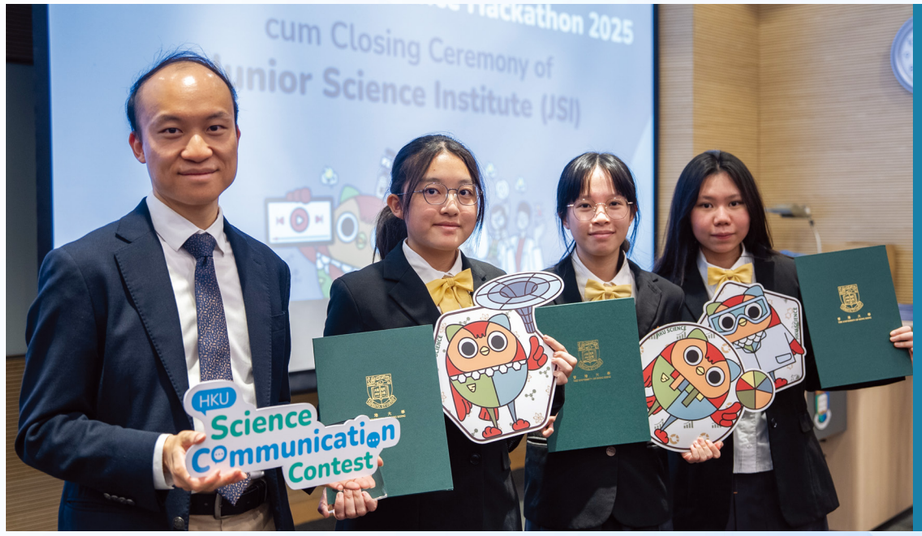
The final day captured DEPS' character in quieter ways. While strategic discussions among Faculty and CAS academicians unfolded indoors, alumni revisited familiar coastlines by boat in the Tolo Channel, guided by retired academic Professor L S CHAN. For many, their connection to Earth science began not with theory, but with the landscape itself.

Together, the anniversaries of SWIMS and DEPS highlight a shared legacy within the Faculty of Science: communities built slowly, sustained by mentorship, generosity, and a deep respect for the natural world. As both look ahead to new technologies, partnerships, and responsibilities, their histories suggest that the most enduring impact comes not only from discovery but from the people who carry that curiosity forward.

Full Story

SCIENCE OUTREACH

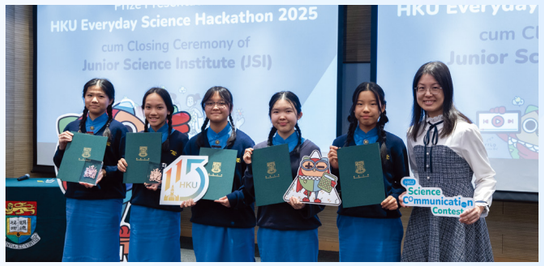
SCIENCE COMMUNICATION YOUTUBER CHALLENGE 2025: EVERYDAY SCIENCE HACKATHON



View the winning video

Gold Prize Winner — Soft Meal Joy, HKUGA College.
Hang Yu Chelsea LAM, Hei Yee MA, and Tsz Yau NG.

Silver Prize Winner — Alertgy, Good Hope School.
Elisa Kiu On CHUNG, Man Ki Minnie GONG, Yan Tung Royce LI, Man Yi Genevieve MUI, Wing Yi Hailey NG, and Sum Ying WONG.



Bronze Prize Winner — CogniGym: Bridging Cognitive Rehabilitation and Digital Health for Concussion Recovery, True Light Girls' College.
Alexis Nga Yin AU, Tsz Ning CHUI, Yui Chun HO, Wing See Karissa KAN, Chung Yan Katie LAI, and Sze Nga WONG.

The Faculty hosted the Science Communication YouTuber Challenge 2025: Everyday Science Hackathon, inviting local secondary school students to identify pressing everyday problems and harness scientific knowledge to develop innovative app-based solutions, which they presented through creative five-minute videos designed to engage and inspire a broad audience.

The 2025 challenge drew an enthusiastic response, with over 120 students from 24 schools across Hong Kong forming teams to take on the role of science storytellers. Participants demonstrated not only strong scientific understanding but also remarkable creativity and teamwork. Each team tackled contemporary science issues, ranging from environmental sustainability to health and technology, presenting their solutions in accessible language and imaginative formats that captivated both the judging panel and the wider public.

We congratulate the winning teams and thank all participants for their enthusiasm and commitment. Through their creativity and collaboration, these students have demonstrated how science can be communicated in ways that are both engaging and relevant to everyday life.

A hall filled with anticipation as young minds got a preview of the exciting learning experiences awaiting them at the opening ceremony.

Students practiced scientific monitoring by identifying microplastics with microscopes and discussing practical solutions to plastic pollution.

Participants got hands-on with a telescope, learning the observational techniques that have enabled humanity to map the cosmos.

About JSI

JUNIOR SCIENCE INSTITUTE IGNITES PASSION FOR SCIENCE IN YOUNG MINDS

The Faculty proudly hosted its flagship outreach programme, the Junior Science Institute (JSI), on 22 November 2025, welcoming approximately 150 enthusiastic senior secondary school students to the HKU campus for a full day of scientific immersion. The event is a cornerstone of the Faculty's commitment to promoting science education and inspiring the next generation of researchers and innovators.

In an engaging session on the surprising applications of mathematics, students discovered how principles of logic and probability can create illusions that seem to read your mind.

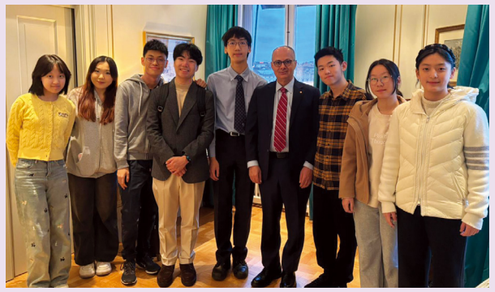
Throughout the day, participants explored a diverse array of scientific fields through six dynamic workshops. The sessions covered topics in chemistry, mathematics, physics, environmental science, ecology and biotechnology, featuring hands-on activities such as "Exploring Colour Changes in Chemical Reactions" and "Using AI to Conduct Bird Surveys". Through a carefully curated blend of laboratory exercises, engaging lectures, and interactive discussions, students were offered a glimpse into university-level study and the excitement of scientific discovery.

The programme was a resounding success, providing students with an invaluable opportunity to experience the vibrant learning environment at HKU. Upon completion, all participants received a certificate of attendance, and their participation will be taken into consideration during admissions to the 6901 Bachelor of Science programme, reinforcing the Faculty's dedication to nurturing future scientific talent.

Through hands-on laboratory experiments, students explored the science behind colour change, bringing concepts such as pH and colourimetry to life.

EXPERIENTIAL LEARNING

LIGHTING THE SPARK AT NOBEL WEEK



Meeting with Professor Omar YAGHI, Nobel Laureate in Chemistry 2025.

At the Faculty of Science, experiential learning often takes students beyond the classroom and into the global scientific community. For Gordon Yat Long WONG, a Year 5 Physics major in the Science Master Class, that journey led him to Stockholm during Nobel Week, where he experienced firsthand the ideas and people shaping modern science.

In the reflection below, Wong shares how meeting Nobel Laureates and guiding Hong Kong secondary school students through the programme reshaped his perspective on physics and his path ahead.

Nobel laureates, scientists & experts discussing global issues at the Nobel Dialogue Day.

