



香港中文大學
The Chinese University of Hong Kong

2022-23



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



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

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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 & Molecular Biology, Food & Nutritional Science, 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.

In addition to quality teaching, we also strive for excellence in research. For example, three research projects “Plant and Agricultural Biotechnology”, “Centre for Organelle Biogenesis and Function” and “Center for Genomic Studies on Plant-Environment Interaction for Sustainable Agriculture and Food Security” led by our school have been selected by the University Grants Committee as one of the Areas-of-Excellence in Hong Kong. We believe that the best way to train future generation of scientists is to inspire the students and give them the opportunities to take part in cutting-edge research themselves. To this end, we have the SMART (young Scientist Mentorship And Research Training) and DREAM (Dedicated Research Exchange And Mentorship) programs to allow motivated students to engage in research in local and overseas laboratories. To equip our students with a global perspective and enhance their learning experience in a world-renowned university, we have introduced a Berkeley Biosciences Study Abroad (BBSA) Programme, which enables our students to spend a semester in UC Berkeley.

If you are interested in the science of living organisms - from the structure and function of DNA and proteins to the interactions among living organisms in an ecosystem; from preparing a career in environmental protection, food technologists, or nutritionists to research and development of biotechnological products - you will find our diverse courses and flexible curriculum fit your interests.

– Professor Wong Kam-Bo

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 110 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 (2022-23)

Life Sciences

Course Code	Course Title	Unit(s)
LSCI1000	Biochemistry of Health and Disease	3
LSCI1001	Basic Concepts in Biological Sciences	3
LSCI1002	Introduction to Biological Sciences	3
LSCI1003	Life Sciences for Engineers	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
LSCI4000	Literature Research	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	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	BIOL3630	Animal Physiology	3
BIOL2210	Ecology	3	BIOL3710	Marine Biology	3
BIOL2213	Ecology Laboratory	1	BIOL4010	Evolutionary Biology	3
BIOL2313	Genetics Laboratory	1	BIOL4012	Field and Environmental Biology	2
BIOL2410	General Genetics	2	BIOL4032	Physiological Investigations	2
BIOL2420	Population Genetics	1	BIOL4120	Developmental Biology	3
BIOL3012	Biodiversity Laboratory I	2	BIOL4230	Global Change Biology	3
BIOL3022	Biodiversity Laboratory II	2	BIOL4260	Conservation Biology	3
BIOL3310	Human Biology	3	BIOL4310	Human Genetics	3
BIOL3410	General Microbiology	3	BIOL4420	Marine Microbial Ecology	2
BIOL3413	Microbiology Laboratory	1	BIOL4510	Hong Kong Flora and Vegetation	3
BIOL3420	Advanced Genetics and Epigenetics	3	BIOL4520	Plant Metabolism and Metabolic Engineering	2
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

Food and Nutritional Sciences

Course Code	Course Title	Unit(s)
FNESC2001	Introduction to Food Sci & Technology	2
FNESC2002	Nutrition for Health	2
FNESC2005	Ethics and Professionalism for Nutritionists	1
FNESC3001	Food Sci Lab I	2
FNESC3002	Nutritional Sci Lab I	2
FNESC3010	Nutrition and Human Development	3
FNESC3030	Nutritional Biochemistry	3
FNESC3110	Food Chemistry and Analysis	3
FNESC3180	Food Microbiology	3
FNESC4001	Food Sci Lab II	2
FNESC4002	Nutritional Sci Lab II	2
FNESC4101	Human Physiology for Nutrition Studies I	3
FNESC4102	Human Physiology for Nutrition Studies II	3
FNESC4110	Food Technology	3
FNESC4120	Community Nutrition	3
FNESC4150	Introduction to Medical Nutrition Therapy	3
FNESC4160	Nutrition Planning and Food Policy	3
FNESC4170	Food Product Development and Quality Control	3
FNESC4901	Senior Experimental Project I	2
FNESC4902	Senior Experimental Project II	2
FNESC4903	Senior Experimental Project III	2
FNESC4906	Internship	2
FNESC4907	Nutrition Practicum	2
FNESC5430	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 and their Applications	2
MBTE3521*	Transgenic technologies in Animals	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.

The next phase of the undergraduate study helps to understand in more detail of the 6 major programmes in the School of Life Sciences. In Term 4, students can choose classes from 15 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	FNCS	MBTE
BCHE2000	2	✓				
BCHE3050	2	✓		✓		
BCHE3070	1	✓		✓		
BCHE3650	2	✓				
BIOL2210	3		✓			
BIOL2213	1		✓			
BIOL2313	1	✓	✓	✓		✓
BIOL2410	2	✓	✓	✓	✓	✓
BIOL2420	1		✓			
CMBI2200	2			✓		
ENSC2270	3					
FNCS2001	2				✓	
FNCS2002	2				✓	
FNCS3180	3				✓	
MBTE2000	2					✓
MBTE2010	2					✓

General Study Scheme for entrants from 3-3-4 curricular system

TERM 1	Build up fundamental knowledge with Faculty Package in Terms 1 and 2 LSCI1002* + CHEM1280 or CHEM1070 + one course from Maths, Physics, Statistics.
TERM 2	
TERM 3	with foundation courses in life sciences in Term 3: LSCI2002 + BIOL2120 + BCHE2030
TERM 4	Confirm your interest Select preferred courses from a list of 15 offered by all 5 programmes BCHE2000 BCHE3050 BCHE3070 BCHE3650 BIOL2210 BIOL2213 BIOL2313 BIOL2410 BIOL2420 CMBI2200 FNCS2001, 2002 FNCS3180 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	

* choose only ONE laboratory course from BIOL2213, BIOL2313 or BIOL3413 (offered in the second year) for the major requirement of BIO.



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

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 FNCS.

■ 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
FNCS2002	2	BIOL2213	1	BIOL2410	2
FNCS3180	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.

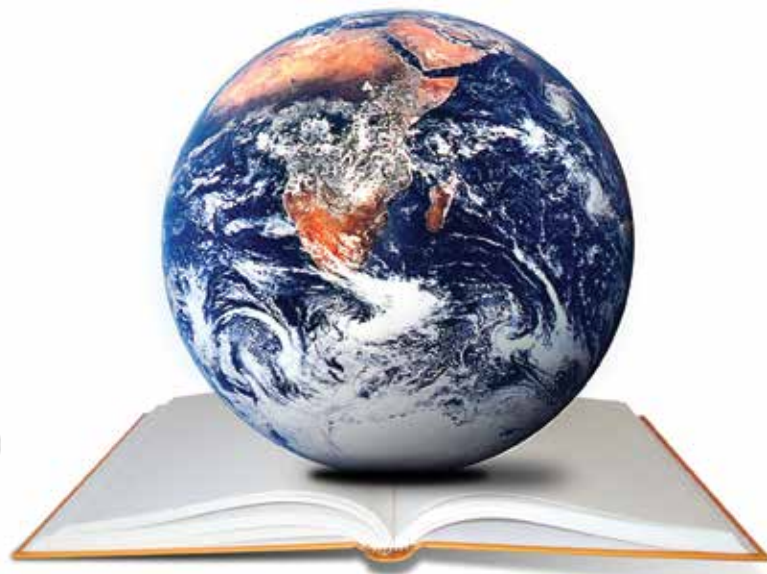
Declaration occasion	After admission	End of Year 1	End of Year 2
Condition	Level 5 or above in HKDSE of Biology OR Chemistry OR Combined Science (with Biology or Chemistry component) OR Integrated Science OR Technology and Living* (Food Science and Technology Strand only)	C+ or above in LSCI1002	Taken (NOT necessarily ALL PASSED) LSCI1002, LSCI2002, BCHE2030 AND BIOL2120

* Apply to FNCS 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

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



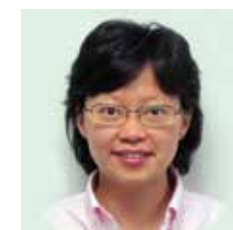
Wong Kam-Bo, PhD (Cantab)
Director, School of Life Sciences
Email: kbwong@cuhk.edu.hk

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

PROFESSORS

Au Wing-Ngor Shannon, PhD (HK)
Email: shannon-au@cuhk.edu.hk



Research Interests:

1. Protein post-translational modification
2. Macromolecular assembly

Chan Ho-Yin Edwin, PhD (Cantab)
Associate Director, Biochemistry Programme
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

Chan Michael Kenneth, PhD (UC Berkeley)

Email: michaelkchan88@cuhk.edu.hk



Research Interests:

1. Protein crystallography
2. Chemical biology

Chen Zhen-Yu, 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

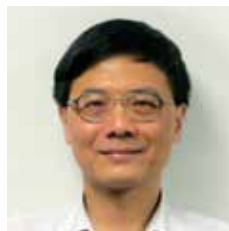
Cheung Chi-Keung Peter, PhD (NSW)Division Head, Research Postgraduate Programmes
Email: petercheung@cuhk.edu.hk

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

Fong Wing-Ping, PhD (CUHK)

Email: wpfong@cuhk.edu.hk



Research Interests:

1. Anti-cancer activities of novel photosensitizers

Jiang Liwen, PhD (S. Fraser)Director, Cell and Molecular Biology Programme
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

Lam Hon-Ming, PhD (Northwestern)Director, Molecular Biotechnology Programme
Email: honming@cuhk.edu.hk

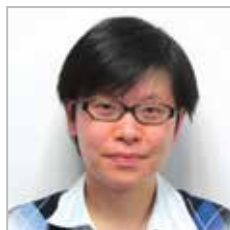
Research Interests:

1. Genomic study of soybean
2. Identification and characterization of functional genes to improve abiotic stress tolerance and disease resistance in plants;
3. Manipulation of nitrogen sink-source relationship in plants

Shaw Pang-Chui, PhD (Lond.)Director, Biochemistry Programme
Director, Centre for Protein Science and Crystallography
Email: pcsshaw@cuhk.edu.hk

Research Interests:

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

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

ASSOCIATE PROFESSORS

Chan Ting-Fung Philos, PhD (Wash.)

