



香港中文大學理學院

**FACULTY OF SCIENCE**

THE CHINESE UNIVERSITY OF HONG KONG

# 追 **EMPOWERING** 夢 **DREAMS** ∞



## 追夢 EMPOWERING DREAMS ∞

- 01 Dean's Message
- 02 Faculty Introduction
- 04 Research
- 08 Teaching and Learning
- 12 School of Life Sciences
- 18 Department of Chemistry
- 22 Department of Mathematics
- 28 Department of Physics
- 32 Department of Statistics
- 36 Earth and Environmental Sciences Programme
- 39 Natural Sciences Programme
- 40 Emeritus Professors, Professors (Teaching), and Research Professors
- 41 Alumni Affairs
- 42 Student Life
- 44 Diversity and Inclusion
- 45 Acknowledgement of Donations

## TABLE OF CONTENT

### DEAN'S MESSAGE



I am honored to serve as Dean of the Faculty of Science at The Chinese University of Hong Kong (CUHK) and have been enjoying our collaborative work involving both academic and administrative staff and our students as well as university leadership team since July 2020. We are excited to showcase our Faculty through this brochure in the year of 2023, the 60<sup>th</sup> Anniversary for both the Faculty and CUHK. From the humble beginnings, with the Departments of Mathematics, Chemistry, Physics, and Biology coexisting in the respective Colleges at CUHK as independent yet closely affiliated units, until 1977 when the Faculty became a unified entity, and to today, the Faculty has flourished over time. Former Vice-Chancellor of CUHK, Professor Sir Charles Kuen KAO once said, "Ideas do not always come in a flash, but by diligent trial-and-error experiments that take time and thought."<sup>1</sup> This diligent and dedicated spirit underlies the efforts in advancing science education and exploring new scientific frontiers at the Faculty of Science since its establishment in 1963.

Now home to six major teaching units – School of Life Sciences, Departments of Chemistry, Mathematics, Physics, and Statistics, as well as the Earth and Environmental Sciences Programme – the Faculty offers

<sup>1</sup>The Nobel Foundation. (2009). *Charles K. Kao*. <https://www.nobelprize.org/prizes/physics/2009/kao/lecture/>

<sup>2</sup>Programmes stated as of 2022-23 entry.

18 undergraduate and 20 postgraduate programmes<sup>2</sup> designed to provide a comprehensive education by combining rigorous physical, mathematical, and biological science courses with fundamental liberal arts subjects for undergraduate students as well as professional training in cutting-edge research for Ph.D., M.Phil. and M.Sc. students. Over the past two years, we developed and launched four new B.Sc. undergraduate programmes in collaboration with Faculties of Business Administration, Education, Engineering, and Medicine. We initiated three new Dual Degree undergraduate programmes in collaboration with our global partners including University of Manchester, University of Edinburgh, and Tsinghua University. As a part of CUHK global engagement for advancing science and technology in Greater Bay Area, we developed a new partnership with Great Bay University in Dongguan and established a Joint Institute of Advanced Materials and Green Energy Research (JIAMGER), including a Joint Ph.D. Training Programme. We are also working with CUHK Shenzhen for joint supervision of Ph.D. students.

Our academic staff are committed to the pursuit of excellence in teaching and research, and our

administrative, technical and support staff remain dedicated to serving the Faculty in carrying out our mission to educate and inspire the next generation of scientific innovators and leaders, and to expand the frontier of human knowledge. The Faculty is home to outstanding scientists, including a Nobel laureate, a Fields medallist, Academicians of the Chinese Academies of Science and Engineering, elected fellows and recipients of prestigious awards from global professional societies as well as rising stars and young scholars. With the concerted efforts of our people across all units, we aspire to be a global leading Science Faculty where students learn science to make the world a better place, where "Science Empowers Your Dreams", and where scholars and students continue to learn and explore the fundamental and frontiers of sciences to address the grand scientific and societal challenges.

We would welcome your comments and suggestions via email at [sfo@cuhk.edu.hk](mailto:sfo@cuhk.edu.hk).

#### Prof. SONG Chunshan

Dean, Faculty of Science  
Wei Lun Professor of Chemistry



Dean Song and Science Faculty Office staff in February 2023



# FACULTY INTRODUCTION

CUHK Faculty of Science (CUHK Science) consists of over **3,600 students** guided by more than **540 teaching, research, and administrative staff**. The Faculty offers a wide variety of study programmes <sup>1</sup> – **18 undergraduate programmes**, **13 research postgraduate programmes**, and **7 taught postgraduate programmes** – with a quarter of students working towards postgraduate degrees. With an aim of developing independent and critical thinking, problem solving skills, and creativity, the Faculty offers a rigorous science education supported by a liberal arts approach. Science education is the key to technological innovations. Not only does it fuel economic growth in modern society, but it also benefits humanity in their daily lives.

The teaching and research units affiliated with the Faculty of Science contribute to a connected community of inspired teachers, researchers, students, and supporting staff who help build the Faculty into a world-class place for the advancement of science, and a hub for the training of scientific leaders of tomorrow.

<sup>1</sup>For details, please refer to “Teaching and Learning” on pages 8-11.

## 7 FACULTY STRATEGIC AREAS



**Research**



**Undergraduate Education**



**Postgraduate Education**



**Global Engagement**



**Student Affairs**



**Alumni Affairs**



**Diversity and Inclusion**



# RESEARCH

The Faculty of Science at CUHK comprises six research units (Chemistry, Life Sciences, Mathematics, Physics, Statistics, and Earth and Environmental Sciences). More than 150 scientists committed themselves to a wide spectrum of research areas, from astronomy and meteorology to biomedical and scientific advancement. After more than half a century, CUHK Science is now a world-class, research-oriented Faculty which attests to the fine level of research and expands the frontier of human knowledge.



## FACULTY STRATEGIC RESEARCH AREAS

To achieve the Faculty's mission for expanding the knowledge and towards Research Excellence and Innovation, the Faculty strives to develop and nurture the research environment to encourage collaborative interdisciplinary research. Riding on the existing strength, the Faculty has identified seven Strategic Research Areas which are well in line with the CUHK Strategic Plans 2020 and 2025 to meet the new challenges and funding opportunities of Hong Kong and beyond.

-  Artificial Intelligence, Machine Learning, Big Data, Risk Analytics
-  Chemical and Synthetic Biology for Emerging Diseases
-  Clean and Sustainable Energy, Environment, and Food
-  Green and Sustainable Technology for Low-Carbon Society
-  Integrated Capability Building for Biological Science and Applications
-  Intelligent Computing for Earth, Energy, Climate, Atmosphere, Materials, and Space
-  Quantum Science and Technology



## RESEARCH ACHIEVEMENTS

Over the decades, our scientists have been recognised by prestigious awards for their cutting-edge forefront research.



**Prof. YANG Chen Ning**  
Nobel Laureate  
Distinguished  
Professor-at-Large of Physics



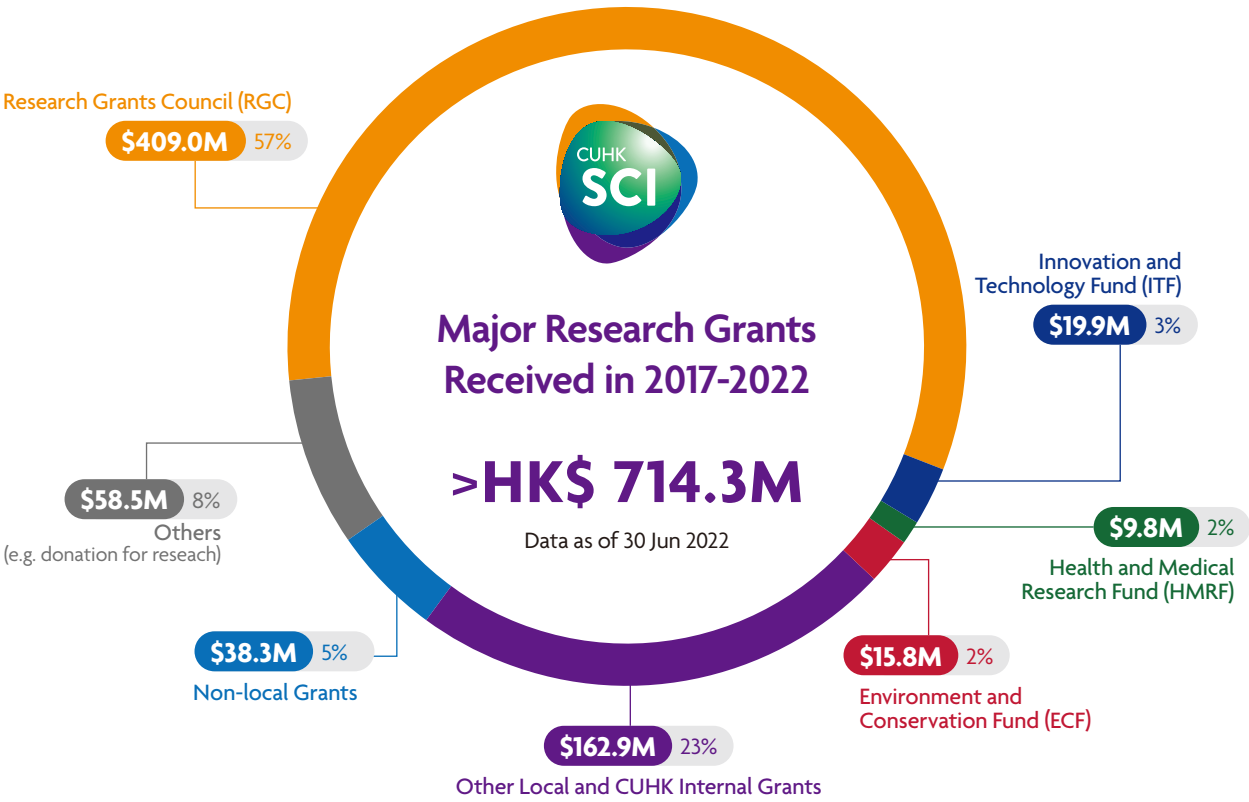
**Prof. YAU Shing Tung**  
Fields Medal Winner  
Distinguished Professor-at-Large  
of Mathematics

- |  |  |  |
|--|--|--|
| <b>6</b> Academicians of the Chinese Academy of Sciences   | <b>1</b> Academician of the Chinese Academy of Engineering                                     | <b>5</b> Highly Cited Researchers by Clarivate Analytics |
| <b>2</b> New Cornerstone Investigators   | <b>12</b> Ministry of Education Higher Education Outstanding Scientific Research Output Awards | <b>9</b> State Natural Science Awards                    |
| <b>4</b> China's Excellent Young Scientists Fund (Hong Kong and Macau)                           | <b>1</b> MIT Technology Review Innovators Under 35 Asia Pacific                                | <b>14</b> Croucher Senior Research Fellows               |
| <b>2</b> Croucher Tak Wah Mak Innovation Awards (Formerly known as "Croucher Innovation Awards") | <b>4</b> RGC Research/Senior Research Fellows  |  |



RESEARCH EXCELLENCE

The Faculty of Science receives numerous competitive research grants from local, national, and overseas commissions and donations. Our endeavours are also recognised by the establishment of various national and world-class research centres.