▲ *WONG (bottom left) with fellow participants in the Nobel Week programme.*

Stepping into the crisp air of Stockholm, Sweden, for Nobel Week was more than an academic field trip; it marked a turning point in how I see my future in physics. As a student in the Science Master Class at HKU, I took on a dual role: an eager participant immersed in world-class physics and a student leader guiding a group of Hong Kong high school students throughout the programme. This unique vantage point allowed me to deepen my own scientific understanding while witnessing the "spark" of discovery ignite in the next generation.

A Journey Beyond the Textbook

The tour immersed us in the history of the Nobel Prize while introducing us to cutting-edge ideas such as macroscopic quantum phenomena and metal-organic frameworks. Learning how fundamental discoveries in physics, chemistry, and related fields have shaped the world reminded me that scientific research can have a lasting impact far beyond the laboratory.

For me, the experience reinforced a deeper motivation to pursue physics not only as an academic discipline, but also as a way to contribute to society. As an aspiring researcher, I hope one day to follow in the footsteps of these pioneers by pursuing a PhD and contributing to new scientific discoveries.

Wisdom from the Podium

One of the most memorable experiences was attending the Nobel lectures and the Nobel Week Dialogue. Listening to Nobel laureates reflect on their discoveries and decades-long careers was both humbling and inspiring.

What struck me most was how often they emphasised curiosity and persistence rather than immediate success. Many shared that their ideas were initially met with scepticism and that their research journeys were marked by setbacks and uncertainty.

As a physics student, I often find myself absorbed in problem sets and examinations, but hearing these stories reminded me that true scientific progress begins not with answers but with meaningful questions and the courage to explore the unknown. The dialogue sessions also highlighted the deep connection between science and global challenges, demonstrating how scientific research is intertwined with broader societal needs.

Science, Culture, and Community

Beyond the academic programme, Stockholm itself offered a rich cultural dimension to the experience. Visiting Stockholm City Hall and Concert Hall, where the Nobel ceremonies take place, made everything feel more tangible and immediate. Walking through the city during the Nobel Week Lights light show and exploring museums also showed us how deeply science is woven into Sweden's cultural identity and history.

These interactions made me appreciate the international nature of science and the importance of collaboration across cultures.

Overall, the Nobel Week Tour strengthened my passion for physics and broadened my understanding of science in a global context. Much like the Grand Master tutorials at HKU Science, where leading scientists share the stories behind their discoveries, the opportunity to hear directly from Nobel laureates offered invaluable insight into the realities of a scientific career. It also allowed me to grow as an aspiring researcher and mentor.

I am grateful to the HKU Admissions Office and the Faculty of Science for making this experience possible. The journey has reinforced my commitment to carrying forward the spirit of curiosity, collaboration, and responsibility that defines the scientific community.

Nobel Week (6–12 December 2025) Programme Highlights

- Nobel Lecture Day
- Nobel Dialogue Day
- Meeting with Nobel Laureate in Chemistry Professor Omar YAGHI
- Lectures and visits at Stockholm University
- Day tour in Stockholm
- Excursion to Uppsala

> *"As the lights dimmed in Stockholm's Concert Hall and a Nobel laureate stepped to the podium, I realised that my vision of a career in physics had changed forever."*

Serving as a student leader during the tour added another meaningful layer to the experience. The role challenged my communication and mentorship skills as I guided younger students through the programme and supported their engagement with lectures and discussions. Encouraging them to ask questions and connect with peers from around the world reminded me how important it is to make science accessible and exciting for the next generation. Their curiosity and enthusiasm also reminded me of why I chose to study physics in the first place.

Furthermore, interacting with students from different countries broadened my perspective. We exchanged ideas about cultural differences, science, and our future aspirations.

Learn more

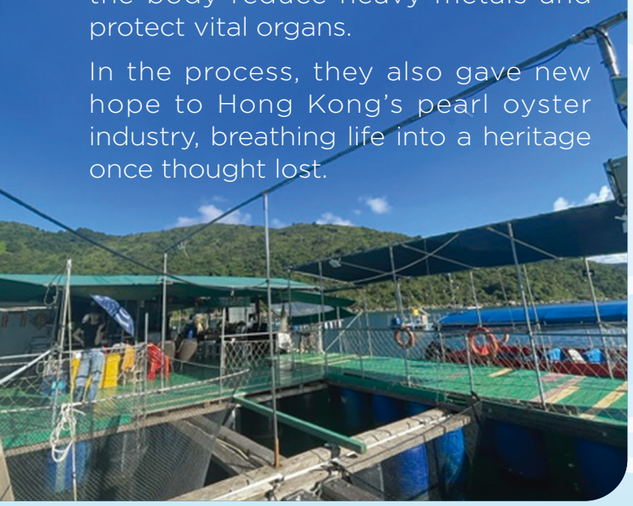
Nobel Week Lights at Stockholm City Hall.

AWAKENING THE LEGACY OF PEARLS THROUGH SCIENCE

For centuries, pearl powder was treasured as something more valuable than a jewel. Crushed into the finest dust, it was believed to heal wounds, and cleanse the body of toxins. But did it truly work? Without science, the answer remained a mystery.

In 2016, a research team from the School of Biological Sciences set out with global partners and local pearl farmers to put those age-old claims to the test. Their findings are striking: pearl powder can indeed help the body reduce heavy metals and protect vital organs.

In the process, they also gave new hope to Hong Kong's pearl oyster industry, breathing life into a heritage once thought lost.



A Heritage of Pearls in Hong Kong

Once abundant in Hong Kong's coastal waters, the *Pinctada fucata*, a pearl oyster prized for its beauty and medicinal value, thrived in the region's warm seas and sheltered shores. Renowned for their quality, these pearls were treasured as far north as Peking, their value so great that historical records note that troops were stationed in Tai Po to harvest and guard them. Sai Kung, too, was famed as a fertile ground. Today, however, this centuries-old legacy faces mounting challenges. Warming seas and rising acidity are making it harder than ever for oysters to form pearls.

"Pearl farming was attempted in Hong Kong back in the 1960s, but those early efforts eventually faded," says Dr Wa-tat YAN, a PhD graduate of the School of Biological Sciences (SBS). "My research focuses on pearl oyster farming, and I want to revive that attempt by making use of the many idle fish rafts around Hong Kong."

Together with Professor Billy Kwok-Chong CHOW, Chair Professor of Endocrinology at SBS, the two now lead a research team dedicated to reviving Hong Kong's pearl oyster heritage while exploring its modern scientific potential.

In the past, pearls formed naturally in the wild, but today most are cultivated. The process begins when researchers insert a small nucleus, usually from a freshwater mussel shell, into the pearl oyster. Over time, the oyster coats the nucleus with nacre, the lustrous substance also known as mother-of-pearl, gradually forming a pearl.

"The nacre layer is the key," explains Chow. "It's rich in calcium carbonate, proteins and amino acids, all the essential materials that give pearl powder its medicinal value in Chinese medicine."

To help oysters adapt to rising sea temperatures, the team is training local fishermen in pearl oyster farming, collaborating with scientists in China to identify climate-resilient varieties, and exploring tropical species better suited to warmer waters.

"After about a year of cultivation, the pearls are harvested. At the farm, suitable shells are selected and taken to the lab, where they are cleaned, examined, and ground into powder for analysis."

Putting Tradition to the Test

Once the nacre was processed into powder, the team put it to the test. Using laboratory rats, they conducted in vivo experiments to model exposure to heavy metals, specifically mercury, lead, and aluminium, followed by treatment with pearl powder.

The results are compelling. The powder consistently lowers the concentration of these metals in the blood, regardless of dosage. It aids in flushing the toxins out through urine and faeces, and more importantly, lessens signs of damage in the liver and kidneys, the organs most vulnerable to metal poisoning. It is evidence that echoes the claims of ancient texts.

HKU researchers and fishermen collaborate on fish rafts to revive pearl oyster farming.

