



香港中文大學
The Chinese University of Hong Kong

2024-25



生命科學學院課程

PROGRAMMES OF THE SCHOOL OF LIFE SCIENCES

- Biochemistry
- Biology
- Cell & Molecular Biology
- Food and Nutritional Sciences
- Molecular Biotechnology



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MESSAGE FROM THE DIRECTOR



The School of Life Sciences was established in 2010 under the Faculty of Science by merging the Departments of Biochemistry and Biology, which are among the oldest departments in CUHK. Our School now offers five major programmes: Biochemistry, Biology, Cell and Molecular Biology, Food and Nutritional Sciences, and Molecular Biotechnology, which have trained over 8000 alumni over the years. Our curriculum is designed to meet the diverse interests of life science students. The students will receive training in fundamental knowledge in life sciences in their junior years, before they specialize into one of the five programmes in their senior years.

Life Sciences is a multi-disciplinary subject that concerns the understanding of living organisms, including micro-organisms, plants, animals, and human beings, at levels ranging from atomic to anatomical, from cellular to organismal, and from basic to applied research.

Life scientists study biodiversity to explore the various life forms on our planet. They delve into cell and developmental biology to understand the signalling pathways that regulate growth at the cellular and organismal levels. Additionally, they investigate the intricate biomolecular interactions involving proteins and nucleic acids to comprehend processes like DNA replication. By studying how energy is stored and utilized in our cells and bodies, life scientists contribute to our understanding of nutrition, metabolism, and overall health. Moreover, the knowledge garnered from the field of life sciences is instrumental in developing biotechnological tools that aim to improve the world we live in.

Bioinspiration, a concept where biological phenomena inspire research in non-biological fields and technology, is another fascinating aspect of Life Sciences. It not only opens up avenues for innovation but also provides insights that can be applied across various disciplines. Whether you aim for a career in the biological sciences or simply wish to expand your understanding of the natural world, training in Life Sciences equips you with the tools to appreciate the complexity of cellular processes, biodiversity, and biochemical pathways, as well as apply this knowledge to real-world scenarios through biotechnology.

Established in 2010, the CUHK School of Life Sciences was created to foster both fundamental academic research and cutting-edge translational studies in the biological sciences. Our undergraduate curriculum is designed to provide a balance of theoretical knowledge and practical skills in various areas of Life Sciences, including biochemistry, biology, cell & molecular biology, food & nutritional sciences, and molecular biotechnology. I sincerely invite you to join us on this journey of exploration and discovery in the realm of life sciences!

– Professor Chan Ho-Yin Edwin

ESTABLISHMENT OF THE SCHOOL OF LIFE SCIENCES



YEAR	EVENT
1963	Established Department of Biology
1971	Established Department of Biochemistry
1994	Established Food & Nutritional Sciences Programme, jointly by Departments of Biochemistry and Biology
1998	Established Molecular Biotechnology Programme, jointly by Departments of Biochemistry and Biology
2008	Established Cell & Molecular Biology Programme
2009	Launched Life Sciences Broad-based Admission Scheme
2010	Established the School of Life Sciences

WHY SLS AT CUHK?

HIGH DIVERSITY IN LIFE SCIENCES

The School provides highly diverse and sophisticated courses in life sciences. Study topics cover from biomolecules to ecology. And the flexible curriculum offered by the School also fits the needs of individual students.

WORLD CLASS EDUCATION

The extraordinary reputation of our programmes and the excellent quality in education are commended and affirmed by the Quality Assurance Council of the Hong Kong University Grants Committee (UGC).

EXCELLENT RESEARCH

The School has a marvelous team of teachers who are field-pioneers and outstanding researchers. For instance, our plant biotechnology research is an Area of Excellence, with the establishment of the State- key laboratory of Agrobiotechnology. With a variety of the state-of-the-art equipment and our excellent research personnel, we ensure that our research shall continue to prosper.

AMPLE OPPORTUNITIES

We provide incomparable undergraduate research opportunities, for instance DREAM and SMART programmes, and these chances are something difficult to find in other institutes. Students will also find numerous exchange and internship opportunities that the learning experience will not be confined to the textbooks and classrooms. The Berkeley Biosciences Study Abroad (BBSA) Programme enables selected students to study in UC Berkeley for a term with subsidies. In addition, plentiful of other activities also help to develop the all-round competence. Numerous scholarships are provided to outstanding students throughout the studies.

HIGH INTERNATIONALIZATION

Our programmes attract local and overseas students. This enables students to appreciate different cultures, hone language skills and grow as confident individuals.

OUTSTANDING CAREER PROSPECTS

According to the recent career survey of our graduates, the distribution of the work type of the respondents is as follows: 45% in scientific/research work and medical & health service; 10% in administration/management; 15% in business/commerce; 6% each in environmental science, media and teaching, the rest in hotel/tourism, disciplined service, construction/architecture, human resource/training and logistics/shipping, etc.

HIGH DIVERSITY IN LIFE SCIENCES



The School of Life Sciences offers five programmes that focus on the study of an extensive range of topics in all aspects of life sciences.

In total, we provide over 130 courses at the undergraduate level for our students. In addition to the lecture courses, more than 40% of the courses the School offers are laboratories courses, workshops, student-oriented teaching courses, independent study modules, and supervised research courses. This wide variety of course format and course content facilitates the establishment of the solid knowledge foundation in life sciences, and fosters the development of students' all-round competence.

Course List for 4-Year Cohort (2024-25)

Life Sciences

Course Code	Course Title	Unit(s)
LSCI1001	Basic Concepts in Biological Sciences	3
LSCI1002	Introduction to Biological Sciences	3
LSCI1012	Introduction to Life Forms in the Biosphere	3
LSCI2002	Basic Laboratory Techniques in Life Sciences	2
LSCI2003	Scientific Conduct and Ethics	2
LSCI2005	Junior Summer Project	3
LSCI3000	Synthetic Biology Workshop	2
LSCI3012	Practical Bioinformatics for Life Sciences	2
LSCI3030	Structural Biology	2
LSCI3333	Introductory Live-Cell Imaging : Applications and Analysis	2
LSCI3520	Environmental and Biochemical Toxicology	3
LSCI4000	Literature Review	3
LSCI4911, 4912, 4913	Group Research in Life Sciences I, II, III	2 @

Biochemistry

Course Code	Course Title	Unit(s)
BCHE2000	Frontiers in Biochemistry	2
BCHE2030	Fundamentals of Biochemistry	3
BCHE2070	Research Internship	2
BCHE3030	Methods in Biochemistry	3
BCHE3040	Proteins and Enzymes	3
BCHE3050	Molecular Biology	2
BCHE3070	Recombinant DNA Techniques	1
BCHE3080	Bioenergetics and Metabolism	3
BCHE3092	Self-study Modules in Biochemistry and Professional Development	3
BCHE3110	Chemical Biology	3
BCHE3650	Molecular Biology and Recombinant DNA Laboratory	2
BCHE3730	Analytical Biochemistry Laboratory	2
BCHE4030	Clinical Biochemistry	3
BCHE4040	Aspects of Neuroscience	3
BCHE4060	Basic and Applied Immunology	3
BCHE4070	Management and Accreditation of Biochemical Laboratory	3
BCHE4080	Biochemistry for Forensic Sciences	2
BCHE4090	Biochemistry for Sport and Exercise	2
BCHE4130	Molecular Endocrinology	3
BCHE4640	Aspects of Neuroscience Laboratory	2
BCHE4760	Immunology and Haematology Laboratory	2
BCHE4830	Medical Biochemistry Laboratory	2
BCHE4901	Senior Experimental Project I	2
BCHE4902	Senior Experimental Project II	2
BCHE4903	Senior Experimental Project III	2

Cell and Molecular Biology

Course Code	Course Title	Unit(s)
CMBI2200	Literature survey in CMB and Scientific Communication	2
CMBI2500	Research Internship	2
CMBI3010	CMB Laboratory I	3
CMBI3020	CMB Laboratory II	3
CMBI3030	CMB Laboratory III	1
CMBI3040	CMB Laboratory IV	1
CMBI3100	Methodology of Critical Thinking in CMB Research	2
CMBI3101	Biology of Model Organisms for CMB Research	3
CMBI3200	Proposal Formulation and Creative Scientific Writing in CMB	2
CMBI4001	Protein Trafficking	1
CMBI4002	Protein Folding	1
CMBI4003	Signal Transduction	1
CMBI4101	Cancer Cell Biology	1
CMBI4102	Stem Cell Biology	1
CMBI4103	Neuronal Cell Biology	1
CMBI4201	Genomics and Transcriptomics	1
CMBI4202	Proteomics	1
CMBI4203	Metabolomics	1
CMBI4301	Current Topics in Cell Biology	1
CMBI4302	Current Topics in Molecular Biology	1
CMBI4303	Current Topics in Biotechniques	1
CMBI4901	Senior Experimental Project I	2
CMBI4902	Senior Experimental Project II	2
CMBI4903	Senior Experimental Project III	2

Biology

Course Code	Course Title	Unit(s)	Course Code	Course Title	Unit(s)
BIOL2120	Cell Biology	3	BIOL3710	Marine Biology	3
BIOL2210	Ecology	3	BIOL4010	Evolutionary Biology	3
BIOL2213	Ecology Laboratory	1	BIOL4012	Field and Environmental Biology	2
BIOL2313	Genetics Laboratory	1	BIOL4120	Developmental Biology	3
BIOL2410	General Genetics	2	BIOL4230	Global Change Biology	3
BIOL2420	Population Genetics	1	BIOL4240	Environmental Impact Assessment	3
BIOL3012	Biodiversity Laboratory I	2	BIOL4242	Environmental Impact Assessment Lab	2
BIOL3022	Biodiversity Laboratory II	2	BIOL4260	Conservation Biology	3
BIOL3310	Human Biology	3	BIOL4310	Human Genetics	3
BIOL3410	General Microbiology	3	BIOL4510	Hong Kong Flora and Vegetation	3
BIOL3510	Palaeobiology	2	BIOL4610	Foundation for Secondary School Biology Teaching	3
BIOL3530	Plant Physiology	3	BIOL4901	Senior Experimental Project I	2
BIOL3560	Biology of Fungi and Non-Vascular Plants	2	BIOL4902	Senior Experimental Project II	2
BIOL3570	Biology of Vascular Plants	2	BIOL4903	Senior Experimental Project III	2
BIOL3610	Invertebrate Form and Function	2	BIOL4906	Internship	2
BIOL3620	Vertebrate Life	2	BIOL4907	Field Study	2
BIOL3630	Animal Physiology	3			

Food and Nutritional Sciences

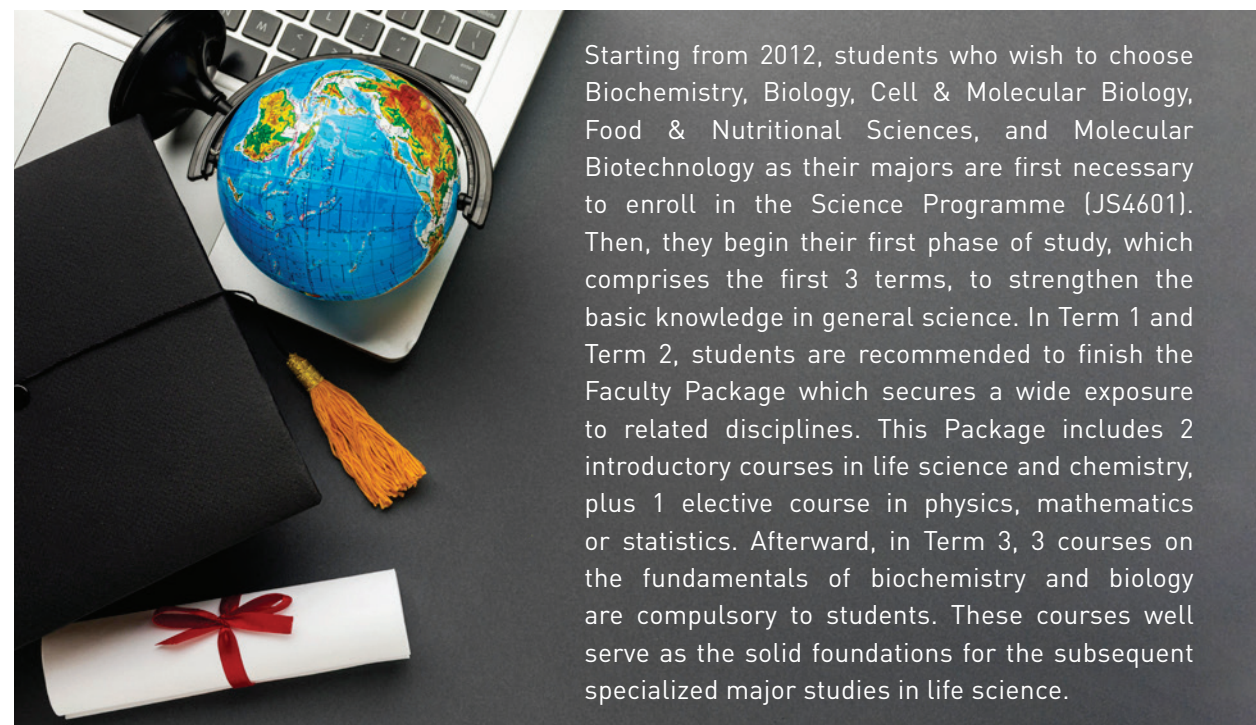
Course Code	Course Title	Unit(s)
FNNSC2001	Introduction to Food Sci & Technology	2
FNNSC2002	Nutrition for Health	2
FNNSC2005	Ethics and Professionalism for Nutritionists	1
FNNSC3001	Food Sci Lab I	2
FNNSC3002	Nutritional Sci Lab I	2
FNNSC3010	Nutrition and Human Development	3
FNNSC3030	Nutritional Biochemistry	3
FNNSC3110	Food Chemistry and Analysis	3
FNNSC3180	Food Microbiology	3
FNNSC4001	Food Sci Lab II	2
FNNSC4002	Nutritional Sci Lab II	2
FNNSC4101	Human Physiology for Nutrition Studies I	3
FNNSC4102	Human Physiology for Nutrition Studies II	3
FNNSC4110	Food Technology	3
FNNSC4120	Community Nutrition	3
FNNSC4150	Introduction to Medical Nutrition Therapy	3
FNNSC4160	Nutrition Planning and Food Policy	3
FNNSC4170	Food Product Development and Quality Control	3
FNNSC4901	Senior Experimental Project I	2
FNNSC4902	Senior Experimental Project II	2
FNNSC4903	Senior Experimental Project III	2
FNNSC4906	Internship	2
FNNSC4907	Nutrition Practicum	2
FNNSC5430	Food Toxicology and Safety	3

Molecular Biotechnology

Course Code	Course Title	Unit(s)
MBTE2000	Introduction to Molecular Biotechnology	2
MBTE2010	Diversity of Life: Applications and Sustainability	2
MBTE3000	Business and Social Aspects of Biotechnology	3
MBTE3510	Medical Biotechnology	1
MBTE3511*	Industrial applications of plant genetic modification	1
MBTE3518	Project in Medical Biotechnology	2
MBTE3521*	Transgenic technologies in Animals and their Applications	1
MBTE3528*	Project in Transgenic technologies in Animals and their Applications	2
MBTE3531*	Microbes and Bioremediation	1
MBTE3550	Biotechnology for Environment and sustainability	1
MBTE3558	Project in Biotechnology for Environment and sustainability	2
MBTE3560*	Protein Engineering and Drug Design	1
MBTE3568*	Project of Protein Engineering and Drug Design	2
MBTE4033	Methods in Molecular Biotechnology Laboratory I	2
MBTE4034	Methods in Molecular Biotechnology Laboratory II	2
MBTE4320	Genetic Engineering	3
MBTE4510	Plant Biotechnology	3
MBTE4520	Animal Biotechnology	3
MBTE4530	Microbial Biotechnology	3
MBTE4901	Senior Experimental Project I	2
MBTE4902	Senior Experimental Project II	2
MBTE4903	Senior Experimental Project III	2
MBTE4906	Internship	2

* Not for MBT Students

STUDY SCHEME



Starting from 2012, students who wish to choose Biochemistry, Biology, Cell & Molecular Biology, Food & Nutritional Sciences, and Molecular Biotechnology as their majors are first necessary to enroll in the Science Programme (JS4601). Then, they begin their first phase of study, which comprises the first 3 terms, to strengthen the basic knowledge in general science. In Term 1 and Term 2, students are recommended to finish the Faculty Package which secures a wide exposure to related disciplines. This Package includes 2 introductory courses in life science and chemistry, plus 1 elective course in physics, mathematics or statistics. Afterward, in Term 3, 3 courses on the fundamentals of biochemistry and biology are compulsory to students. These courses will serve as the solid foundations for the subsequent specialized major studies in life science.

General Study Scheme for entrants from 2025/26 and thereafter

TERM 1	Build up fundamental knowledge <i>with Faculty Package in Terms 1 and 2</i> LSCI1002* + CHEM1280 or CHEM1070 + one course from Maths, Physics, Statistics.
TERM 2	
TERM 3	
TERM 4	Confirm your interest <i>Select preferred courses from a list of 15 offered by all 5 programmes</i> BCHE2000 BCHE3050 BCHE3070 BCHE3650 BIOL2210 BIOL2213 BIOL2313 BIOL2410 BIOL2420 CMBI2200 FNESC2001, 2002 FNESC3180 MBTE2000 MBTE2010
TERM 5	Foster to be a specialist Engage in the advanced and specialized study posed by your Major program
TERM 6	
TERM 7	
TERM 8	

* Students who do not have high school Biology should take LSCI1001 prior to LSCI1002.

The next phase of the undergraduate study helps to understand in more detail of the 5 major programmes in the School of Life Sciences. In Term 4, students can choose classes from 14 different courses offered by our programmes. To avoid possible overloading, students are recommended not to take more than 13 units of major courses. Nonetheless, this limitation can already accommodate the requirements of up to 3 majors to acquire their preliminary savors. Through this flexible course-selecting scheme, students can comprehend their specific interests in the diverse fields in life sciences and formulate their best fitting choice for the majors.

Course code	Unit	BCHE	BIOL	CMBI	FNESC	MBTE
BCHE2000	2	✓				
BCHE3050	2	✓		✓		
BCHE3070	1	✓		✓		
BCHE3650	2	✓				
BIOL2210	3		✓			
BIOL2213	1		✓			
BIOL2313	1	✓	✓	✓		✓
BIOL2410	2	✓	✓	✓	✓	✓
BIOL2420	1		✓			
CMBI2200	2			✓		
FNESC2001	2				✓	
FNESC2002	2				✓	
FNESC3180	3				✓	
LSCI2002	2				✓	
MBTE2000	2					✓
MBTE2010	2					✓

* Choose only ONE lab course from BIOL2213 or BIOL2313 (offered in Term 2 of second year) for major requirement of BIOL Programme.

** FNESC2001, LSCI2002 (offered in Term 1 of second year) for the major requirement of FNESC Programme.



EXAMPLES OF COURSE PATTERNS FOR THE EXPLORATION PHASE

■ Example 1:

Alan can never resist the temptation from food. Starting from several years ago, the issues of malachite green and nitrofurantoin residues found in freshwater fish, Sudan dyes in eggs as well as melamine in dairy products had aroused his awareness in the science of food safety. Hence, he decides to major in FNSC.