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

ASSOCIATE PROFESSORS

Chung Hau-Yin, PhD (Louisiana State)

Email: anthonychung@cuhk.edu.hk



Research Interests:

1. Food flavor chemistry, analysis and application
2. Natural product, safety, health and application
3. Food evaluation and food product development
4. Soy-based fermented food and seafood

Guo Dian-Jing 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

He Jun-Xian, 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

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

Kang, Byung-ho, PhD (Wisconsin-Madison)

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

Lau Kwok-Fai, PhD (CUHK)

Email: kflau@cuhk.edu.hk



Research Interests:

1. Molecular neuroscience
2. Molecular pathogenesis of neurodegeneration

Luo Haiwei, PhD (South Carolina)

Email: haiweiluo@cuhk.edu.hk



Research Interests:

1. Molecular evolution of marine bacteria and archaea
2. Microbial genomics
3. Ecological and evolutionary bioinformatics

Ngai Sai-Ming, PhD (Alta.)Associate Director, Molecular Biotechnology Programme
Email: smngai@cuhk.edu.hk

Research Interests:

1. Bioinformatics and proteomics
2. Protein/peptide structural and functional studies
3. Research and development on modern Chinese medicine

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

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

ASSOCIATE PROFESSORS

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

Falkenberg, Laura, PhD (Adelaide)

Email: laurafalkenberg@cuhk.edu.hk



Research Interests:

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

Lau Chun Yu Wilson, PhD (Toronto)

Email: wcylau@cuhk.edu.hk



Research Interests:

1. Structural biology
2. Single particle cryo-electron microscopy
3. Structure-function studies of macromolecular assemblies and membrane proteins

Michael Pittman, PhD (UCL)

Email: mpittman@cuhk.edu.hk



Research Interests:

1. Dinosaur-to-bird transition – feathered dinosaur anatomy, systematics, biology and evolution especially:
 - Soft anatomy
 - Early flight development
 - Feeding, diet and ecology
2. Other dinosaur biology and evolution
3. Lagerstätten & fossilized soft tissues – imaging, geochemistry and palaeobiology

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 ASSISTANT PROFESSOR

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

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

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

Chow Cheung-Ming Cherry, PhD (Oxford)

Email: cmchow@cuhk.edu.hk



Research Interests:

1. Plant cell biology
2. Membrane trafficking
3. Nitrogen metabolism in plants

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

LECTURERS

Law Man Suet Michelle, PhD (CUHK)

Email: michellelaw@cuhk.edu.hk

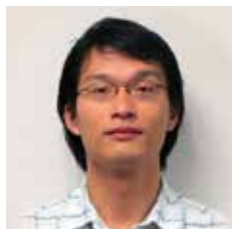


Research Interests:

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

Lo Fai-Hang, PhD (CUHK)

Email: lofaihang@cuhk.edu.hk



Research Interests:

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

Ngai Hung-Kui, PhD (CUHK)

Assistant Director, Biochemistry Programme

Email: hkngai@cuhk.edu.hk



Research Interests:

- 1. Protein biochemistry
- 2. Science education

Siow Lam Nina, PhD (HKUST)

Email: nina@cuhk.edu.hk



Research Interests:

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

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 LECTURERS

Chu Kin-Kan Astley, MPhil (CUHK)

Assistant Director, Biochemistry Programme

Email: potato@cuhk.edu.hk



Research Interests:

- 1. Chemical and physical analyses of food materials
- 2. Food processing technology
- 3. Food product development
- 4. Molecular marker for food authentication

Sin Man Ching Daisy, MND (Canberra)

Accredited Practising Dietitian (AU),

Certified Personal Fitness Trainer (AASFP, HK)

Email: daisymcsin@cuhk.edu.hk



Research Interests:

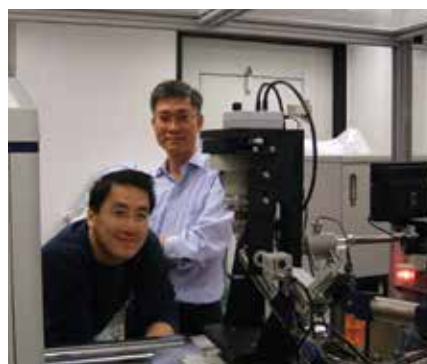
- 1. Nutrition education and behavioral modification
- 2. Weight and chronic disease management

EXCELLENT RESEARCH



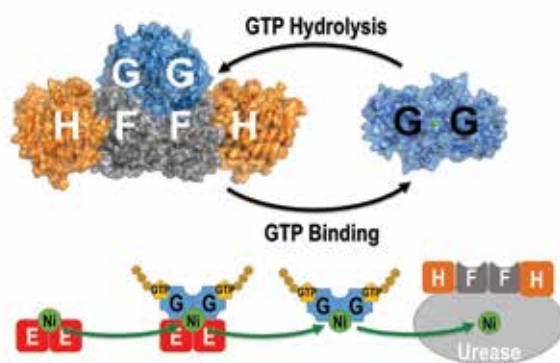
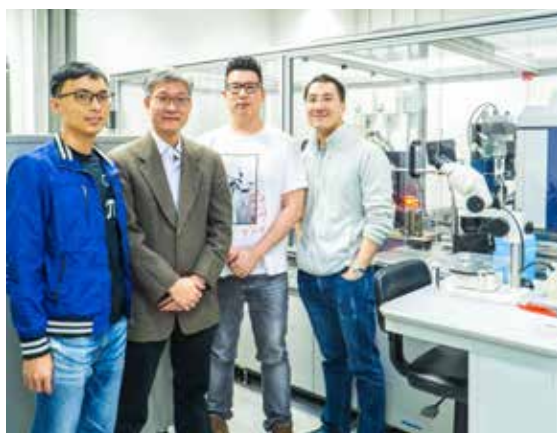
HOW HELICOBACTER PYLORI USES A TOXIC SUBSTANCE TO KEEP ALIVE IN HUMAN STOMACH

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.



INNOVATIVE PLATFORM FOR FOOD AUTHENTICATION



Supermarkets mislabeled oilfish filet as codfish filet. Stores claimed whelk pieces as abalone slides. 'Fraudulent substitutions' is hot in the city. They damage the confidence of both locals and tourists in food products in Hong Kong.

The Innovative and Technology Commission of the Hong Kong Government funded a HK\$3 million project 'First-Stage Development of Platform for Authentication of Dried Seafood and Tonic Food Products'. The leader of the project is Professor Kwan Hoi Shan, Director of the Food Research Centre at CUHK. The project aims to develop a database and platform with morphological data and DNA sequences of common dried seafood and tonic food products in Hong

Kong. This platform enables the government, local industry, and testing laboratories to monitor food products with DNA sequence markers. The second target of the project is to develop a rapid DNA-based diagnostic kit for species authentication. Laboratories can quickly distinguish genuine products from the fake ones with the database and the kit.

With these efficient quality assurance controls, mislabeling and fraudulent substitution in the local markets can be controlled. The project will contribute to food safety and enhance the reputation of the local food market.



Professor Kwan received a Bronze Bauhinia Star (BBS) of 2012 for his meritorious public and community service, particularly his contribution to promoting food safety and quality assurance.

THE STORY INSIDE AND BEHIND THE SOYBEAN GENOME

Global Agriculture is facing growing challenges including limitation in freshwater resources, topsoil depletion, as well as extreme temperatures brought upon by climate change. Sustainable agriculture is now among the top national priorities of developing countries, to bolster food security, economy, and environmental sustainability.

Among all crops, soybean is the third most important cash crop in the international trade market. It is the No. 1 source of vegetable protein, the leading source of edible oils as well as a source of biodiesel. In addition, its high symbiotic nitrogen fixing capacity is environmentally important as its cultivation can naturally replenish soil nutrients. Despite all its benefits, soybean's great potential in promoting sustainable agriculture is still undervalued and awaiting to be unveiled.

Prof. Lam Hon-Ming, Director of the Partner State Key Laboratory of Agrobiotechnology, The Chinese University of Hong Kong (PSKLA), has been working on the identification of stress tolerance genes in soybean for almost 20 years. In 2010, Prof. Lam published a cover article in the renowned scientific journal *Nature Genetics*, reporting the decoding of 31 wild and cultivated soybean genomes that revealed a much higher biodiversity in wild soybeans. In 2014, his team has successfully identified and cloned a major salt tolerance gene from wild soybeans. This finding was published in *Nature Communications*, a multi-disciplinary scientific journal ranked just after *Nature* and *Science*. This is a milestone in the mass production of high quality salt tolerant soybeans, a stage reached which will eventually benefit agriculture worldwide.