State Key Laboratories (SKLs)

Established under the approval of Ministry of Science and Technology of China (MOST)



State Key Laboratory of Synthetic Chemistry (Partnership) (Since 2010)



State Key Laboratory of Agrobiotechnology (CUHK) (Since 2008)

Areas of Excellence (AoE) projects

RGC funded world leading research by international standards. Four out of 11 Research Grants Council (RGC)-funded AoE projects at CUHK are led by members of the Faculty.



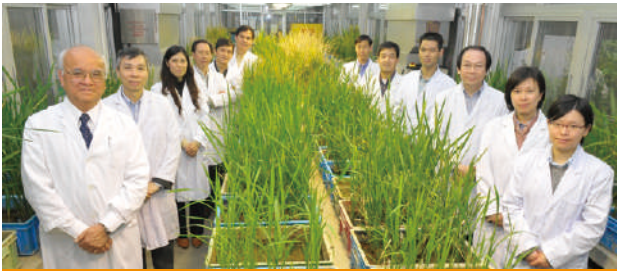
Probing the Fundamental Structure of Matter with High Energy Particle Collisions (2019- 2027)  
(Projector Coordinator: Prof. CHU Ming Chung)



Centre for Genomic Studies on Plant-Environment Interaction for Sustainable Agriculture and Food Security (2017-2025)  
(Projector Coordinator: Prof. LAM Hon Ming)



Centre for Organelle Biogenesis and Function (2014-2021)  
(Projector Coordinator: Prof. JIANG Liwen)



Centre for Plant and Agricultural Biotechnology (2000-2011)  
(Projector Coordinator: Prof. SUN Sai Ming Samuel)

Research Impact on Society, and for Society<sup>1</sup>

75 Patents

38 Licenses and Agreements for Commercialisation and Industry (2017-2022)

13 Spin-out Companies and Social Enterprises

<sup>1</sup>Data as of 4 Jan 2023



# TEACHING AND LEARNING

We believe that every student has the potential to be leaders of tomorrow, and we take pride in offering ample support and guidance to our students. Since 2011, the University has implemented an enhanced advisory system for undergraduates and postgraduates. With this system, we ensure that students can seek support and input from their teachers on a range of academic-related issues, such as course selection, study plan development, and averting or overcoming academic problems.



We aim to train our students not only on the scientific knowledge and skills related to their programmes of study, but to nurture them into individuals who move on to be tactful contributors to society. The Faculty offers a diverse teaching and learning approach to ensure our students are exposed to the most suitable and effective learning methods, and become high-achieving, all-rounded individuals. We encourage all students to take part in a range of activities to increase their exposure and boost their learning experience, and in addition to University-wide programmes, the Faculty and our units operate a number of schemes and opportunities:



Co-op/  
Internships



Research  
Opportunities



Student  
Exchanges

Moreover, CUHK Science offers extensive research opportunities to our undergraduates who are interested in research and wish to challenge themselves. Below are some **Science, Technology And Research Stream (STARS)** highlights:



Research opportunities  
starting from 1<sup>st</sup> Year



Chances to join international  
conferences and seminars



Admission scholarship &  
financial support



Research  
mentorship



Exchange &  
internship opportunities



**YUAN Lin** (Cell and Molecular Biology)

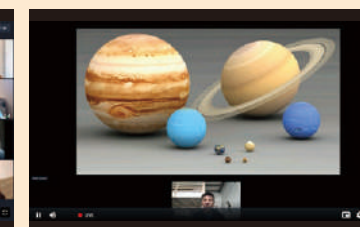
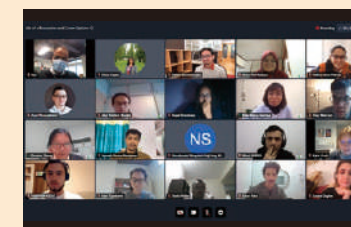
Studied at University of Toronto, Canada in Term 1, 2021-22

During exchange at University of Toronto, I joined the Recognized Study Group with a number of students. It was in this class where I met my partner Aaryan for Peer-Assisted-Reflection assignment, in which we could explore given mathematical questions in greater depth and then submitted in an essay-type worksheet to show our inference.

It was great to take part in these activities. Not only did they train us to build our logical thinking about math questions, but they also encouraged us to reflect on our own reasoning by teaching our peers. Additionally, they gave us chances to go beyond the lecture, to think out of the textbook and midterms and finally develop our interest in Mathematics.

**Hemraj BHATTARAI** (Earth and Atmospheric Sciences PhD)  
Global Young Scientists Summit (GYSS) 2022 Participant

Joining the GYSS2022, Singapore, is a great experience. Although it is virtual, sharing from Nobel Laureates, influential scientists, and young researchers from diversified fields not only nourished my knowledge but also makes me more enthusiastic.



This is my first time to interact directly with Nobel Laureates. Listening to their struggle stories and their achievements have strengthened my willingness of becoming a world influential scientist in the field of earth and atmospheric science. The open group discussion session has connected me with global young researchers, broadening my horizon and building confidence to achieve my career goal.



**Trix ZHANG** (Risk Management Science)  
Co-op Class of 2021-22<sup>1</sup>

The Co-op pre-courses help me to further understand myself, both my core competencies and areas of improvement, in a more thorough and systematic way. I also learned how to work in teams while appreciating the diversity and fostering integration. This is particularly important while working as a global executive or a future leader.

<sup>1</sup>For more information, please consult CUHK Co-op Programme (<https://coop.cuhk.edu.hk/>)



Since 1963, CUHK Science has taken pride in providing an ideal environment for active scientists to learn and undertake research. The Faculty offers a wide variety of undergraduate and postgraduate programmes.

18 Undergraduate Programmes

4-Year Programmes

- B.Sc. in Biochemistry

B.Sc. in Mathematics
- B.Sc. in Biology

B.Sc. in Molecular Biotechnology
- B.Sc. in Cell and Molecular Biology

B.Sc. in Physics
- B.Sc. in Chemistry

B.Sc. in Risk Management Science
- B.Sc. in Earth and Environmental Sciences

B.Sc. in Statistics
- B.Sc. in Food and Nutritional Sciences

Double Major Programme

- B.Sc. in Biology and Chemistry / B.Sc. in Chemistry and Biology

Joint-Faculty Programmes

- B.Sc. in Biotechnology, Entrepreneurship and Healthcare Management

B.Sc. in Mathematics and Information Engineering
- B.Sc. in Computational Data Science

B.Sc. in Quantitative Finance and Risk Management science
- B.Sc. in Learning Design and Technology

2-Year Programme

- B.Sc. in Natural Sciences<sup>2</sup>

From 2023-24 entry, a number of new programmes will be accepting enrolment, leveraging the strengths of partnering institutions to provide rigorous training for students while broadening their horizons.

Joint-Institution Programmes

- B.Sc. in Chemistry [CUHK] and B.Sc. in Chemistry [UoM<sup>3</sup>]

B.Sc. in Quantitative Finance and Risk Management Science [CUHK] and B.Sc. in Mathematics and Business [UoE<sup>5</sup>]
- B.Sc. in Interdisciplinary Data Analytics and Mathematics [CUHK and CUHK(SZ)]<sup>4</sup>

B.Sc. in Risk Management Science [CUHK] and B.Sc. in Mathematics and Business [UoE]
- B.Sc. in Interdisciplinary Data Analytics and Statistics [CUHK and CUHK(SZ)]<sup>4</sup>

B.Sc. in Statistics [CUHK] and B.Sc. in Mathematics and Statistics [UoE]

<sup>2</sup> A 2-year programme for articulation of local Associate Degree / Higher Diploma Holders  
<sup>3</sup> University of Manchester

<sup>4</sup> Programme subject to approval by Senate of CUHK.  
<sup>5</sup> University of Edinburgh

20 Postgraduate Programmes

Research Postgraduate Programmes

- M.Phil.-Ph.D. in Biochemistry
- M.Phil.-Ph.D. in Biology
- M.Phil.-Ph.D. in Cell and Molecular Biology
- M.Phil.-Ph.D. in Chemistry
- M.Phil.-Ph.D. in Earth and Atmospheric Sciences
- M.Phil.-Ph.D. in Environmental Science
- M.Phil.-Ph.D. in Food and Nutritional Sciences
- M.Phil.-Ph.D. in Molecular Biotechnology
- M.Phil.-Ph.D. in Materials Science and Engineering
- M.Phil.-Ph.D. in Mathematics
- M.Phil.-Ph.D. in Physics
- M.Phil. in Risk Management Science
- M.Phil.-Ph.D. in Statistics

Taught Postgraduate Programmes

- M.Sc. in Accreditation Chemistry
- M.Sc. in Biochemical and Biomedical Sciences
- M.Sc. in Data Science and Business Statistics
- M.Sc. in Mathematics
- M.Sc. in Nutrition, Food Science and Technology
- M.Sc. in Physics
- M.Sc. in Risk Management Science and Data Analytics



# School of LIFE SCIENCES

The School of Life Sciences was established in 2010 by merging the Departments of Biochemistry and Biology, which are among the oldest departments in CUHK. Currently, the School offers six undergraduate programmes: Biochemistry, Biology, Cell & Molecular Biology, Environmental Science, Food & Nutritional Sciences, and Molecular Biotechnology. These programmes are designed to inspire the students through both in-class and experiential learning. Ample research and internship opportunities are provided to students to take part in cutting-edge science. Students are well-equipped with a global perspective and the skills for careers or postgraduate studies in science, health, and related fields. Thus far, over 8400 alumni have been trained.