■ Example 2:

Jackson enjoys nature and outdoor activities. Whenever he has a chance, he would go camping or diving with his friends. However, it frustrates him a lot lately as he can hardly find a nice local place for the activities due to pollution or urbanization. He wonders if he can contribute something to preserve our planet. Therefore, he wants to focus on the study of biodiversity.

■ Example 3:

Jenny is interested in the study of DNA and proteins, and wishes to find out more about BCHE, CMBI, and MBTE before she makes a final decision on her major.

Suggested course pattern in second term for:

Example 1: Alan		Example 2: Jackson		Example 3: Jenny	
Course	Unit	Course	Unit	Course	Unit
BIOL2410	2	BIOL2210	3	BCHE2000	2
FNSC2002	2	BIOL2213	1	BIOL2410	2
FNSC3180	3	LSCI1012	3	BIOL2313	1
1 major elective	3			CMBI2200	2
				MBTE2000	2
Total: 10		Total: 7		Total: 9	

After the second phase of study, students should finalize their decisions on major selection according to their interests. There are 3 occasions on which students can declare their major: after admission, by the end of the first year and by the end of the second year of study. Depending on the pre-defined academic achievements, students can declare their major on any one of the 3 occasions within the first 2 years of study.

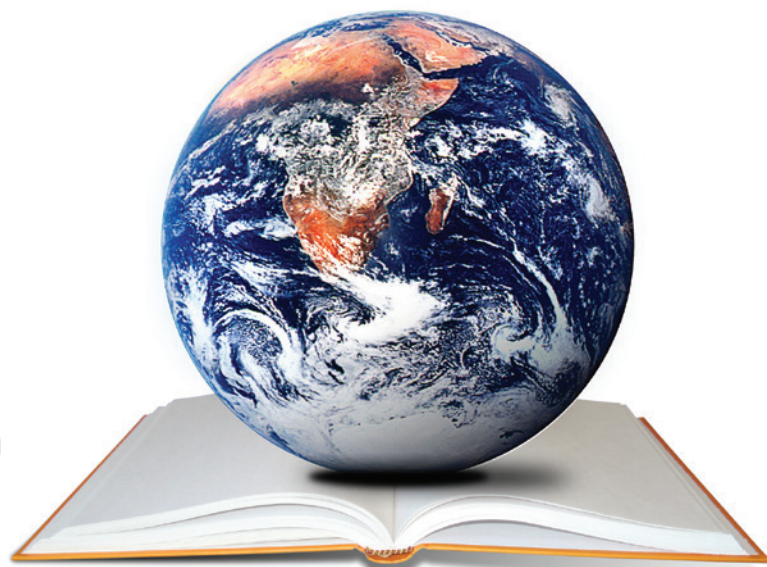
Declaration occasion	After admission	End of Year 1	End of Year 2
Condition	Level 5 or above in HKDSE of Biology OR Chemistry OR Combined Science (with Biology or Chemistry component) OR Integrated Science OR Technology and Living* (Food Science and Technology Strand only)	C+ or above in LSCI1002	Taken (NOT necessarily ALL PASSED) LSCI1002 BCHE2030 AND BIOL2120

* Apply to FNSC only

After major declaration, in the final phase which is basically the last 4 terms, students take courses to fulfill the study requirement posed by the specific major to graduate.



WORLD CLASS EDUCATION



The Hong Kong University Grants Committee (UGC) stated that the University 'provides high quality student learning experience that reflects its mission and role statement, underpinned by good quality assurance systems'.

This merit, of course, is not the only affirmation. Hong Kong Economic Journal Monthly ranked CUHK to be the top among the other UGC-funded universities. The six major criteria included the percentage of PhD holders for academic staff, JUPAS admission results, teaching qualities, financial resources, quality of graduates, and research performance.

Indeed, the faculty members from the School of Life Sciences have been recognized to be commendable that over the last few years, our teachers have been receiving various teaching awards.

Vice Chancellor's Exemplary Teaching Award

Year	Awardees
2002	Professor Lee Sau-Tuen Susanna
2003	Professor Ge Wei
2007	Professor Ge Wei
2008	Professor Leung Kwok-Nam
2012	Professor Kong Siu-Kai
2018	Dr. Apple PY Chui
2023	Professor Kwan Kin-Ming

Exemplary Teaching Award in General Education

Year	Awardees
2012	Dr. Chiu Chi-Ming Lawrence
2018	Dr. Apple Pui-Yi Chui
2021	Mr. Chu Kin Kan Astley

TEACHERS IN THE SCHOOL OF LIFE SCIENCES

DIRECTOR



Chan Ho-Yin Edwin, PhD (Cantab)

Director, School of Life Sciences
Email: hyechan@cuhk.edu.hk

Research Interests:

1. Cellular, genetic and biochemical analyses of RNA and protein toxicity in neurological diseases
2. Human disease modelling

PROFESSORS

Au Wing-Ngor, Shannon, PhD (HKU)

Email: shannon-au@cuhk.edu.hk



Research Interests:

1. Protein post-translational modification
2. Macromolecular assembly

Chan Michael Kenneth, PhD (UC Berkeley)

Email: michaelkchan88@cuhk.edu.hk



Research Interests:

1. Protein crystallography
2. Chemical biology

PROFESSORS

Chan Ting-Fung, Philos, PhD (Wash.)

Associate Director, Molecular Biotechnology Programme
Email: tf.chan@cuhk.edu.hk



- Research Interests:
1. RNomics and bioinformatics in biological processes and diseases
 2. Technology and algorithm development for genomics and transcriptomics

Cheung Chi-Keung, Peter, PhD (NSW)

Division Head, Research Postgraduate Programmes
Email: petercheung@cuhk.edu.hk



- Research Interests:
1. Structure-function of cell wall polysaccharides
 2. Bioactive substances from mushroom and edible fungi
 3. Chemical properties and biological functions of dietary fiber and prebiotics
 4. Functional foods and nutraceuticals

Hui Ho-Lam, Jerome, DPhil (Oxon)

Director, Biology Programme
Email: jeromehui@cuhk.edu.hk



- Research Interests:
1. Insect and arthropod biology, cnidarians, invertebrates, insect-plant interaction
 2. Marine biotechnology, molecular ecology and conservation of biodiversity
 3. Evolutionary biology, genomics

Jiang Liwen, PhD (S. Fraser)

Director, Centre for Cell and Developmental Biology
Email: ljiang@cuhk.edu.hk



- Research Interests:
1. Cell and molecular biology
 2. Protein targeting and trafficking
 3. Plant endocytosis and exocytosis
 4. Organelle dynamics and biogenesis
 5. Plant biotechnology

Kang Byung-Ho, PhD (Wisconsin-Madison)

Director, Cell and Molecular Biology Programme
Email: bkang@cuhk.edu.hk



- Research Interests:
1. Plant cell biology
 2. 3D electron microscopy

Kwan Kin-Ming, PhD (HKU)

Associate Director, Cell and Molecular Biology Programme
Email: kmkwan@cuhk.edu.hk



- Research Interests:
1. Genetic manipulation by transgenic and gene knockout technology
 2. Study of organogenesis and tumorigenesis
 3. Mammalian neural development
 4. Stem cell research

Lam Hon-Ming, PhD (Northwestern), MH

Director, Molecular Biotechnology Programme
Email: honming@cuhk.edu.hk



- Research Interests:
1. Climate-smart and sustainable agriculture
 2. Plant and agricultural biotechnology
 3. Genomic studies on crop-environment interaction

Lau Kwok-Fai, PhD (CUHK)

Associate Director, Biochemistry Programme
Email: kflau@cuhk.edu.hk



- Research Interests:
1. Molecular neuroscience
 2. Molecular pathogenesis of neurodegeneration

Tsang Suk-Ying, PhD (CUHK)

Director, Food & Nutritional Sciences Programme
Email: fayetsang@cuhk.edu.hk



- Research Interests:
1. Stem cell biology
 2. Derivatives of human embryonic stem cells for therapeutic purposes
 3. Ion channels and cardiovascular physiology

PROFESSORS

Wong Kam-Bo, PhD (Cantab)

Email: kbwong@cuhk.edu.hk



- Research Interests:
1. Structure-function studies of proteins
 2. Structure-determination of proteins by NMR spectroscopy and X-ray crystallography
 3. Protein engineering and design
 4. Simulation and modeling of proteins

ASSOCIATE PROFESSORS

Chen Sijie, PhD (HKUST)

Email: sijie.chen@cuhk.edu.hk



- Research Interests:
- Fluorescent materials and fluorescence-based technologies :
- Fluorescent probes for bioimaging
 - Fluorescent probes for biosensing
 - Fluorescent probes for diagnosis and therapy
 - Super-resolution imaging
 - Fluorescence lifetime imaging

Guo Dianjing, Diane, DS (Chinese Acad. of Sc.)

Email: djguo@cuhk.edu.hk



- Research Interests:
1. Genomics and bioinformatics
 2. Systems biology
 3. Plant stress response
 4. Plant secondary metabolism and trichome function

Luo Haiwei, PhD (South Carolina)

Email: haiweiluo@cuhk.edu.hk



- Research Interests:
1. Genome evolution of marine bacterioplankton
 2. Molecular clock and bacteria deep evolution
 3. Endosymbiotic bacteria - marine host interaction
 4. Microbial therapy for marine organisms
 5. Terrestrial nitrogen-fixing bacteria

Ngo Chi-Ki, Jacky, PhD (UC San Diego)

Director, Biochemistry Programme
Email: jackyngo@cuhk.edu.hk



- Research Interests:
1. Structure-function studies of pre-mRNA splicing factors
 2. The roles of splicing kinases in cancers and viral infections
 3. Structure-based drug discovery

Tsui Tsz-Ki, Martin, PhD (Minnesota)

Director, Environmental Science Programme
Email: mtktsui@cuhk.edu.hk



- Research Interests:
1. Environmental pollution
 2. Ecosystem biogeochemistry
 3. Stable isotope applications

Wong Wing-Tak, Jack, PhD (CUHK)

Email: jack_wong@cuhk.edu.hk



- Research Interests:
1. Vascular and metabolic biology
 2. Stem cell biology
 3. Cardiovascular regeneration

Zhong Silin, Steven, PhD (Nottingham)

Email: silin.zhong@cuhk.edu.hk



- Research Interests:
1. Genetics and epi-genetics in plant development
 2. The roles of transcription factor in hormone signaling
 3. Sequencing technology and computational biology

ASSISTANT PROFESSORS

Chow Hei-Man, Kim, PhD (HKU)

Email: heimanchow@cuhk.edu.hk



Research Interests:

1. Metabolic plasticity and neurodegenerative disorders
2. Mitochondrial bioenergetics
3. Aging and cellular senescence

Li Cheng, PhD (Queensland)

Email: cheng.li@cuhk.edu.hk



Research Interests:

1. Starch structure-function relationships
2. Carbohydrates and health
3. Cereal chemistry and processing

McIlroy Shelby E., PhD (Buffalo)

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Research Interests:

1. Ecology and Evolution of Coral Symbioses
2. The Impact of Anthropogenic Change on Marine Biodiversity

Michael Pittman, PhD (UCL)

Email: mpittman@cuhk.edu.hk



Research Interests:

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

Benoit Thibodeau, PhD (Quebec)

Email: benoit.thibodeau@cuhk.edu.hk



Research Interests:

1. Ocean Biogeochemical Dynamics
2. Stable Isotope Geochemistry
3. Anthropogenic impacts
4. Paleoceanography & paleoclimate

Tsang Ling-Ming, PhD (CUHK)

Associate Director, Biology Programme

Email: lmtsang@cuhk.edu.hk



Research Interests:

1. Biogeography and conservation genetic
2. Evolution and phylogeny of crustaceans
3. Molecular ecology of marine animals

Zhuang Xiaohong, PhD (CUHK)

Email: xhzhuang@cuhk.edu.hk



Research Interests:

1. Autophagy and autophagosome formation in plants and green algae
2. Signaling mechanisms of selective autophagy in plant stress resistance
3. Lipid metabolism and membrane dynamics

RESEARCH PROFESSORS

Chen Zhenyu, PhD (Mass.)

Email: zhenyuchen@cuhk.edu.hk



Research Interests:

1. Cholesterol metabolism and heart diseases
2. Antioxidants and free radicals
3. Fatty acids and health

RESEARCH PROFESSORS

Shaw Pang-Chui, PhD (Lond.)

Director, LDS YYC R&D Centre for Chinese Medicine

Email: pcshaw@cuhk.edu.hk



Research Interests:

1. Structure-function studies of proteins
2. Authentication and quality control of Chinese medicinal material

RESEARCH ASSOCIATE PROFESSOR

He Junxian, DS (Lanzhou)

Email: jxhe@cuhk.edu.hk



Research Interests:

1. Plant development and signal transduction
2. Functional genomics and signaling mechanisms of plant stress resistance
3. Improvement of crop yield and quality using molecular biotechnologies

RESEARCH ASSISTANT PROFESSORS

Cheng Kaihao, PhD (HKU)

Email: kaihaocheng@cuhk.edu.hk



Research Interests:

1. Spectral biology in coastal health and food security
2. Precision agriculture and plant physiology
3. Ecological remote sensing
4. Coastal algal blooms and fecal pollution

Chui Pui-Yi, Apple, PhD (CUHK)

Email: applepychui@cuhk.edu.hk



Research Interests:

1. Impact of climate change on marginal coral communities
2. Interventions that might increase coral resilience
3. Coral restoration

Lao Xiangzhou, PhD (HKU)

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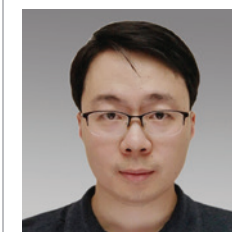


Research Interests:

1. Fluorescence microscopy
2. Fluorescent materials
3. Spectroscopy
4. Optical Instrumentation
5. Cellular Structures

Liang Zizhen, PhD (Beijing Normal Univ)

Email: zizhenliang@cuhk.edu.hk



Research Interests:

1. Organelle dynamics in developing pollens
2. Plastid transformation in Arabidopsis cotyledon
3. 3D electron microscopy, cryo-electron microscopy

Zhai Liting, PhD (CAS)

Email: ltzhai@cuhk.edu.hk



Research Interests:

1. Structure-function study (using X-ray crystallography and Cryo-EM) of the molecular mechanism in bacteria and plant.
2. Structural and functional study of suppressors of *free1* in plant.

SENIOR LECTURERS

Chiu Chi-Ming Lawrence, PhD (HKU)

Email: chimingchiu@cuhk.edu.hk



Research Interests:

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

SENIOR LECTURERS

Koon Chun, Alex, PhD (UMass Med)

Assistant Director, Cell and Molecular Biology Programme
Email: alexkoon@cuhk.edu.hk



Research Interests:

1. Synaptic plasticity
2. Neurodegenerative and neuromuscular diseases
3. Drosophila neurobiology
4. Science communication
5. Humour as a pedagogical approach

LECTURERS

Kwek Erika, PhD (CUHK)

Email: erikakwek@cuhk.edu.hk



Research Interests:

1. Food safety & processing technology
2. Nutrition, human physiology & endocrinology
3. Gut microbiota regulation

Law Man-Suet, Michelle, PhD (CUHK)

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Research Interests:

1. Earthworm Ecology and Biodiversity
2. Soil Biogeochemistry and Ecosystem Functioning
3. Sustainability and Environmental Resource Management

Li Yuk-Man Charis, PhD (CUHK)

Email: charisli@cuhk.edu.hk



Research Interests:

1. Fat and cholesterol metabolism
2. Anti-aging and nutraceutical
3. Food Toxicology

Lo Fai-Hang, PhD (CUHK)

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Research Interests:

1. Molecular cell biology
2. Cancer research
3. Natural product research
4. Life science research and education method ologies

Ngai Hung-Kui, PhD (CUHK)

Assistant Director, Biochemistry Programme

Email: hkngai@cuhk.edu.hk



Research Interests:

1. Protein biochemistry
2. Metabolic disorders
3. Pedagogical development

Siow Lam, Nina, PhD (HKUST)

Assistant Director, Molecular Biotechnology Programme

Email: nina@cuhk.edu.hk



Research Interests:

1. Molecular and cellular neuroscience
2. Cell signaling and gene regulation

So Wai-Lok, Henry, PhD (CUHK)

Email: wailokso@cuhk.edu.hk



Research Interests:

1. Soil biodiversity
2. Myriapod, arthropod and invertebrate biology
3. Invertebrate endocrinology
4. Evolutionary biology and genomics

LECTURERS

Yam Kwan-Mei, MPhil (CUHK)

Assistant Director, Biology Programme
Email: kwanmeiyam@cuhk.edu.hk



Research Interests:

1. Molecular biology
2. Endocrinology
3. Popular science promotion
4. Learning and teaching methodologies

Yip Pui-Sze, Peggy, MPH (Benedictine)

Registered Dietitian (USA), Registered Nutritionist (UK),
Accredited Dietitian (HK)

Email: peggyyipuisze@cuhk.edu.hk



Research Interests:

1. Nutrition promotion
2. Public health and community nutrition

ASSISTANT LECTURER

Sin Man-Ching, Daisy, MND (Canberra)

Accredited Practising Dietitian (AU),
Certified Personal Fitness Trainer (AASFP, HK)
Email: daisymcsin@cuhk.edu.hk



Research Interests:

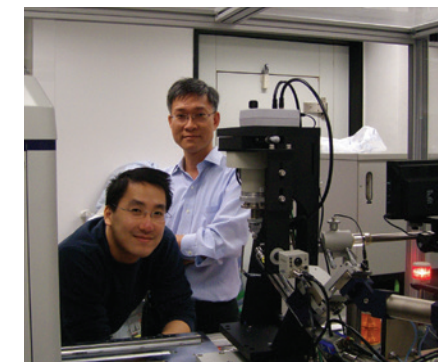
1. Nutrition education and behavioral modification
2. Weight and chronic disease management

EXCELLENT RESEARCH



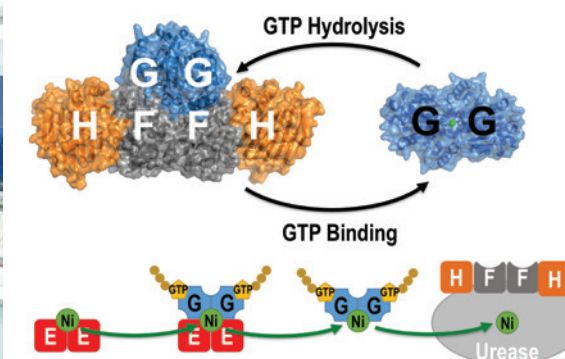
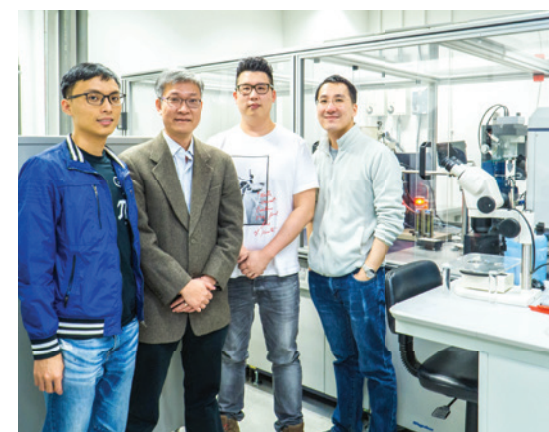
HOW HELICOBACTER PYLORI USES A TOXIC SUBSTANCE TO KEEP ALIVE IN HUMAN STOMACH

Prof. Kam-Bo Wong's research group at the School of Life Sciences uncovered how *Helicobacter pylori* (*H. pylori*) solves the problem of delivering a toxic metal, nickel, to the active site of urease, an enzyme essential for the infection of the pathogen in acidic human stomach.