"The results of our experiments have been nothing short of exciting!" says Yan. "The depth and brilliance of traditional Chinese medicine continue to amaze and inspire us."

The promise of pearl powder does not end with proof. Building on their discoveries, the team has secured three patents and intellectual property rights to protect new applications, laying the groundwork for future collaboration with industry.

"Leveraging these patents, Dr Yan and I have established a start-up, the Pearl Power Research Institute, so we can develop the technology not only for pearl oyster farmers, but also for Hong Kong," says Chow.

"In a significant move, local fishermen have joined our HKU start-up as shareholders, enabling them to benefit directly from our research," says Yan with excitement. "Our company is also committed to sourcing oyster shells exclusively from accredited local fish farms. We believe this initiative will not only increase fishermen's income but also provide a sustainable and successful model for collaboration between academia and the primary sector."

The team is now experimenting with various formulations for supplements and skincare products. If all goes to plan, they aim to launch three product lines within a year, focusing on detoxification, anti-oxidation, and gut health, all in easy-to-take pill form.

"I'm optimistic that we cannot only revive pearl oyster farming in Hong Kong, but also build a strong industry around pearl oyster powder," adds Yan.

What began as an ancient remedy is now being reshaped by modern science. Through their work, the team is demonstrating how tradition and innovation can coexist, opening the door to new therapeutic possibilities and a revitalised future for Hong Kong's pearl oyster industry.

> *"I'm honoured to be part of a meaningful project that seeks to make a lasting impact on our community through research. I'm hopeful that Hong Kong will once again reclaim its title as the Pearl of the Orient."*
>
> *Dr Wa-tat YAN*

About Pearl Power Research Institute

View this video to learn more about their research

Video credit: HKU Knowledge Exchange Office

Professor Billy CHOW
- Co-founder of Pearl Power Research Institute
- Professor and Chair of Endocrinology, School of Biological Sciences, HKU

Dr Wa-tat YAN
- Co-founder of Pearl Power Research Institute
- PhD in Biological Sciences, School of Biological Sciences, HKU

MAKING SENSE OF SCIENCE YOU CAN FEEL

How a Dietitian, Athlete, and Researcher Turns Evidence into Strength

"Science has always been my anchor. It's never been outside my life, only part of it."

Some journeys begin with grand ambitions. Our alumna Jaclyn TSANG started with a quiet kind of wonder. She did not dream of titles or big stages. She simply wanted to understand how food nourishes the human body, how movement changes it, and how science can explain the smallest shifts in strength, energy, and health.

That quiet curiosity eventually led her from the wards of a public hospital to the arena of an international powerlifting championship, from a humble Instagram account to her own training centre, and now, to a PhD lab.

Step by step, that simple curiosity became the thread connecting every chapter of her life.

A Seed Takes Root

When Tsang first entered HKU Science's 6901 BSc programme, she did not have a plan. She had not mapped out her career in neat bullet points. She just liked human biology a lot. She liked questions.

Since students were not required to choose a major in their first year, she had the space to explore environmental science, chemistry, and physiology. Still, somewhere in the midst of lecture halls and lab sessions, nutrition quietly took root in her heart.

"I was fascinated by the way food interacts with the body," she recalls. "Eating is something we do every single day, and yet it's full of science."

Her undergraduate years also took her to the University of British Columbia, where visiting farms gave her a firsthand look at how everyday food is produced. An internship at a local social service agency introduced her to the community, allowing her to learn directly from registered dietitians.

"Those experiences, together with my three years of study, were a turning point that transformed my passion into a professional path," she says.

Tsang graduated with first-class honours in Food and Nutritional Science, a foundation that took her to the National Health Service in the UK, and then back home to Queen Elizabeth Hospital as a registered dietitian. The work was intense: bariatric surgery patients, weight management cases, people navigating major lifestyle changes.

TSANG shared practical, evidence-based nutrition tips with runners at a marathon, turning complex science into real-life strength.

Science in the Hospital

Each day, Tsang drew on the scientific principles she had once scribbled into her notebooks: metabolism, physiology, biochemistry. But this time, they were not theories; they were treatment plans.

"In hospitals, I learnt to make recommendations so clear that even a child or an elderly patient could grasp the key message behind complex science," she says.

She also saw how easily people were drawn to misinformation catchy, and entertaining content that spreads faster than facts. That was when something clicked: science only matters if it can be understood.

Tsang decided to step outside the hospital walls to meet people where they were. She began sharing simple, evidence-based fitness nutrition tips on Instagram, not as a business plan, but as a way to set the record straight. At the same time, she was forging another identity: a competitive powerlifter. She pushed herself in training and deepened her expertise by earning certifications as a powerlifting coach and personal trainer.

Armed with knowledge in both nutrition and fitness, her message began to resonate. People listened, shared her posts, and something bigger began to grow.

The Leap

As Tsang's influence expanded, she realised that sharing knowledge online was not enough. She wanted to build a space where evidence-based nutrition and training could come together in real life. That clarity pushed her to make a bold move: leaving the security of her hospital job to create her own training centre in Central.

Her approach was straightforward: nutrition and exercise go hand in hand. The centre was not just a business. It was a small kingdom built on science, a place where clients came not for trends or shortcuts, but for clarity and trust. Many who started with her stayed on for years. She also gave talks and workshops, teaching personal trainers and gym-goers how to understand and apply evidence-based nutrition.

"Perfect plans are useless if they don't fit into real lives," Tsang says. "That's why I always tried to make science practical."

SCIENCE SPARKS

Coming Home to Research

Nonetheless, the more Tsang worked with real people, the more questions emerged. She began to notice gaps in the literature, subtle nuances of performance and recovery that no study had fully explained. That quiet curiosity from her university days resurfaced.

"I realised that if I wanted better answers, I had to be part of finding them."

In 2024, she received the prestigious Hong Kong PhD Fellowship Scheme, marking a turning point. Now a PhD student in Sports Nutrition at The Education University of Hong Kong, her research focuses on integrating evidence-based nutrition and resistance training into practical applications. To fully commit to research, she has paused her private practice. This is not a retreat, it is a return to the roots of the science she loves.

Science, Translated

Tsang has never stopped living what she teaches. She experiments with nutrition, monitors performance, and turns herself into her own case study. In 2023, she rose to the top of the national powerlifting scene, claiming the U57kg Champion title at the Asian Pacific African Classic Bench Press Championship and setting national records.

She also continues to share her knowledge. Her bestselling book, *A Guide to Fitness Nutrition*, launched at the 2024 Hong Kong Book Fair, bridges scientific theory with everyday choices. It is her way of giving people tools to live healthier lives.

"Science isn't meant to sit in books or journals," she says. "It's meant to be understood and lived."

Video interview

IG of Fitness Dietitian

This bestselling guide bridges science and everyday nutrition for smarter, stronger living.

Jaclyn TSANG

- U57kg Champion at the 2023 Asian Pacific African Classic Bench Press Championship
- Book Author
- PhD student in Sports Nutrition at The Education University of Hong Kong
- BSc in Food and Nutritional Science, School of Biological Sciences, HKU

OBSERVING CLIMATE CHANGE THROUGH THE LENS OF BUTTERFLIES

At first glance, butterflies seem like carefree drifters, fluttering lightly from flower to flower as though life were nothing more than a sunlit stroll. To most of us, they embody beauty, fragility, and grace. Yet behind those shimmering wings lies a very different truth.

"People often think of butterflies as delicate," says Dr Yuet Fung LING, Postdoctoral Fellow at the School of Biological Sciences. "But they are strong flyers, and at the same time, powerful indicators of climate change."

Science Behind the Wings

Ling's journey into the world of insects began with an unlikely houseguest: a praying mantis that flew into his home when he was a child. Rather than shooing it away, his family chose to care for it, and before long, he watched it lay eggs and hatch a brood of young.