The School has developed excellent research programmes in plant molecular biology and biotechnology, protein science and structural biology, chemical biology, omics and bioinformatics, stem cell biology, neuroscience, marine biology, environmental science, and food science and technology. Over 160 M.Phil. and Ph.D. students are currently being trained under the School's research postgraduate programmes. Besides, the School also offers two Taught M.Sc. programmes in Biochemical and Biomedical Sciences, and Nutrition, Food Science and Technology. Recognition of research excellence is highlighted by the award of funding from the Areas of Excellence Scheme of the Hong Kong University Grants Council as well as by the establishment of a State Key Laboratory of Agrobiotechnology.



**Prof. WONG Kam Bo**  
Professor; Director, School of Life Sciences

- Using structural biology (NMR, X-ray crystallography and cryo-EM) to understand the molecular mechanism of life
- The maturation pathway of urease
- Vacuolar sorting in plant cells
- Protein engineering, design, simulation and modelling



**Prof. AU Wing Ngor Shannon**  
Professor; Assistant Dean (Student Affairs)

- Structure-function studies of macromolecular assembly in pathogenic bacteria
- Structure-function studies of metabolic enzymes



**Prof. CHAN Ho Yin Edwin**  
Professor; Founding Member, YASHK

- Human disease modelling
- Cellular, genetic and biochemical analyses of RNA and protein toxicity in neurological diseases
- Therapeutic intervention of neurological diseases



**Prof. CHAN Michael Kenneth**  
Professor; Fellow, AAAS

- Protein delivery
- Chemical biology
- Biocatalysis
- Protein therapeutics



**Prof. CHAN Ting Fung**  
Associate Professor

- RNomics and bioinformatics in biological processes and diseases
- Technology and algorithm development for genomics and transcriptomics



**Prof. CHEN Zhenyu**  
Professor; Choh-Ming Li Professor of Life Sciences; Fellow, ACS; Fellow, RSC

- Food chemistry and nutrition
- Fat and cholesterol metabolism and heart diseases



**Prof. CHEUNG Chi Keung Peter**  
Professor

- Structure-function of cell wall polysaccharides
- Bioactive substances from mushroom and edible fungi
- Chemical properties and biological functions of dietary fiber
- Prebiotics, probiotics and gut microbiome
- Functional food development



**Prof. CHOW Hei Man Kim**  
Assistant Professor

- Metabolic plasticity and neurodegenerative disorders
- Mitochondrial bioenergetics
- Aging and cellular senescence



**Prof. CHUI Pui Yi Apple**  
Research Assistant Professor

- Impact of climate change on marginal coral communities
- Interventions that might increase coral resilience
- Coral restoration
- Ecological monitoring

Note:

AAAS = American Association for the Advancement of Science | ACS = The American Chemical Society | RSC = The Royal Society of Chemistry  
YASHK = The Hong Kong Young Academy of Sciences





**Prof. CHUNG Hau Yin**  
Associate Professor

- Food flavor chemistry, analysis and application
- Natural product, safety, health and application
- Food evaluation and food product development
- Soy-based fermented food and seafood



**Prof. FALKENBERG Laura Jane**  
Assistant Professor

- Global change biology – particularly ocean acidification and warming
- Marine ecosystem dynamics, shifts, and resistance/resilience
- Herbivore-autotroph ecophysiology, behaviour, and interactions
- Socio-economic consequences of environmental change



**Prof. FONG Wing Ping**  
Professor (Teaching)

- Novel photosensitizers for photodynamic therapy
- Yeast pathogenesis and engineering



**Prof. GUO Dianjing**  
Associate Professor

- Genomics and bioinformatics
- Systems biology
- Plant stress response
- Plant secondary metabolism and trichome function



**Prof. HE Junxian**  
Associate Professor

- Hormone signal transduction in plants
- Nitrogen signaling and nitrogen use efficiency
- Functional genomics of plant stress resistance



**Prof. HUI Ho Lam Jerome**  
Associate Professor

- Insect and arthropod biology, cnidarians, invertebrates, animal-plant interactions
- Marine biotechnology, molecular ecology and conservation of biodiversity
- Evolutionary biology, genomics



**Prof. JIANG Liwen**  
Professor; Choh-Ming Li Professor of Life Sciences; Associate Dean (Research)

- Plant cell and molecular biology
- Protein targeting and trafficking in plant cells
- Organelle biogenesis and function in plants
- Plant bioreactors for pharmaceutical proteins



**Prof. KANG Byung Ho**  
Associate Professor

- Plant cell biology
- Eukaryotic cell structure and function
- 3D electron microscopy



**Prof. KWAN Kin Ming**  
Associate Professor; Associate Dean (Education)

- Genetic manipulation by transgenic and gene knockout technology
- Study of organogenesis and tumorigenesis using mouse as model organism
- Neural development and neuronal cell biology
- Stem cell research



**Prof. LAM Hon Ming**  
Professor; Choh-Ming Li Professor of Life Sciences  
Outstanding Fellow of the Faculty of Science

- Climate-smart and sustainable agriculture
- Plant and agricultural biotechnology
- Genomic studies on crop-environment interaction



**Prof. LAU Chun Yu Wilson**  
Assistant Professor

- Single-particle cryo-electron microscopy (cryo-EM)
- Structure-function relationship of macromolecular machines
- Drug and herbicide discovery through rational design



**Prof. LAU Kwok Fai**  
Associate Professor

- Amyloid precursor protein interacting proteins in Alzheimer's disease and neurodegenerative disorders
- Amyloid precursor protein and its interacting proteins in neurodevelopment
- Protein kinases in neurodegenerative disorders



**Prof. LUO Haiwei**  
Associate Professor

- Geobiology
- Early life evolution
- Coral microbiology
- Crop microbiology
- Microbial ecology and evolution



**Prof. NGAI Sai Ming**  
Associate Professor

- Bioinformatics and proteomics
- Protein/peptide structural and functional studies
- Research and development on Modern Chinese Medicine



**Prof. NGO Chi Ki Jacky**  
Associate Professor

- Structure-based drug discovery for cancers and other emerging diseases
- Structure-function studies of pre-mRNA splicing factors
- Identification and engineering of novel peptides to improve agriculture



**Prof. PITTMAN Michael David**  
Assistant Professor

- Flight evolution from ground to air, especially dinosaurs to birds
- Dinosaur biology, ecology and evolution
- Using laser imaging to study fossilised soft tissues and artefacts in palaeobiology and archaeology



**Prof. SHAW Pang Chui**  
Professor

- Structure-function studies of proteins
- Authentication and quality control of Chinese Medicinal material



**Prof. THIBODEAU Benoit**  
Assistant Professor

- Ocean biogeochemical dynamics
- Stable isotope geochemistry
- Anthropogenic impacts
- Paleocyanography & paleoclimate



**Prof. TSANG Ling Ming**

Assistant Professor

- Biogeography, biodiversity and conservation of aquatic ecosystems
- Evolution and adaptation of crustaceans
- Molecular ecology of marine animals



**Prof. TSANG Suk Ying Faye**

Professor

- Cardiac differentiation of pluripotent stem cells
- Cardiac maturation of pluripotent stem cells
- Ion channels and cardiovascular physiology
- Cancer and cancer stem cells



**Prof. TSUI Tsz Ki Martin**

Associate Professor

- Environmental pollution
- Ecosystem biogeochemistry
- Stable isotope applications



**Prof. WONG Wing Tak Jack**

Associate Professor

- Vascular and metabolic biology
- Stem cell biology
- Cardiovascular regeneration



**Prof. ZHONG Silin**

Associate Professor

- Epigenetics and genomics
- Hormone signaling network
- Fruit ripening
- Sequencing technology



**Prof. ZHUANG Xiaohong**

Assistant Professor

- Autophagy and autophagosome formation in plants and green algae
- Signalling mechanisms of selective autophagy in plant stress resistance
- Lipid metabolism and membrane dynamics



**Dr. CHIU Chi Ming Lawrence**

Senior Lecturer

- Cell signaling in apoptosis
- Cancer chemoprevention and chemotherapy with natural products targeting the molecular pathways in carcinogenesis
- Applications of flow cytometry



**Dr. CHOW Cheung Ming Cherry**

Lecturer

- Plant cell biology
- Membrane trafficking
- Nitrogen metabolism in plants



**Mr. CHU Kin Kan Astley**

Assistant Lecturer

- Food processing technology and product development
- Teaching material development in food science



**Dr. KOON Chun Alex**

Senior Lecturer

- Synaptic plasticity
- Neurodegenerative and neuromuscular diseases
- *Drosophila* neurobiology
- Science communication
- Humour as a pedagogical approach



**Dr. LAW Man Suet Michelle**

Lecturer

- Earthworm ecology and biodiversity
- Soils and the environment
- Biogeochemistry and ecosystem functioning
- Sustainability and environmental education



**Dr. LI Yuk Man Charis**

Lecturer; Registered Nutritionist, Association for Nutrition, UK

- Fat and cholesterol metabolism
- Anti-aging and nutraceutical
- Food toxicology



**Dr. LO Fai Hang**

Lecturer

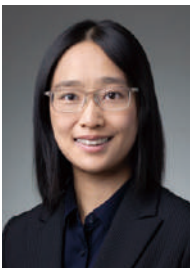
- Biochemistry as the basis of life sciences
- Pedagogical methodology and technology of life science education
- Science education in multidisciplinary context
- Modern curriculum, learning outcome, student oriented teaching, and competence assessment theories



**Dr. NGAI Hung Kui Patrick**

Lecturer

- Protein biochemistry
- Metabolic diseases



**Ms. SIN Man Ching Daisy**

Assistant Lecturer

- Nutrition education and behavioral modification
- Weight and chronic disease management
- Food, health and environmental sustainability



**Dr. SIOW Lam Nina**

Lecturer

- Molecular and cellular neuroscience
- Cell signaling and gene regulation



**Miss YAM Kwan Mei**

Lecturer

- Molecular biology
- Endocrinology
- Popular science promotion
- Learning and teaching methodologies



**Ms. YIP Pui Sze Peggy**

Lecturer; Registered Dietitian Nutritionist (USA); Registered Nutritionist (UK); Accredited Dietitian (HK)

- Primary health care in nutrition
- Nutrition promotion
- Public health and community nutrition
- Nutritional survey



# Department of CHEMISTRY

Being a central science, chemistry is not merely a study of periodic table or atomic structures. It indeed is so reachable that it exists in every single part of life, ranging from food flavorings to cosmetics to medicines to clean fuels – indispensable to all of us. Studying Chemistry is therefore a key to understand everything around us, and CUHK Chemistry has long been devoted to nurture young scientists with considerable chemistry expertise.