H. pylori, which infects half of the human population and causes peptic ulcers and stomach cancer worldwide, is the only pathogen that can survive the gastric acidity in the human stomach. This is because *H. pylori* produces urease, a neutralising agent that breaks down urea into ammonia, which helps neutralise the acid. However, there is one problem for the bacterium which is that urease requires nickel ions to function - free nickel ions are toxic. *H. pylori* must find a way to deliver the nickel ions to the urease, without releasing the toxic metal ions inside the cells.

In *H. pylori*, the delivery of nickel ions for urease activation is assisted by four helper proteins, UreE, UreF, UreG and UreH. Prof. Wong and his team used X-ray crystallography as a molecular microscope to visualise how these helper proteins work together to deliver the nickel ions to the urease. They showed that the ability of UreG to change its molecular shape is essential for nickel delivery. Upon binding or hydrolysis of guanosine triphosphate (GTP), UreG can change its molecular shape, which determines its protein-interacting partners; UreG interacts with UreE when GTP is bound, but binds UreF/UreH after GTP hydrolysis. This process allows the nickel ions to pass from UreE to UreG, and finally to the urease through protein-protein interactions so that the toxic nickel ions have no chance to escape inside the cells where they can create havoc. Since the survival of *H. pylori* depends on the production of active urease, this discovery helps the future development of novel drugs against *H. pylori* infection.



THE STORY INSIDE AND BEHIND THE SOYBEAN GENOME

The Director of State Key Laboratory of Agrobiotechnology, Prof. Lam Hon-Ming and his team, supported by the China Manned Space Agency, and in collaboration with the China Resources Research Institute of Science and Technology (CRRIST) and Shenzhou Space Biotechnology Group (SBG), have sent **Longhuang Soybeans** into space on the Shenzhou-16 crewed spacecraft that launched on 30 May 2023. Together with the rhizobia specimens launched by the Tianzhou-6 cargo spacecraft on May 19, 2023, this represents the full implementation of the first Hong Kong agricultural research project launched into space.

Led by Professor Lam Hon-Ming, the research team has been devoted to soybean research for 25 years – namely the Soybean Homecoming project. The team has successfully defined new directions for soybean genome research by being the first to reveal the genetic diversity of wild soybeans in China using whole-genome sequencing (Nat. Gen., 2010), the first to identify the major-effect salt tolerance gene using an integrated genomic and genetic approach (Nat. Comm., 2014), and the first to construct a reference-grade genome of wild soybeans (Nat. Comm., 2019).



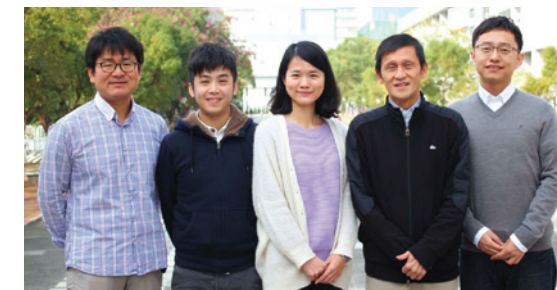
To further advance soybean breeding technology, Professor Lam is collaborating with CRRIST and SBG, launching these cultivars into space, to investigate any induced mutagenesis under space conditions. The team will conduct a meticulous analysis of the precious returned specimens to explore the mutation mechanism of soybean seeds in space, aiming to achieve breakthroughs in agricultural technology and explore the possibility of prospective space voyages.

The soybean seeds that were launched include three cultivars (**Longhuang 1, Longhuang 2, and Longhuang 3**) with excellent salt and drought tolerance characteristics. They are jointly developed by Professor Lam Hon-Ming with his collaborator Professor Zhang Guohong at the Gansu Academy of Agricultural Sciences, tailored for field application in Gansu province's geographical conditions. The soybean series is widely adaptive, with excellent salt and drought tolerance and disease resistance. Approved by the Gansu Province Agricultural Variety Approval Committee for field application in 2016, the Longhuang series has been distributed to farmers in Gansu for cultivation at no cost. As of 2022, they had been planted in an area of more than 55,000 hectares, bringing local farmers additional income of RMB69 million. The research project has also been included as an example in the STEM education curriculum, benefiting Hong Kong students.

Overwhelmed with joy and excitement, Professor Lam Hon-Ming sent off his soybean seeds to the skies, looking forward to their safe journey home. "This project, on the one hand, marks a new milestone for agricultural advancement in Hong Kong, and on the other hand, it also strengthens the synergistic scientific efforts in Hong Kong and the Mainland. I hope that this project can also inspire local students to excel, to break through, and to broaden their horizons."

MAJOR PROGRESS MADE IN PLANT AUTOPHAGY RESEARCH BY CUHK RESEARCHERS PUBLISHED IN PNAS

A team of researchers at The Chinese University of Hong Kong (CUHK) led by Professor JIANG Liwen, Choh-Ming Li Professor of Life Sciences, has recently made a major breakthrough in revealing the membrane origin of autophagosome in plants, providing new insight into improving crop quality. The results have been published in Proceedings of the National Academy of Sciences (PNAS).



A research team led by Prof. Liwen Jiang of School of Life Sciences sheds new light on the essential role of ATG9 in plant autophagosome membrane initiation. From Left: Prof. Byung-Ho KANG; Mr. Kin Pan CHUNG; Dr. Xiaohong ZHUANG; Prof. Liwen JIANG and Dr. Yong CUI.

Autophagy is a conserved degradation process in eukaryotic cells to eliminate intracellular components during stress conditions and pathogen infection. Professor Jiang's research team has been working on the underlying mechanisms of protein transport and organelle biogenesis in plant cells for more than 23 years at CUHK, and has been internationally recognized as a leading group in the field of plant cell biology. In the recent study published as a PNAS Plus paper, his research team utilized a combination of in vivo real-time imaging, 3D tomographic reconstruction, and genetic approaches, uncovered a unique role of ATG9 in mediating autophagosome progression from the endoplasmic reticulum (ER). His research team has addressed a fundamental question on "where is the membrane origin of the autophagosome" which puzzling scientists in the past decades.

Professor Jiang said, 'This discovery has far reaching implications for enhancing agricultural productivity. Since ATG9 is conserved among higher eukaryotic cells, such as rice, maize and soybean, further research on the molecular mechanism of plant autophagy pathway will provide new insight into how to improve crop quality to overcome stress environment or pathogen infection, which has become a serious problem in agriculture.'

This study was mainly carried out by two postdoctoral fellows (Drs. ZHUANG Xiaohong and CUI Yong) and a Ph.D. student (Mr. CHUNG Kin Pan) in Professor Jiang's laboratory, in collaboration with Prof. Byung-ho KANG, an expert in 3D Tomography TEM analysis. The project was supported by the Areas of Excellence (AoE) Scheme and Collaborative Research Fund (CRF) of the Hong Kong Research Grants Council, as well as the AoE Centre for Organelle Biogenesis and Function, Centre for Cell and Developmental Biology, and State Key Laboratory of Agrobiotechnology (Partner Laboratory in The Chinese University of Hong Kong) of CUHK.

Graduate students and postdoctoral researchers supervised by Professor Jiang's have received many prestigious awards for their research excellence, including CUHK Young Scholars Dissertation Award (twice), Postgraduate Students Publication Award (six times), Keystone Symposium Scholarship USA (twice) and Human Frontier Science Program Long-Term Fellows (twice), as well as the Thousand Talents Plan of China (three times).

UNRAVELING BRAIN FUEL METABOLISM TO COMBAT ALZHEIMER'S DISEASE

Metabolic dysregulation is commonly observed in early Alzheimer's

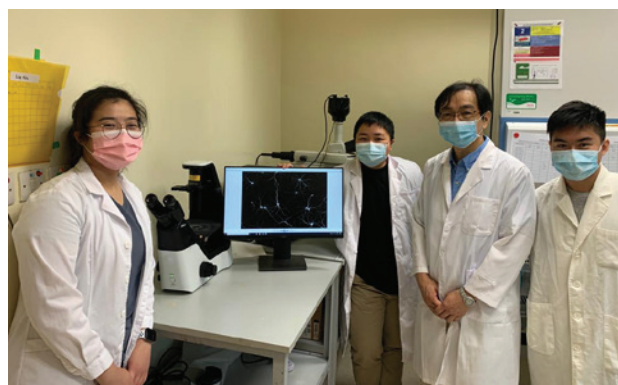
Recently, growing numbers of evidence hinted that Alzheimer's disease (AD) is a pervasive metabolic disorder in which altered cellular fuel metabolism is found at the early prodromal stages of the disease long before the symptoms manifest. Therefore, understanding on how perturbations in fuel metabolism are related to cellular changes occurred during this stage are critical to identifying targets for disease-modifying therapies.

Research advances in fuel metabolism

Prof. Hei Man (Kim) Chow's lab is a basic neuroscience research laboratory focuses on studying metabolic-related mechanisms underlying brain aging, particularly on how the peripheral body metabolic status affects the brain central metabolism, leading to elevated risks of dementia and Alzheimer's disease.

A research team led by Prof. Chow revealed that altered brain metabolism resulted from both lifestyle and genetic causes underlies early changes in dementia and Alzheimer's disease (AD).

In 2019, the team first revealed that how age-related hyperinsulinemia—a pre-diabetic condition—links to dementia and AD at cellular level. This study illustrated how metabolic responses initiated at the peripheral alters the fuel metabolism in the brain which consequently causes accelerated aging and functional decline of neurons (Chow et al., Nature Neuroscience, 2019).



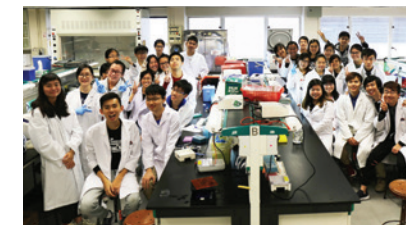
(From left) Ms. Jacquelyne Sun (PhD student), Prof. Hei Man (Kim) Chow, Prof. Kin Ming Kwan and Mr. Michael Lau (FYP)

More recently in 2023, the team studied how alcohol (i.e., ethyl alcohol) drinking leads to irreversible and persistent changes in brain cells that last even after alcohol abstinence. The study revealed that metabolism of ethyl alcohol in neurons directly alters their physiological metabolic network and cross-talks to aspects related to genome integrity, DNA-damage response and cellular senescence. As a metabolite, ethanol oxidation immediately yields acetaldehyde in neurons, which subsequently leads to a cascade of genomic stress and DNA damage. Accumulation of unrepaired DNA damage is associated with poorer cognitive and memory functions, even after a brief period of alcohol abstinence (Sun et al., Aging Cell 2023).

As of today, Prof. Chow's team is working on improving the maintenance of good metabolic health and avoiding the development of multiple chronic age-related conditions in the general population. The team aims to unlock the keys to extended health span and longevity observed among cohorts of centenarians of different ethnicities (Deng et al., Aging Cell 2023).

IGEM – GOLD MEDAL STORY

Synthetic biology, a rapidly emerging field that applies abstraction and other important engineering concepts to biological science, has taken the undergraduate science and engineering education by storm. The annual iGEM competition has quickly become the major event that encourages undergraduate student worldwide to spearhead in synthetic biology research.



Our iGEM teams consist mainly but not limited to students from the Faculty of Science and Engineering. We work together using synthetic biology experiments to develop their "bio-bricks", the standardized DNA parts tailor-made for different specific tasks, and characterize them systemically and scientifically, we also need to explain their projects to other non-science students and recently to secondary school pupils and the general public. Since the iGEM games are international games, we are able to make contacts with their peers from universities overseas via the Internet and in the virtual competition during the iGEM Jamborees. The games also put emphasis on presentations in oral format, poster format, and the use of wiki pages.

Joining such competition could provide us with opportunities to be at the front row seat to learn the latest development of research field and new techniques outside of the classroom. Most importantly, we also learn how to work together and interact with their peers at top universities around the world. Since 2010, we have obtained 4 gold awards, 1 silver award, and obtained Best New Bio-Brick Part (Natural), Best Bio-Brick Measurement Approach, in 2011 Asia Jamboree (Table 1). Our teams have had many exposures to the general public and mass media through different channels.

Previous iGEM projects of Hong Kong_CUHK and their achievements

Year	Team Name	Specific Project	Achievements
2010	Bioencryption	Using bacterial DNA to store encrypted information	World Jamboree Gold Medal
2011	ChloriColight	Using light-inducible halorhodopsin to transport chloride ion	Gold Medal, best bio-brick, best bio-brick measurement, advanced to world jamboree
2012	Light of No Return	Using light to attract bacteria to move by a light-sensitive protein linked to a signaling pathway to stimulate cell motility	Gold Medal, advanced to world jamboree
2013	Switch off PAHs	Using enzymes to degrade benzo-a-pyrene or other polycyclic aromatic hydrocarbons	Silver Medal, advanced to world jamboree
2014	ABCDE, AzotoBacter vinelandii Cluster-transformable Deoxygenated protein Expression	Developed a protein expression system in Azotobacter with genome recombination gene transfer cluster mechanism	Gold Medal obtained in World Jamboree
2015	Magnetosome Forming Azotobacter vinelandii	An expression system for the biosynthesis of magnetosomes - prokaryotic intracellular organelles with magnetic properties - in Azotobacter for biotechnology applications	Gold Medal obtained in World Jamboree
2017	Dr. Switch	A rapid on-site method for subtyping influenza A virus	Gold Medal obtained in World Jamboree
2019	2019 Team CUHK	Banana Savior: The X Sense	Gold Medal obtained in Giant Jamboree

A NEW THEORY FOR BACTERIAL GENOME EVOLUTION IN THE OCEAN



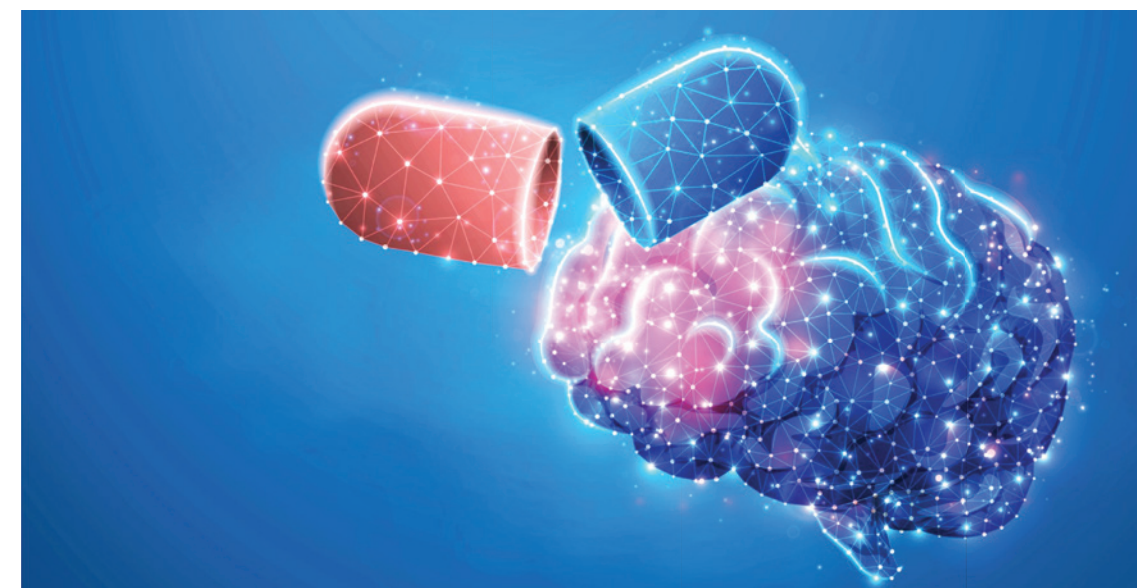
A drop of seawater contains millions of bacteria, most of which are smaller than 1 micron in cell diameter and smaller than 2 mega nucleobases in genome size. Over the past two decades, it was believed that the evolutionary pattern of these tiny marine bacteria is well explained by Darwin's theory of biological evolution, which posits that organisms adapt to the environment by preserving or eliminating genetic traits through natural selection. Seawater is an extremely dilute matrix where nutrients are scarce and often limit the growth of plankton. Through long-term evolution, many successful planktonic bacteria lost a large portion of their genomic DNA. This phenomenon has been interpreted as the major way that marine bacteria take to adapt to the oligotrophic seawater, because having less DNA

can save energy and material in biosynthesis and reduce the cell volume, thereby increasing the surface-to-volume ratio allowing more efficient uptake of nutrients from seawater. Thus, scientists have generally believed that evolution toward small genomes in marine bacterioplankton is the result of Darwinian natural selection. One prominent example is *Prochlorococcus*. As the most abundant photosynthetic carbon-fixing organisms responsible for 10% of global oxygen production, *Prochlorococcus* was generally accepted to have extremely large effective population sizes, so that natural selection was believed to be very efficient and genetic drift negligible in their evolution. *Prochlorococcus* is also known to have undergone a massive DNA loss event during its early evolution, and it was believed that natural selection acted to drive the genome reduction.

Over the past few years, the team led by Prof. Haiwei Luo provided evidence against this prevailing selective theory. By reconstructing the *Prochlorococcus* evolutionary history and calculating the evolutionary rate of different types of gene mutations, the researchers identified an excess of the more deleterious type of gene mutations accumulated at a genome-wide scale during the early evolution of *Prochlorococcus*, which coincided with the large-scale loss of DNA molecules. According to the modern molecular evolution theory, this finding supports that *Prochlorococcus* lost DNA molecules not for the purpose of adaptation to the nutrient-deficient seawater. On the contrary, it was a random process driven by genetic drift. The most likely reason for genetic drift to dominate early *Prochlorococcus* evolution is that the ancestral *Prochlorococcus* evolved under hostile environmental conditions and thus experienced severe population bottlenecks. In a subsequent study, the team performed a molecular clock analysis and linked this environmental catastrophe to the famous Snowball Earth icehouse climate conditions eponymous with the Cryogenian Period during 720 to 635 million years ago. Leveraging an agent-based model, the team further constrained the effective size of the ancestral *Prochlorococcus* populations evolving at that stage to be very low, on the order of only 10^4 - 10^5 . Together with the evidence supporting that opportunities of genetic recombination in ancestral *Prochlorococcus* were reduced in a frozen ocean during the Snowball Earth conditions, Prof. Luo proposed Muller's ratchet to be the mechanism driving the massive loss of DNA molecules in early *Prochlorococcus*. The modern environment is friendly to *Prochlorococcus*, thus hosting *Prochlorococcus* populations of larger effective sizes estimated to be on the order of 10^7 . This estimate was made based on the *Prochlorococcus* genomic mutation rate determined through a three-year mutation accumulation experiment. Despite being larger than that in *Prochlorococcus* early evolutionary stage, this effective size is still smaller than expected for modern *Prochlorococcus* populations by several orders of magnitude, suggesting genetic drift remains important in modern *Prochlorococcus* evolution.