"Through caring for it, I learned a lot about insects' biology and ecology," he recalls. "The experience sparked my curiosity and deepened my interest in nature."

The Chestnut Tiger (Parantica sita), captured in Repulse Bay on December 21, 2024, was tagged in Japan on August 18, 2024. Photo courtesy: Yuet Fung LING.

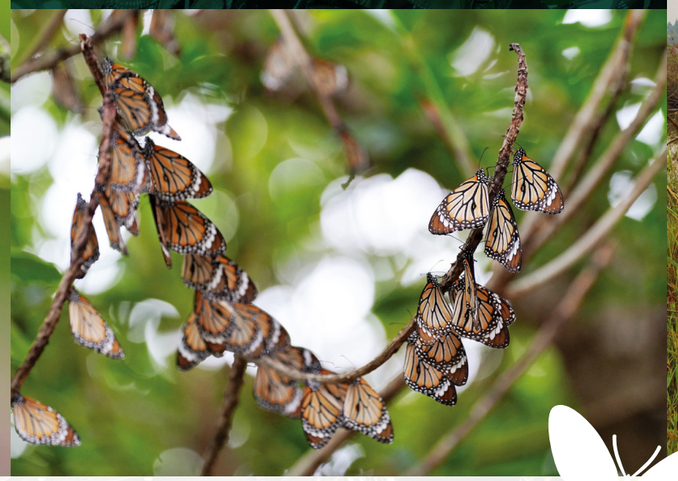
That childhood encounter planted a seed that never faded. His passion for nature eventually led him to the Faculty of Science at HKU, where he majored in Environmental Science. During his undergraduate years, frequent hikes brought him face-to-face with Hong Kong's butterflies. His early admiration, first expressed through photography, gradually deepened into a fascination that steered him toward the serious study of insects.

"Butterflies are not only beautiful, but they are also important parts of ecosystems and are vulnerable to changes in the environment," he says. That realisation led him into doctoral research on the ecophysiology of butterflies and moths, and eventually, to his postdoctoral research exploring how climate and habitat changes are transforming tropical insect communities.

Ling's research explores how insects adapt to a changing environment: from testing butterflies' tolerance to heat and hunger, to comparing day- and night-active species, to understanding the range expansion of tropical species into Hong Kong. Each study adds to the picture of how climate change is reshaping biodiversity.

However, the most astonishing insights have come from his research on butterfly migration. Since 2021, Ling, together with Professor Timothy BONEBRAKE, Director of the School of Biological Sciences, PhD student Emily JONES, volunteers, and the public, has tracked the seasonal movements by tagging nearly 16,000 butterflies across 13 species at 32 sites in Hong Kong. The project yielded 1,503 recoveries, with more than half reported by the public and 78 movement records within the city. Each tiny sticker, carefully affixed to a wing, carries a website address for the public to report sightings, an ingenious way to turn the community into collaborators.

> *"I use butterflies and moths as a lens to understand how climate and habitat changes affect tropical insects."*



Danaid butterflies formed a spectacular winter cluster, clinging to branches for shelter. Photo taken in Pui O, 2023.

Then came the discovery that redefined expectations: in December 2024, they found a Chestnut Tiger butterfly that had flown 3,016 kilometres from Fukushima, Japan, to Hong Kong, the longest recorded journey for the species.

"I was both shocked and excited," Ling recalls. "The Chestnut Tiger is very rare in Hong Kong in winter, and in three years of fieldwork, we hadn't seen one. I was aware of a case in 2011, but I thought it was a once-in-a-lifetime event. Out of more than 15,000 butterflies that we tagged, this was our first international recovery!"

Why Does It Matter?

These findings challenge the perception of butterflies as fragile creatures, revealing them instead to be resilient, long-distance travellers and vital indicators of environmental change.

"Butterflies are a good study system for understanding climate change and conservation due to their sensitivity to the environment," Ling explains. Their biology is also relatively well-studied, and their unique connection with the public makes them powerful tools for education and outreach. "By studying butterflies, we can gain insights into the responses of other insects, using them as umbrella species to guide conservation strategies," he says.

SCIENCE SPARKS

What began with photographing butterflies soon became a passion for studying them.

Ling now turns his attention to moths, another vital yet often overlooked group of insects, to explore how urbanisation and light pollution are reshaping their lives. His ambition is to bridge the gap between science and society, to produce research that informs conservation while sparking awareness among the wider public. "Ultimately, I hope that even for the general public, my work can inspire greater awareness of the environmental changes we are facing and action for conservation," he says. In the delicate lives of these creatures lies a quiet strength, one that may yet shape the world of tomorrow.

Read the full Q&A with Dr LING on the HKU Science website

Spot a Danaid butterfly? Report it here

Dr Yuet Fung LING

- Postdoctoral Fellow, School of Biological Sciences, HKU
- PhD in Ecology and Biodiversity, HKU
- BSc (double major in Environmental Science and Geography), HKU

When people think of public health and safety, they often picture hospitals or emergency services. Few imagine a chemist in a government laboratory, quietly analysing powders, herbs, and mystery substances that may hold the key to urgent poisoning cases or hidden health threats. Yet this is exactly where HKU Chemistry alumna Dr Ella WONG has built her career, in a role where science meets responsibility, and every test result could protect thousands.

PROTECTING A CITY, ONE SILENT GUARDIAN IN THE LAB

Since joining the Government Laboratory in 2012, Wong has worked across several key sections, from pharmaceutical chemistry to Chinese medicine safety. She now focuses on ensuring the safety and quality of Chinese herbal medicines and proprietary Chinese medicines in Hong Kong, using science to protect the public.

Science that Protects Society

Wong's day begins with a stack of incoming samples from different government departments, each one a tiny mystery with potentially serious consequences. "Every sample is a puzzle," she laughs. "Some days it's a tablet where we need to confirm its active ingredients. Other days, it's a slimming product suspected to contain undeclared Western drugs such as sibutramine; and sometimes it's an unlabelled white powder from an intoxication case, something we must identify urgently."

She currently focuses on testing for harmful residues or substances (e.g., pesticide residues, heavy metals, aflatoxins, and sulfur dioxide) in Chinese medicines on the local market. Advanced analytical techniques such as high-performance liquid chromatography and tandem mass spectrometry are part of her daily toolkit, enabling her to detect harmful substances at extremely low concentrations.

Then there are the emergencies, the cases of suspected intoxication where every minute counts. From dried herbs to remnants of decocted Chinese medicine suspected of toxic contamination, she designs the appropriate analytical approach and leads the scientific investigation. Her findings provide scientific evidence to support the authorities in removing dangerous products from shelves. When required, she serves as an expert witness in court, presenting and explaining her findings to support legal proceedings.

Full Story

"Chemistry is not just a subject, it's a way of training and thinking that helps you solve real-world problems."

Two Defining Achievements

Among Wong's many R&D projects, two stand out as milestones in her career.

The first was a highly challenging case involving ultra-trace detection of botulinum toxins, substances so toxic that even minute amounts require extraordinary care and analytical sensitivity. Conventional methods were proven inadequate. She had to design a new analytical strategy from scratch.

Drawing on her deep understanding of the toxin's biochemical properties, she engineered a custom molecular substrate selectively cleaved by the toxin's unique activity. This breakthrough enabled definitive detection and quantification with unprecedented sensitivity. The method was later presented at major international platforms, including the PAWG-CCQM workshop at BIPM in Paris, a proud achievement for her and Hong Kong.

Her second major achievement was developing a new and effective clean-up technique for pesticide multi-residue analysis in plant-based Chinese medicines. As regulatory standards tightened and the list of regulated pesticides expanded, existing methods proved inadequate for complex herbal matrices. She optimised extraction and purification steps to enhance recoveries while minimising interferences, "like finding a needle in a haystack," she recalls. The final method became a robust, versatile tool that strengthened regulatory enforcement and protected public health. The method has been presented at an international conference and accepted for publication in a leading scientific journal.