Established in 1956, the Department of Chemistry remains one of the oldest and best-equipped departments in CUHK. Currently, there are 28 faculty members engaging in diverse frontier research areas, including synthetic, organometallic, polymer and green chemistry; chemical biology and mass spectrometry, etc. Remarkable grants from various sources are secured while notable scientific papers are published continuously.

Moreover, the Department devises the curriculum by planning the Dual Degree Programme with University of Manchester and introduced the Double Major Programme in Chemistry and Biology. Ample exchange, internship and research opportunities are offered to prepare students for cutting-edge careers. To stimulate the public's interest towards science, STEM<sup>1</sup> activities are launched annually with Faculty and renowned companies, to let youngsters experience science.

<sup>1</sup>STEM = Science, technology, engineering, and mathematics



**Prof. KWONG Fuk Yee**

Professor; Department Chairperson;  
Member, YASHK

- Catalyst and phosphine development for sustainable chemical syntheses
- Chiral ligand design towards asymmetric catalysis
- Methodology development for tackling challenging polyaromatic syntheses
- Selective aromatic carbon-oxygen bond cleavage and cross-coupling processes
- Carbon-hydrogen bond activation and functionalization



**Prof. LEE Hung Kay**

Associate Professor

- Chemistry of low-coordination transition-metal and lanthanide complexes
- Synthetic and reactivity studies of metal complexes of biological relevance
- Isolation and characterization of active constituents in herbs



**Prof. CHAN Tak Wah Dominic**

Professor

- Mass spectrometry-based methodologies for characterization of peptides/ proteins, DNA fragments and carbohydrates
- Novel ionization methods and mass spectrometry interfaces for biomolecule analysis
- Mass spectrometry imaging of biological tissues
- Differential ion mobility spectrometry



**Prof. LI Hung Wing**

Associate Professor

- Ultra-sensitive detection assays for disease biomarkers
- Theranostic nanomaterials and nanodrugs
- Single molecules fluorescence imaging



**Prof. CHEN Ye**

Assistant Professor

- Design and synthesis of advanced nano-catalysts for clean energy conversion
- Design and synthesis of advanced nanoybrids for biosensing and optical sensing
- Methodology for novel and robust nanomaterial synthesis and stabilization
- Understanding structure-property relationships in inorganic nanocrystals



**Prof. LIU Zhifeng**

Professor

- Applications of computational and theoretical chemistry to study chemical reactions



**Prof. HUANG Zhifeng**

Associate Professor; Member, YASHK

- Inorganic chiral nanostructures
- Surface-enhanced optical activity spectroscopies
- Asymmetric (photo)catalysis
- Optoelectronics for flexible perovskite solar cells
- Cell culture for cell therapy



**Prof. LYU Hairong**

Assistant Professor; Vice-Chancellor Early Career Professorship

- Synthetic methods involving transition metal catalysis and photo-/electro-catalysis
- New organoboron functional materials
- Application of organoboron in the synthesis of drug molecules



**Prof. LAU Shing Hing Michael**

Assistant Professor

- Development of synthetic chemistry methodology
- Enabling technology application in bioactive molecule synthesis
- Peptide drug discovery in neurological diseases and cancers



**Prof. MIAO Qian**

Professor; Outstanding Fellow of the Faculty of Science

- Precision synthesis of nanocarbon structures
- Design and synthesis organic electronic materials
- High-performance organic electronic devices

Note:

ACS = American Chemical Society | ASHK = The Hong Kong Academy of Sciences | CAS = The Chinese Academy of Sciences | RSC = The Royal Society of Chemistry  
YASHK = The Hong Kong Young Academy of Sciences | TWAS = Third World Academy of Sciences



**Prof. NG Kee Pui Dennis**

Professor; Chartered Scientist of the Science Council, UK; Chartered Chemist and Fellow, RSC

- Chemistry of functional dyes
- Development of advanced photosensitizers for photodynamic therapy
- Bioorthogonal and supramolecular chemistry for theranostics
- Development of efficient bioconjugation methods
- Phthalocyanine-based materials for energy applications

**Prof. TSUI Chit**

Associate Professor

- Homogenous catalysis for bioactive compounds
- Organofluorine chemistry using sustainable and environmentally friendly reagents
- Organometallic chemistry for the development of efficient and selective catalytic processes
- Converting industrial waste and greenhouse gas fluoroform into valuable products
- Synthesis of new pharmaceutical agents for treating emerging diseases

**Prof. YEUNG Ying Yeung**

Professor; Outstanding Fellow of the Faculty of Science

- Chemistry and heterogeneous catalysts for energy and fuels
- Carbon neutrality for sustainability
- Organocatalysis
- Asymmetric halogenation
- Shape-selective catalysis for chemicals synthesis

**Prof. NGAI To**

Professor; Assistant Dean (Research); Fellow, RSC

- Colloidal particles at interfaces - from fundamentals to materials
- Development of orthopaedic implant materials
- Manufacturing of green packaging materials
- Measuring the interactions between particle-particle and particle-surface
- Studying microrheology with TIRM and magnetic tweezers

**Prof. WANG Ying**

Assistant Professor

- Electrocatalysis
- Electrochemistry
- Energy storage and conversion
- Catalysis for CO<sub>2</sub> conversion to fuels and chemicals
- Carbon neutrality for sustainability

**Prof. YU Chai Mei Jimmy**

Research Professor; Emeritus Professor

- Preparation and characterization of novel nano-structured materials
- Environmental applications of photocatalysis

**Dr. MAK Kin Wah**

Senior Lecturer

- Organic chemistry and catalysis
- Develop innovative technologies for science learning and teaching

**Prof. SONG Chunshan**

Professor; Dean of Science; Wei Lun Professor of Chemistry; Fellow, ACS

- Chemistry and heterogeneous catalysts for energy and fuels
- Carbon Neutrality for Sustainability
- Adsorptive separation of CO<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, NO<sub>2</sub> and SO<sub>2</sub>
- Catalysis for CO<sub>2</sub> conversion to fuels and chemicals
- Shape-selective catalysis for chemicals synthesis

**Prof. WONG Nai Ching Henry**

Research Professor; Emeritus Professor of Chemistry; Honorary Fellow, CUHK; Member, CAS; Fellow, TWAS; Member, ASHK

- Syntheses and studies of non-natural molecules and naturally occurring molecules
- Iron-catalyzed carbon-carbon cross-coupling reactions employing organolithium reagents
- The use of tetraphenylenes as building blocks in supramolecular chemistry

**Prof. ZHANG Jie**

Research Assistant Professor

- Functionalization of carboranes
- Nucleophilic reaction of carboranes
- Chemistry of o-carboryne
- Design and Synthesis of carborane derivatives for BNCT
- DFT calculations for mechanistic study

**Dr. CHAN Ka Long Donald**

Lecturer

- Analytical chemistry
- Environmental chemistry
- Nanotechnology
- Renewable energy

**Prof. TAM Dick Yan**

Research Assistant Professor

- DNA-based nanomaterials
- Photodynamic therapy
- Cancer treatment

**Prof. XIA Jiang**

Professor

- Chemical biology
- Synthetic biology
- Protein reaction
- Phase separation
- Biomaterials

**Dr. CHEUNG Yu San**

Senior Lecturer

- Physical chemistry
- Quantum chemistry calculation
- Computer simulation

**Dr. HAU Chun Kit Sam**

Lecturer

- Supramolecular chemistry
- STEM teaching
- Virtual learning

**Prof. TSE Ying Lung Steve**

Associate Professor

- Physical chemistry of interfacial systems
- Simulations of atmospheric chemical reactions
- Development of efficient reactive molecular simulation models
- Method development of molecular dynamics simulations
- Computational studies of asymmetric organic reactions

**Prof. XIE Zuowei**

Professor; Choh-Ming Li Professor of Chemistry; Member, CAS; Member, ASHK; Fellow, RSC

- Homogenous catalysis
- Small molecules activation
- Carboranes
- Main group chemistry
- Organometallic chemistry

**Dr. LO Chui Man**

Lecturer

- Applications of hydrogels
- Chemistry in food and cosmetics

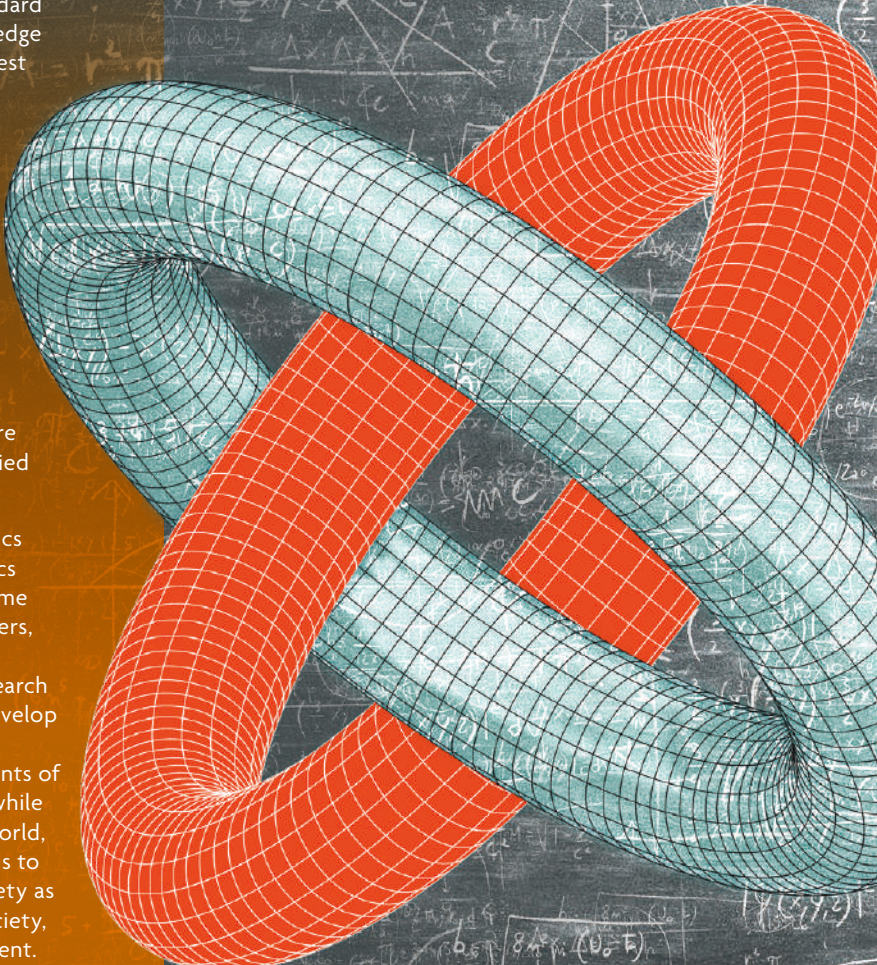


# Department of MATHEMATICS

Established in 1963, the Department of Mathematics is a world-class department of the highest standard of excellence in education, research and knowledge transfer. It ranks consistently among the very best Mathematics Departments in Asia and ranks 37<sup>th</sup> and 41<sup>st</sup> globally in the World University Rankings by Subject in 2021 and 2022 respectively.