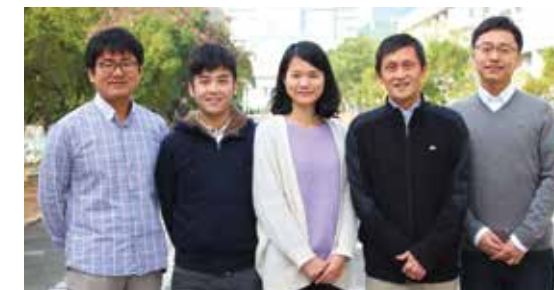
Prof. Lam has also been working with soybean breeders in China to produce salinity and drought tolerant soybeans that can be grown on saline and/ or arid lands, via non-GM methods. In 2016, two new stress tolerant soybean cultivars gained provincial approval in China, and were cultivated in arid regions to restore arable land and help the local farmers. In the same year, he jointly published a perspective article to *Nature Plants*, together with other members of the World University Network (WUN).

Using the WUN platform, Prof. Lam organized an international legume symposium in 2017, hosting more than a hundred legume scientists from the six Continents, establishing extensive collaboration networks for academic exchange and collaboration projects.

In 2017, Prof. Lam leading a team of plant and agricultural researchers, has been awarded funding in excess of HKD81 million over 8 years from the Area of Excellence (AoE) Scheme under the Research Grants Council (RGC), with their vision to develop new plant and agricultural technology to strike for a better balance between food security and agricultural sustainability.

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 22 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.

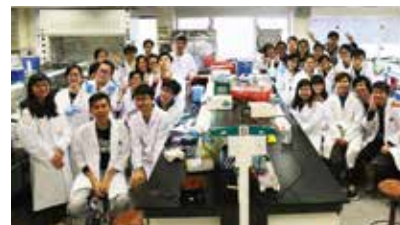
Professor Jiang said, 'This discovery has far reaching implications for enhancing agricultural productivity. Since ATG9 is conserved among higher eukaryotic cells, such as rice, maize and soybean, further research on the molecular mechanism of plant autophagy pathway will provide new insight into how 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).

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.



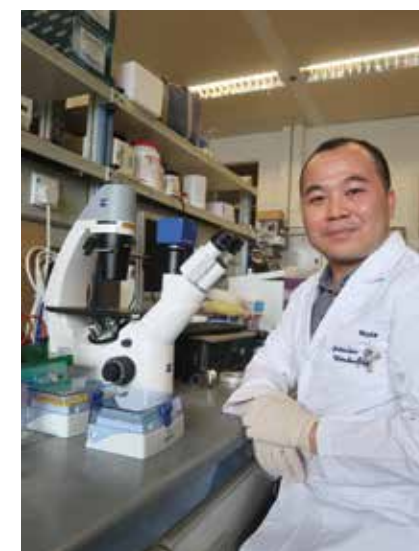
Our iGEM teams consist mainly but not limited to students from the Faculty of Science and Engineering. We work together using synthetic biology experiments to develop their “bio-bricks”, the standardized DNA parts tailor-made for different specific tasks, and characterize them systemically and scientifically, 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

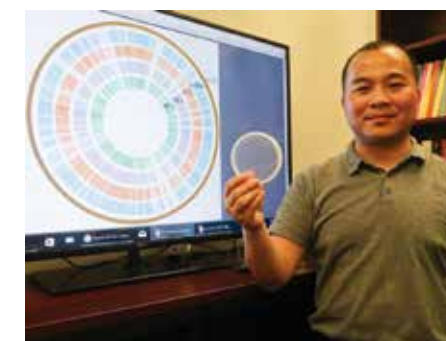
A NEW THEORY FOR BACTERIAL GENOME EVOLUTION IN THE OCEAN



A drop of seawater contains millions of bacteria, most of which are only about 0.5 microns in cell size and about 1.5 mega nucleobases in genome size. A few prominent examples include the photoautotrophs *Prochlorococcus*, which makes 20% of the chlorophyll synthesized by marine and land plants on the Earth, and the most abundant organoheterotrophs SAR11 and SAR86. Over the past decade, it has been believed that the evolutionary pattern of these tiny marine bacteria is well explained by Darwin's theory of biological evolution, which states 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 including *Prochlorococcus*, SAR11 and

SAR86 lost a large number of DNA molecules. 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 also 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.

A recent study by Prof. Haiwei Luo and his international team has provided convincing evidence against this theory. By reconstructing the evolutionary history and calculating the evolutionary rate of different types of gene mutations in nearly 100 genomes of *Prochlorococcus*, the researchers identified an excess of the more deleterious type of gene mutations accumulated at 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 a large number of 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. This mechanism was also shown to drive the massive DNA losses during the early evolution of some marine organoheterotrophs such as SAR86. An important implication from this study is that during the early evolution of these tiny bacteria, the ocean changed to a hostile condition in which these bacteria ceased to grow. This led to the failure of the natural selection mechanism and the concomitant accumulation of harmful genetic mutations. This study involved multi-disciplinary knowledge including microbiology, evolutionary biology, marine science and computer science, and was published in *Nature Microbiology* in July 2017.



UNLOCKING THE MYSTERIES OF A RARE NEURODEGENERATIVE DISORDER



CUHK's discovery brings new hopes to patients of HD. Huntington's disease (HD), a hereditary disorder that causes the brain's nerve cells to malfunction, is currently an incurable condition. However, an international collaboration involving neuroscience experts from CUHK is getting closer to understanding the root of the illness and thus opening up new therapeutic horizons.

Symptoms of HD tend to develop between the ages of 30 and 50, with sufferers experiencing progressive decline in movement and cognition, and in some cases psychiatric disturbances. Existing medication for HD can help patients to manage symptoms, but not treat the underlying disease.

Catching the culprit

Now, however, Prof. Edwin Chan of the School of Life Sciences at CUHK, in collaboration with scientists from the University of Illinois at Urbana-Champaign in USA and the University of Pisa in Italy, has taken a step closer to a possible cure.

Prof. Chan's team has revealed how a particular species of ribonucleic acid (RNA), known as 'small CAG repeat RNAs' (sCAG), triggers the onset of HD by causing damage to genetic materials in the genome, the ordering system for our DNA. It is the first study to show how a build-up of these small toxic molecules in the brain's nerve cells can compromise the functioning of the gene, NUDT16, that safeguards the integrity of the genome. Inhibiting this gene leads to DNA damage, the degeneration of neurons and cell death.

'Our team is very grateful for being able to put one more jigsaw piece to the puzzle in explaining how HD comes about,' said Prof. Chan.

Neutralising the threat

The research team also believes that the findings can help develop new treatments for HD. This is because of a further important discovery: that a small molecule compound known as DB213 can target sCAG and neutralise its toxicity.

Using advanced techniques, Prof. Chan's team was able to apprehend at the atomic level how the DB213 compound 'docks' onto the toxic sCAG. This patent-protected technology has also allowed the team to modify the compound in order to enhance its therapeutic effects against HD.

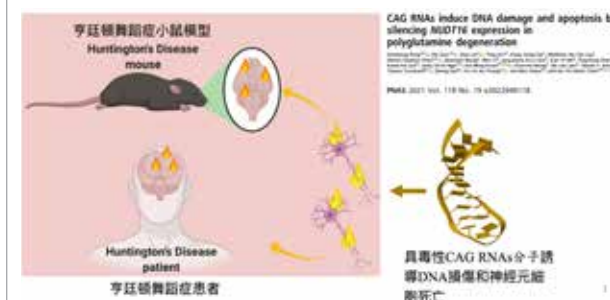
Further experiments showed that therapeutic interventions based on DB213 can suppress DNA damage and significantly restore motor deficits in mice that contract HD. Such interventions have the added benefit of being administered nasally rather than by spinal injection, as is the case with previous experimental drugs, making them more effective and further highlighting the therapeutic potential of DB213. The compound could also potentially be used to treat forms of Spinocerebellar Ataxias, another group of rare neurological diseases.



Prof. Edwin Chan is establishing a HD Patient Registry for Hong Kong to support the long-term clinical care of HD patients.

The team is now in initial discussions with pharmaceutical companies regarding preclinical experiments on non-human primates. In addition, Prof. Chan is currently establishing a HD Patient Registry in Hong Kong to stimulate the development and clinical testing of DB213 and other therapeutic interventions, and support the long-term care of HD patients. The registry will act as a two-way platform for clinicians and scientists to disseminate new clinical and research information to patients and their caretakers, and for patients to offer feedback.

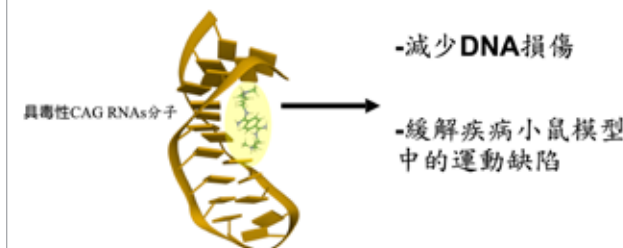
我們的研究發現了一種新的藥物治療方向 Our research discovered one new druggable pathway for Huntington's disease



什麼是DB213? What is a DB213?