"Those projects taught me that real science begins when things feel impossible. Each breakthrough was a quiet reminder that persistence and heart can carry you farther than you think."

Professor Chi-Ming CHE, Chair Professor in the Department of Chemistry, was WONG'S mentor, who fuelled her passion for research and scientific inquiry.

Why Chemistry?

Wong's journey into chemistry began with a spark of pure curiosity, when she first watched the instant colour change in the iodine clock reaction. "I was hooked. I wanted to know why. That moment shaped how I learnt and how I approached science even today. And I realised that I love doing experiments!"

This spark grew into a passion when she joined HKU. She still remembers representing the University in the Hong Kong Chemistry Olympiad. "It was a powerful exercise in teamwork, critical thinking, and effective communication, skills that have continued to influence my approach to both research and academic challenges."

If her early experiences lit the flame, it was her supervisor Professor Chi-Ming CHE who helped shape it into a lifelong career. Under his supervision, she completed her undergraduate final-year project and later her PhD studies, synthesising and studying the anti-cancer and anti-viral properties of metal-based compounds. Seeing cancer cells killed selectively under the microscope in response to compounds she created was a moment she describes as "transformative".

Professor Che's mentorship was equally impactful. "He gave me the freedom to explore in his multi-disciplinary research environment, yet always guided me with wisdom and clarity," she says. "He balanced independence with support in a way that made me grow, not just as a scientist but as a person." His influence continues to shape how she approaches challenges and opportunities today.

Advice to Aspiring Chemists

To students who dream of becoming chemists, her message is heartfelt and grounded:

"Build a strong technical foundation and gain as much hands-on experience as you can. Stay curious and keep learning. Chemistry is not just a subject, it's a way of training and thinking that helps you solve real-world problems. Explore widely, and above all, be patient and persistent. Good science takes time."

Dr Ella WONG
- Chemist, Government Laboratory HKSAR
- Postdoctoral Fellow, HKU
- PhD in Chemistry, HKU
- BSc in Chemistry, HKU

FACULTY'S FUNDING SUCCESS FUELS FUTURE RESEARCH

The Faculty continues to secure competitive external research funding in 2025/26, with total awards amounting to at least HK$73.6 million. This substantial support enables our researchers to pursue innovative projects across diverse scientific domains, advancing knowledge and addressing pressing global challenges. Below, we highlight some of the notable grants and achievements that contributed to this year's success.

Research Grants Council (RGC) General Research Fund (GRF) and Early Career Scheme (ECS) 2025/26

HK$46.5M

These significant funding sources supported a total of 47 projects in 2025, furthering research excellence across various disciplines.

RGC Research Fellow Scheme (RFS) for 2025/26

HK$5.4M

This grant was awarded to two distinguished academics from the Department of Earth and Planetary Sciences and Department of Mathematics, empowering the awardees to advance their research and mentor the next generation of local research talent in Hong Kong.

RGC Research Impact Fund (RIF) 2025/26

HK$4.2M

This grant was awarded to the School of Biological Sciences to support research with significant benefits for the wider community. The funding encourages academics to undertake impactful projects and to strengthen collaboration beyond academia, including partnerships with government departments and industry.

Research, Academic and Industry Sectors One-plus Scheme (RAISe+) 2025 and 2026

Two applications from the Department of Chemistry secured multi-million-dollar funding under the scheme in consecutive years, driving transformative research and advancing the development and commercialisation of innovative outcomes. In 2025, the project "Guiding Clinical Surgery by Intraoperative Infrared Fluorescence Imaging" was funded, followed in 2026 by "Peptide Drug Innovation and Discovery".

CFMES Joins Third InnoHK Research Cluster SEAM@InnoHK

The Centre of Functional Materials for Energy and Sustainability (CFMES) has been approved for admission to the third InnoHK research cluster, SEAM@InnoHK, which focuses on sustainable development, energy, advanced manufacturing, and materials. Led by the Department of Chemistry, the Centre will collaborate with leading partners to advance functional materials research and address key challenges in energy storage and sustainability, including next-generation battery technologies and light-enabled materials.

FRESH FACES ABOARD

Professor Yang WANG

HKU Vice-President and Pro-Vice-Chancellor (Institutional Advancement)

Chair in Mathematics, Computing and Data Science

"Embracing complexity, inspiring simplicity."

"When I was young, I didn't realise how much I didn't know. I grew up in China at a time with very little contact with frontier sciences—there were no computers, and certainly no internet. I actually became a mathematician by accident; my colour blindness prevented me from pursuing virtually any other discipline in college, a twist of fate that turned out to be highly fortuitous. Mathematicians are intrinsically curious, and over the years, my curiosity has expanded far beyond the blackboard to include everything from world affairs to card games. Ultimately, I love people; I view myself as a networker who finds joy in bringing individuals from different fields together for a common cause."

- Passed China's National College Entrance Examination (Gaokao) at age 15 and entered the University of Science and Technology of China (USTC); later moved to the United States to complete a PhD in Mathematics at Harvard University.
- Former Full Professor at the Georgia Institute of Technology and later Department Chair at Michigan State University. Joined HKUST in 2014, serving as Head of the Department of Mathematics, Dean of Science, and Vice-President for Institutional Advancement. Also served as Programme Director for Mathematical Sciences at the US National Science Foundation.
- While his roots are in mathematics, his current intellectual passion is driven by the rapid evolution of digital technology. He is deeply focused on Machine Learning and Artificial Intelligence, particularly regarding how they can shape the future of science and education. Furthermore, he is actively researching the Web3 ecosystem, with a specific interest in blockchain technology, stablecoins, cryptocurrencies, and the tokenisation of Real-World Assets (RWA).

Professor Shifeng CHENG

Professor
School of Biological Sciences

"See the unseen beauty of plants. We are working on two 'goldmines' and two 'holy grails' for the next Green Revolution. Want to know what they mean? Come and talk to me."

- PhD in Computational Biology, The University of Hong Kong.
- Previously Professor and Director of Plant Science Center at the Agricultural Genomics Institute at Shenzhen (CAAS) (2018–2025); visiting scientist at Cornell University (2018) and John Innes Centre (2023).
- Served at BGI Research as Team Leader of Bioinformatics and Plant Evolutionary Genomics (2011–2013) and later as Executive Director of the Plant & Agriculture Institute (2017–2018).
- Research focuses on a mechanistic understanding of the genomic and genetic foundations of evolutionary novelties and phenotypic diversity in plant traits.

"Build like Noah, lead like Moses, fight like David, love like Jesus."

Dr Helen CHEUNG

Assistant Lecturer
School of Biological Sciences

"Fueling recovery and resilience through evidence-based nutrition, one patient and one student at a time."

"Outside of work, I enjoy listening to music a lot; my Spotify recap usually lands at around 250,000 minutes. Outside the clinic and classroom, I am passionate about community outreach and helping people make sustainable, everyday changes to their eating habits."

- A Registered Dietitian Nutritionist trained in the United States and Hong Kong, shaping a global perspective on clinical nutrition and education. She completed a PhD in Anaesthesia and Intensive Care at CUHK, where she focused on perioperative medicine and clinical nutrition.
- Before joining HKU, she was a Research Fellow in Anaesthesia and Intensive Care at CUHK under the Hong Kong PhD Fellowship Scheme. She also served as an Honorary Dietitian at Prince of Wales Hospital.
- Research focuses on perioperative medicine and surgical nutrition, particularly how nutritional prehabilitation can improve recovery and address malnutrition in surgical patients.