Education is an integral part of our mission. Since 1963, the Department of Mathematics offers rigorous and competitive undergraduate and postgraduate programmes in Mathematics. In addition to teaching excellence, the Department is proud of the efforts in making significant research accomplishments in a wide range of areas in pure mathematics as well as computational and applied mathematics.

Moving forward, the Department of Mathematics will continue to provide top quality mathematics education to young people who aspire to become devoted mathematicians and mathematics leaders, and act as a unified whole in most respects to maximize the benefits of the Department's research in all fundamental areas in mathematics, and develop gradually more in the direction of applied and computational mathematics. Future developments of the Department of Mathematics will be made while keeping abreast with the general trend in the world, with an aim of making more direct contributions to the various aspects of mathematics to the society as well as worldwide impacts on the economy, society, culture, public policy, health, and the environment.



**Prof. ZOU Jun**  
Professor of Mathematics; Department Chairperson; Choh-Ming Li Professor of Mathematics; Fellow, AMS; Fellow, SIAM

- Numerical solutions of electromagnetic Maxwell systems
- Numerical solutions of interface problems
- Ill-posed problems
- Inverse problems
- Preconditioned iterative methods and domain decomposition methods



**Prof. CHAN Kwok Wai**  
Associate Professor

- Complex geometry
- Deformation theory
- Gromov-Witten theory
- Mirror symmetry
- Theory of quantisation



**Prof. FAN Fenglei**  
Research Assistant Professor

- Deep learning theory
- Deep learning methodology
- Deep learning applications in computer vision, science, and manufacturing



**Prof. CHUNG Tsz Shun Eric**  
Professor; Outstanding Fellow of the Faculty of Science

- Multiscale methods for problems in heterogeneous porous media
- Data-driven computational methods
- Multiscale simulations for geosciences
- Multiscale modeling for mechanics
- Novel discretisation for applications



**Prof. FENG Dejun**  
Professor

- Fractal geometry
- Ergodic theory
- Dynamical systems
- Geometric measure theory



**Prof. DUAN Renjun**  
Professor

- Partial differential equations
- Kinetic theory
- Fluid dynamics
- Viscous conservation laws
- Mathematical physics



**Prof. HE Xuhua**  
Professor of Mathematics; Choh-Ming Li Professor of Mathematics; Invited Speaker, ICM 2018

- Algebra
- Number theory
- Representation theory
- Arithmetic geometry
- Combinatorics



**Prof. JIN Bangti**  
Professor of Mathematics; HKSAR Global STEM Scholar

- Computational methods for inverse problems
- Numerical analysis of differential equations
- Mathematics of deep learning
- Scientific computing, including machine learning assisted techniques

Note:  
AMS = American Mathematical Society | ICM = International Congress of Mathematicians | SIAM = Society for Industrial and Applied Mathematics





**Prof. LEE Man Chun**

Assistant Professor

- Differential geometry
- Complex geometry
- Geometric partial differential equation
- Compactness of geometric objects



**Prof. LEE Yi Jen**

Professor; Si Yuan Professor of Mathematics

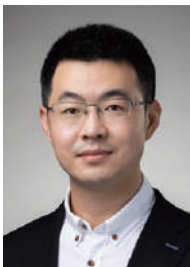
- Symplectic topology
- Symplectic geometry
- Low-dimensional topology
- Gauge theory
- Geometric analysis



**Prof. LEUNG Nai Chung Conan**

Professor of Mathematics; Fellow, AMS

- Algebraic geometry
- Symplectic geometry
- Quantization
- Mirror symmetry
- Geometry of special holonomy



**Prof. LI Hongjie**

Research Assistant Professor

- Mathematical analysis of metamaterials
- Cloaking invisibility caused by plasmonic material
- Scientific computing for metamaterials



**Prof. LI Man Chun Martin**

Associate Professor

- Differential geometry and geometric analysis
- Geometric problems in mathematical general relativity
- Partial differential equations arising in geometry and analysis



**Prof. LIU Liu**

Assistant Professor

- Numerical analysis and scientific computation
- Kinetic problems with multiple scales
- Uncertainty quantification
- Deep learning for partial differential equations
- Tumor growth models and numerical methods



**Prof. LUI Lok Ming Ronald**

Professor

- Computational quasiconformal geometry
- Scientific computing
- Medical imaging
- Geometry processing
- Mathematical artificial intelligence



**Prof. LUO Chenyun**

Assistant Professor

- Short and long time behavior for water waves
- Partial differential equations modeling magnetohydrodynamics and elastodynamics with a free surface boundary
- Partial differential equations modeling liquid crystals with a free surface boundary
- Partial differential equations modeling relativistic fluids with a free surface boundary
- Formation of magnetic fluid stars



**Prof. MCBREEN Michael**

Assistant Professor

- Symmetry groups and their representations
- Mathematical aspects of gauge theory
- Quantum integrable systems
- Mathematical aspects of string theory
- Symplectic and algebraic geometry



**Prof. TAN Xiaolu**

Associate Professor

- Financial risk analytics
- Principal-agent problem
- Stochastic optimization
- Dynamic programming
- Optimal transport



**Prof. WU Zhongtao**

Associate Professor

- Low dimensional topology
- Theory of knots, links and spatial graphs
- Contact and symplectic geometry
- Floer homology and gauge theory
- DNA topology



**Prof. XIN Zhouping**

Professor of Mathematics; William M.W. Mong Professor of Mathematics; Invited Speaker, ICM 2002

- Partial differential equations
- Fluid dynamics
- Shocks and nonlinear waves
- Numerical analysis
- Applied mathematics



**Prof. YU Jiu Kang**

Professor of Mathematics; Lee Hysan Professor of Mathematics; Fellow, AMS

- Number theory
- Representation theory
- Algebraic and arithmetic geometry
- Ramanujan graphs and higher dimensional analogues
- Spectral geometry



**Prof. YU Yong**

Associate Professor

- Partial differential equation, focusing on the equations/systems of elliptic and parabolic types
- Liquid crystal materials, focusing on the patterns of liquid crystal materials and droplets
- Ion channel, focusing on boundary layer phenomenon and dynamical properties of ion channel
- Bio-math, mass concentration phenomenon in terms of Keller-Segel equation and its variants
- Harmonic map flow, mean curvature flow, Navier-Stokes equations, and their free boundary type problems



**Prof. YUAN Xu**

Research Assistant Professor

- Nonlinear dispersive and wave equations

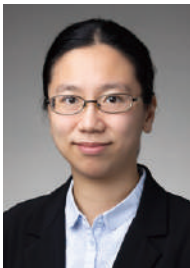


**Prof. ZENG Tieyong**

Professor

- Data science
- Optimisation
- Imaging science
- Computer vision
- Machine learning





**Dr. CHAN Hiu Ning**

Lecturer

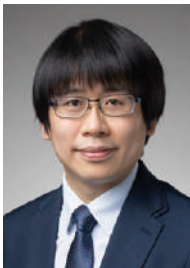
- Wave propagation
- Rogue waves
- Numerical methods for partial differential equations



**Dr. LIU Chun Lung Kelvin**

Lecturer

- Algebra
- Algebraic geometry
- Algebraic cobordism
- Group action in algebraic geometry



**Dr. CHAN Kai Leung**

Lecturer

- Symplectic geometry
- Toric geometry
- Mirror symmetry and SYZ mirror symmetry



**Dr. CHEUNG Leung Fu**

Lecturer

- Submanifolds
- Minimal surfaces
- Stable constant mean curvature hypersurfaces
- p-harmonic maps
- Automatic grading of math homework



**Dr. MAK Hugo Wai Leung**

Lecturer

- Applied and computational mathematics
- Remote sensing and satellite informatics
- Numerical and geospatial techniques in environmental science
- Air quality studies and smart city development
- Image processing and data analysis



**Dr. CHAN Ping Shun**

Lecturer

- Number theory
- Automorphic representations



**Dr. FONG Wing Chung**

Lecturer

- Finite geometries
- Twistor theory
- General relativity



**Dr. NG Ming Ho**

Assistant Lecturer

- Number theory
- Analytic number theory
- Modular forms
- L-functions



**Prof. WAN Yau Heng Tom**

Senior Lecturer; Emeritus Professor

- Geometric analysis and nonlinear partial differential equations (in particular harmonic maps between noncompact manifolds)
- Mean curvature flow and other geometric flow of submanifolds
- Tropical geometry and its application to Calabi-Yau structure of general type submanifolds



**Dr. CHENG Man Chuen**

Lecturer

- Algebraic topology
- Equivariant stable homotopy theory
- Group representation



**Prof. LEUNG Chi Wai**

Senior Lecturer

- Abstract harmonic analysis
- Banach space theory
- Operator algebra



**Dr. PAN Li Lily**

Lecturer

- Operations research
- Computational optimisation
- Algorithm design and analysis



**Dr. WONG Chak Fu Jeff**

Senior Lecturer

- Computational fluid dynamics
- Inverse problems
- Mathematical sociology
- Educational technology
- Recreational mathematics



**Dr. LI Chun Che Charles**

Lecturer

- Number theory
- Representation theory
- Theory of automorphic forms
- Trace formula



**Dr. XIAO Jingjing**

Lecturer

- Partial differential equations related to fluid dynamics

# Department of PHYSICS

The Department of Physics strives for excellence in teaching and research, which are the main missions of the Department.