These studies were published in *Nature Microbiology* (2017), *Proceedings B* (2021), *ISME Journal* (2024), and *Nature Ecology & Evolution* (2022). The effective population sizes of modern and ancient *Prochlorococcus* were discussed in an invited article published in *Annual Review of Marine Science* (2025).

THE RARE POWER OF CARE, CHECK & CURE



Professor Ho-Yin Edwin Chan began his research on rare diseases in 1999, but the defining moment that solidified his dedication to studying rare diseases occurred during an annual laboratory conference.

The heartfelt plea of the patient

In the year 2000, Prof. Chan was conducting post-doctoral research on spinocerebellar ataxias in Philadelphia, USA. During one instance, he attended an annual research conference on cerebellar atrophy research. The emcee of the conference revealed that she actually carried a genetic mutation for cerebellar atrophy herself, and she might develop the disease at any time. She acknowledged that many rare diseases had no cure, but the attending researchers may find a cure one day if they continue their studies. Despite the fact that she might not benefit from the studies in her life time, she hoped that future generations will.

The lonely planet of rare disease research

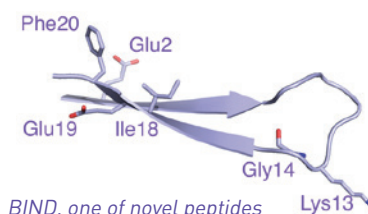
The words of the conference emcee deeply impacted Prof. Chan. The heartfelt plea of the patient, hoping for a method to help delay the onset of the disease or provide new treatments for themselves or their future generations, made him acutely aware of the sense of duty that scientists should possess. It should not be solely about pursuing personal career achievements but rather utilizing their knowledge and abilities to assist those in need. From that moment onwards, Prof. Chan devoted himself to the research of rare diseases. Later, realizing that there were few researchers in Hong Kong engaged in the study of rare diseases, he made the resolute decision to abandon his research work in the United States and return to Hong Kong to focus on studying the pathological mechanisms of cerebellar atrophy."



Prof. Edwin Chan, who established a Huntington's disease (HD) Patient Registry for Hong Kong to support the long-term clinical care of HD patients.

Dreams and Breakthroughs at the School of Life Sciences

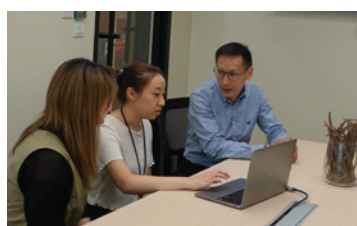
Through the relentless efforts of Prof. Chan and his research team, significant research achievements have been made over the years. In 2012, the research team began developing drugs for rare neurodegenerative diseases. In 2016, Prof. Chan developed a novel peptide inhibitor to counteract the CAG RNA toxicity of polyQ diseases. Recently, his research team discovered a peptide molecule composed of 21 amino acids, which serves as an improved peptide inhibitor for neurodegenerative diseases and is named BIND. This inhibitor targets the RNA toxicity of polyQ diseases as well as C9orf72-related amyotrophic lateral sclerosis (also known as ALS or Lou Gehrig's disease)/frontotemporal dementia (C9ALS/FTD). To date, Prof. Chan has obtained at least six patents for CUHK.



BIND, one of novel peptides invented by Prof. Chan, had been patented (CUHK-owned) for treating polyglutamine diseases.

From a dreamer to an entrepreneur

In order to more effectively assist patients with rare diseases and to have the opportunity to develop existing research patents into drugs more effectively, he conceived the idea of establishing "Rare Power."



Prof. Chan analysing data with the core members of "Rare Power".

Apart from Prof. Chan, Dr. Aldrin Yim and Dr. Maggie Leong, who are both CUHK Biochemistry Programme graduates, also have rich experiences in rare disease research, drug development, and biotechnology. This trio is regarded as the "iron triangle" in the rare diseases research community. In 2023, Prof. Chan's intention to establish a company received recognition and support from Dr. Maggie Leong and Dr. Aldrin Yim. The three of them became the founders of "Rare Power", a CUHK spin-off company that was funded by the Innovation and Technology Fund (ITF). "Rare Power" is dedicated to promoting scientific research, helping patients, and advancing drug development to combat rare diseases.

Technologies driven by The Rare Power

The initial mission of "Rare Power" is "Learn from the Rare, redefining rare through innovation." The company aims to work alongside patients, develop products and services based on the needs of rare disease patients, and provide high-quality services that benefit not only rare disease patients but also other patients. The company offers "3 C" services to patients, which include Care, Check, and Cure. It provides patients with auxiliary and alternative communication tools to help others understand their needs and achieve effective care. Researchers can examine patients' conditions through biomarkers and provide suitable drugs for treatment. The company hopes to provide appropriate assistance to patients at different stages of their illness through a series of technologies and services.

The Government jumpstarter

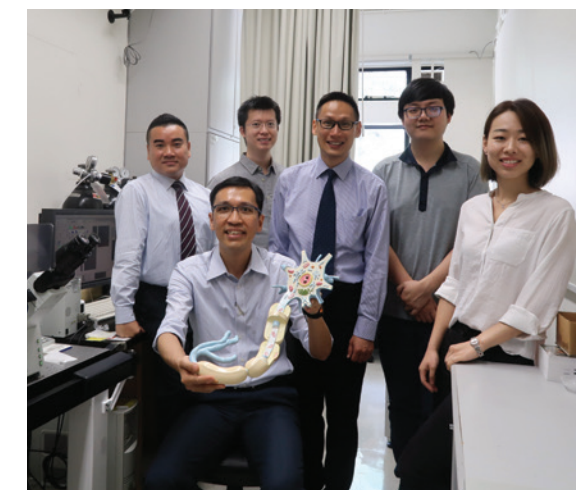
The technologies held by the company are innovative and cutting-edge in the market. "Rare Power" pioneered the non-invasive delivery of drugs to the brain through the nasal cavity, and these peptide drugs were developed specifically for RNA in neurodegenerative diseases. The company is committed to promoting local scientific research and drug development, with products developed through the efforts of the local research team. Many ongoing drug developments focus on gene silencing and gene editing, while the company's research direction is novel and differs from the mainstream. This brings new thinking and inspiration to the field of drug development in the scientific research community. The company's drug development projects are currently supported by the Innovation and Technology Fund of the Hong Kong Government.

A NOVEL MECHANISM TO STIMULATE NEURITE OUTGROWTH – PAVING A NEW ROAD FOR BRAIN REGENERATIVE MEDICINE

A team of scientists led by Professor Kwok-Fai LAU has recently discovered a novel mechanism that stimulates a process called neurite outgrowth – the growth of nerve cell (neuron) projection. This finding provides important insights into developing strategies to stimulate neurite regeneration after nerve injury caused by traumatic brain injury (TBI) and in neurodegenerative disorders. This research is published in the May 2018 issue of the Journal of Biological Chemistry, the prestigious journal of the American Society for Biochemistry and Molecular Biology.

TBI occurs when an external force injures the brain. It usually results from falls, car accidents, sports-related injuries and beatings. Severe situations may lead to permanent disability. Neurodegenerative disorders are symptoms of loss of function in brain and spinal cord cells, including Alzheimer's disease, Parkinson's disease, spinocerebellar ataxia, and amyotrophic lateral sclerosis. About 5% to 8% of elderly people in Hong Kong suffer from dementias, most of whom have Alzheimer's disease, placing a heavy burden on society. In these diseases, a damaged neural network is observed, in which degeneration and retraction of neurite are found.

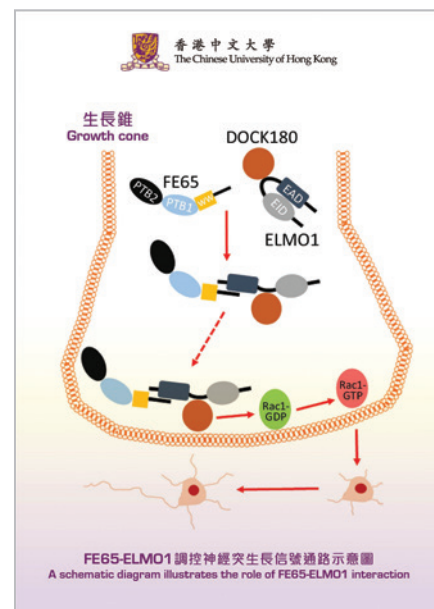
The brain is the command centre of animals and is composed of neurons interconnected by neurite, grown out from their cell bodies. Such connections are essential for the formation of neural networks which allow the communication of neurons to regulate different cognitive functions and body activities. However, when neurites are degenerated and retracted, the connections of the neural network cannot be maintained and the cognitive and body's motor functions will be difficult to recover. At present, there is no cure for nerve damage. CUHK School of Life Sciences has discovered a mechanism that stimulates neurite outgrowth. As long as two specific proteins are introduced into the neuron, their interactions can increase the length of neurites by at least two times and bring new hope for the reconnection of impaired neural networks.



Professor Kwok-fai Lau and his team members (from left, back row): Professor Jacky Ngo, Dr. Alex Koon, Professor Edwin Chan, Mr. Ray Chan, and Dr. Wen Li.



A comparison of neurite length between control and FE65-ELMO1 introduced neurons



A schematic diagram illustrates the role of FE65-ELMO1 interaction. In a growth cone, FE65 recruits the complex of ELMO1 and DOCK180, and together they form FE65-ELMO1-DOCK180 complex. It is targeted to the plasma membrane to promote Rac1 activation and thereby neurite outgrowth.

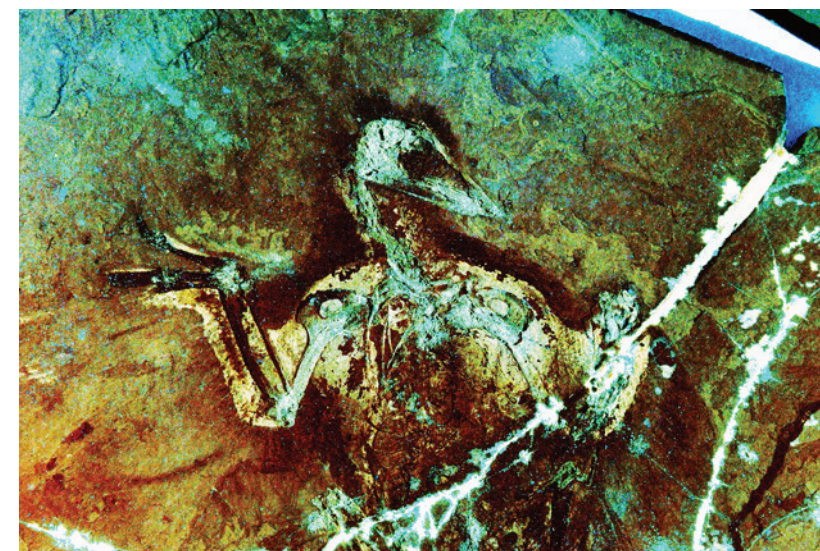
Professor Lau's team has found that the interaction between two proteins, named FE65 and ELMO1, strongly stimulates neurite outgrowth. FE65 is a brain-enriched adaptor that is implicated in nervous system development, while ELMO1 is a widely expressed protein that participates in various processes including cell migration. However, the role of ELMO1 in the nervous system has never been reported. By introducing FE65 and ELMO1 to mammalian neurons, the length of neurite was increased by at least two-fold. Conversely, such stimulatory effect was not observed when the interaction was interrupted. The team further demonstrated that such interaction promotes the transport of ELMO1 to the plasma membrane where it activates Rac1, a key regulator of cytoskeleton, the remodeling of which is required for neurite extension.

One major obstacle in treating neurodegenerative disorders, including Alzheimer's disease, is how to re-connect the neurons in the brain of the patients. Professor Lau believes that their work has provided a new direction in regenerative medicine for the injured brain. He said, 'Re-connection of injured neurons could be achieved by the stimulation of neurite re-outgrowth in these cells through manipulating FE65-ELMO1 interaction.' Most recently, the team has obtained new data regarding how to regulate the interaction.

CUHK PALAEONTOLOGIST CONFIRMS ANCIENT FLYING DINOSAURS USED SHOULDER-POWERED WING UPSTROKE IN EARLY FLIGHT EVOLUTION

Palaeontologists previously discovered that ancestral flying dinosaurs used shoulder muscles to power wing upstrokes and chest muscles to power wing downstrokes, based on existing evidence from bony fossils and living animals. Scientists from The Chinese University of Hong Kong (CUHK) and around the world finally confirmed the milestone by examining elusive preserved soft tissues. This represents the earliest soft anatomy profiles of flying dinosaurs, discovered using high-tech laser imaging technology.

The research team applied the Laser-Stimulated Fluorescence (LSF) technique to more than 1,000 fossils of flying paravian dinosaurs that lived during the Late Jurassic and Early Cretaceous periods in what is now northeastern China. The shoulder and chest regions were key targets for observations of preserved soft tissue flight anatomy. The team combined the soft anatomy data with quantitative skeletal reconstructions for their validation work.

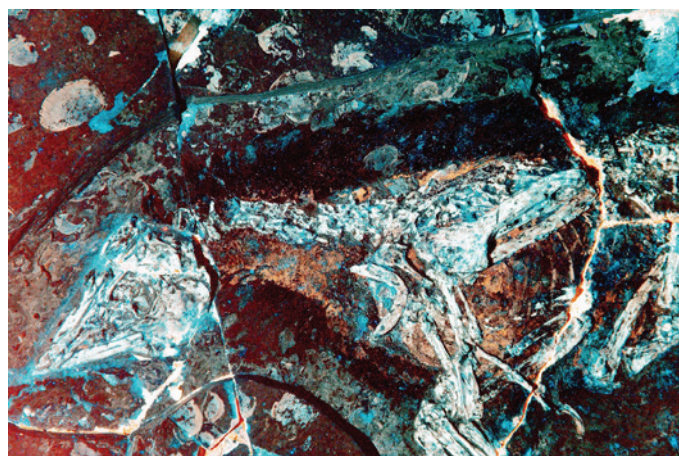


Laser-stimulated fluorescence (LSF) image of the Early Cretaceous beaked bird *Confuciusornis*, showing large shoulders that powered the wing upstroke. Image Credit: Pittman et al. 2022.

Dr Michael Pittman, Assistant Professor of CUHK's School of Life Sciences and lead author of the study, said, "We have a good understanding of how living birds fly, but we know much less about how early fossil birds and their closest relatives flew since their soft tissues are rarely preserved. By using LSF imaging, my team can now see these elusive soft tissues that were only suggested previously by fossil bones."

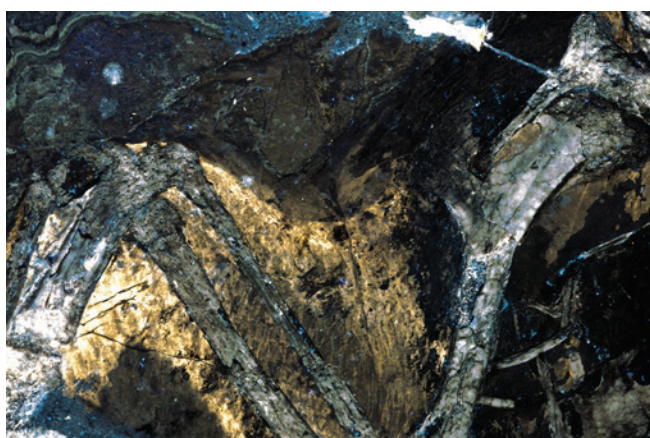
"The LSF data validated the ancestral flight condition of flying dinosaurs, where shoulder muscles powered the wing upstroke and chest muscles powered the wing downstroke, moving the field closer to accurately reconstructing early flight capability."

The team's soft tissue reconstructions also included an early beaked bird from around 125 million years ago, *Confuciusornis* – named after the famous Chinese philosopher. Its reconstruction suggests that it had a weakly constructed chest and strongly constructed shoulders. Professor Xiaoli Wang from Linyi University in Shandong Province, the study's joint-corresponding author, commented, "Our *Confuciusornis* reconstruction indicates the earliest evidence of upstroke-enhanced flight, which is very exciting."



LSF image of the Early Cretaceous beaked bird *Confuciusornis*, showing a rare side view with a weakly constructed chest. These data were used to show early development of upstroke-enhanced flight. Image Credit: Pittman et al. 2022.

Certain early flying birds have a strangely absent breast bone, or sternum, something that has been a mystery in the field. Co-author Mr Thomas G. Kaye from the Foundation for Scientific Advancement in Arizona, USA, commented, "We used our LSF data to propose that a more weakly constructed chest in early birds like *Anchiornis* was behind their lack of a breast bone. They didn't use their chest muscles enough for the sternum to be needed, so it was lost."



LSF reveals the wing of the Early Cretaceous beaked bird *Confuciusornis*, including a ligament controlling the tension of the wing's front edge (yellow stripe). Image Credit: Pittman et al. 2022.

Many of the specimens studied are on display at the Shandong Tianyu Museum of Nature in Shandong Province, which is world-renowned for its collection of feathered dinosaurs. Museum Director and co-author Professor Xiaoting Zheng commented, "We are delighted that the team used data from more than 1,000 of our specimens to produce further significant advances in the study of flying dinosaurs. We look forward to sharing more exciting discoveries in the future."

The findings were published in prestigious international scientific journal *Proceedings of the National Academy of Sciences (PNAS)* (<https://www.pnas.org/doi/10.1073/pnas.2205476119>)

ACADEMIC HONOREES AND AWARDEES



Croucher Senior Research Fellowship
RGC Senior Research Fellow

Professor JIANG Liwen

Dr. Jiang joined CUHK Biology as an Assistant Professor in 2000 and was promoted as Professor in 2007. Professor Jiang is currently Choh-Ming Li Professor of Life Sciences of School of Life Sciences and Director of RGC-AoE Centre for Organelle Biogenesis and Function, as well as Director of Centre for Cell and Developmental Biology. Professor Jiang's research team has been working on the underlying mechanisms of protein transport, organelle biogenesis and function in plants for

23 years at CUHK, and has been internationally recognized as a leading group in the field. Professor Jiang received numerous awards for teaching and research achievements, including CUHK Science Faculty Exemplary Teaching Award 2008, CUHK Research Excellence Award four times (2006-07, 2009-10, 2015-16, 2022-23), Croucher Senior Research Fellowship twice (2009-10 & 2015-16), Ministry of Education (MoE) Higher Education Outstanding Scientific Research Output Awards, including First-Class Award once (2009) and Second-Class Award three times (2013, 2017, 2022), Outstanding Fellow of the Faculty of Science (2013), Choh-Ming Li Professorship of Life Sciences (2014) and RGC Senior Research Fellow (2021/22). Graduate students from Professor Jiang's lab have also received many prestigious awards, including CUHK Young Scholars Dissertation Award (twice), Postgraduate Students Publication Award (six times), Keystone Symposium Scholarship (twice) and Human Frontier Science Program Long-Term Fellows (twice). 20 graduate students/ postdoctoral fellows from Professor Jiang's lab have become PIs. As PI/PC, Professor Jiang has received competitive research grants worth over HK\$146 million from the Research Grants Council of Hong Kong, the Croucher Foundation and other important funding bodies. Professor Jiang has also served as Editors-in-Chief of *Plant Science*, Associate Editor of *Protoplasma*, Senior Editors of *Journal of Integrative Plant Biology* and Editorial Board Members of *The Plant Cell*, *Molecular Plant*, *Botanical Studies* and *Science China : Life Sciences*.