Dr Vindya BHAT

Assistant Lecturer
Department of Mathematics

"Finding patterns, sharing ideas, endless possibilities."

- PhD in Mathematics from Emory University, USA.
- Left a 10-year career in actuarial consulting to join NYU Courant, pursuing a lifelong passion for teaching and mentoring. Brings over a decade of higher education experience, with a focus on industry collaboration and student-centred learning.
- Specialises in graph theory and extremal combinatorics, with a focus on Ramsey theory.

"Outside the classroom, I enjoy traveling, learning Chinese, playing tennis, and finding ways to make the world a better place."

Professor Meng GUO

Assistant Professor
Department of Earth and Planetary Sciences

"Stay curious, take risks, and let discovery lead the way."

"Outside of science, I love staying active. I hold a Zumba instructor certificate in the United States. I'm also an avid animal lover and can never decide whether I'm a cat person or a dog person, because I'm truly an 'all animals' person."

- Trained as a planetary scientist at Yale University, where she earned her PhD in Earth & Planetary Sciences.
- Served as a Presidential Postdoctoral Fellow at Nanyang Technological University and a T. C. Chamberlin & Origins Fellow at the University of Chicago. Earlier in her career, she worked as an Associate Researcher at the Institute of Crustal Dynamics, China Earthquake Administration.
- Uses planetary models to study the origins of life and search for its cosmic counterparts. By linking planetary evolution with physical, geochemical, and geobiological evidence, her work reconstructs Earth's deep past and explores how habitable worlds emerge, addressing two enduring questions: Where did we come from, and are we alone?

Professor Matthieu LERAY

Associate Professor
School of Biological Sciences

"The path to discovery often starts with careful observation of nature."

"I love travelling and getting to know new places through their food and culture. After more than a decade living in Latin America, I'm excited to discover Hong Kong and explore more of East and Southeast Asia with my family. I am also looking forward to some amazing diving in the region."

- PhD in Community Ecology from Pierre and Marie Curie University (now Sorbonne University).
- Prior to joining HKU, he spent more than a decade in Panama at the Smithsonian Tropical Research Institute, first as a postdoctoral researcher and later as a staff scientist. Prior to that, he was a postdoctoral researcher at the Smithsonian Museum of Natural History in Washington, DC.
- Research focuses on understanding the resilience of coastal ecosystems to global change.

Professor Jiacheng LIU

Assistant Professor
Department of Earth and Planetary Sciences

"Exploring Mars to better understand Earth's past and future."

"Hiking new trails, savouring a thoughtful movie, reading widely, and thinking deeply all feed my curiosity about people and the world."

- PhD in Planetary Geology from HKU; previously served as a Postdoctoral Fellow and Research Assistant Professor at HKU.
- Research interests include the geology, habitability, and astrobiology of Mars, using spectroscopy, mineralogy, and chemical weathering to study planetary surfaces.

Professor Wei QIAN

Associate Professor
Department of Mathematics

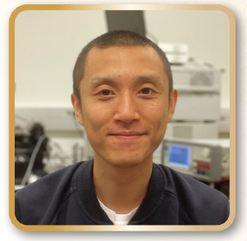
"Freedom and curiosity lead the way to discovery."

- PhD in Mathematics from ETH Zurich; previously Junior Research Fellow at Churchill College, University of Cambridge, and Research Scientist at the French National Centre for Scientific Research (CNRS), Paris-Saclay University.
- Together with P. Nolin, X. Sun and Z. Zhuang, she computed the exact value of the backbone exponent in Bernoulli percolation at criticality.
- Research interests include random geometry, statistical mechanics, Schramm–Loewner evolution, and Brownian loop soups.

"I am fascinated by literature and cinema. They offer a different order of complexity than mathematics."

Professor Zhong WAN

Assistant Professor
Department of Physics



"If all you have is a hammer, everything looks like a nail."

"I enjoy hiking scenic trails with my dog, where quiet moments in nature bring balance and inspiration beyond the lab."

- PhD in Physics from Purdue University; previously a Postdoctoral Researcher at University of California, Los Angeles.
- Research explores quantum materials under extreme conditions, uncovering new ways to manipulate superconductivity, symmetry, and electron interactions at the atomic scale.
- Current work aims to engineer layered quantum systems with programmable properties, revealing exotic phenomena such as chirality, spin–orbit coupling, and topological phases through low temperature experiments.

Professor Mengqiu WANG

Assistant Professor
Department of Earth and Planetary Sciences

"Exploring the ocean from space to better understand and protect our blue planet."

- Obtained her PhD in Marine Sciences from the University of South Florida. Before joining HKU, she was a full professor at Wuhan University.
- Her research uses satellite observations, physical models, and AI to study the surface ocean under environmental change and human influence, focusing on processes such as macroalgae blooms, red tides, eddies, and waves along land–ocean boundaries, and improving the monitoring and prediction of marine environmental change.
- A Science (2019) study she led revealed the unprecedented expansion of floating macroalgae across the tropical Atlantic. Her work also applies petabyte-scale satellite data and deep learning to study bloom dynamics and their links to climate change and human activities.

"Beyond science, I enjoy hiking along Hong Kong's coastal trails, which helps me stay inspired and connected to nature."

Professor Mo Dick WONG

Assistant Professor
Department of Mathematics

"Research is like exploring without a map, marked by trials, illuminated by discoveries, and enriched by friendships."

- Born and raised in Hong Kong, he studied Actuarial Science as an undergraduate at HKU, where he discovered his passion for mathematical research through the Undergraduate Research Fellowship Programme. After graduation, he pursued further studies at the University of Cambridge and obtained a PhD in Pure Mathematics.
- Before returning to HKU, he was an Assistant Professor at Durham University and previously a Postdoctoral Research Associate at the University of Oxford.
- Research focuses on probability theory and its applications, particularly random multifractal structures arising from problems in mathematical physics and analytic number theory.

"There is this famous saying by Rényi: 'A mathematician is a machine for turning coffee into theorems.' I'm more in favour of tea; it helps me keep calm and carry on. When I'm not proving theorems, you'll probably find me at the piano."

Professor Zhendong ZHANG

Assistant Professor
Department of Physics

"Exploring the quantum world through precision experiments with ultracold atoms, molecules and ions."

"Outside the lab, I enjoy reading literature, history, and biographies and trying to see the world from different perspectives."

- PhD in Physics from the University of Chicago under the supervision of Professor Cheng Chin. His thesis, "Coherent Dynamics and Reactions in Atomic and Molecular Bose–Einstein Condensates," received the Outstanding Dissertation Award from the International Organization of Chinese Physicists and Astronomers (OCPA).
- He later joined Stanford University as a Bloch Postdoctoral Fellow, working with Professor Benjamin Lev on experiments involving magnetic quantum gases strongly coupled to a high-finesse multimode optical cavity.
- Research focuses on ultracold quantum gases and ions, including developing all-optical methods to trap ultracold ions in multimode optical cavities and studying their interactions with quantum-degenerate gases to explore quantum many-body physics and ultracold chemical reactions.

AWARDS AND ACHIEVEMENTS

This year, our scholars have once again distinguished themselves on the global stage.

In the 2025 Best Scientists Ranking, four Faculty Professors and two affiliated Professors were listed among the top 100 scientists worldwide in their respective disciplines. Positions in the ranking is based on a scientist's D-index (Discipline H-index), which takes into account only the publications and citation values within a specific discipline.

Further to this, eight scientists from the Faculty, including six academics and two affiliated scholars, have been recognised as 2025 Highly Cited Researchers by Clarivate Analytics. Each researcher selected has authored multiple highly cited papers that rank in the top 1% by citations for their fields and publication year in the Web of Science over the past decade.

These honours underscore the sustained contributions of our scholars and reinforce the Faculty's international reputation for academic excellence.