The Department has a long tradition and excellent reputation to foster high-quality teaching and learning experience, offering undergraduate degree programmes (B.Sc.), Taught Master programmes (M.Sc.), Research Master programmes (M.Phil. in Physics and M.Phil. in Materials Science & Engineering), and Research Doctoral programmes (Ph.D. in Physics and Ph.D. in Materials Science & Engineering). Various experiential learning opportunities supplement the Department's broad and rigorous curriculum, equipping students not only with the technical skills but also soft skills that are transferable beyond the workplace. The dedicated faculty members are committed to guide students in reaching their full potential, and equip them with the scientific knowledge and attitude to tackle challenging problems.

The scientific research in the Department covers a wide range of topics in both fundamental and applied physics. The research areas broadly include fundamental physics, quantum science and technology, materials science, and complex systems. The cutting-edge research in the Department has been recognised worldwide. Physics faculty members constantly receive prestigious grants and awards at the international, national, and local levels.



**Prof. WANG Jianfang**  
Professor; Department Chairperson;  
Outstanding Fellow of the Faculty of Science;  
Fellow, RSC

- Nanoplasmonics
- Nanoparticles
- Nanophotonics
- Photocatalysis



**Prof. CHENG Hok Chuen**  
Research Assistant Professor

- Precision measurement of the properties of the Higgs boson
- Search for new physics beyond the Standard Model of particle physics
- Hyperon and spin physics
- Applications of machine learning in high-energy physics and other areas

Note:  
APS = American Physics Society | IOP = Institute of Physics, UK | RSC = The Royal Society of Chemistry | YASHK = The Hong Kong Young Academy of Sciences



**Prof. CHING Shuk Chi Emily**  
Professor; Fellow, APS; Fellow, IOP

- Thermally-driven turbulence
- Boundary layer theories for thermal turbulence
- Network reconstruction from dynamics
- Structure-dynamics and structure-function of neuronal networks



**Prof. HANNUKSELA Otto Akseli**  
Research Assistant Professor

- Gravity and general relativity
- Gravitational waves
- Dark matter
- Cosmology
- Beyond standard model physics



**Prof. CHU Ming Chung**  
Professor; Choh-Ming Li Professor of Physics;  
Outstanding Fellow of the Faculty of Science;  
Fellow, APS

- Dark matter cosmology
- Particle physics
- Computational physics
- Neutrino oscillations
- Compact star astrophysics



**Prof. HUI Pak Ming**  
Professor (Teaching); Emeritus Professor

- Modeling complex systems -- dynamics and competing games
- How to teach undergraduate physics to majors and non-majors effectively
- Solid state physics and statistical physics



**Prof. FLORES-CASTILLO Luis Roberto**  
Associate Professor

- Experimental high-energy physics
- Precision measurements and search for evidence of new physics at the Large Hadron Collider
- Reconstruction and identification of high-energy particles in proton-proton collision data
- Possibilities and challenges of future particle colliders and detectors
- Use of machine learning in the analysis of large datasets for physics research



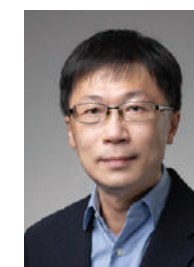
**Prof. LAN Tian**  
Assistant Professor

- Mathematical framework for topological phases of matter
- Higher categorical structures of symmetry, quantum phases and phase transitions
- Exactly solvable models for topological phases and quantum computation



**Prof. GOH Swee Kuan**  
Associate Professor

- Superconductivity
- High pressure phenomena
- Fermi surface mapping



**Prof. LAW Chi Kwong**  
Associate Professor

- Quantum optics
- Waveguide QED
- Quantum optomechanics



**Prof. GU Zhengcheng**  
Associate Professor

- Topological phases of quantum matter
- Topological phase transitions
- Tensor network simulation for strongly correlated systems
- Quantum gravity



**Prof. LI Guang Feng Tjonnie**  
Associate Professor

- Gravitational waves
- Compact objects (black holes, neutron stars)
- General relativity





**Prof. LI Huabai**  
Associate Professor; Founding Member, YASHK

- Star formation
- Interstellar magnetic fields
- Interstellar turbulence
- Astronomical instrumentation



**Prof. NG Chun Yu Kenny**  
Assistant Professor

- Particle Astrophysics
- Dark Matter and new physics in Space
- Astrophysical data analysis
- Particle interaction simulations
- Cosmic rays, neutrinos, gamma rays



**Prof. WU Yilin**  
Professor

- Collective motion and self-organization of living active matter
- Growth dynamics of general living matter
- Bacterial motility in complex environments
- Population dynamics, pattern formation and cell-environment interactions in natural and synthetic multicellular systems



**Dr. CHOW Tsz Him**  
Lecturer

- Synthesis, properties and applications of plasmonic nanoparticles
- Nanoplasmonics
- Nanotechnology



**Prof. LI Quan**  
Professor; Fellow, RSC

- Electrochemical energy storage
- Nano-bio interface
- Quantum sensing



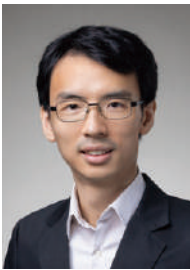
**Prof. ONG Hock Chun Daniel**  
Professor

- Optical sensing for trace element detection
- Chemical detection for food, water, and environment monitoring



**Prof. XU Lei**  
Professor

- Fluid mechanics and complex fluids
- Mechanical metamaterial
- Hydrodynamic metamaterial
- Nano-amorphous drug manufacture



**Dr. LAI Yu Hang**  
Lecturer

- Strong-field atomic physics
- Ultrafast optics



**Prof. LI Yufan**  
Assistant Professor

- Quantum materials
- Quantum devices
- Topological materials
- Superconductivity
- Pure spin current phenomena



**Prof. WANG Dajun**  
Professor

- Ultracold atoms and molecules
- Quantum simulation
- Precision spectroscopy



**Prof. YAN Renbin**  
Associate Professor; HKSAR Global STEM Scholar; Council Member, Chinese Astronomical Society

- Astronomy
- Astronomical instrumentation
- Spectroscopy surveys
- Processing and analysis of big data in astronomy
- Interstellar medium of galaxies



**Dr. LEUNG Po Kin**  
Senior Lecturer

- Astrophysics
- Compact objects
- Radiative transfer



**Prof. LIU Renbao**  
Professor; Outstanding Fellow of the Faculty of Science; Fellow, IOP; Fellow, Optica

- Quantum sensing
- Quantum optics
- Quantum computing
- Open quantum systems
- Nonlinear optics
- Condensed matter physics



**Prof. WANG Qisi**  
Assistant Professor

- Unconventional superconductivity, quantum magnetism and correlated electron physics
- X-ray and neutron scattering of elementary excitations and phase transitions in quantum matter
- Crystal growth of novel materials



**Prof. YAN Yangqian**  
Assistant Professor

- Ultracold quantum gas
- Topological states of matters
- Few body physics
- Quantum simulation



**Dr. LIN Lap Ming**  
Senior Lecturer

- Relativistic astrophysics
- Gravitational-wave sources
- Numerical relativity



**Prof. LU Xinhui**  
Associate Professor

- Renewable energy
- Advanced characterization
- Solar Cells
- Scattering Techniques
- Optoelectronic Device Fabrication



**Prof. WANG Yi**  
Associate Professor

- Molecular dynamics simulations
- Computer modeling of macromolecules
- Energetics and kinetics at the (nano)material-cell interface



**Prof. ZHU Junyi**  
Associate Professor

- Defect and doping of semiconductors
- Density functional theory calculations
- Magnetism and spintronics
- Artificial intelligence in physics
- Energy materials



**Dr. TONG Shiu Sing**  
Senior Lecturer

- Physics education, popular science education
- Open wave systems
- Radiation in plasma



# Department of STATISTICS

The Department of Statistics at The Chinese University of Hong Kong was founded in 1982. Its primary mission is to provide students with state-of-the-art statistical education and conduct cutting-edge statistical research. At present, the Department offers four undergraduate programmes, three research postgraduate programmes leading to M.Phil. and Ph.D. degrees, and two taught postgraduate programmes.

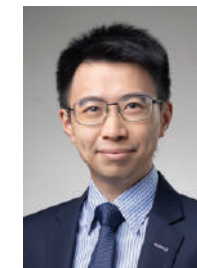
For more than four decades, the Department has accommodated world-class faculty members with diverse research areas including statistical finance and risk management science, statistical theory and methodology, big data, biostatistics and bioinformatics, and other areas of cross-disciplinary research.

In today's Information Age, Statistics has become an indispensable tool in many diverse branches of natural sciences, medical sciences, social sciences, biomedical sciences, finance, economics, engineering, etc. Faculty and staff of the Department are ready to meet these new challenges. Its goal is always to be nothing less than a world-class statistics department, providing the highest quality education and leading-edge research.