- 小分子藥物
- small molecule drug

DB213的作用機理：中和具毒性CAG RNAs分子
Mechanism of DB213: neutralize toxic CAG RNAs

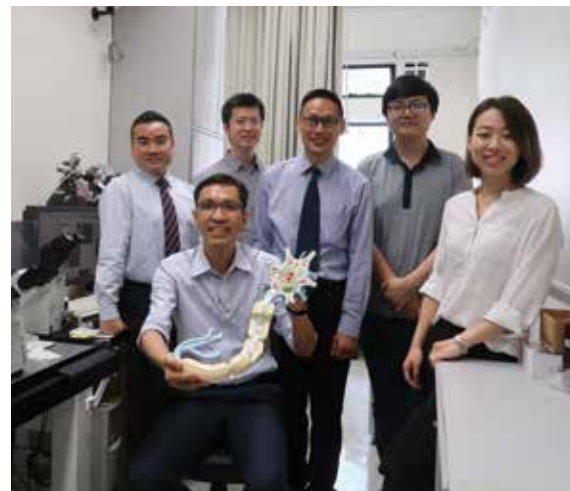


A NOVEL MECHANISM TO STIMULATE NEURITE OUTGROWTH – PAVING A NEW ROAD FOR BRAIN REGENERATIVE MEDICINE

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.

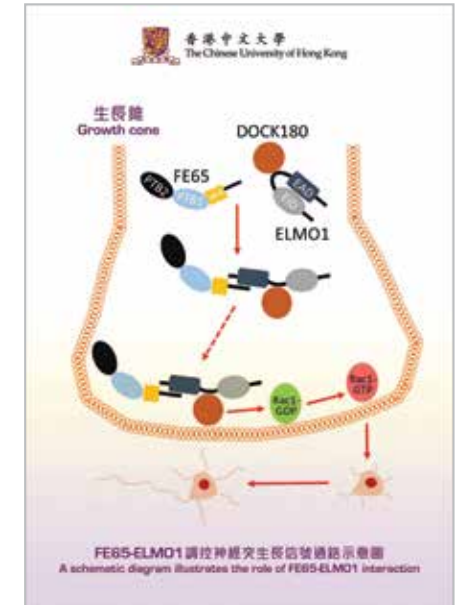
The brain is the command centre of animals and is composed of neurons interconnected by neurite, grown out from their cell bodies. Such connections are essential for the formation of neural networks which allow the communication of neurons to regulate different cognitive functions and body activities. 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, Professor 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, 'Reconnection 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.

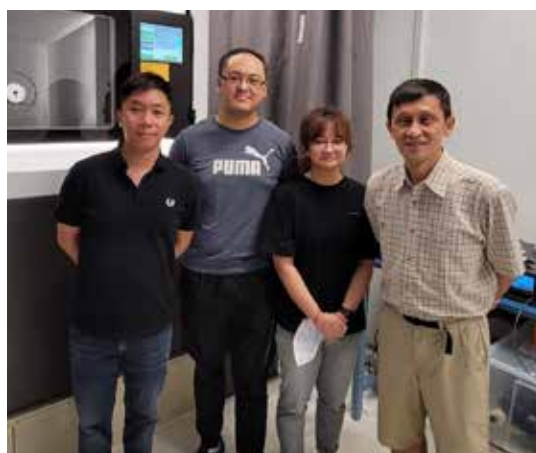
CUHK UNLOCKS THE MYSTERY OF SMALL HEAT SHOCK PROTEIN USING CRYO-EM TECHNOLOGY PAVES THE WAY FOR PLANT GENETIC ENGINEERING

A research team led by Professor Wilson Chun-Yu Lau has uncovered the anti-aggregation mechanism of small heat shock proteins (sHsps) and unveiled the structure of sHsps for the first time using the state-of-the-art single particle cryo-electron microscopy (cryo-EM) technology. The findings, recently published in the prestigious scientific journal *Nature Communications*, provide opportunities for potential enhancement of thermo-tolerance in crop plants and improvement in crop production.

Environmental stresses, such as drought, salinity and extreme temperatures, cause over 50% of worldwide yield loss of major crops every year. There is a broad scientific consensus that climate change and global warming will significantly impact future agricultural and food productivity. Therefore, a comprehensive understanding of environmental stresses tolerance mechanisms in plants would be of benefit and essential to genetic modification of crops with the aim of achieving sustainable agriculture and food supply.

Elevated temperature is considered as one of the major environmental stresses that affects the metabolism and many physiological processes of plants and thus has a devastating impact on plant growth and development. In a non-stressed environment, proteins fold into a functional shape and structure in order to function correctly and control dynamic processes in living cells. However, under conditions of stress, for instance, when temperature rises, proteins will tend to unfold and aggregate. Plants have evolved various defense mechanisms such as the heat shock response to cope with environmental stresses.

sHsps represent a class of highly conserved molecular chaperones, meaning they widely exist in plants and animals, and the genetic difference across species is not significant. A molecular chaperone is defined as protein that helps another protein to acquire its functional form. sHsps are known as “housekeeping” proteins to prevent aggregation and unfolding from happening under heat stress condition. In plants, genetically modified production of sHsps has been shown to confer enhanced thermotolerance.

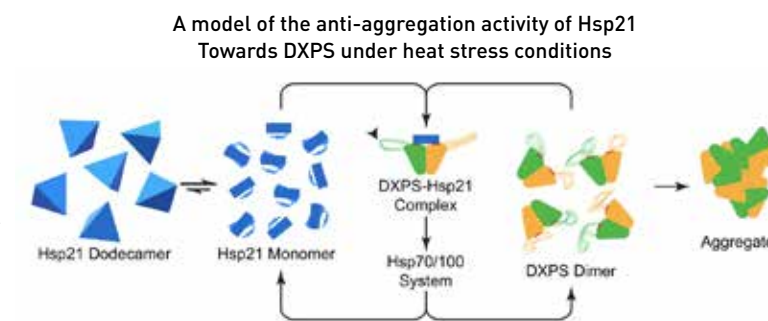


(From left) Professor Wilson LAU, Mr. Stephen LEUNG (Research Assistant), Ms. Chuanyang YU (PhD student), in collaboration with Professor Liwen JIANG, have successfully uncovered the anti-aggregation mechanism of small heat shock proteins (sHsps) for the first time using the state-of-the-art single particle cryo-electron microscopy (cryo-EM) technology.

Structural elucidation of Hsp21 and its complex with a natural substrate

To explore and open up the applicability of sHsps in plant biotechnology, Professor Lau and his research team set out to investigate the molecular mechanism of a plant sHsp, Hsp21, using a structural biology approach. They chose to focus on the Hsp21, a crucial sHsp that protects all photosynthesizing plants from heat stress.

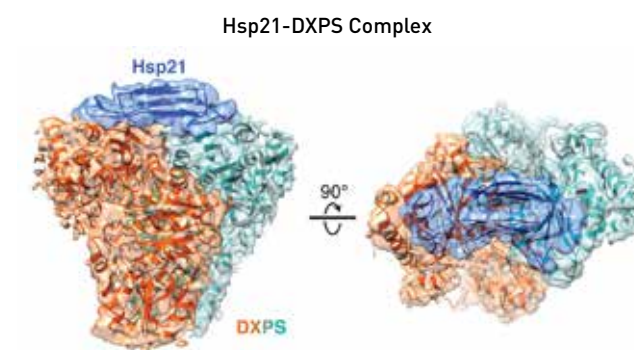
They first identified a substrate (a protein molecule upon which a chaperone acts on) of Hsp21, an enzyme called 1-deoxy-D-xylulose 5-phosphate synthase (DXPS), and then solved three-dimensional structures of Hsp21, DXPS and the Hsp21-DXPS complex, at unprecedented resolution, using cryo-EM of single particles combined with advanced computational image processing algorithms. Structural characterisation of sHsp-substrate complexes by the traditional X-ray crystallography method has proved notoriously difficult owing to the transient and heterogenous nature of their interactions.



Anti-aggregation activity of Hsp21 towards DXPS under heat stress conditions.

Professor LAU said, “Through solving the Hsp21-DXPS structure, our work unravels an unanticipated mechanism of sHsps anti-aggregation activity that is likely applicable towards a wide range of substrates. The current work not only provides a structural framework for understanding the functional properties of Hsp21 and sHsps in general, but also could form a basis and provide reference for genetic engineering of heat-resistant food crops to fight global climate change.”

The study was carried out by Ms. Chuanyang YU, PhD student of Professor Wilson LAU, and Mr. Stephen King Pong LEUNG, and in collaboration with Professor Liwen JIANG from the School of Life Sciences at CUHK.



Cryo-EM map and model of the Hsp21-DXPS complex.

FUTURE CURE FOR PARKINSON'S DISEASE

CUHK researchers develop novel peptide inhibitor for Parkinson's disease treatment



(From left) Prof. Michael Chan, Dr. Marianne Lee, Ms. Liang Zhaohui and Prof. Edwin Chan

A research team led by Prof. Michael Chan and Dr. Marianne Lee from the School of Life Sciences has developed a novel peptide inhibitor that can reduce the formation of neurotoxic protein in aggregates, slowing down the deterioration progress in patients with Parkinson's disease and other types of neurodegenerative diseases.

Parkinson's disease is one of the most common neurodegenerative diseases in the elderly. Despite the lack of medical evidence for its clear cause at this stage, various studies have found that α -synuclein, a protein which aggregates in the brain nerve cells of patients with Parkinson's disease and dementia, can lead to progressive loss of cognitive and motor functions.

'Most patients with Parkinson's disease and dementia have aggregates of α -synuclein in their brain,' said Prof. Michael Chan. 'We believe the progression of the disease can be delayed if there is a therapy which can inhibit the α -synuclein accumulation.'