Professor Xiang ZHANG

President and Vice-Chancellor of HKU, Chair Professor in both Faculty of Science and Faculty of Engineering
2025 Best Scientists – ranked 48th globally in Physics
2025 Highly Cited Researchers in Physics

Professor Peng GONG

Vice-President and Pro-Vice-Chancellor (Academic Development), Chair Professor in both Faculty of Science and Faculty of Social Sciences
2025 Best Scientists – ranked 65th globally in Environmental Scientists
2025 Highly Cited Researchers in Geosciences

Professor Guochun ZHAO

Mok Sau-King Professor and Chair Professor of Earth & Planetary Sciences
2025 Best Scientists – ranked 6th globally in Earth Science
2025 Highly Cited Researchers in Geosciences

Professor Chi-Ming CHE

Zhou Guangzhao Professor in Natural Sciences, Chair Professor of Chemistry
2025 Best Scientists – ranked 79th globally in Chemistry
Professor Chi-Ming Che also led a **Gold Medal-winning project at the 51st International Exhibition of Inventions of Geneva**, developing a rapid, non-invasive AI-powered cancer detection device.

Professor Hongjie DAI

Sapientia Eminence Professor and Chair Professor of Chemistry
2025 Best Scientists – ranked 17th globally in Materials Science
2025 Highly Cited Researchers in Chemistry

Professor Wang YAO

Chair Professor of Physics
2025 Highly Cited Researchers in Physics

Professor Shuang ZHANG

Interim Head and Chair Professor of Physics
2025 Highly Cited Researchers in Physics

Professor Min SUN

Emeritus Professor of Earth & Planetary Sciences
2025 Best Scientists – ranked 20th globally in Earth Science

Professor Zhengxiao GUO

Chair Professor of Chemistry
2025 Highly Cited Researchers in Cross-field

Professor Renhao DONG

Associate Professor of Chemistry
2025 Highly Cited Researchers in Chemistry

◀ Learn more on 2025 Clarivate Highly Cited Researchers

◀ Learn more on 2025 Best Scientists Ranking

Professor Xiang ZHANG

Professor Shuang ZHANG

Professor Chi-Ming CHE

HKU State Key Laboratories were presented with plaques by the Ministry of Science and Technology on 25 August 2025. With the establishment of the **State Key Laboratory of Optical Quantum Materials** under the Department of Physics, alongside four existing laboratories at HKU including the State Key Laboratory of Synthetic Chemistry led by the Department of Chemistry, this further cements HKU's position as the institution with the highest number of State Key Laboratories in Hong Kong.

Directed by Professor Xiang ZHANG, President and Vice-Chancellor and Chair Professor of Physics, with **Professor Shuang ZHANG**, Interim Head and Chair Professor of Physics, serving as Associate Director, the **State Key Laboratory of Optical Quantum Materials** merges the fields of photonics and two-dimensional materials to pioneer advancements in quantum and metamaterials, with particular emphasis on ultrafast processes and topological structures. Its work supports technological innovation and contributes to the development of the Guangdong-Hong Kong-Macao Greater Bay Area as a hub for cutting-edge research.

The **State Key Laboratory of Synthetic Chemistry**, directed by **Professor Chi-Ming CHE**, Zhou Guangzhao Professor in Natural Sciences and Chair Professor of Chemistry, conducts fundamental and interdisciplinary research in sustainable green catalysis, precision synthesis, synthetic biology, and novel functional molecules, advancing materials science and biomedicine in the Greater Bay Area.

Professor Max SHEN

Professor Max SHEN, Chair Professor in the Department of Mathematics, has been elected an **International Member of the Chinese Academy of Engineering (CAE)** in recognition of his remarkable contributions to the fields of artificial intelligence and supply chain optimisation.

Professor Ferenc KRAUSZ

Professor Ferenc KRAUSZ, Chair Professor of Laser Physics in the Department of Physics, has been elected as an International Member of the National Academy of Sciences, USA (NAS), in recognition of his outstanding contributions to ultrafast laser science and attosecond physics.

AWARDS AND ACHIEVEMENTS


Professor Vivian YAM


Professor Hongjie DAI

The Centre of Functional Materials for Energy and Sustainability (CFMES) of HKU has been officially approved for admission to the third InnoHK research cluster, SEAM@InnoHK, which focuses on sustainable development, energy, advanced manufacturing, and materials. This marks an important expansion of HKU's involvement in InnoHK, a major innovation and technology initiative by the Hong Kong SAR Government to position Hong Kong as a hub for global research collaboration.

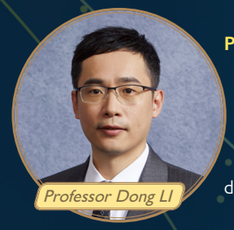
SEAM@InnoHK builds on the existing Health@InnoHK and AIR@InnoHK clusters, bringing the total number of HKU Science research centres under InnoHK to three.

Led by Professor Vivian Wing-Wah Yam, Vice-President and Pro-Vice-Chancellor (Global Innovation Centre) (Interim), Philip Wong Wilson Wong Professor in Chemistry and Energy, and co-headed by Professor Hongjie Dai, Sapientia Eminence Professor, both Chair Professors at the Department of Chemistry at HKU, CFMES aims to advance breakthroughs in functional materials to address challenges in energy and sustainability. The Centre will also promote world-class research, strengthen Hong Kong's international research profile, and nurture the next generation of scientists.

CFMES will leverage the unique strengths and competitive edges to address bottleneck challenges in advancing discovery of advanced battery materials and electric-enabled technology for energy storage, green conversion and sustainability applications, and innovative light-emitting materials, and light-enabled and responsive materials and technology for energy and materials conversion, and recyclable sustainability through international, national and local inter-institutional and industrial collaborations.

Professor Yam highlighted the significance of the initiative, saying, "We are thrilled to be selected as a SEAM@InnoHK Centre, and we envision our CFMES as the premier Centre to provide solutions to important global real-world energy and sustainability challenges through innovative original research in advanced functional materials and processes. This will also serve as an international S&T hub to bring top talents both from academia and industry to Hong Kong and the GBA, to tackle the grand challenges, and to actively align with the National S&T strategy."

The Centre will work with renowned collaborators, including The University of Groningen, the Max Planck Institute, Peking University and Peking University Shenzhen Graduate School, and The University of Tokyo, to advance collaborative research and drive impactful innovations in energy and sustainability.


Professor Dong LI

Professor Dong LI, Chair Professor in the Department of Mathematics, was named a **Fellow of the American Mathematical Society (AMS) for 2026**. This prestigious recognition honours his significant contributions to nonlinear partial differential equations and fluid dynamics.


Professor Xuhua HE

The Hong Kong Academy of Sciences has elected **Professor Xuhua HE**, Chair Professor of the Department of Mathematics, as a **Member of the Academy** in recognition of his outstanding achievements in scientific research and contributions to society. He is one of five newly elected members this year.

Professor He's research spans arithmetic geometry, algebraic groups, and representation theory. His innovative approaches and impactful applications in these areas have earned him wide recognition in the global mathematical community.


Professor Vivian YAM

Professor Vivian YAM, Philip Wong Wilson Wong Professor in Chemistry and Energy and Chair Professor in the Department of Chemistry, has been ranked **16th among the Best Female Scientists in China 2025/2026**. The recognition affirms her outstanding contributions to chemistry and her international scientific impact. Her inclusion on this list also reflects HKU's continued efforts to support and advance women in science.


Professor Wei QIAN

Professor Wei QIAN from the Department of Mathematics has been awarded the **2025 David G. Kendall Award for Young Researchers**. Jointly presented by the Bernoulli Society and the Royal Statistical Society, and given every two years, the award recognises outstanding early-career researchers who have demonstrated significant achievements and great potential in the fields of mathematical statistics and probability theory. For the 2025 edition, which specifically honoured excellence in Probability Theory, the committee noted the impressive depth of Professor Qian's research, which spans several core areas of modern probability.