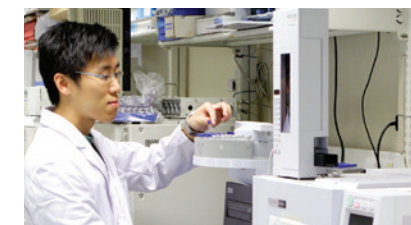
Research Grant Council (RGC)-funded Collaborative Research Fund

In the last few years, the School of Life Sciences received both the AoE and CRF funding from RGC to build upon our existing strengths and develop them into Areas of Excellence (AoE) and to fund projects with significant potential to develop into an area of strength.

AoE Project:

Professor Liwen Jiang and his team received an AoE grant of HK\$47.25M to establish the Center of Organelle Biogenesis and Function beginning in January 2014.

Professor Hon-Ming Lam received an AoE grant of HK\$75.591M for "Center for Genomic Studies on Plant-Environment Interaction for Sustainable Agriculture and Food Security."



CRF/RIF Project:

Professor Liwen Jiang was awarded HK\$9.5M for “Molecular Mechanisms of Vacuole Biogenesis and Vacuole Fission in Plants”, HK\$10M for “The First Integrated State-of-the-Art Live Cell Imaging Platforms to Timely Promote Interdisciplinary and Advanced Life Sciences Research in Hong Kong and Beyond”, HK\$6.4M for “Vacuole Biogenesis, Dynamics and Functions in Plants”, HK\$ 7.439M for “The First Integrated State-of-the-Art Sample Preparation System for Cryo-Electron Microscopy/Tomography Analysis to Promote Advanced Cellular and Structural Biology Research in Hong Kong”, HK\$7.21M for “Molecular Mechanisms of Autophagy and Autophagosome in Plants”, HK\$5M for “Plant Bioreactor for Pharmaceutical Proteins” and HK\$9.5M for “The First Integrated cryo-EM and cryo-ET Shared Facility for Life Sciences Research in Hong Kong”, HK\$9.5M for “Molecular Mechanisms of Vacuole Biogenesis and Vacuole Fission in Plants”

Professor Hon-Ming Lam and his collaborators were funded HK\$6.99M for “Genomic and Molecular Studies of a Salinity Tolerance Locus in the Wild Soybean Genome”.

Professor Ting-Fung Chan was granted HK\$2.17M for “A Nanochannel-based next-generation Mapping System for the Study of Complex Genomic Feature and Variation for Biotechnological and Biomedical Applications”.

Professor Kam-Bo Wong was granted HK\$2.3M for “A State-of-the-art X-ray Diffraction Facility for Structural Biology Research in Hong Kong”.

Professor Edwin Chan was granted HK\$7M for his project titled “Targeting RNA and Protein Toxicities of Polyglutamine Diseases Using Peptidyl Inhibitors”.

Professor Jerome Hui was granted HK\$3.25M for his project titled “Earth BioGenome Project: Hong Kong”

Other Research Awards:**Research Excellence Award**

Year	Awardees
2006-2007	Professor Jiang Liwen
2007-2008	Professor Chu Ka-Hou
2008-2009	Professor Chen Zhen-Yu
2009-2010	Professor Jiang Liwen
2012-2013	Professor Lam Hon-Ming
2015-2016	Professor Jiang Liwen
2018-2019	Professor Wong Po Keung
2019-2020	Professor Lam Hon-Ming
2021-2022	Professor Luo Haiwei
2022-2023	Professor Jiang Liwen
2023-2024	Professor Chan Ting Fung

Outstanding Research Impact Award

Year	Awardees
2022-2023	Professor Lam Hon-Ming

CUHK Young Researcher Award

Year	Awardees
2008-2009	Professor Kwan Kin-Ming
2009-2010	Professor Chan Ho-Yin Edwin
2016-2017	Professor Luo Haiwei

Other Distinguished Award

Year	Award	Name
2023	Medal of Honour (HKSAR)	Professor Lam Hon-Ming
2019	GGEF Women Eco Changer Awards – Eco Star of China	Dr. Chui Pui-Yi, Apple

Teaching Development and Language Enhancement Grant for 2022-25 Triennium

A total amount of HK\$6,836,317 was awarded to 11 projects supervised/co-supervised by the teaching staff of the School of Life Sciences : Prof. P.C. Shaw; Prof. LW Jiang; Prof. Apple Chui; Prof. Jack Wong; Prof. BH Kang; Prof. KM Kwan; Prof. XH Zhuang; Prof. Wilson Lau; Prof. Edwin Chan; Dr. Alex Koon; Dr. Michelle Law; Dr. Patrick Ngai; Dr. Charis Li; Dr. David Lau; Dr. FH Lo.

Funding Scheme for Initiatives on United Nations Sustainable Development Goals

\$300,000 was awarded to a project run by Professor CHUI Pui Yi Apple and others

RESEARCH IN THE SCHOOL

The School of Life Sciences engages actively in a wide array of research areas. They vary from as small as a molecule to as large as a habitat.

Cell Biology

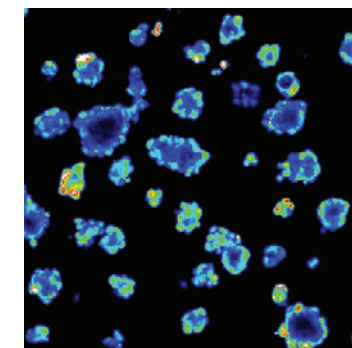
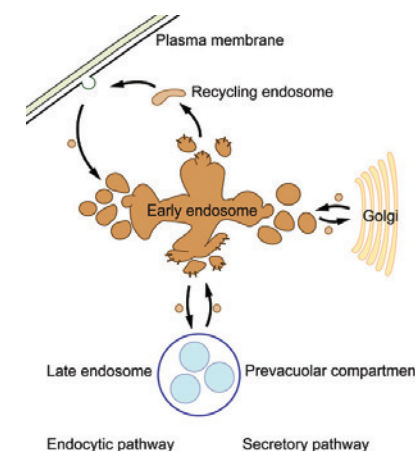
This covers a wide range of interdisciplinary areas in life sciences that explain the molecular and cellular organization, and how the signaling pathway regulates cellular function. Major topics include signal transduction, cell fate, neuroscience, stem cell biology, and cancer cell biology.

Molecular mechanisms of protein trafficking in the plant secretory and endocytic pathways provide hints for using plants as bioreactors for producing pharmaceuticals.

Recent development of stem cell research focuses on the basic biology and biomedical application of embryonic stem cells that aim to identify possible strategies for clinical uses.

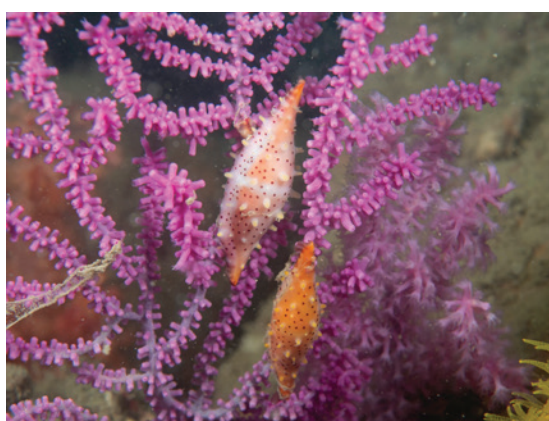
Cancer cells were discovered to be capable of recovering after exposure to a chemical cocktail that triggers programmed cell death. This finding could potentially help the development of new, more effective anti-cancer drugs.

Neuroscience is the biology of nervous system, which allows us to sense and respond to the external environment. Our neuroscience research actively investigates the pain hypersensitivity, neuronal differentiation, and the pathogenesis of nervous system diseases, for instance, Alzheimer's and Parkinson's Diseases.



Biodiversity, Conservation and Ecology

One of our research areas is in the discipline of wildlife conservation and habitat restoration. Analyses of ecosystem functioning, bioindicator assemblages, and microbiological status are the key attributes of the desirable ecological changes in terms of the ecosystem integrity and health, which are of primary concern in the ecological restoration. We also investigate vegetation composition and ecological succession on fly-ash lagoons and used municipal landfill sites for better habitat restoration.



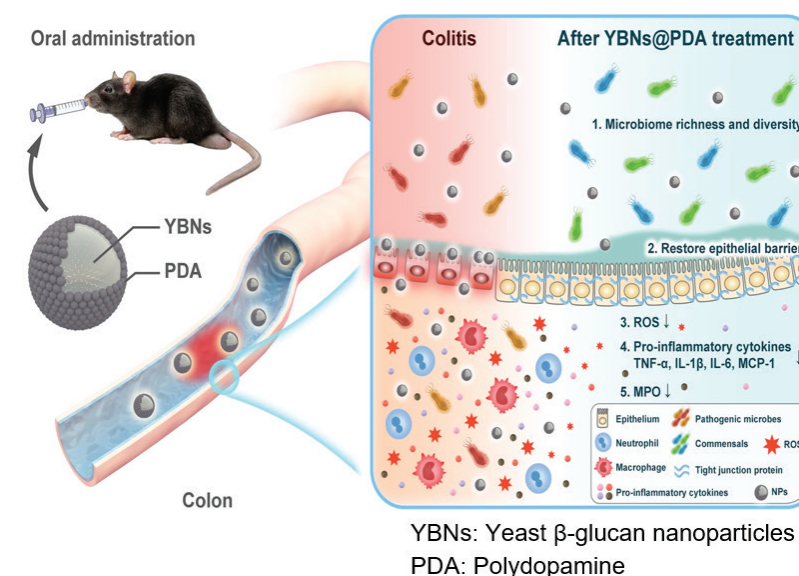
Marine Science

Eighty percent of life on earth is found in the oceans where they inhabit many diverse and unique ecosystems. CUHK scientists conduct research to understand, conserve, and restore marine biodiversity, and to promote healthy marine ecosystems. Just a short boat ride away from some of the most diverse marine ecosystems in the region, researchers at the Simon F.S. Li Marine Lab use a variety of traditional as well as cutting edge research tools for marine science. For example, small sections of DNA such as protein coding genes are used to quantify biodiversity, discover new species, and understand phylogenetic relationships among marine organisms. Whole genome sequencing is used to study how climate change and local stressors are driving adaptation which helps them to make predictions of what our ecosystems might look like under different scenarios. This understanding of biodiversity and how it is being reshaped by human impacts feeds directly into conservation and restoration work in Hong Kong and beyond.



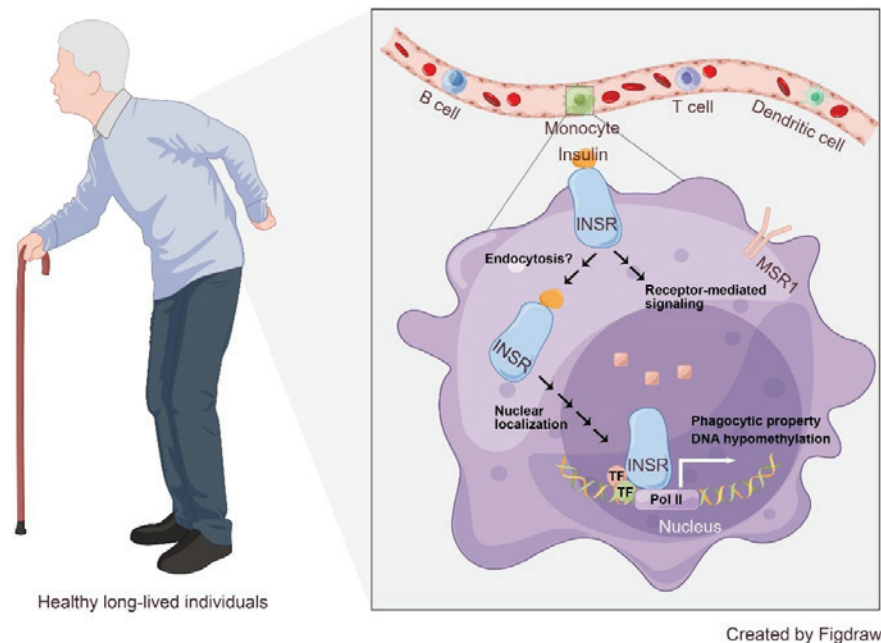
Food & Nutritional Sciences

Nutritive food ingredients, like lipids and dietary fibres, and non-nutritive compounds isolated from plant foods are investigated for their potential benefits in the prevention of chronic disease development. Among these food ingredients, non-starch polysaccharides are a multifunctional bioactive macromolecules capable of being a prebiotics for gut health and as nanotherapeutics by forming nanocarriers for targeted drug delivery.



Preparation and mechanistic study of novel food polysaccharide-based nanotherapeutics for inflammatory diseases

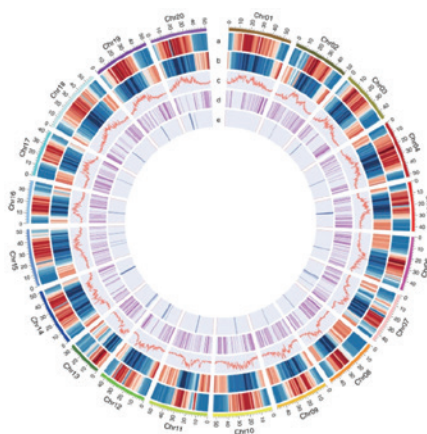
Conversely, the causal relationships between these diseases with the overconsumption of food ingredients with “empty calories” such as alcohol and sugar of the modern diets are focused as well. To tackle disease that have not been cured by modern medicine, several members in the School are working in functional food, nutraceuticals, and precision nutrition research. The neurological, anti-tumor, and immunomodulatory effects of the active compounds isolated from traditional Chinese medicines and functional foods are examined at gene and protein levels, using pathways guided genomic and proteomic approaches. Moreover, some of our members are also focusing on dissecting the linkage between metabolic reprogramming and disease pathogenesis, including the relationship with healthy lifespan and extreme longevity from the opposite perspective. Advanced integrated omics techniques that offer single-cell and spatial-related resolutions are deployed to address how cellular metabolic network became dysfunctional in different tissue microenvironments and homeostatic status.



The unique whole body metabolic status of supercentenarians

Genomics & Bioinformatics

Genomics and bioinformatics have jointly revolutionized the landscape of life science research. Genomics, as a discipline, is responsible for generating vast amounts of data through the sequencing and analysis of genomes, offering a deeper insight into the genetic makeup of organisms. On the other hand, bioinformatics is the toolset that enables the analysis and interpretation of the colossal amount of data. Their combined influence can be witnessed across diverse research areas, ranging from understanding biodiversity and conservation, to unraveling disease mechanisms and pioneering biotechnological applications. At the School of Life Sciences, a group of our faculty members specialize in various facets of genomics and bioinformatics research, including the development of genomic technologies, exploration of biodiversity through genomic approaches, studies in evolutionary biology and microbial genomics, understanding the complexities of epigenome regulation, and advancements in plant biotechnology. The synergy of these two disciplines within our institution ensures that we remain at the forefront of life science research and innovation.



Plant & Agricultural Science

The Chinese University of Hong Kong obtained approval from the Ministry of Science and Technology of China to set up the State Key Laboratory of Agrobiotechnology (CUHK) in 2008, a national-level laboratory with outstanding research strength. This SKL comprised 16 principal investigators from CUHK including members from SLS and 9 associate members from other local Universities. It receives annual government support from the Innovation and Technology Commission. This national-level laboratory aims to build a World Class International Research Center in China with the mission to uplift China's agricultural technology, increase agricultural productivity, safeguard national food security, and improve people's nutrition. By combining the strength of modern biotechnology and the traditional wisdom of breeders and farmers, we pledge to serve society by generating new knowledge, producing novel technological platforms, products, and training high-caliber technologists and thereby boosting technical reserves and agricultural productivity in China and beyond.

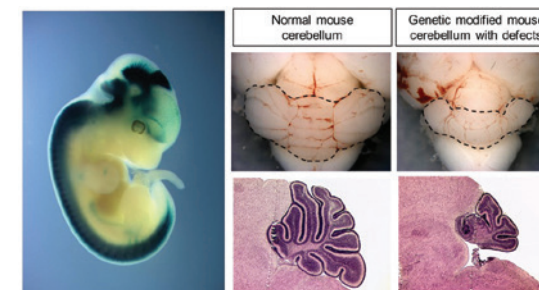


The SKL team and the researchers from the member laboratories at the SKL 2022 Annual Meeting. The current director and deputy director are Prof. Hon-Ming Lam and Prof. Liwen Jiang (front row, 5th and 3rd from left, respectively).

Developmental Biology

How can a single cell (fertilized egg) develop into a multicellular organism with specialized structures and organs? This question also becomes a very important medical question.

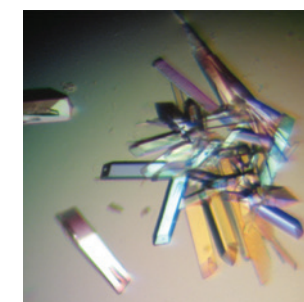
A newborn may possess some tragic abnormality when the embryo development goes wrong as shown in the figures as some genes are mutated by genetic engineering technology. The knowledge of normal development is the base for understanding abnormal developmental diseases.



This area of study is made possible by the advanced molecular biology, cell biology, and genetic engineering technology. The mammalian embryonic developmental process is studied with mouse as the model organism.

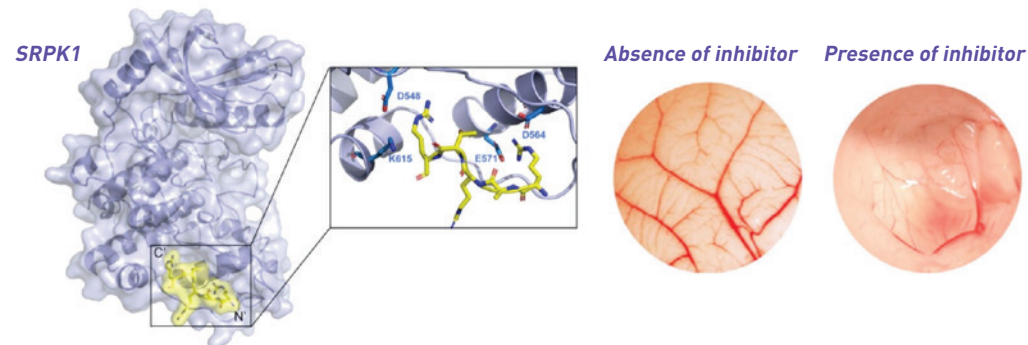
Protein Science

In this post-genomic era, protein structure-function study is of major importance in understanding the molecular basis of cellular pathways and developing therapeutic targets. Our ongoing research projects focus on proteins in cellular signaling and biomedical science, pathogenic microorganisms, and are of biotechnological significance. Major techniques including X-ray crystallography, nuclear magnetic resonance spectroscopy and the state-of-the-art cryo electron microscopy will provide insight into the working principles of complex biological systems and the foundation for structure-based design of molecular therapeutics.



Drug Discovery

Structure-based drug discovery is one of the most important techniques in modern therapeutic development. Advanced structural studies of the growing number of therapeutically important targets have provided new opportunities for preclinical drug discovery in academic settings. Using rational structure-based approaches, several members in the School have made major breakthroughs in the discovery of novel inhibitors against different diseases including influenza, angiogenesis, and neurodegenerative diseases. Together with our strengths in different research disciplines, the School of Life Sciences serves as the perfect platform to translate basic science findings into new therapeutic means.