In 2015, Ms. Liang Zhaohui, a PhD student in Professor Chan and Dr. Lee's laboratory, discovered that certain variants of the protein, SUM01, were effective against α -synuclein accumulation. In the ensuing five years, the team identified a minimal functional core, SUM01(15-55), which can bind to α -synuclein and directly suppress its aggregation.

The team then collaborated with Prof. Edwin Chan from the School of Life Sciences and Gerald Choa Neuroscience Centre, CUHK, and made use of the fruit fly *Drosophila* to carry out experiments and further evaluate the neuroprotective effect of SUM01(15-55). They found that treatment of *Drosophila* larvae with the SUM01(15-55) peptide can lead to an amelioration of neurodegenerative disease symptoms, highlighting the potential of their peptide as a therapeutic inhibitor against Parkinson's disease.

As of today, the research team is working on improving the biostability, brain-targeting ability and therapeutic efficacy of the peptide inhibitor, with the hope that an optimized construct can eventually be used to treat patients in the clinic.

The current work is supported by the Hong Kong Research Grants Council, the CUHK Centre of Novel Biomaterials, the CUHK School of Life Sciences Seed Fund, and the CUHK Faculty Major Research Area 2 Translational Biomedicine Research Incentive Scheme 16/17. Findings of this study are reported in the prestigious journal *Cell Chemical Biology*.

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 22 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 thrice (2006-07, 2009-10 & 2015-16), Croucher Senior Research Fellowship twice (2009-10 & 2015-16), Ministry of Education (MoE) Higher Education Outstanding Scientific Research Output Awards three times (2009, 2013 & 2017), 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). 17 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 Editors of *Protoplasma* and *Frontiers in Plant Science*, Senior Editors of *Journal of Integrative Plant Biology* and Editorial Board Members of *The Plant Cell*, *Molecular Plant*, *aBIOTECH*, *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\$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", for the past 5 years.

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

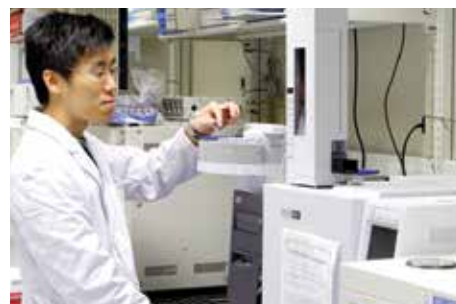
Other Research Awards:

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
2021-2022	Professor Luo Haiwei

CUHK Young Researcher Award

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



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

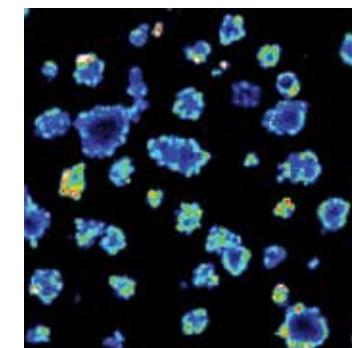
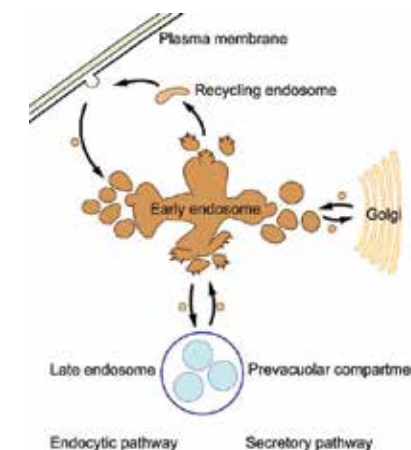
This covers a wide range of interdisciplinary areas in life sciences that explain the molecular and cellular organization, and how the signaling pathway regulates cellular function. Major topics include signal transduction, cell fate, neuroscience, stem cell biology, and cancer cell biology.

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

A number of nuclear protein-coding genes are used as DNA markers for resolving the phylogenetic relationships among the decapods crustaceans such as shrimps, lobsters and crabs.



The studies of dolphin, coral communities, and seaweed are underway in local marine parks. Impacts of climate change on marine ecosystems are also of our concerns.

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.

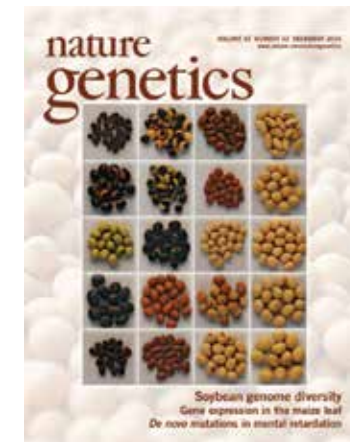
The palatability of food depends on our sensual perception. Key food chemical ingredients interacting with our sensory receptor are investigated.

To tackle diseases that have not yet been cured by modern medicine, several members in the School are working in functional foods and nutraceuticals. 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 pathway guided, genomic and proteomic approaches.



Genomics & Bioinformatics

The Human Genome Project has brought enormous technological breakthroughs in sequencing technology that give rise to a new area of research focusing on the sequence, structural, and functional analysis of the genome of all living organisms. The importance of genomics is best exemplified during the SARS outbreak in 2003. CUHK researchers deciphered the SARS-coronavirus genome isolated from the patients, and investigate how it mutates from the strain in palm civets. A number of professors in our School specialize in different aspects of genomic research such as evolution, population genetics and epigenetics, in a wide-range of living organisms with particular strengths in human, crustacean, and plant genomics.



Plant & Agricultural Science

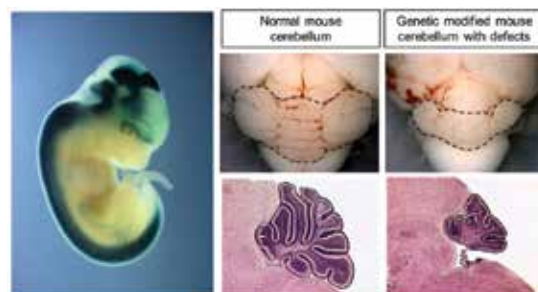
Achieved international excellence and obtained the official approval from The Ministry of Science and Technology of P.R. China, SLS members established the **State Key Laboratory (SKL) of Agrobiotechnology**, in partnership with the prestigious China Agricultural University in 2008. This SKL, comprised 16 principal investigators from CUHK and 5 associate members from other local Universities, has received a support totalled \$19M (2011-2016) from the Innovation and Technology Commission. This national-level laboratory has a mission to up-scale China's agricultural technology to the world frontier for increasing agricultural productivity, safeguarding food security in China, improving people's nutrition and promoting cooperation between China and Hong Kong on scientific advancement. Prioritized research areas include the development of stress tolerant, high-quantity, high-quality and high value-added crops via the application of state-of-the-art technologies such as genomics, proteomics, metabolomics and recombinant DNA approaches.



The SKL team and the researchers from the member laboratories at the SKL 2014 Annual Meeting. The current director and deputy director are Prof. Jianhua Zhang and Prof. Hon-Ming Lam (front row, 7th and 9th 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.

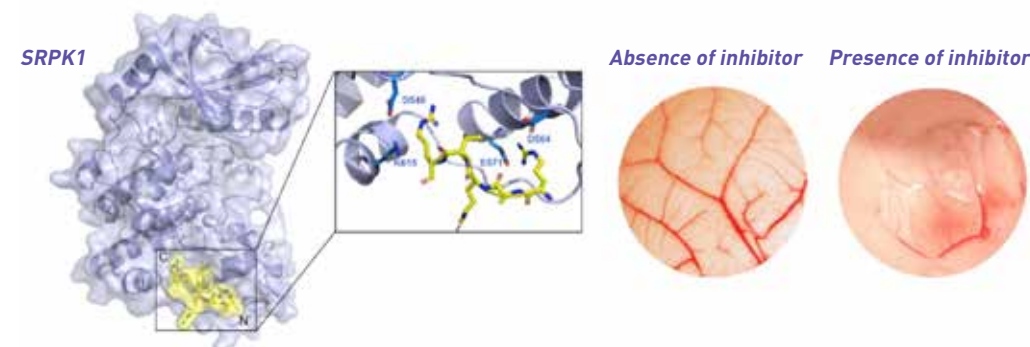
Protein Science

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

- 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, School of Life Science, 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.



SHIU-YING HU HERBARIUM



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.



AMPLE OPPORTUNITIES

Contact

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



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.



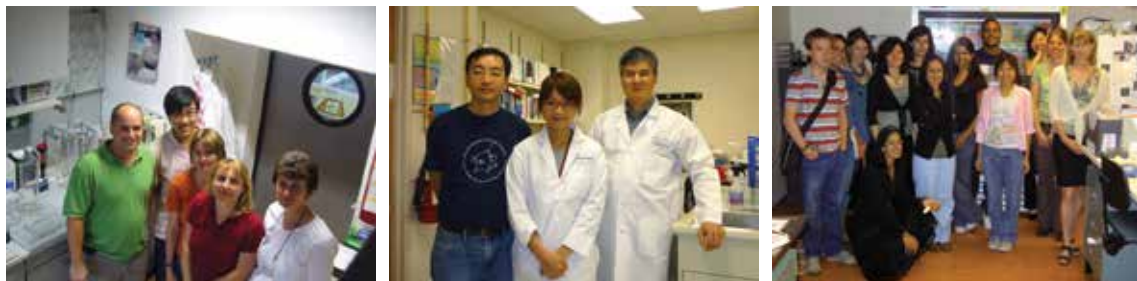
DREAM

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 in 2018 include 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 \$3300 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

"We would like to thank Ocean Park Conservation Foundation Hong Kong and the University for this valuable opportunity to join the 14-day cetaceans conservation project. We visited Bais City in the Philippines for a 5-day dolphin survey, and were lucky to see more than 300 individuals of spinner dolphins and Indo-Pacific bottlenose dolphins. Beside field survey, we also assisted with the laboratory work and gained practical experience on research. One of the research highlights of the team was the detection of antibiotic resistance of the bacteria isolated from cetaceans; this is significant not only to cetaceans, but also to human health, as the bacteria can be transmitted from cetaceans to human. The most important lesson we learnt from the trip is the "One Health" concept, that is the connection between the health of human, marine mammals and the environment. As the environment and the wildlife living in it are closely related to us, we should take action to protect them."