Professor Ngaiming MOK

Professor Ngaiming MOK, Edmund and Peggy Tse Professor in Mathematics and Chair Professor of the Department of Mathematics, has been invited to deliver a one-hour **Plenary Lecture at the International Congress of Mathematicians (ICM) 2026**, to be held in Philadelphia, USA, from July 23 to 30, 2026.

Plenary speakers at the ICMs are internationally recognised mathematicians of the highest reputation, selected to present current directions of research to a broad mathematical audience. This marks the second time Professor Mok has been invited to speak at the ICM, following his first invitation in 1994. The invitation represents one of the highest honours in mathematics and reflects his sustained contributions and influence in the discipline over the past decades.


Professor Nicole KHAN

Professor Nicole KHAN from the Department of Earth and Planetary Sciences has received the **2025 Sir Nicholas Shackleton Medal from the International Union for Quaternary Research (INQUA)**, a biennial award recognising outstanding young scientists in Quaternary research. She was honoured for her work on sea-level change and coastal evolution, including reconstructing high-precision records in regions vulnerable to climate change.


Professor Janet CHAN

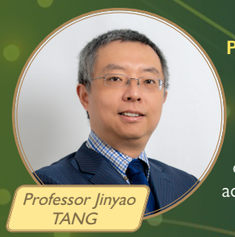
Professor Janet CHAN from the School of Biological Sciences has received the **Advanced Materials Innovation Award from the International Association of Advanced Materials (IAAM)**. The award was presented at the European Advanced Materials Congress in Stockholm, recognising her work on innovative approaches to waste management and recycling. At the congress, Professor Chan presented research applying behavioural science to improve recycling practices and introduced a newly developed mobile app aimed at enhancing public engagement in recycling and environmental education.

AWARDS AND ACHIEVEMENTS

The HKU Excellence Award Scheme 2025

Professor Ryan MCKENZIE

Professor Ryan MCKENZIE, Associate Professor in the Department of Earth and Planetary Sciences, received the **Faculty Research Output Prize 2024-25** for his research titled 'A Climate Threshold for Ocean Deoxygenation during the Early Cretaceous', published in the journal *Nature* in 2024.



Professor Jinyao TANG

Professor Jinyao TANG, Associate Head (Research) and Professor of the Department of Chemistry, was honoured with the **Outstanding Researcher Award** in recognition of his exceptional research accomplishments.

Professor Haibo JIANG, Associate Professor of the Department of Chemistry, was awarded the **Outstanding Young Researcher Award**, acknowledging his promising potential and achievements in the respective research fields.

Professor Haibo JIANG

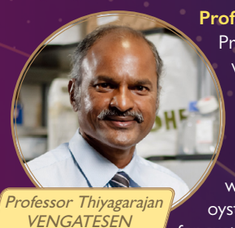
Dr Kin Sum LEUNG, Lecturer of the School of Biological Sciences, was awarded the **Early Career Teaching Award**, under the Teaching Excellence Award Scheme, which is designed to recognise individuals for their potential for leadership in teaching as well as their past achievements.

Dr Kin Sum LEUNG

Faculty Awards on Teaching Excellence and Outstanding Performance

Dr Yat Ming CHAN

Dr Yat Ming CHAN, Lecturer of the Department of Mathematics, was honoured with the **Award for Teaching Excellence 2024-25** in recognition of his dedication to delivering high-quality teaching.



Professor Thiyagarajan VENGATESEN

Professor Thiyagarajan VENGATESEN, Professor of the School of Biological Sciences, was recognised with the **Faculty Knowledge Exchange (KE) Award 2025** for his research on the genetic basis of climate resilience in oysters and the development of climate-adaptive aquaculture strains. His work led to a climate-resilient 'HKU super oyster' with improved survival and meat quality for sustainable aquaculture.

Ms Emily Elizabeth JONES, PhD student of the School of Biological Sciences, was awarded the **Excellent Teaching Assistant Awards 2024-25** for her enthusiasm in providing teaching support in classes.

Ms Emily Elizabeth JONES

Dr Angela Mai Yan YUEN, Associate Head (Teaching & Learning) in the Department of Chemistry, received the **Outstanding Service Award 2024-25** for her leadership in advancing interdisciplinary education and her dedicated mentorship of students.

Dr Angela Mai Yan YUEN

STUDENT ACHIEVEMENTS

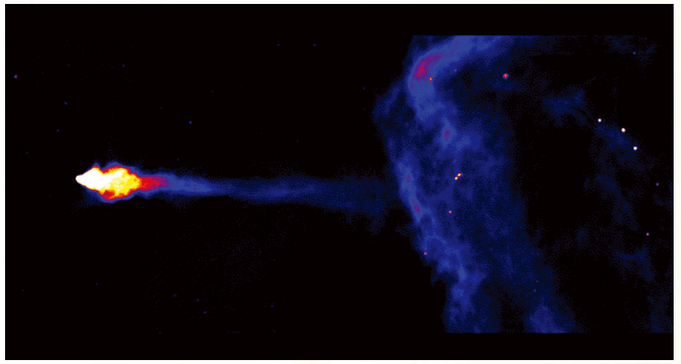
Physics PhD Candidate Awarded 2025 NSFC Youth Student Basic Research Project Grant

PhD candidate Haochen WANG from the Department of Physics was awarded the highly competitive "2025 NSFC Youth Student Basic Research Project Grant" under the supervision of Professor Wang YAO.

The grant will support his research on the study and control of hybrid exciton quantum states in 2D semiconductor Moiré materials using artificial microstructures.

In this project, he will investigate the quantum physics of light-matter coupling in microcavities containing moiré superlattices of 2D semiconductors. By developing theoretical frameworks for hybrid exciton-cavity photon systems, the project aims to enable precise optical control of novel quantum states, such as super-solids and super-radiance, which are essential for the future development of integrated on-chip quantum technologies.

This prestigious grant is designed to support promising PhD students in undertaking new research directions or substantially expanding their doctoral research.



Physics PhD Candidate Captures the Beauty of a Pulsar Nebula

PhD candidate Zhihong SHI from the Department of Physics received the Runner-up Prize in the inaugural Graduate School Research Image Competition. The competition invites participants to capture the essence of their research through visually compelling images, with winning entries selected for their aesthetic appeal, originality, and ability to inspire and illustrate knowledge.

Shi's image depicts a pulsar wind nebula, formed when a rapidly spinning neutron star releases a stream of charged particles that collide with the surrounding gas and dust. Under the supervision of Professor Stephen NG, his research explores how pulsar wind nebulae behave across different wavelengths.

HKU LSR Shines at International Space Science and Scientific Payload Competition

Read more

Two student teams from the Laboratory for Space Research (LSR) earned Silver and Bronze medals at the International Space Science and Scientific Payload Competition (ISSSP), held at Cyberport from 27 to 29 November under Track 2: Innovative Design of a Space Payload Experiment. The teams were recognised for their proposed experiments for the China Space Station.

Dr Chung To KONG (Andy) and Dr Andreas RITTER from LSR also received Best Instructor Awards for their guidance to the Silver-winning "Spectro" team. This year, 60 teams participated, and LSR also served as an official supporter of the competition.

Acknowledgements

We would like to express our heartfelt appreciation to our donors for their generous support, which has been pivotal in driving our growth and empowering us to achieve new milestones. Their contributions have been invaluable in helping us to new heights, and we are honoured to recognise their generosity. To acknowledge their support, we will list all donors in alphabetical order, with corporate donors listed by organisation name and individual donors by surname, as applicable.

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