Structure-based design of a protein-protein interaction inhibitor that blocks angiogenesis

Research Institutes and Centres

- Hong Kong Seed Technology and Education Center
- Centre of Plant Molecular Biology and Agricultural Biotechnology
- Centre for Cell and Developmental Biology
- Centre for Protein Science and Crystallography
- Food Research Centre
- Simon FS Li Marine Science Laboratory



SHIU-YING HU HERBARIUM

Shiu-Ying Hu Herbarium, School of Life Sciences, CUHK



History

The Herbarium of CUHK was established as a research facility in the Department of Biology in 1968. It was renamed as the Shiu-Ying Hu Herbarium in 2013 to honor the late Prof. Hu's contribution in plant taxonomy and to extend her legacy. The Herbarium collection contains more than 40,000 plant specimens, mostly collected and authenticated by Prof. Hu, and an archive of botanical references and information.



Research platform

The Herbarium is dedicated to documenting plant biodiversity in Hong Kong and the most up-to-date research information. A new research platform of our herbarium was established in 2014 to document plant specimens, multiple botanical images, GPS locations, DNA tissues and Taxonomic Archive System for comprehensive records of local flora.



Taxonomic Archive System

Taxonomic Archive System is a multi-platform database tailor-made with more than 3000 botanical character states for describing every plant species in Hong Kong. This unique archive and its derived educational databases are well recognized by a wide range of users including researchers, teachers, undergraduates, primary and secondary students, as well as the general public. The user interfaces are user-friendly and interactive, which can rapidly link to glossary, species comparison and informative factsheets to facilitate flipped learning.



Training and education

Another important mission of the Herbarium is to nurture trainee botanists. Herbarium archive and expertise enhance the teaching of Hong Kong Flora and Vegetation, a unique course offered by the School of Life Sciences (SLS), CUHK. The Herbarium also offers internship programs for undergraduate students of SLS. It further facilitates the career development of our students who are interested in conservation, environmental education, arboriculture or herbal medicines.



Public education

In addition, various educational activities such as seminars, herbarium visits, campus walks and overseas excursions are organized regularly for the quality enhancement of general education and community services.



Mission and new perspectives

We will continue to dedicate our best efforts to taxonomic research and applications, and explore every opportunity to transfer knowledge and experience to our society through professional training courses, general education and community services. We cherish and thank you for your continued support, participation and collaboration with our Shiu-Ying Hu Herbarium.



Contact

Website: <http://syhuherbarium.sls.cuhk.edu.hk/>
Tel: (852)3943 6113 / (852) 3943 6141 Fax: (852)2603 7246
Email: syhuherbarium.sls@cuhk.edu.hk



AMPLE OPPORTUNITIES



Internship, Scholarship and other opportunities

BBSA

The Berkeley Biosciences Study Abroad (BBSA) Programme was introduced in 2016 to enable upper year students of our School to spend a semester in UC Berkeley. They can take 12 units of upper level Integrative Biology and Molecular & Cell Biology courses there and the credits can be transferred back to CUHK to fulfill their graduation requirements. Selected students will be awarded subsidies for tuition fee in UC Berkeley.



Exchange Programme of University of Manchester:

There is an Exchange Programme between University of Manchester (Faculty of Biology, Medicine and Health) and CUHK SLS, where selected CUHK SLS students will go on exchange to University of Manchester for studying either one or two semester(s), subject to the final confirmation and fulfilment of vaccination requirements imposed by University of Manchester. Further information can be found here: <https://www.bmh.manchester.ac.uk/study/biosciences/exchange-programmes/how/>. An interview at SLS will usually be held in the second semester of each academic year.

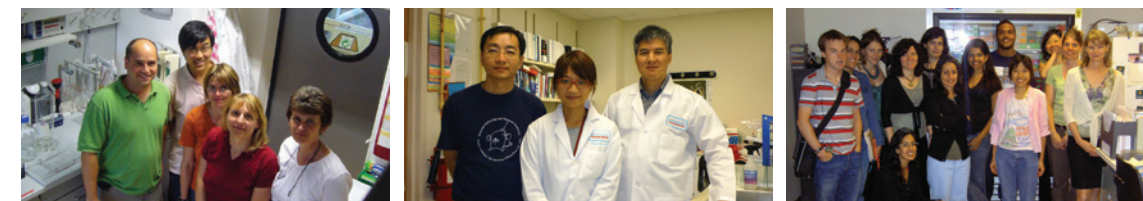
DREAM

The Dedicated Research Exchange And Mentorship (DREAM) Programme provides precious opportunities for our students to expose to the frontiers of biological researches. Our students first participate in a coaching programme, and learn the basic techniques and background information related to the project from a local supervisor in the School. During summer, as sponsored by the School, they travel abroad and conduct research projects in foreign laboratories or corporations. Participating institutions and corporations included the Law Offices of Albert Wai-Kit Chan in New York, University of Queensland, Kazusa DNA Research Institute in Japan, Nanyang Technological University in Singapore, Phase Diagnostics and Keck Graduate Institute in California, Institute of Plant and Microbial Biology as well as Biodiversity Research Centre Academia Sinica in Taiwan and Chonnam National University in Korea.



SMART

The new Young Scientist Mentorship And Research Training (SMART) Programme specifically offers a distinguished research experience to first year students. Through individual guidance from Professors in research laboratories, students are able to ignite their inquisitiveness in scientific research at the very beginning of the university journey. Besides, they may also receive up to \$3600 as rewards for working in the research laboratory.



Others

Exchange programmes with the following institutions have also been well established: POSTECH (Pohang University of Science and Technology) in South Korea, University System of Taiwan, Tianjin University as well as Zhiyuan College of Shanghai Jiao Tong University.



University Student Sponsorship Programme (USSP) in Wildlife Conservation

University Student Sponsorship Programme (USSP) in Wildlife Conservation is a programme organised by Ocean Park Conservation Foundation, Hong Kong (OPCFHK) that sponsors Hong Kong university students to participate in field conservation research and community education of neighbouring Asian countries. Students will gain valuable experiences of working alongside with conservation professionals which would give them insight to take up careers in conservation through real-life encounters.

If you are selected, you will:

- Join a local research team in an Asian country/region for 10 to 14 days and contribute to local conservation efforts.
- Have the chance to meet some of the world's most endangered animals.
- Design and implement your own conservation campaign in Hong Kong.
- Meet local conservationists and fellow university students for knowledge exchange.
- Join local wildlife expeditions to learn more about Hong Kong wildlife and conservation issues.

Subsidy for each successful candidate could be up to HKD10,000.

Let's see what our 2024 participants said:

"The opportunity to monitor the endangered dugongs in the Philippines was life changing to me. Thanks to OPCFHK and C3 (Community Centred Conservation) Philippines, we studied the grazing habits and behaviour of Dugongs, as well as some community centered methods for conservation and education. This experience has broadened my perspective towards people centered conservation. I learnt that their patience and care towards both human enrichment and animal well-being is a crucial component for sustainable conservation. This allows me not only to rethink my personal views and goals but offers me a human aspect to consider. I can have a more all-rounded approach towards the overall field of scientific thinking for the applicable future."



Ashley FU Hoi Lam (CMBI2)



"The site in Bayawan Nature Reserve in Philippines is out of my expectation. The facilities there are not very technological, but the natural protection, including iron fence around the reserve, shoes cleaning before entering the reserve, etc. are good for the animals living there. Philippines' culture also makes me interested: The pace there is slow, and the people there are very talkative and helpful. I love the place."

Alex LEUNG Cheuk Yin, BIOL4

"Through USSP, I have the chance to have a field trip to the Bayawan Nature Reserve in Philippines. Confronting the reality of protecting endangered species first-hand, I have experienced the importance and urgency of conservation efforts. Witnessing and participating in the scientific research conducted there has allowed me to appreciate the efforts of conservationists, given me a comprehensive awareness of this field, strengthened my resilience and reinforced my determination and passion to engage in scientific research in the future."

Justin LEONG Chi Ho, BIOL3



Good Internationalization

Every year, the University attracts excellent secondary students both from local and overseas. Currently, the University has close to 2,000 international students from countries and regions: all over the world. The School of Life Sciences admitted over 166 students in 2023 entry.



OUTSTANDING CAREER PROSPECTS



The diverse training by the School prepares our graduates to not only feature in areas related to their studies, but also find their starring paths in areas outside life sciences.

Interviews of Alumni

Biology programme at CUHK was my top choice for my undergraduate study. It offered a broad curriculum as well as special topics in life science that provided me a very good foundation for my graduate study in marine biology as well as the scientific knowledge, training, skills of logical and critical thinking for my career as a Senior Fisheries Officer in the government.

1991 Alumnus (Biology) - Chow Wing-Kuen

Senior Marine Conservation Officer, Agriculture, Fisheries and Conservation Department of the Government of HKSAR

I would like to say thanks to all my teachers for their guidance, support, and also the research opportunities such as the summer research programme and the internship programme that prompted me to apply to graduate school for more intense graduate research training. The study at CUHK not only provided me with a platform to acquire textbook knowledge of biochemistry, but most importantly enabled me to appreciate its beauty of the scientific knowledge. Being a professor at CUHK now, in addition to fostering responsible students and researchers, one of my anticipated roles is to make sure that the knowledge of biochemistry and life sciences can reach different strata of our society, and ultimately everyone can apply scientific knowledge to their work positions and daily lives.

1995 Alumnus (Biochemistry) - Chan Ho-Yin Edwin

*Professor and Director, School of Life Sciences, CUHK
Founding member, Hong Kong Young Academy of Sciences
Faculty Exemplary Teaching Awardee
Young Researcher Awardee
Genetics Society of China Thirteenth Ju-Chi Li Animal Genetics Prize winner*

It is my honour as the first batch of graduates of the CUHK B.Sc. in Environmental Science Programme. The Programme is a multi-disciplinary academic study that integrates knowledge and skills from chemistry, biology, and biochemistry, which nurtures students in critical and creative thinking skills across different subjects to seek for solutions of environmental problems.

The learning experience has not only equipped me with invaluable science knowledge, but also trained me to become versatile and thus competitive in both the job market and further study. After I obtained my postgraduate degree, I took up managing roles in chemical wastes treatment, testing and food industries. Eventually I becoming a scientist with my research in various aspects relating to our daily life.

1996 Alumnus Sze Tung Po Eric

Associate Professor, School of Science and Technology, Hong Kong Metropolitan University

I am glad that I chose FNSC at CUHK as my undergraduate major. In addition to the solid knowledge on food science and nutrition from the coursework, the soft skills, like trouble-shooting and communication skills, creativity, and passion benefited my career development. The summer lab and undergraduate final year research programme are something in particular to mention as they allowed me to gain early exposure to food laboratory environment.

1997 Alumnus (Food and Nutritional Sciences) – Leung Arnold

Senior Food Scientist, the Coca-Cola Company

Look back the time when I chose my major at CUHK, I believed that following my own personal interests would give no regrets to my life, so I devoted to Science, and MBT was my first choice as I really like the idea of DNA and genes. MBT program has given me wonderful University life, the Professors are inspiring and the lab courses are practical, well-equipped me with scientific knowledge, critical thinking and laboratory techniques. Final year project has also trained me to be a careful, tough, logical and optimistic person. After graduation, I further studied at the CUHK Graduate School, and went to both Canada and USA for a period of post-doc training. Luckily, now I got my faculty position at the Macau University of Science and Technology, and have the opportunities to run my own lab and research projects. After so many years, I am still very proud of being the first year of MBT graduates as it has started my scientific career as a Scientist, and I believed that I had made the best choice.

2001 Alumna (Molecular Biotechnology) - LEUNG Lai Han, Elaine

Associate Professor

Macau Institute for Applied Research in Medicine and Health

Macau University of Science and Technology

To me, the program offered broad knowledge of fundamental science and ample opportunities to translate what I had learnt into practical research projects. Interactive lab courses, group projects, presentations, and diverse program activities are features of this program, which allowed us to develop independent thinking, teamwork, and effective communication. I believe the program will continue to thrive and foster talents who will shine in different fields.

2002 Alumna (Molecular Biotechnology) – Lam Hung-Ming

Assistant Professor, University of Washington, Seattle

Young Investigator Award, Prostate Cancer Foundation

Career Development Award, Pacific Northwest Prostate Cancer SPORE, NCI/NIH

Idea Development Award (New Investigator), Department of Defense

I am glad that some 10 years ago I put CUHK Food and Nutritional Sciences programme as my first priority in my JUPAS form. Not mentioning its multi-disciplinary curriculum (including food science and technology, nutrition, biochemistry, biology etc) provided me with solid scientific knowledge, the programme also trained me with a variety of soft skills particularly critical thinking, which are still very useful in my everyday work. In addition, the programme offered a lot of great laboratory research opportunities, especially food technology and product development as well as final year project, which helped me to learn effectively in a practical and fun way!

2003 Alumnus (Food and Nutritional Sciences) – Ma Ka-Ming

Scientific Officer, Food and Environmental Hygiene Department, HKSAR Government

I am very glad to study MBT in my bachelor. The knowledge and experience I gained from MBT indeed lead to some of the most amazing and life-changing opportunities including doing a DPhil at Oxford and working as a scientist in Denmark. The trainings offered by MBT are at the world-class standard. Connection is another key characteristic of MBT. It is precious for MBT graduates to be so close to each other. And for those who are joining our family, there are unlimited possibilities in your future careers. Not only restricted to biotechnology, but there are also various chances such as medicine, publication industry, legal practice and business consultancy. Welcome to MBT!

2004 Alumnus (Molecular Biotechnology) - Chu Wai Kit

Assistant Professor, Department of Ophthalmology & Visual Sciences, CUHK

The critical piece of mind acquired from project work and assignment work, comprehensive thinking and good communication/presentation skills obtained from lab report and project works, and persistence and a piece of mind to serve the community learnt from the final year project are some of the critical generic skills that were trained by my major programme. These figured me into an enthusiastic territory educator to inspire students in Science Education of the next generation. I broke my school's 11 years of record with the highest credit rates and full passes for my classes. Some of my graduates have joined the School of Life Sciences at CUHK in these several years.

2005 Alumnus (Biology) – Ho Tik Shun

Head, Department of Science, The Chinese Foundation Secondary School

The curriculum in FNSC at CUHK is not only beneficial to my career but also my life. The series of food safety and microbiology courses built up my knowledge, prepared me well to win the job as a Health Inspector and granted me competitive advantage in my career. On the other hand, the nutrition related ones allowed me to live a healthier life though I was not in that field. Not to mention, the inspiring and heartfelt ways of teaching and interactive learning enabled me to see and think from different angles. Also thanks to the FNS academic visit and excursion programs which have led my eyes beyond the locality and allowed me to exchange the experience with counterparts of food and nutritional sciences in other countries.

2006 Alumnus (Food and Nutritional Sciences) – Chan Yun-kwan

Health Inspector, Food and Environmental Hygiene Department of the Government of HKSAR

Learning interesting facts about food and nutrition, doing labs, cooking for new food products – I would say studying in the FNS programme was one of the most enjoyable time in my life. It has also paved the way for my career of becoming a registered dietitian. FNS teaching staff were supportive and helped me meet all the essential requirements to enroll into the overseas dietetics master's programme. The knowledge acquired from the FNS programme was useful and practical, which enabled me to often excel in the postgraduate study of dietetics. Our FNS dietitian alumni were very helpful too by sharing their experiences in overseas dietetic study and real-life work as a local dietitian. I would like to take this good opportunity to say "thank you" to you all.

2006 Alumna (Food and Nutritional Sciences) –Wong Sze-Man Candy

Dietitian, Hospital Authority

Master of Science in Nutrition and Dietetics, the University of Sydney

Accredited Dietitian, Hong Kong Dietitians Association

Accredited Practising Dietitian, Dietitians Association of Australia

The programme equipped me with knowledge, both theoretical and practical, of current advances in the field and skills for conducting research in life sciences. These prepared me well for the study of M. Phil that facilitated my job hunting in the education field after graduation. The training also allows me to share the current development in the field with students both from the view of researchers as well as public health which is hot in Liberal Studies.

2007 Alumna (Biochemistry) – Ho Lilian

Graduate Master/ Mistress, Holy Trinity College

After graduation, I continued my study in the finance areas, and obtained my Master degree in Finance and the Advanced Diploma in Professional Financial Planning. I am now working in the area of financial planning engaging in the wealth and relationship management. Financial world is full of uncertainties. Strong and independent logical thinking and scientific method I acquired from my undergraduate study benefit my judgment in deciphering the reason and finding out the answers for these uncertainties. I particularly thank the inspiration provided by my programme for the scientific and personal growth.

2007 Alumnus (Biology) – Mok Kai-Cheung Steven

Chief Wealth Management Advisor, Convoy Financial Services Limited

Swiss Privilege – Financial Planning Top 10 Awardee

Hong Kong Institute of Bank – Financial Planning Competition Awardee

The CMB program has offered me a superb learning experience. As a student interested in life science research, not only did I acquire knowledge in a wide range of biological disciplines, I also had the opportunity to join three different laboratories throughout my undergraduate years. These hands-on experiences helped me understand what scientific research is like and allowed me to discover my passion in cell and molecular biology, based on which I made a decision to pursue my future career in this field. Studying CMB has undoubtedly brought me an enriched and meaningful university life.

2017 Alumnus (Cell and Molecular Biology) – Gong Yaoyu Maurice

PhD Candidate, Biomedical Graduate Studies, University of Pennsylvania, USA

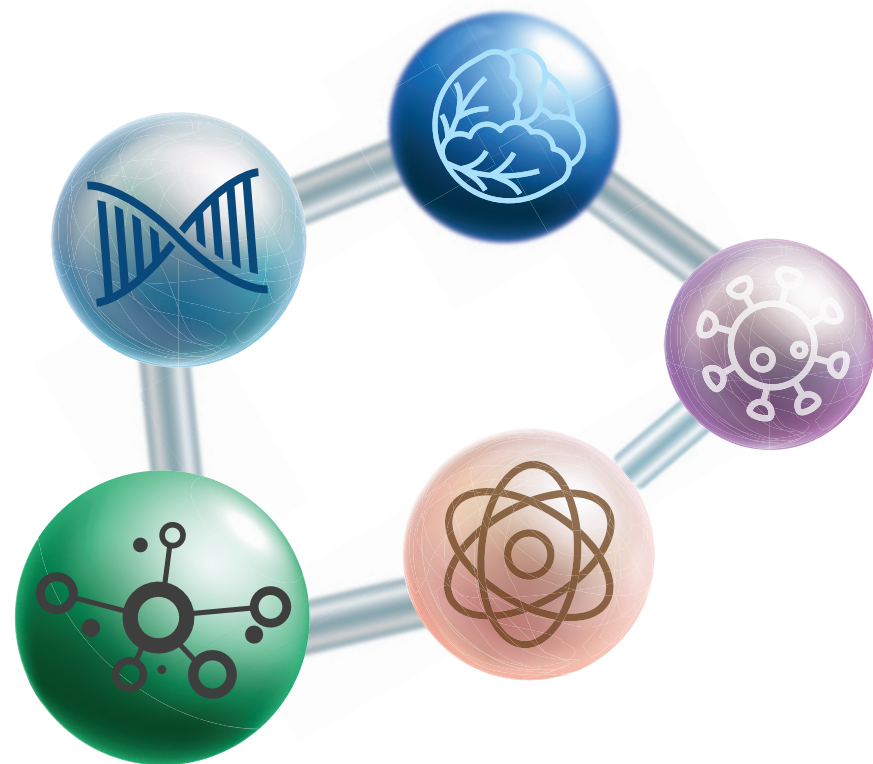
I graduated from CUHK's Biochemistry (BCHE) programme in 2019. This programme garners many heartwarming memories for me. Some highlights include a funded scholarship supporting me to study at University of California, Berkeley for a semester, as well as a fruitful Final Year Project on colorectal cancer, equipping me with useful literature review and critical appraisal skills. In addition to the lectures and professors, I am also grateful to the office staff and laboratory coordinators who enhanced my experience as a BCHE student by making administrative processes smooth and lab sessions adventurous. Today, I continue to foster a fascination for fundamental biochemical processes that fuel our understanding of science.