**Prof. SONG Xinyuan**  
Professor; Department Chairperson;  
Elected Member, ISI

- Bayesian method
- Latent variable models
- Nonparametric and semiparametric methods
- Statistical computing
- Survival analysis



**Prof. CHAN Kin Wai**  
Assistant Professor

- Nonparametric time series
- Incomplete-data inference
- Long-run variance estimation
- Recursive methods for online problems
- High-frequency data analysis



**Prof. FAN Xiaodan**  
Professor

- Statistical modeling and computing
- Pattern recognition and classification methods
- Computational biology and bioinformatics
- Astrophysics data analysis



**Prof. CHAN Ping Shing Ben**  
Associate Professor

- Reliability in engineering
- Optimal experiment design
- Inference for censoring data



**Prof. FANG Xiao**  
Associate Professor

- Asymptotic theory in probability and statistics
- Stein's method for distributional approximations
- Multivariate and high-dimensional central limit theorems
- Change-point analysis



**Prof. DAI Ben**  
Assistant Professor

- Learning frameworks with sound empirical and theoretical validation
- Theoretical and/or experimental studies yielding new insight into machine/deep learning
- Optimization and software development
- Statistical inference, interpretability, causal inference for data science



**Prof. LIN Yuanyuan**  
Associate Professor

- Statistical machine learning
- High-dimensional statistics
- Nonparametric and semiparametric inference



**Prof. LIN Zhixiang**  
Assistant Professor

- Machine learning for big data in biomedicine
- Bayesian statistics
- Computational biology and bioinformatics

Note:

GARP = Global Association of Risk Professionals | ISI = International Statistical Institute | SOA = Society of Actuaries





**Prof. POON Wai Yin Isabella**  
Professor; Pro-Vice-Chancellor / Vice -  
President; Outstanding Fellow of the Faculty  
of Science

- Structural equation modeling and its application
- Statistical methods for modeling and analyzing ordinal categorical data
- Data with misclassification
- Teaching and learning enhancement and innovation
- Quality assurance of teaching and learning



**Prof. WANG Junhui**  
Professor

- Statistical machine learning and data science
- Network modelling and analysis
- Recommender system and individualized prediction
- Causal inference



**Prof. SIT Tony**  
Associate Professor

- Survival analysis and semiparametric inference
- Quantile modelling
- Risk management and analytics
- Network modelling and analysis



**Prof. WEI Yingying**  
Associate Professor

- Experimental design of high-throughput biological experiments
- Integrative analysis of genomic datasets
- Fine-scale inference from aggregate-level genomic data
- Inference of network structures
- Development of scalable statistical inference algorithms for big data



**Prof. WONG Hoi Ying**  
Professor; Associate Dean (Student Affairs);  
Outstanding Fellow of the Faculty of Science

- Risk management
- Stochastic control
- Machine learning finance
- Deep learning
- Quantitative finance



**Prof. YAM Sheung Chi Phillip**  
Professor; Assistant Dean (Education)

- Actuarial science and mathematical finance
- Applied mathematics
- Probability theory and stochastic analysis
- Statistical theory and data analytics
- Control theory and optimization



**Prof. YAU Chun Yip**  
Professor

- Change-point analysis
- Time series analysis
- Spatial statistics
- Extreme value theory



**Prof. ZHU Huichen**  
Research Assistant Professor

- Quantile regression
- Machine learning
- Spatial data analysis
- Functional data analysis



**Dr. CHAN Chun Man**  
Lecturer

- Bayesian statistics
- Heavy tailed distributions
- Stochastic volatility models



**Dr. CHEUNG King Chau**  
Lecturer

- Network data analysis
- Spatial data analysis
- Text data analysis



**Dr. HO Kwok Wah**  
Lecturer

- Bayesian statistics
- Financial risk management
- Statistical computing



**Dr. LEUNG Sze Him Isaac**  
Lecturer

- Change-point analysis
- Forecasting under instability
- Time series



**Dr. LIU Kin Yat**  
Lecturer

- Computational statistics
- Functional data analysis
- Longitudinal data analysis
- Survival analysis



**Dr. OUYANG Ming**  
Lecturer

- Bayesian method
- Hidden markov models
- Latent Variable Models
- Semiparametric methods
- Statistical diagnostics



**Dr. WONG Tat Wing**  
Lecturer; Associate, SOA

- Actuarial science
- Financial risk management
- Stochastic control



**Dr. WRIGHT John Alexander**  
Lecturer; Certified Financial Risk Manager,  
GARP

- Financial mathematics
- Malliavin calculus
- Multivariate statistics
- Option pricing and sensitivities
- Stochastic calculus



# EARTH AND ENVIRONMENTAL SCIENCES PROGRAMME

Earth and Environmental Sciences Programme (EESC) is the new integrated programme resulting from a merger between Earth System Science (ESSC) and Environmental Science (ENSC). Global climate change, environmental pollution, natural hazards, biodiversity loss, and the current energy and food crisis are all critical issues of public concern. The new programme will equip students with the latest knowledge and technical skills to observe, understand, analyse, and model the systems and processes that drive natural and anthropogenic global environmental changes.

In this programme, particular emphasis is placed on multidisciplinary and combined theoretical-observational approaches to understanding the problems stated above and formulating potential solutions. Students will acquire a strong comprehensive foundation in the dynamics of the Earth and its environment, with options to specialise in the following streams to suit their background, interests and career objectives: (i) Atmospheric Science, (ii) Geology and Geophysics, and (iii) Environmental Science and Technology. Students will be given opportunities to gain valuable quantitative and analytical skills, and build their capabilities via laboratory work, field studies, numerical modeling and programming experience, seminars, workshops and research projects. Further enhancing these are exchange opportunities at overseas universities as well as internships in the Hong Kong Observatory and other government agencies, geotechnical firms, environmental organizations, and the educational sector.



## Prof. SONG Chunshan

Professor; Dean of Science; Wei Lun Professor of Chemistry; EESC Programme Director; Fellow, ACS

- Chemistry and heterogeneous catalysts for energy and fuels
- Carbon Neutrality for Sustainability
- Adsorptive separation of CO<sub>2</sub>, H<sub>2</sub>, NH<sub>3</sub>, NO<sub>2</sub> and SO<sub>2</sub>
- Catalysis for CO<sub>2</sub> conversion to fuels and chemicals
- Shape-selective catalysis for chemicals



## Prof. TAI Pui Kuen Amos

Associate Professor; EESC Programme Coordinator; Founding Member, YASHK

- Atmospheric chemistry and physics of air pollution and climate change
- Ecoclimatology and biosphere-atmosphere interactions
- Sustainable agriculture, food systems and forest management
- High-performance computing and analytics of the Earth system



## Prof. TSUI Tsz Ki Martin

Associate Professor; EESC Programme Coordinator

- Environmental pollution
- Ecosystem biogeochemistry
- Stable isotope applications



## Prof. CHAN Man Nin

Associate Professor

- Atmospheric aerosol science
- Air pollution and climate change



## Prof. Arthur CHENG

Adjunct Professor; Honorary Fellow, CUHK

- Rock physics
- Quantitative reservoir characterisation
- Acoustic logging
- Geomechanics
- Urban and near surface geophysics



## Prof. LIU Lin

Associate Professor

- Artificial intelligence for earth and climate
- Earth observation big data
- Geophysics and remote sensing for sustainability



## Prof. LUO Haiwei

Associate Professor

- Geobiology
- Early life evolution
- Coral microbiology
- Crop microbiology
- Microbial ecology and evolution



## Prof. TAM Chi Yung Francis

Associate Professor; Fellow and Executive Committee Member, Hong Kong Meteorological Society

- Numerical weather prediction and climate simulations aided by machine learning
- Extreme weather and climate impacts on cities

Note:

ACS = American Chemical Society | AGU = American Geophysical Union | GSHK = Geological Society of Hong Kong |

HKRG of GSL = Hong Kong Regional Group of The Geological Society of London | YASHK = The Hong Kong Young Academy of Sciences





**Prof. TAN Yen Joe**  
Assistant Professor

- Marine geophysics
- Earthquake, volcano, and environmental seismology
- Machine learning applications in geophysics



**Prof. THIBODEAU Benoit**  
Assistant Professor

- Ocean biogeochemical dynamics
- Stable isotope geochemistry
- Anthropogenic impacts
- Paleoceanography & paleoclimate



**Prof. ZHAN Yan**  
Assistant Professor; Ng Yin Ying Assistant Professor of Geophysics

- Artificial intelligence for forecasting natural hazards (e.g., volcanic eruptions)
- Clean energy and sustainable environment (e.g., geothermal energy)



**Prof. WONG Teng Fong**  
Research Professor; Fellow, AGU

- Experimental rock deformation
- Rock physics applied to energy resources
- Earthquake mechanics
- Environmental hydrogeology



**Dr. AU-YEUNG Yee Man Andie**  
Lecturer

- Tropical cyclone simulations
- Regional climate simulations
- Tropical meteorology



**Prof. YANG Hongfeng**  
Associate Professor

- Earthquake seismology and marine geophysics
- Machine learning for geophysics
- Clean energy and sustainable environment



**Dr. TAM Pui Yuk Tammy**  
Lecturer; Committee Member, HKRG of GSL; Vice Chairperson, GSHK

- Metamorphic P-T-t evolution
- Metamorphic petrology
- Red-bed succession
- Tectonic history reconstruction
- Geomorphological study of geohazards



**Dr. LI Kwan Kit Ronald**  
Assistant Lecturer

- Atmospheric dynamics
- Climate predictions



**Prof. KWAN Kin Ming**  
Associate Professor; NSCI Programme Director; Associate Dean (Education)

- Genetic manipulation by transgenic and gene knockout technology
- Study of Organogenesis and Tumorigenesis using mouse as model organism
- Neural development and neuronal cell biology
- Stem cell research



**Dr. CHAN Ka Long Donald**  
Lecturer

- Analytical chemistry
- Environmental chemistry
- Nanotechnology
- Renewable energy



**Prof. CHAN Ho Yin Edwin**  
Professor; Founding Member, YASHK

- Human disease modelling
- Cellular, genetic and biochemical analyses of RNA and protein toxicity in neurological diseases
- Therapeutic intervention of neurological diseases



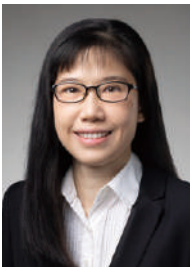
**Dr. LAM Yiu Man Otis**  
Lecturer

- Biomimicry
- Molecular biology
- Learning design



**Dr. CHAN Chun Man**  
Lecturer

- Bayesian statistics
- Heavy tailed distributions
- Stochastic volatility models



**Dr. WONG Tsz Yan**  
Lecturer

- Food toxicology
- Nutraceutical and cholesterol metabolism

# NATURAL SCIENCES PROGRAMME

The Natural Sciences Programme (NSCI) is an articulation programme for local associate degree or higher diploma graduates. Supported by 12 programmes of CUHK Science with around 300 courses open to NSCI students to tailor-make their study plan, NSCI provides a rigorous training in the sciences so that graduates will have acquired broad knowledge in science and in-depth knowledge across several science subjects, mastered a basket of professional and generic skills for career development. Students have to complete two years of science training from one of the seven concentration areas<sup>1</sup>. Graduates develop their career successfully in industrial, business as well as public sector, and graduates with good academic performance pursue postgraduate studies in local and international universities.

Note:  
YASHK = The Hong Kong Young Academy of Sciences

<sup>1</sup> Concentration areas are Biological Sciences, Biotechnology, Environmental Studies, Food and Nutrition, Data Science, Chemical and Testing Sciences, and Physical Sciences.



## EMERITUS PROFESSORS, PROFESSORS (TEACHING), AND RESEARCH PROFESSORS

The Faculty is grateful for the contributions in striving for research excellence by our faculty members over the decades.