2019 participants - Chan Ying Tung (BIOL) and Cheng Lok Yiu (BIOL)



"I went to Yushu, Qinghai Province to help with the conservation work of snow leopards. However, their breeding season had made observation difficult; so we switched our focus to monitoring Chinese mountain cats, monitoring birds in forests and grassland management. We followed the researchers and nomads to look for traces of wild animals and to set camera traps. The task was quite harsh because we had to walk a long way on high altitudes and even climb up hills. We also went up to a village at 4700 m to conduct interviews with nomads. Although it was tiring and exhausting, and the condition in the village was bad, we did treasure the chance to interact with the local nomads and to know more about their lifestyles. This trip was unique and fruitful to me: I have learnt so much about different ecosystems and animals; but the best thing I have learnt is how different people cooperate with one another with respect and in harmony. I hope I can utilise all the experiences I have gained when I am doing conservation work in Hong Kong."



2019 participant - Wong Long Ching Elvis (BIOL)



“Thanks to the University Student Sponsorship Programme, we have the chance to visit C3 (Community Centred Conservation) in Philippines and participate in the project titled ‘Community-Driven Monitoring and Conservation of Palawan’s Threatened Dugongs’. Staying in C3, talking to the staffs and getting involved in some of the projects have made me realise the importance of community based principle in environment management. Environmental management can never be done just by professionals, planners and scientists. It is always the gathered effort from the community to make the management sustainable and truly applicable. Although it may be a hard and long term process to influence others, it is the intrinsically meaningful way to conserve the natural resources. The experience in C3 has made me truly believe, with time, patience, passion, skills and perseverance, our effort will inspire and influence the community to join our team someday.”

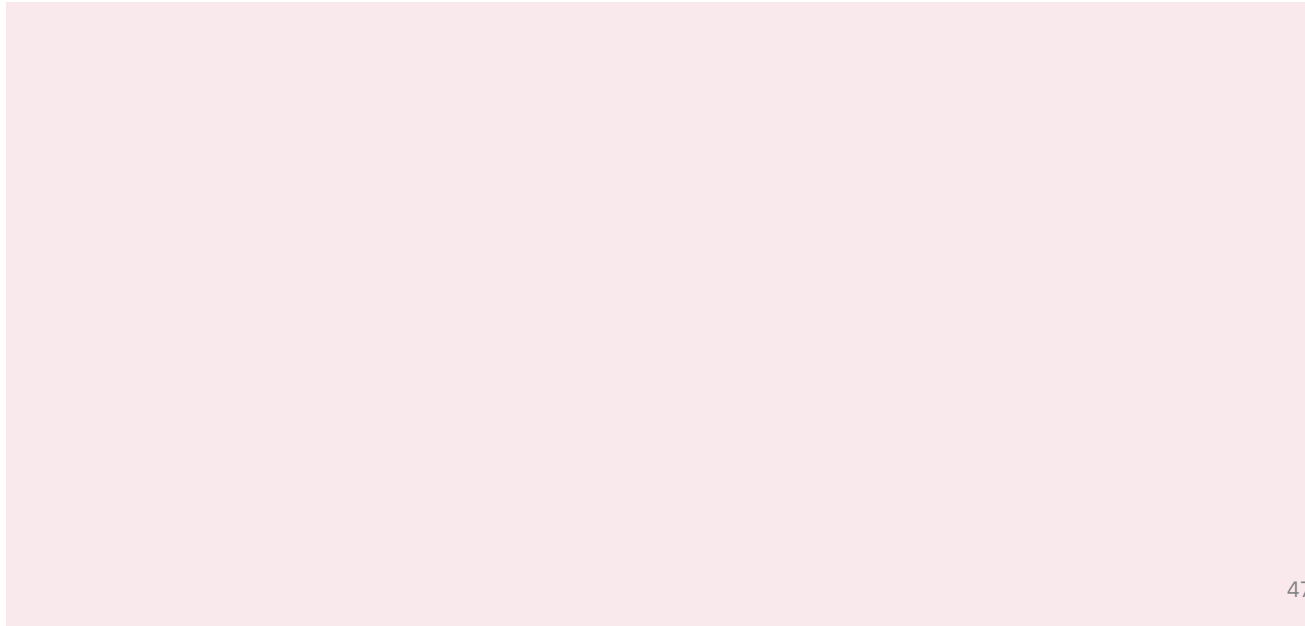
2019 participant – Kong Ka Wing (ENSC)

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 200 students in 2021 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, 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 troubleshooting 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

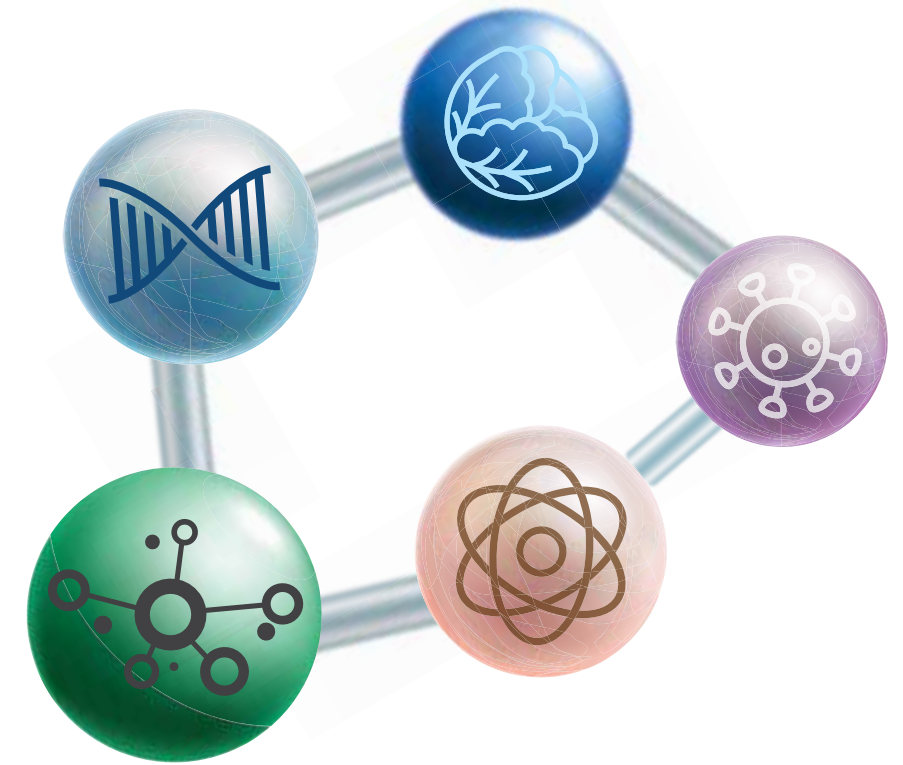
I graduated from CUHK's Biochemistry (BCHE) programme in 2019. This programme garners many heartwarming memories for me. Some highlights include a funded scholarship supporting me to study at University of California, Berkeley for a semester, as well as a fruitful Final Year Project on colorectal cancer, 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

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 the study in biochemistry has found extensive applications in medicine and biotechnology that drastically revolutionize our daily life.

In 1971, the University established the Department of Biochemistry (now the Biochemistry programme), and it quickly became a strong programme in teaching and research. The study of Biochemistry in the School comprises a broad array of scientific disciplines, including the chemistry of life processes, bioinformatics, the metabolism of biomolecules and their regulation, energy transformation, the functions of enzymes and the structure-function relationship of enzymes and proteins, genome research and genetic diseases, heredity and evolution, the mechanisms of the nervous, immune and endocrine systems, biotechnology, and biomedical sciences.