To this effect, CUHK's BCHE programme was both a stimulus and propagator of my innate curiosity of molecular science.

2019 Alumna (Biochemistry) – YUE Ru Bing Serena

Current student, Medical Bachelor and Bachelor of Surgery, HKU

Master of Science in Global Health Science and Epidemiology, the University of Oxford



PROGRAMMES IN THE SCHOOL OF LIFE SCIENCES

Biochemistry

Biology

Double Major Biology / Chemistry

Cell and Molecular Biology

Food & Nutritional Sciences

Molecular Biotechnology

BIOCHEMISTRY



Background

Biochemistry is a branch of science that investigates the chemical compounds and processes occurring in living organisms at molecular level. The knowledge procured from studying biochemistry has found extensive applications in medicine and biotechnology, drastically revolutionizing our daily life.

The Department of Biochemistry was established in 1971, with Prof. Lin MA, the second Vice-Chancellor of CUHK, serving as the Department Head. In 2010, the Department of Biochemistry merged with the Department of Biology to form the School of Life Sciences. The current Biochemistry Programme at the School of Life Sciences upholds the esteemed legacy of the Department of Biochemistry by providing a robust educational foundation to nurture and cultivate the next generation of scientific scholars.



Mission

- To provide core knowledge training on classical biochemistry topics, e.g. metabolism, proteins & enzymes, neuroscience, immunology, and endocrinology.
- To cultivate proactive and responsible students with the ability to think critically, solve problems, and communicate efficiently, ensuring high competitiveness in further study and career development.



Curriculum Highlights

- Current topics in biochemistry and molecular biology that have scientific, medical, and social significance.
- Academic and experiential learning in four key areas: structural biology, chemical biology, synthetic biology, and health and well-being.
- Hands-on experience through a year-long laboratory course on cutting-edge biochemical techniques.
- Scientific literacy skills and preparations for professional career development.



Curriculum

Biochemistry (BCHE)

Study Focus:

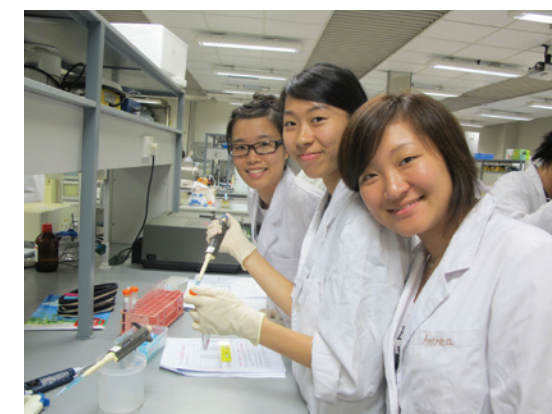
- Bioenergetics and Metabolism
- Genetics and Cell Biology
- Methods in Biochemistry and Molecular Biology
- Structural Biology
- Chemical Biology
- Synthetic Biology
- Health and Well-being

Elective Areas:

- Clinical Biochemistry
- Endocrinology
- Forensic Sciences
- Immunology
- Independent research in Biochemistry
- Laboratory Management and Accreditation
- Neuroscience
- Sport Sciences
- Advanced topics offered by SLS programmes:
 - Biology:** Microbiology, Animal Physiology, Human Genetics
 - Cell & Molecular Biology:** Protein Trafficking and Folding, Stem Cell Biology, Cell Biology of Cancer and Neuronal System
 - Environmental Science:** Biochemical Toxicology, Environmental Health
 - Food & Nutritional Sciences:** Medical Nutrition Therapy, Nutrition and Human Development
 - Molecular Biotechnology:** Animal Biotechnology
 - Statistics:** Biostatistics

Expected learning outcomes

- Understand the core knowledge in biochemistry covering biomolecules, molecular biology, cellular biochemistry, metabolism, bioinformatics, proteins and enzymes and have the opportunity to specialize in a selected area of biochemistry
- Gain the knowledge of the latest biochemical technology in proteins, cell biology and molecular biology
- Possess skills in designing experiments to test hypothesis, writing research report, applying their knowledge to daily life and developing self-learning capability
- Become all-round competent including the capability to work in a team.
- Think critically and analytically
- Commit to ethical professionalism



Views of Current Students



Choosing biochemistry as my major has been one of the best decisions I have ever made. Supported by an excellent and experienced teaching team, we are inspired to look for the hidden mysteries of life. The programme does not only provide us with the opportunity to learn in different research laboratories, but also supports overseas exchange programmes and research opportunities. As one of the committee members of the biochemistry student society, I have organized and participated in numerous activities of the programme. I really enjoy the warm atmosphere of this big family.

Tong Phoebe

My surviving motto is: "Learn Actively and Explore Who You Are!". Biochemistry curriculum offers a versatile platform to help taste the biological world, from abstract ideas in lectures to practical skills in laboratories. Biochemistry programme also provides seminars, visiting tours, internship and exchange opportunities. With the full support and large flexibility, together with your curiosity and courage, it is an ideal ladder to get involved in the world of emerging science.

Lam Mastech



Programme Director: **Professor Ngo Chi Ki, Jacky**
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BIOLOGY



Background

Biology is a broad scientific discipline embracing many different fields of study, including the functioning of living organisms from virus to human. Fundamental to the study of life is unfolding biological organization at its many levels, from molecular architecture to ecosystem services. During the past few decades, new discoveries in biology have brought significant impact on the way we live. Armed with exciting new research methods and information from genomics of human and other living organisms, biologists are beginning to unravel some of life's most engaging mysteries.

The Department of Biology, now the Biology Programme, was established in 1963, and is one of the oldest departments in the University. Indeed, we are the first biological sciences department in Hong Kong awarded the Area of Excellence by University Grants Committee. We offer a broad range of courses for students to choose from, including genetics, physiology, plant biology, zoology, marine biology, and ecology.



Mission

- To prepare students for careers in biological sciences and related fields
- To provide students with knowledge on the latest advancements in biology
- To promote excellence in teaching and research in all levels of biological sciences from molecular biology to ecology



Stanley Main Beach, HK



Taipo River, HK

Nature Trail of Native Forest
in Dasyueshan, Taiwan

Biology students investigate natural environments through local and overseas field trips.

Curriculum

Biology (BIOL)

Study Focus:

- Ecology
- Genetics
- Evolution
- Biodiversity
- Fundamentals of Biochemistry & Cell Biology

Elective Areas:

- Microbiology
- Marine Biology
- Plant & Animal Biology
- Developmental Biology
- Conservation Biology
- Physiology
- Field Study
- Courses from other programmes:
Bioenergetics and Metabolism, Molecular Biology, Immunology, Endocrinology, Protein Trafficking and Folding, Stem Cell Biology, Cell Biology of Cancer and Neuronal System, Pollution and Toxicology, Food Microbiology, Molecular Biotechnology, Biostatistics

Curriculum Highlights

- A broad scientific disciplinary programme focusing on academic and experiential learning in four key areas: Biodiversity and organismal biology (animals, microorganisms, plants), Evolution, ecology, and ecosystems (freshwater, marine, terrestrial), Sustainability and conservation and Teaching and public understanding of science.
- Three recommended packages based on the different combinations of the courses offered by the programme to fit students' career plans: Biodiversity and conservation biology, Biology for teaching career, and Environmental biology.



Biodiversity Lab – Floral dissection demonstration



Winter Camp



BBQ gathering of students and teachers

Expected learning outcomes

- Acquire basic knowledge in all aspects of biological sciences and in-depth understanding in at least one major area of biology
- Develop skills in scientific problem solving, statistics and information technology
- Understand the latest developments and advancements in biology
- Appreciate the importance of biological conservation and environmental issues

Views of Current Students

Biology programme allows me to view society in a more scientific way. In class we had discussion in a wide variety of aspects including genetic diseases and corresponding treatments, structure of bacteria and viruses and the process of invasion, marine biology, ecology, local flora and vegetation, etc. This inspires me to analyse social issues, such as covid-19 and country park protection, from a broader perspective and with a scientific mind. Apart from classes, there are multitudes of opportunities for research and teaching. Some programmes are cross-disciplinary and from them I have learnt new knowledge of Chinese medicine and literature. I am grateful to have such a fruitful university life in CUHK under the

Ip, Tsz Yu



Views of Current Students

The journey with CUHK Biology Programme has been exciting and rewarding which allows me to know more about myself in various perspectives. To start with, I was admitted to the Programme without an aim -- I have an interest in life sciences but not limited to any field of biology. But now, as a Year 4 student, I am grateful to be one of the member of the Biology Programme as there are numerous courses and opportunities that I can choose from. Not only have I explored a variety of subjects under biology, from evolution and genetics to ecology and biodiversity, but I have also had the chance to explore my research interests. I am fortunate to be a member of Coral Academy under the supervision of Professor Apple Chui. I have been granted the chance to take part in the coral restoration in Hong Kong waters. My curiosity and passion have led me to this path and I am thrilled to experience more in the future. These cannot be achieved without the knowledge and design of Biology programme.

Cheung, Chun Ting (Billy)



Programme Director: **Professor Hui Ho Lam Jerome**
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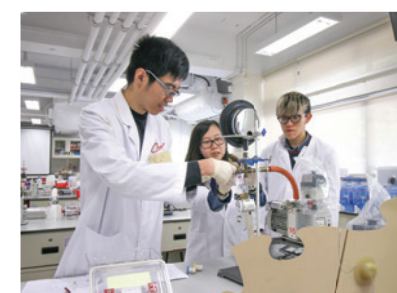
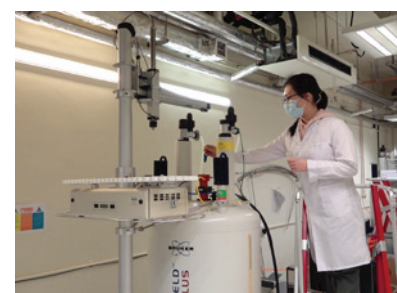
Contact

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Background

Conscientiously devised by the Faculty of Science, School of Life Sciences and Department of Chemistry, the Bachelor of Science in Biology and Chemistry Double Major Programme is planned to equip students with enhanced broadness and diversity in both fields. In light of the prevalent trend of the transformation to a knowledge-based economy, there is a proliferating demand of highly-educated scientists who has an interdisciplinary scientific expertise. It is believed that this programme will be capable to cope with this particular demand by nurturing a group of students with cutting edges in both workforce and academia.



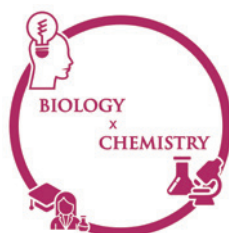
Admission Requirements

- Admitted via Science Broad-based admission (JS4601)
- Phase I: (Admission stage)
 - (A) HKDSE results of Chemistry and Biology (with total scores not less than 10), combinations as follows:
 - Level 5* or above in Chemistry and Level 4 or above in Biology /
 - Level 5* or above in Biology and Level 4 or above in Chemistry /
 - Level 5 or above in both Biology and Chemistry; OR
 - (B) Qualifications eligible for exemption of CHEM1070 & LSCI1002; OR
 - (C) Obtained $\geq 88\%$ of the total score in the Joint Entrance Examination (JEE)
- Phase II (End of Year 1) Grade B or above or granted course exemption in CHEM1070 and LSCI1002

Curriculum highlights (Why Biology X Chemistry?)

Knowledge & Training

- To be equipped with a broad scientific knowledge ranging from quantum chemistry, atoms, molecules, cells, physiology, biodiversity, ecology to evolution.
- To be trained with technical and analytical skills from both biology and chemistry disciplines.



Cross-disciplinary Research

- To enjoy ample opportunities to take research method courses and final year projects supervised by professors from both units.
- To immerse in an environment that can receive the bona fide cross-disciplinary training in research.

Professional Development

- To be equipped with cross-disciplinary scientific skills.
- To develop enhanced adaptability and employability in multiple job sectors.

Expected learning outcomes



B.Sc. in Biology and Chemistry Double Major Programme equips students with cross-disciplinary scientific skills and enhances their adaptability and employability in multiple job sectors that provide accreditation, analytical and clinical testing services, pharmaceutical and health care products marketing, patent law firm or investor consultancy, education, environmental consultancy, and research and development (R&D).

Contact

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CELL & MOLECULAR BIOLOGY

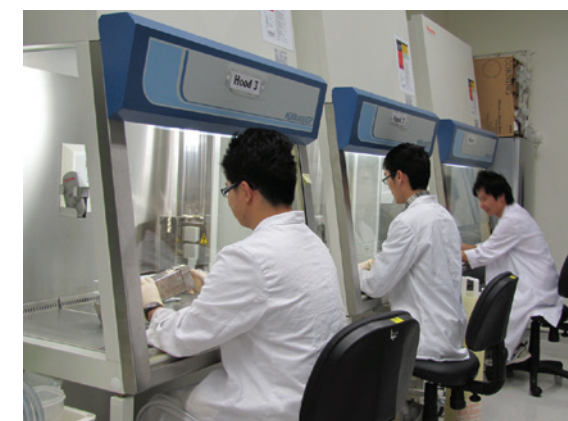


Background

Cell and Molecular Biology (CMB) is an interdisciplinary field that represents the frontiers of biology and medicine. Advances in multi-omics sequencing approaches and imaging techniques have signalled a shift in modern biology to focus on understanding the function of genes at the molecular, cellular and organismic levels.

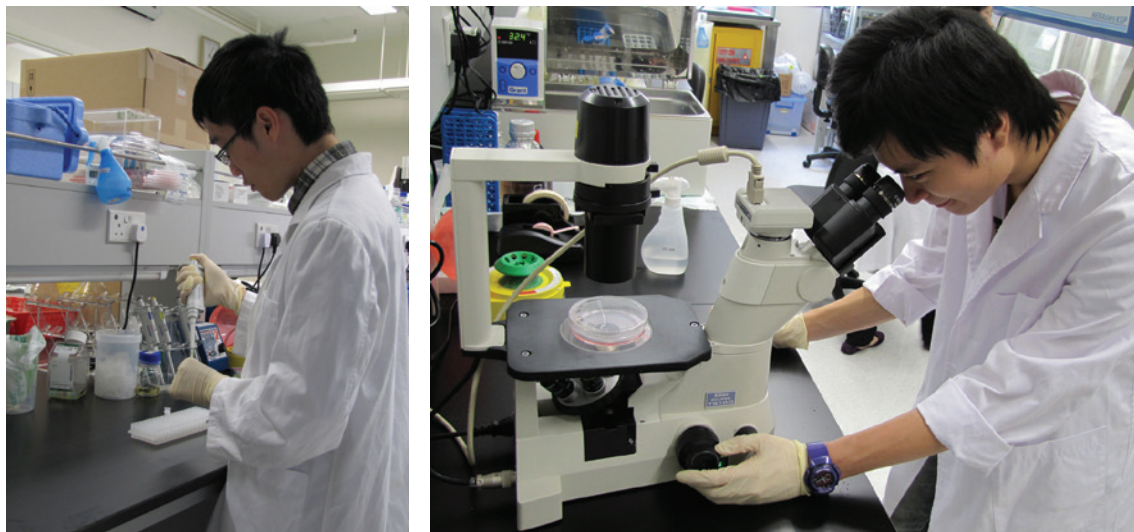


It is in this background that the University launched the Cell and Molecular Biology programme in 2008. As the first in the region to focus on the study of molecular and cellular biology, the programme offers an integrated curriculum that provides students a solid knowledge base in areas such as stem cell biology, cancer cell biology, organelle dynamics, genomics and more. CMB students receive intensive trainings in laboratory techniques, data analysis, literature search, as well as scientific writing and communication, all with the goal of preparing students for undertaking future research-related work in CMB and beyond.



Mission

- To provide excellent training and education that equip students with a solid foundation for developing a career in biological and biomedical sciences
- To become an internationally recognised education centre in Hong Kong and a regional hub for cutting-edge research in cell and molecular biology
- To cultivate highly competent and competitive research scientists with strong critical thinking ability, effective communication skills and a proactive attitude to propel them in further studies.



Study Focus

- Research methods and scientific communication
- Stem Cell Biology, Cancer Cell Biology and Neuronal Cell Biology
- Genomics, Transcriptomics & Metabolomics
- Contemporary topics in Cell Biology and Molecular Biology
- Fundamentals in Biochemistry and Genetics

Elective Areas

- Independent research in Cell & Molecular Biology
- Advanced topics offered by other SLS programmes:
 - Biology: Physiology, Developmental Biology
 - Biochemistry: Clinical biochemistry, Neuroscience, Immunology, Molecular Biotechnology: Animal, Plant and Microbial Biotechnology, Genetic Engineering
- Biomedical Engineering offered by the Faculty of Engineering
- Statistics: Biostatistics

Curriculum Highlights

- Student-oriented capstone courses using an one-to-one mentoring approach
- Intensive project-based laboratory training
- An integrated programme covering cutting-edge research topics in cell and molecular biology on top of a solid knowledge base in life sciences
- Communication skills and problem-solving skills essential for further studies, career development and lifelong learning



Expected learning outcomes

- Acquire fundamental knowledge in the fields of cell and molecular biology
- Obtain core laboratory skills essential for a successful research career
- Cultivate a strong sense of responsibility and teamwork spirit
- Develop proactive and positive work attitudes that facilitate self-fulfillment and productivity

Alumni Messages

Cell and molecular biology are at the core of major scientific discoveries in life sciences in the 21st century. The CMB Programme at CUHK was specially designed to train the next generation life science researcher through its diverse STOT courses and year-long laboratory practical courses. Besides, thanks to CMB's teachers, a lot of local and overseas research opportunities are made available to CMB students. These unique features of the CMB Programme were indispensable for the success of my career - leading an independent research group in just 6 years after graduation from the CMB programme.



Dr. SO Chun (2016 Graduate)

Assistant Investigator, National Institute of Biological Sciences, Beijing
Croucher Fellowships for Postdoctoral Research 2022
Croucher Scholarship for Doctoral Study 2019

Views of Current Students

The CMB programme is especially suited for students pursuing a career in research or the industry. The three writing courses were excellent - we learnt to write research articles, literature reviews and grant proposals, all of which are critical to our future career. The project-based lab courses were also fascinating. It was rewarding to do coherent experiments to reach a conclusion. It was also unforgettable to have fun interactions with the teachers and all other classmates.