### School of Life Sciences

Prof. CHANG Shu Ting  
Prof. CHU Ka Hou  
Prof. FONG Wing Ping  
Prof. HO Kwok Keung Walter  
Prof. KONG Siu Kai

Prof. KWAN Hoi Shan  
Prof. LEUNG Kwok Nam  
Prof. SUN Sai Ming Samuel  
Prof. WOO Ying Shiu Norman  
Prof. WONG Po Keung



### Department of Chemistry

Prof. CHAN Kin Shing  
Prof. CHOW Hak Fun  
Prof. MAK Chung Wai Thomas

Prof. WONG Nai Ching Henry  
Prof. WU Chi  
Prof. YU Chai Mei Jimmy



### Department of Mathematics

Prof. CHAN Hon Fu Raymond  
Prof. NG Kung Fu

Prof. TAM Luen Fai  
Prof. WAN Yau Heng Tom



### Department of Physics

Prof. HUI Pak Ming  
Prof. XIA Keqing

Prof. XIAO Xudong  
Prof. YOUNG Kenneth



### Department of Statistics

Prof. CHAN Ngai Hang



### Earth and Environmental Sciences Programme

Prof. WONG Teng Fong

## ALUMNI AFFAIRS

Established in 1963, CUHK Science has nurtured generations of graduates who have moved on to excel in all walks of life. Science alumni have continued further studies or entered careers in the fields of commerce and industry, education, social and public organisations, government, or other sectors.

校友刊物 Alumni Publication  
*Sci-by-side*  
伴理

The Faculty is keen to build and maintain strong ties with alumni, and in 2022, a new online publication Sci-by-side was launched in an effort to share the latest alumni news and events. Moreover, to give due credit to science alumni who have made contributions to the Faculty's career development efforts, the Faculty established the **Outstanding Alumni Service Award** in 2020. Below are the recipients since award establishment:



2020  
Mr. WONG Chi Wai  
Tommy (Physics)



2021  
Mr. HO Chun Yan  
(Physics)



2022  
Mr. LIT Chi Kai  
(Mathematics)



2022  
Mr. TSE Yiu Cho Joe  
(Statistics)



Playing tangram at the booth of the Mathematics Alumni Association at 2018 CUHK Alumni Homecoming



The first face-to-face CUHK Chemistry Department Alumni Association meeting and gathering of the new cabinet in 2022



A team of alumni and staff from the Food and Nutritional Sciences Programme won the champion title at Dean's Cup - Football tournament in April 2023.



# STUDENT LIFE

When students choose to study at CUHK Science, there is so much more than various lectures, seminars, laboratory sessions, or tutorials. CUHK believes in holistic and balanced education, so that besides rigorous academic training, students will receive ample support and care from units that provide pastoral care and whole-person education by the University's nine colleges, and non-formal education experiences and support by CUHK's Office of Academic Links and Office of Student Affairs.

In addition to various hobby and interest groups at the University, there are also student societies housed at our various major programmes, with the aim of serving fellow students, acting as a bridge between students and teachers, and enriching students' experience at CUHK.

CUHK Science students have also made the Faculty proud for receiving prestigious and highly competitive study awards year after year. This is a testament to both the quality of teaching and learning, as well as the hard work and immense potential of our students.



Graduation photo day organized by the Chemistry Society in May 2022



Happy students at the Inauguration Ceremony for Undergraduate Students



Science students enjoyed a Scientific and Cultural Exchange Programme at United Arab Emirates University in November 2019



Natural Sciences Programme Orientation Camp 2018



M.Sc. in Data Science and Business Statistics Annual Dinner and Award Presentation Ceremony, held on 4 May 2019



Recipients of Science Faculty Postgraduate Research Day Presentation Award, their guests and their research supervisors take a photo with the Dean Team on 1 April 2023



**Jack KWOK** (Physics)

2022 Joseph Needham PhD Fellowship Tenable at the University of Cambridge

“ Jack hopes to make contributions to the frontiers of fundamental physics. As a CUHK Physics undergraduate, he worked closely with leading scholars in Caltech and Cambridge on different aspects of gravitational-wave astrophysics under the Department's Summer Undergraduate Research Exchange Program (SURE), and finds himself heavily indebted to Professor Tjonnje LI. Jack also recalls a pleasant surprise, two years after he sought mentorship from theoretical physicist Professor Kenneth YOUNG as a freshman, “My ability to break a complicated project down into small, self-contained problems, and confront them one after another, most certainly came from Professor Young,” Jack said, This realisation makes me really happy. ”



**YU Kejing** (Mathematics)

Hong Kong Jockey Club Scholarships 2021/22

“ Several years ago, my groupmates and I noticed that a kind of endangered duck called the Chinese merganser started to come to our hometown during winter, but people there didn't pay enough attention, and some even killed them for food. I then led my group to send brochures, make public speeches, and write to the mayor. Later villagers there stopped polluting the river, and some protective measures were adopted. The Scholarship is an important recognition of my academic performance, as well as efforts on endangered species conservation, and I will continue my efforts to improve myself and benefit society. ”



# DIVERSITY AND INCLUSION

To become a place for world-class learning and research, CUHK Science realises the importance of opening doors to talents from diverse walks of life, both local and abroad. Keeping in mind the Faculty motto of “Science Empowers Your Dreams”, CUHK Science is committed to building a welcoming community founded on the core values of Openness, Civility, and Inclusivity, where science staff and students get closer to reaching their dreams.

With support from academic units and the Wellness and Counselling Centre of the University’s Office of Student Affairs, resources and support for full-time undergraduates are available according to individual needs. For staff, CUHK is not only an equal opportunities employer, but also offers considerate policies and benefits to support staff to attend to personal responsibilities. Moreover, the Faculty actively encourages all staff and students to take advantage of the University’s trainings to enrich their understanding on important issues such as preventing sexual harassment, how to support students with SEN<sup>1</sup>, and getting to know the anti-discrimination laws in Hong Kong.



Women in Science - Yes We Can!  
Featuring Prof. Kim CHOW (2 Dec 2022)



Women in Science - My Personal Experience in  
Mathematics with Dr. Eugenia CHENG (17 Mar 2023)



Women in Science – in Dialogue with  
Prof. CHING Shuk Chi Emily (8 April 2022)

Change takes time and effort, and with the concerted efforts of staff and students of the Faculty, positive change will happen at CUHK Science. Faculty-level efforts to make CUHK Science a more diverse and inclusive place since 2021:



## Solicit Diverse Input & Mediate Cases

- Science Faculty Diversity and Inclusion Committee [comprised of students and staff of diverse backgrounds]



## Raise Awareness

- Education and Training
- Sharing Best Practices



## Build a Welcoming Environment

- Themed Events
- Facilities Accessibility Review
- Review Existing Procedures for Inclusivity

# ACKNOWLEDGEMENT OF DONATIONS

Over the years, the Faculty has been honoured to receive the support of our donors who believe that basic science matters – be it through the training of the future leaders of society, advances in the frontiers of human knowledge, or through the spread of scientific knowledge to the general public. We wish to convey our utmost gratitude to our donors, whose generosity has in turn made possible many developments that might otherwise have been impossible. Their support have enriched the Faculty’s efforts in terms of research, education, scholarships and awards, facilities, and much, much more.

## List of Donors<sup>1</sup>

- |   |  |
|---|--|
| Dr. AU YEUNG Kong                                 | Mr. LI Sze Lim   |
| Association of Sino Enterprises Promotion Limited | Lo Kwee Seong Foundation                               |
| Chow Tai Fook Charity Foundation                  | Professor LUK Kam Biu                                  |
| C-Link Research & Development Limited             | NVIDIA Corporation                                     |
| Dr. Stanley Ho Medical Development Foundation     | Shanghai Fraternity Association Hong Kong Limited      |
| Dr. Sunney I. CHAN and Mrs. Irene Y. CHAN         | Star Industrial Co., Ltd.                              |
| Professor Sunney I. Chan                          | The Hong Kong Jockey Club Charities Trust              |
| Mrs. CHAN Shu An                                  | The TUYF Charitable Trust                              |
| Ms. CHENG Pui Sze                                 | Tin Ka Ping Foundation                                 |
| Ms. CHU Chi Ping                                  | Mr. TUNG Wai Wa, Wallace                               |
| Hang Lung Community Limited                       | Mr. WONG Ming Chak                                     |
| HK JEBN Limited                                   | Professor WONG Teng Fong                               |
| Hong Kong Pei Hua Education Foundation            | Wu Jieh Yee Charitable Foundation Limited              |
| Hong Kong Spinocerebellar Ataxia Association      | Xiamen Multi-dimension Biomedical Technology Co., Ltd. |
| Lawco Company Limited                             | Mr. & Mrs. YANG Guanghui, Sunny                        |
| KG Services Limited                               | Professor YAU Shing Tung                               |
| KMBGI Gene Tech Co. Ltd.                          | Professor YOUNG Kenneth                                |
| Lee Hysan Foundation                              | 深圳市格綠特科技有限公司   |
| Lee Kum Kee International Holdings Limited        | Anonymous donors                                       |

The Faculty would like to express our sincere thanks to anonymous donors who have made the following possible:

- Establish the “CUHK Statistics Alumni Scholarship” of the Department of Statistics
- Support the spinocerebellar ataxia research undertaken by the Biochemistry Programme of the School of Life Sciences
- Establish the Madam Ng Yin Ying Early Career Professorship Scheme
- Support the “Sophie Wai Chee Cheng Research Internship Programme” of the Earth and Environmental Sciences Programme

For more about CUHK’s policy on Diversity and Inclusion, please visit: <http://www.dio.cuhk.edu.hk/>

<sup>1</sup> SEN = Special educational needs

<sup>1</sup> Due to space limitation, donations under HK\$200,000 are not recorded in the above list. Record for the period of 1 January 2013 to 1 March 2023. Names listed in alphabetical order by surname.



## CUHK Faculty of Science

Room G43, G/F, Charles Kuen Kao Building,  
Science Centre (North Block),  
The Chinese University of Hong Kong,  
Shatin, N.T., HKSAR

☎ (852) 3943 6327

@ sfo@cuhk.edu.hk

🌐 [www.sci.cuhk.edu.hk](http://www.sci.cuhk.edu.hk)

📘📷🐦🌐 CUHKScience

📺 CUHKScienceFaculty



Copyright © 2023 Faculty of Science,  
The Chinese University of Hong Kong. All Rights Reserved.