Mission

- To provide concepts and mechanisms on the molecular basis of life processes and the significance in human activities and health
- To provide training on the latest biochemical technology
- To cultivate the ability of critical thinking, a proactive and responsible attitude and efficient communication skills for high competitiveness in further study and career development



Career Talks given by Alumni

Curriculum

Biochemistry (BCHE)

Study Focus:

- Bioenergetics and Metabolism
- Biomedical and Health Sciences
- Genetics and Cell Biology
- Independent Research
- Methods in Biochemistry and Molecular Biology
- Proteins and Enzymes

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

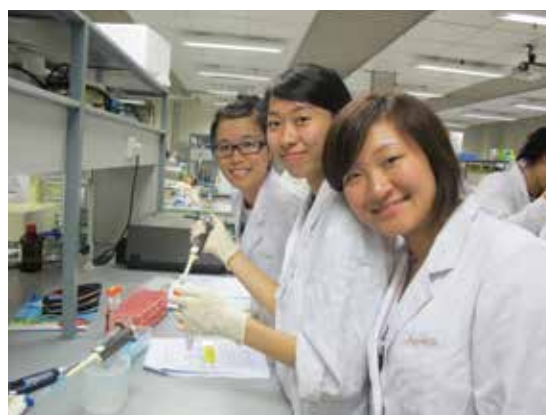
Curriculum Highlights

- Current topics in biochemistry and molecular biology that have scientific, medical and social significance
- Self-study modules and independent research opportunity



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

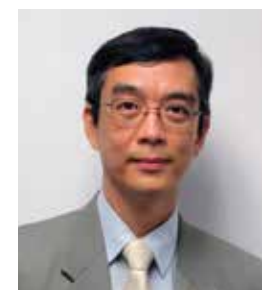


Choosing biochemistry as my major has been one of the best decisions I have ever made. Supported by an excellent and experienced teaching team, we are inspired to look for the hidden mysteries of life. The programme does not only provide us with the opportunity to learn in different research laboratories, 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 Shaw Pang-Chui**
pcshaw@cuhk.edu.hk



Biochemistry 40th Anniversary High Table Dinner

Contact

Website: www.cuhk.edu.hk/lifesciences/bche
Tel: (852) 852-3943-6359
Email: biochemistry@cuhk.edu.hk



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 has 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 oversea field trips.

Curriculum

Biology (BIOL)

Study Focus:

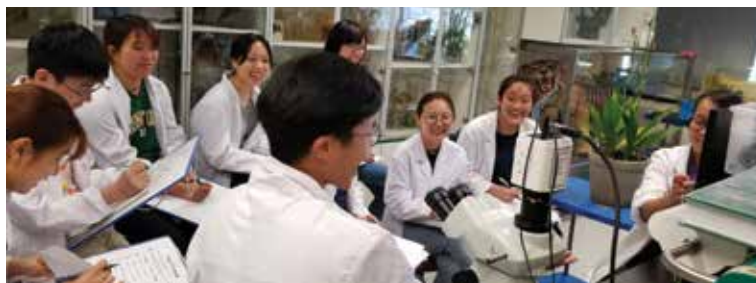
- Ecology
- Genetics
- Evolution
- Biodiversity
- Fundamentals of Biochemistry & Cell Biology

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

Three recommended packages based on the different combinations of the courses offered by Biology Programme: (1) Organismic and Conservation Biology; (2) Human Biology; and (3) Biology for Teaching Career.



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 program 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 a multitude of opportunities for research and teaching. Some programs 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 biology program.

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)



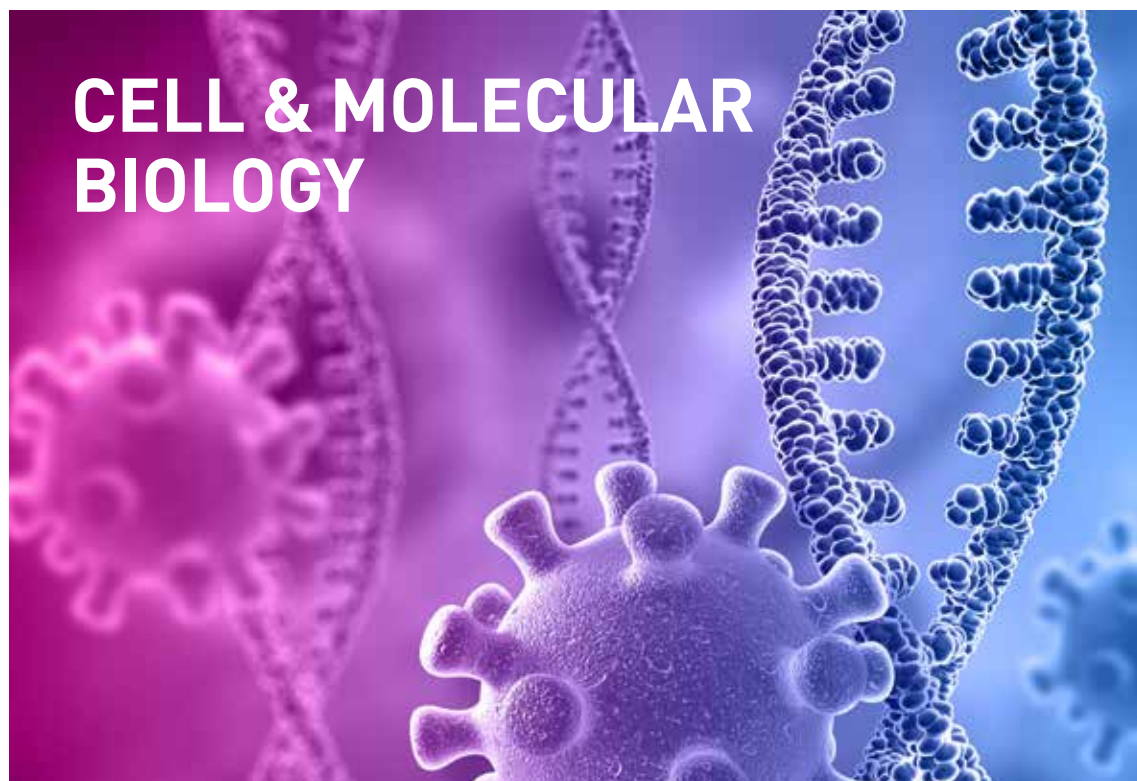
Programme Director: **Professor Hui Ho Lam Jerome**
jeromehui@cuhk.edu.hk

Contact

Website: www.cuhk.edu.hk/lifesciences/biol
Tel: (852) 852-3943-6249
Email: bio@cuhk.edu.hk



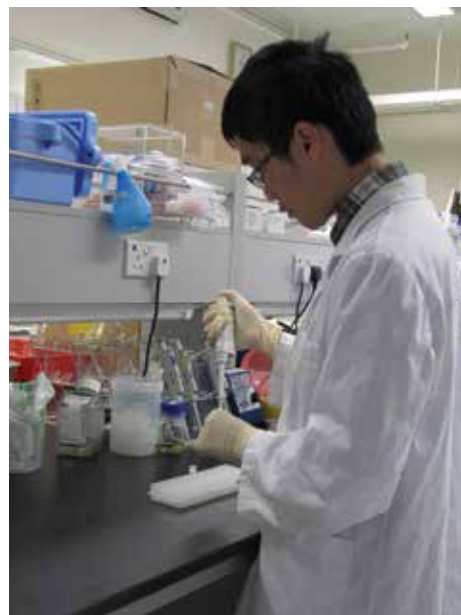
CELL & MOLECULAR BIOLOGY



Background

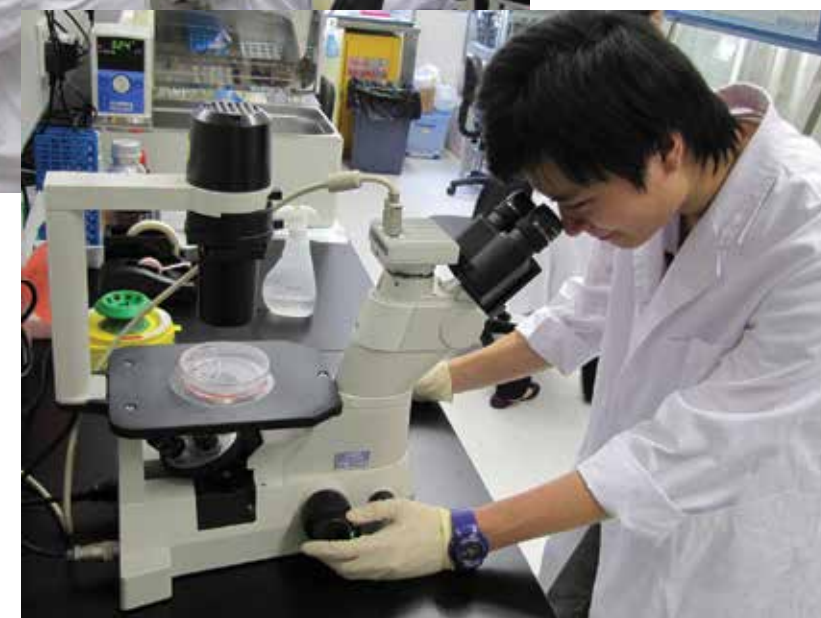
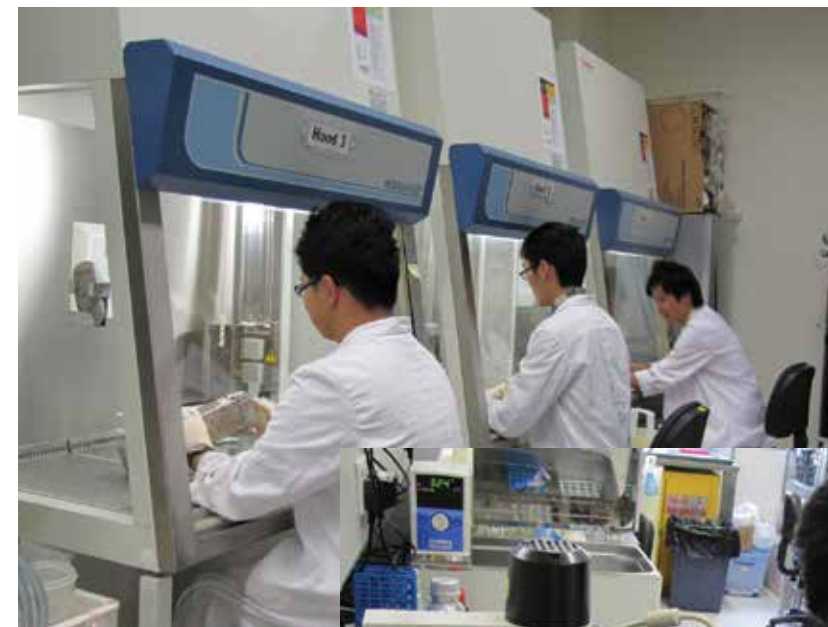
Cell and Molecular Biology (CMB) is an interdisciplinary field that represents the frontiers of biology and medicine. Advances in multi-omics sequencing approaches and imaging techniques have signalled a shift in modern biology to focus on understanding the function of genes at the molecular, cellular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