WONG Chi Ngai (Genper)



YUAN Lin (Lynn)

The CMB program well prepares us for a career in research, starting from basic pipetting techniques and literature survey skills, and eventually leading to designing, conducting, and presenting our own experimental project. Moreover, the small class size and one-to-one STOT courses enable us to connect with our peers and professors firmly. I often recall those lovely afternoons spent in the CMB lab where we collaborated on experiments and brainstormed for result interpretation.



Programme Director: **Professor Kang Byung Ho**
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Contact

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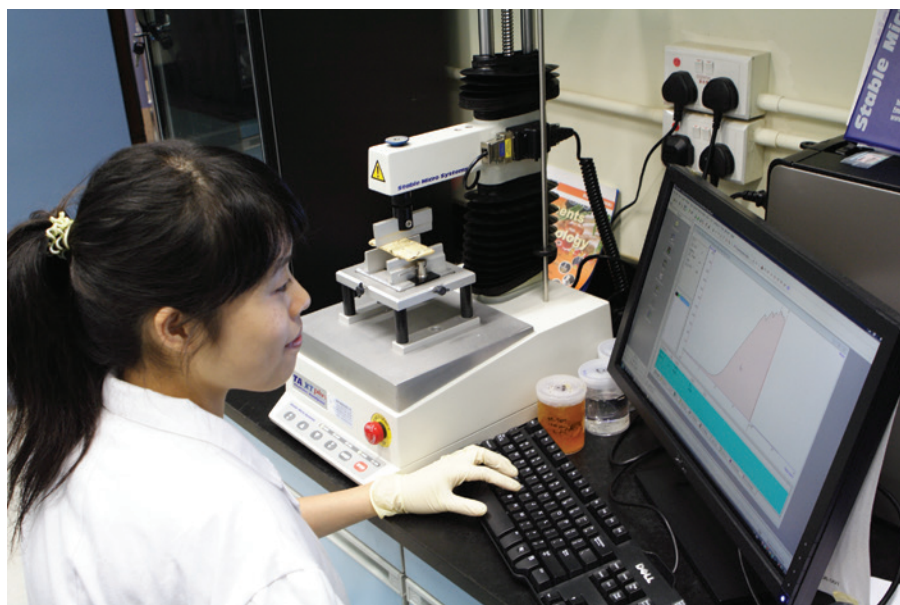
Background

Food safety and prudent diet safeguarding the quality of our lives have become increasingly important. The rapid advancement of nutrition knowledge and the expansion of the food industry further pose new challenges as well as research opportunities in food and nutritional sciences. In order to cope with the increasing demand of specialists in these areas, the Chinese University of Hong Kong started the offering Food and Nutritional Sciences Programme since 1994. Food provides the source of nutrients to human. Although food science and nutritional science are two different subjects, they are inseparable. Therefore, students admitted to our programme are expected to know these two areas. After completion, they will gain the knowledge in both food and nutritional sciences; this background would allow them to work in the food industry, as well as the nutrition/health field. In addition, our programme also prepares students to pursue further study on dietetics.



Mission

- To provide education to students to meet the FNS requirements
- To provide courses that meet the standards and the core competency requirements of AfN
- To prepare students for becoming ANutr
- To equip students with practical experiences in the field of nutrition



Curriculum

Food and Nutritional Sciences (FNSC)

Study Focus:

- Nutrition & Human Development
- Food Chemistry & Analysis
 - Nutritional Biochemistry
- General and Food Microbiology
- Fundamentals of Biochemistry & Cell Biology
- Fundamentals in Organic Chemistry, Mathematics, and Physics

Elective Areas:

- Independent research in Food and Nutritional Sciences
- Community Nutrition and Medical Nutritional Therapy
- Food Technology
- Food Product Development and Quality Control
- Food Safety and Toxicology
- Human and Nutritional Physiology
- Advanced topics offered by other SLS programmes:
 - Biology:* Genetics
 - Biochemistry:* Immunology, Endocrinology
 - Environmental Science:* Environmental Toxicology
 - Molecular Biotechnology:* Genetic Engineering
 - Statistics:* Biostatistics

Specialization: Nutritionist Stream + Disciplines of community nutrition, public health as well as nutrition education and promotion

Expected learning outcomes

- Understand the core knowledge and latest issues in food and nutritional sciences that increase the competitiveness of the students in the labor market
- Acquire abilities to access, retrieve and critically evaluate information relevant to food and nutritional sciences
- Apply the knowledge of food and nutritional sciences into real-life situations



NUTRITIONIST STREAM (FNS-NS)



Background

In 2021, FNS started to offer a new study stream, the Nutritionist Stream (FNS-NS). It is designed for students who want to obtain practical experience before graduation and interested in practicing as a Nutritionist after graduation. FNS-NS has obtained the recognition from the United Kingdom Association for Nutrition (AfN). It is the first and the only AfN accredited programme in Hong Kong. FNS students who meet additional requirements are eligible to submit an application for FNS-NS at the end of year 2 study. Graduates in the FNS-NS are eligible to apply through direct entry to become AfN Registered Associate Nutritionists (ANutr).

Mission

- To provide education to students to meet the FNS requirements
- To provide courses that meet the standards and the core competency requirements of AfN
- To prepare students for becoming ANutr
- To equip students with practical experiences in the field of nutrition

Curriculum

FNS-NS students are required to follow a strict curriculum in order to meet the AfN standards and core competency requirements. Students will mainly take the FNS-NS core courses in year 3 and 4. While students may choose the elective courses, the elective courses cannot replace the FNS-NS core courses.



Expected learning outcomes

- Understand the core knowledge and latest issues in food and nutritional sciences that increase the competitiveness of the students in the labor market
- Acquire abilities to access, retrieve and critically evaluate information relevant to food and nutritional sciences
- Apply the knowledge of food and nutritional sciences into real-life situations
- Obtain the qualification of AfN Registered Associate Nutritionist through direct entry (eligible for students in the NS stream only)

Views of Current Students

I am a final year student of Food and Nutritional Sciences. This programme may not be very career-oriented, but I can obtain useful and interesting knowledge for my daily lives.

When hear about this programme, many people may focus only on the 'nutrition' part. I do learn a lot about nutrition with the three-year study of this programme. I can make use of what I have learnt to eat healthier as well as suggesting my family and friends to eat healthier depending on their needs. I can also see the health products critically and judge whether their claims are valid.



Apart from nutrition, I also learn a lot about food. As a food lover, I enjoy knowing some sciences in food, such as the chemical structure of food which gives the unique taste, texture and aroma to the food. In addition, I am currently working as a hygiene coordinator in a hotel, and I can apply my knowledge gained in courses related to food safety and hygiene management.

WONG Wing-Yin Renay

I chose Food and Nutritional Sciences Program as my major because it is more applicable and closely related to our everyday life. It includes the studies of both food and nutrition, which are inseparable but actually two different disciplines. Food science mainly focuses on food itself, including food handling, manufacturing, and safety, while nutrition science investigates the nutrition needs of our body and how our body reacts to the nutrients. After learning those courses, we would be able to understand and explain most of the phenomenon that we usually come across in our daily life, such as the reason why sugar becomes brown in color after heating and why vitamin A is essential to night vision. The broad topics discussed in the program are definitely an inspiring and valuable knowledge base for our future career or postgraduate studies in this field.

CHOOK Chui-Yiu



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MOLECULAR BIOTECHNOLOGY

Background

Molecular biotechnology is a revolutionary area of scientific discipline that involves the application of gene and protein technology. This state-of-the-art technology has exerted remarkable contributions to agricultural health, environmental, bioenergy, and other bio-industrial areas. Molecular biotechnology is one of the major driving forces shaping the development of human society in the 21st century.

In view of the current needs of increasing manpower and future prospects of biotechnology, the University launched the Molecular Biotechnology programme in 1998. We target students who are interested in genetic engineering, molecular biology, methods in biochemistry, microbial, plant, and animal biotechnology. Other in-depth knowledge from an array of elective courses covering various aspects of cell & developmental biology, animal and plant physiology, immunology and clinical biochemistry, bioinformatic, genomics and proteomics are also provided for students' selection. In addition, we also address the business and social implications of biotechnology, such as government policy, management, intellectual property, and ethical and public concerns.



Mission

- To provide theoretical and hands-on training to students on the fundamental knowledge, current development, business and social implications of molecular biotechnology
- To cultivate the ability of logical and critical thinking, and scientific communications



Molecular Biotechnology Programme – 20th Anniversary

Curriculum

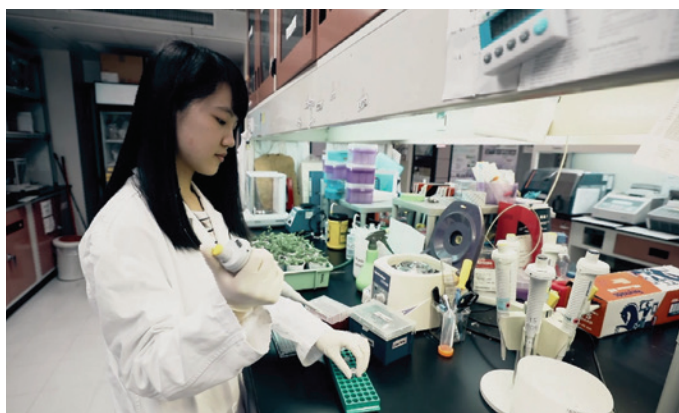
Molecular Biotechnology (MBTE)

Study Focus:

- Molecular Biotechnology in Animals, Plants, Medicine, Microbes and Environment
- Business & Social Aspects of Biotechnology
- Methods in Molecular Biotechnology
- Methods in Biochemistry
- Genetics & Genetic Engineering
- Cell Biology & Diversity of Life
- Microbiology
- Fundamentals in Organic Chemistry, Mathematics, and Physics

Elective Areas:

- Independent research in Molecular Biotechnology
- Advanced topics offered by other programmes:
 - Biochemistry:** Protein and Enzymes, Bioenergetics and Metabolism, Immunology, Clinical Biochemistry
 - Biology:** Physiology, Developmental Biology
 - Cell & Molecular Biology:** Stem Cell Biology, Cell Biology of Cancer and Neuronal System
 - Statistics:** Biostatistics
 - Biomedical Engineering**



Curriculum Highlights

- Fundamental knowledge in life science with emphasis on molecular biotechnology
- Hands-on skills through specially designed laboratory courses on methods in molecular biotechnology
- In-depth knowledge in selected areas of your choice. Topics cover various aspects of challenge's fields in biology & biochemistry
- Comprehensive understanding of the business and social implications of biotechnology, such as government policy, management, intellectual property, and ethical and public concerns



Visit biotechnology companies



Career talk given by alumni

Expected learning outcomes

- Gain solid knowledge in life science, with particular emphasis on the principles and potential applications of molecular biotechnology includes genetic engineering, molecular biology, methods in biochemistry, microbial biotechnology, plant biotechnology and animal biotechnology
- Acquire hands-on operational capability in basic skills of molecular biotechnology
- Understand the business and social implications of biotechnology, such as government policy, management, intellectual property, and ethical and public concerns
- Be able to judge the pros and cons of various applications of molecular biotechnology on human society and natural environment
- Acquire hands-on operational capability in basic skills of molecular biotechnology
- Develop competitive quality for future careers in scientific research and development

Alumni Messages

"I've always been interested in biological science research but struggled to find a specific focus. The MBT Programme's multidisciplinary approach and extensive connections have provided me with valuable opportunities both locally and overseas. During my undergraduate years, I gained experience in various research labs and biotech companies, including a study abroad programme at UC Berkeley and an R&D internship at a local start-up. This diverse curriculum emphasized the importance of molecular biology in the biotech industry, inspiring me to delve deeper into this field."



NG Tin Long Chris (2021 Graduate)

"Gates Cambridge Class of 2021" scholarship

Current PhD student in the University of Cambridge

"The MBT Programme grounded me in molecular biology and introduced me to cutting-edge technology. I engaged with knowledgeable teachers, joined various research labs, and interned in Canada. The curriculum highlighted the expanding biotech industry and introduced me to patent law and genetic engineering ethics. The MBT Programme allowed in-depth study of molecular biology and broadened my understanding of the biotech industry."



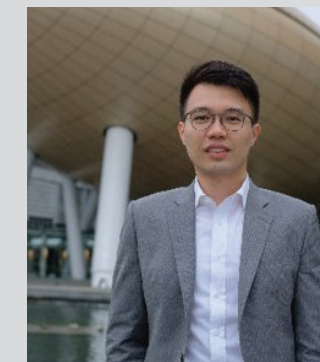
Dr. DAI Yichen Serena (2016 Graduate)

The Rhodes Scholar for Hong Kong 2016

PhD graduate of University of Oxford

Alumni Messages

"Biotechnological challenges have always fascinated me, and solving them requires rigorous training in both basic and applied sciences. The MBT Programme's comprehensive approach to biotechnological challenges equipped me with vital scientific knowledge and research skills, leading me to pursue a PhD from CUHK and an M.Sc. from Oxford. The programme's industry exposure and networking opportunities showed me limitless career paths after graduation. Supported by ITC, HKSTP, and CUHK, I co-founded Codex Genetics to convert genomics research into actionable clinical insights using AI and Big Data analytics."



Dr. YU Chi-Shing (2009 Graduate)

Chief Technology Officer, Codex Genetics Limited

"In our first MBT lecture, Prof. Samuel Sun introduced the 21st century as 'The Biotech Century'. Today, we see biotech's influence, from mRNA vaccines to gene-editing. The MBT Programme's theoretical and practical focus prepared me for my Ph.D. at Yale and my current faculty position at NUS. The programme's small size fostered close interactions with classmates and faculty. I highly recommend considering MBT for an exciting career!"



Dr. LAU On Sun (2001 Graduate)

Assistant Professor, Department of Biological Sciences

National University of Singapore (NUS), Singapore



Programme Director: **Professor Lam Hon-Ming**
honming@cuhk.edu.hk

Contact

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Minimum Admission Requirements

JUPAS Admission

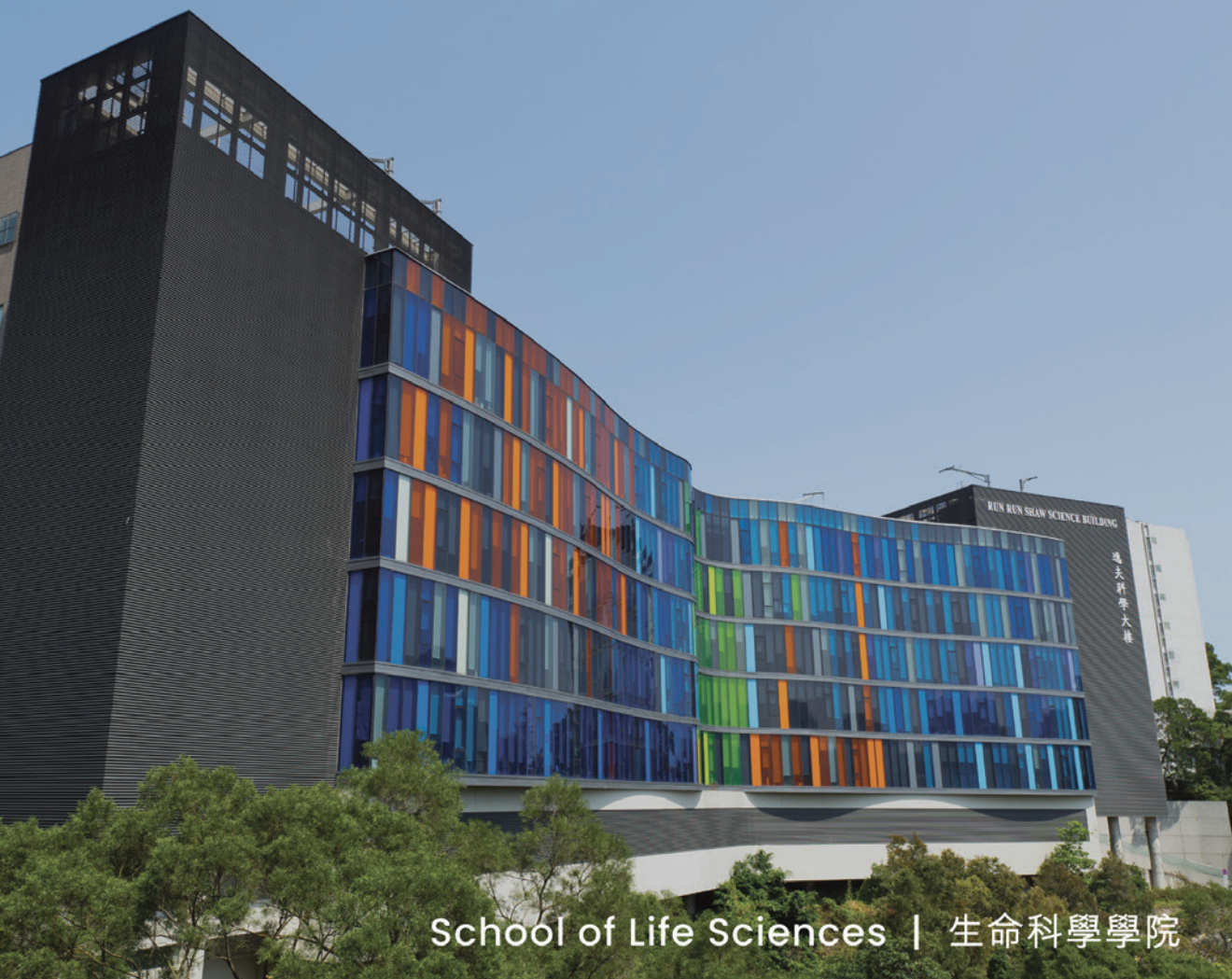
- Local students with Hong Kong Diploma of Secondary Education (HKDSE) results can apply through the Joint University Programmes Admissions System (JUPAS).
- General admission requirement for JUPAS applicants is 4 core and 2 elective subjects (4C+2X or 4C+1X+M1/M2).
- Minimum requirements and admission score calculation of various admission lines are detailed below:

Admission Line	Core Subjects				Elective Subjects		Requirements	HKDSE Subjects with Special Weighting
	C	E	M	CS	1st	2nd		
JS4601 SCIENCE (Broad-based Admission)	3	3	2	A	3	3	1st Elective: Any one from Biology / Chemistry / Physics / M1 or M2 2nd Elective: Any one subject in Category A	2.0 Biology, Chemistry, Physics, M1 or M2 1.5 English or Mathematics, Economics, Geography, ICT, Technology and Living (FST) (A maximum of 3 subjects will be weighted heavier)

Non-JUPAS Admission

- Acquire the International Baccalaureate (IB) Diploma; OR
- Obtain good grades in GCE / International Advanced Level Examination with no less than three Advanced Level subjects; OR
- Possess a qualification which qualifies for university admission in the issuing country (e.g. SAT in USA, UEC/STPM in Malaysia, ATAR in Australia, OSSD in Canada); OR
- Completed an associate degree or higher diploma

Complete and updated information can be found in the websites of Office of Admissions and Financial Aid (admission.cuhk.edu.hk) and Faculty of Science (www.sci.cuhk.edu.hk)



School of Life Sciences | 生命科學學院

生命科學學院課程

PROGRAMMES OF THE SCHOOL OF LIFE SCIENCES

Contact Us



SLS IG



Website

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- Biochemistry
- Biology
- Cell & Molecular Biology
- Food and Nutritional Sciences
- Molecular Biotechnology