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

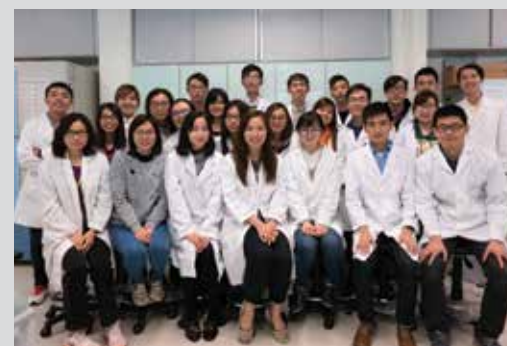
- Student-oriented capstone courses using a one-to-one mentoring approach
- Intensive project-based laboratory training
- An integrated programme covering cutting-edge research topics in cell and molecular biology on top of a solid knowledge base in life sciences
- Communication skills and problem-solving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

Views of Current Students



The one-to-one mentoring approach in STOT courses provides students with an extraordinary angle to appreciate the wonderful scientific world. The family-like atmosphere in CMB also allows good interactions among teachers, staff and students. The project-based CMB lab courses are fascinating – not only did we learn the essential techniques for molecular cloning, we also worked with plant cells and mammalian cells for our cell biology projects.

MA Tsz-Ching Charlotte

I think the CMB program is perfect for those who dream to become researchers. Not only does it provide us with practical laboratory training, it also sharpens our communication and logical reasoning skills. What's more, studying CMB let me connect and develop lasting friendships with a group of cheerful friends, who share common goals and interests with me. I found studying CMB to be absolutely fun.

TO Ching Yuet Andrew



Programme Director: **Professor Jiang Liwen**
ljiang@cuhk.edu.hk

Contact

Website: www.cuhk.edu.hk/lifesciences/cmbi
Tel: (852) 852-3943-1361
Email: cmb@cuhk.edu.hk





FOOD & NUTRITIONAL SCIENCES

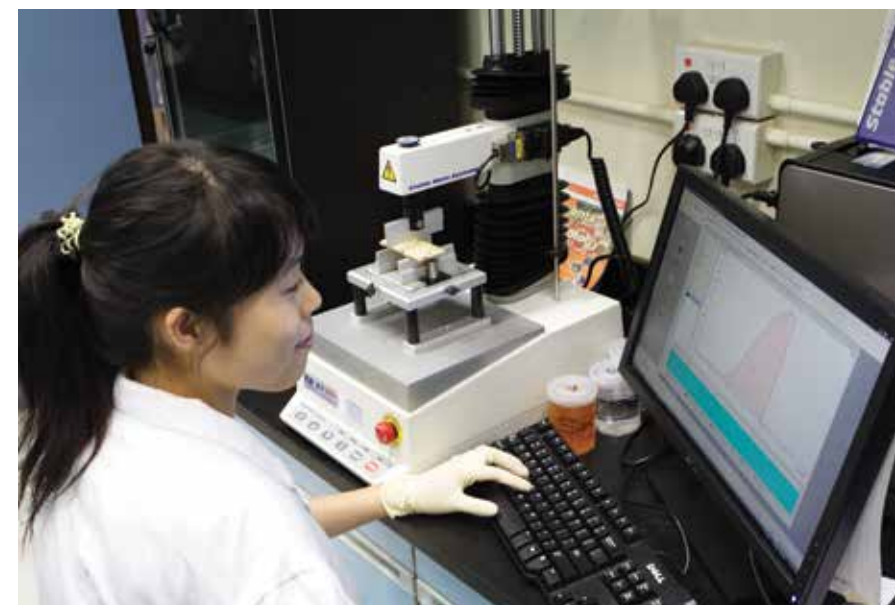
Background

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 training to students on modern food and nutritional sciences, with an emphasis on the oriental perspective
- To provide research and development expertise that enhances and sustains the competitiveness of the Hong Kong food industry
- To provide support and training to nutrition and its related professions.



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

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 has started offering the Food and Nutritional Sciences Programme (FNS) 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.

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 program 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 training to students on modern food and nutritional sciences, with an emphasis on the oriental perspective
- To provide research and development expertise that enhances and sustains the competitiveness of the Hong Kong food industry
- To provide support and training to nutrition and its related professions
- To provide courses that meet the standards and the core competency requirements of AfN

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



Programme Director: **Professor Tsang Suk Ying**
fayetsang@cuhk.edu.hk

Contact

Website: www.cuhk.edu.hk/lifesciences/fnsc
Tel: (852) 852-3943-6295
Email: fns@cuhk.edu.hk



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

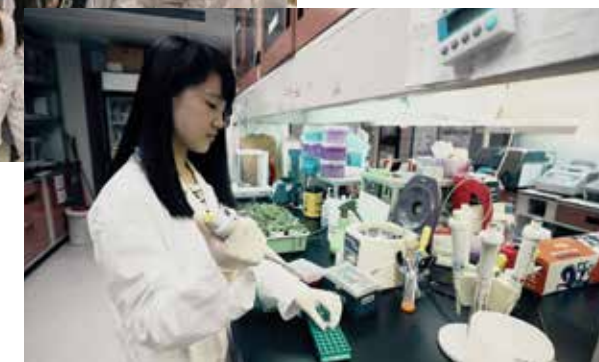
Molecular Biotechnology (MBTE)

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
- Medical Biotechnology
- Advanced topics offered by other SLS 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 offered by the Faculty of 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 have always wanted to contribute to biological science research. However, I just could not seek a particular direction into which I like delving. Fortunately, the MBTE Programme provides not only multidisciplinary life science fields throughout the whole curriculum, but, more importantly, it also furnishes me with tremendous local and overseas opportunities as well as extensive connections with alumni and professors. During my undergraduate years, I was able to participate in different research laboratories and biotech companies such as a study abroad programme at UC Berkeley, a leading University in the U.S. and a full-time R&D internship at a local Start-up in the Science Park. With the diversity of the curriculum, this programme makes me realise the importance of molecular biology in the thriving biotechnology industry, and it becomes an immense inspiration to me to dive deeper into molecular biology research.



Chris Ng Tin Long,
"Gates Cambridge Class of 2021" scholarship
 Current PhD student in the University of Cambridge

The MBT program gave me a solid foundation in basic molecular biology concepts and opened my eyes to cutting-edge technology of the 21st century. I was able to ask questions and hold discussions with patient, knowledgeable teachers and I had the opportunity to join different research labs during my undergraduate years, including a three-month summer research internship in Canada. In addition, the MBT curriculum made sure I was aware of the booming biotech industry and raised my awareness of patent law and the ethics of genetic engineering. Choosing the MBT program gave me wonderful opportunities to dive deep into the study of molecular biology and to also cast my vision far into the rising biotechnology industry.



Serena Yichen Dai,
the Rhodes Scholar for Hong Kong 2016,
 current PhD student in the University of Oxford



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

Contact

Website: www.cuhk.edu.hk/lifesciences/mbte
 Tel: (852) 852-3943-6393
 Email: mbt@cuhk.edu.hk



Minimum Admission Requirements

JUPAS Admission

- Students who have taken HKDSE and intend to major in one of the five programmes offered by the School of Life Sciences, i.e. Biochemistry, Biology, Cell and Molecular Biology, Food and Nutritional Sciences, and Molecular Biotechnology, should apply the SCIENCE broad-based admission scheme (JUPAS Code: JS 4601, Science).

The minimum eligibility to apply is 4 core and 2 elective subjects (4C + 2X or 4C + M1/M2 + 1X), with the minimum requirements for the 4 core subjects of Chinese Language, English Language, Mathematics, and Liberal Studies at levels 3322 respectively.

JUPAS Catalogue No. / Programme	Elective Requirements (X)		Remarks
	Subject	Level	
JS4601 - SCIENCE	Any ONE subject from the following: - Biology - Chemistry - Physics - Combined Science - Integrated Science - Mathematics (Module 1 or 2)	Level 3	Selection Principle: Total score of 5 subjects. Bonus points would be assigned to the 6 th and 7 th subjects in Category A and Category C.
	Any ONE subject in Category A	Level 3	

Non-JUPAS Admission

- Acquire the International Baccalaureate Diploma; OR
- Obtain good grades in Hong Kong Advanced Level (HKAL) Examination or GCE 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 webpage of Faculty of Science (<http://www.sci.cuhk.edu.hk>) Office of Admissions and Financial Aid (<http://admission.cuhk.edu.hk/jupas/requirements.html>).



School of Life Sciences | 生命科學學院



Contact Us

General Office of the School of Life Sciences

Room 132, Science Centre North Block

Tel: 3943-6122

Email: lifesciences@cuhk.edu.hk

Website: www.sls.cuhk.edu.hk

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此品種已列入香港法例第96章及第586章的管制及保護。