



School of Life Sciences
The Chinese University of Hong Kong



CURRICULUM FORUM

How to select your life science programs

Agenda:

- 1. Collection of your study experiences in the school***
- 2. Introduction of Year 2 courses and other arrangements***
- 3. Briefing Sessions of Six Programs***



Undergraduate Education

6 Life Sciences Programmes

- **Biochemistry**
- **Biology (incl. Human Biology)**
- **Cell & Molecular Biology**
- **Environmental Science**
- **Food & Nutritional Sciences**
- **Molecular Biotechnology**



Established in 1994

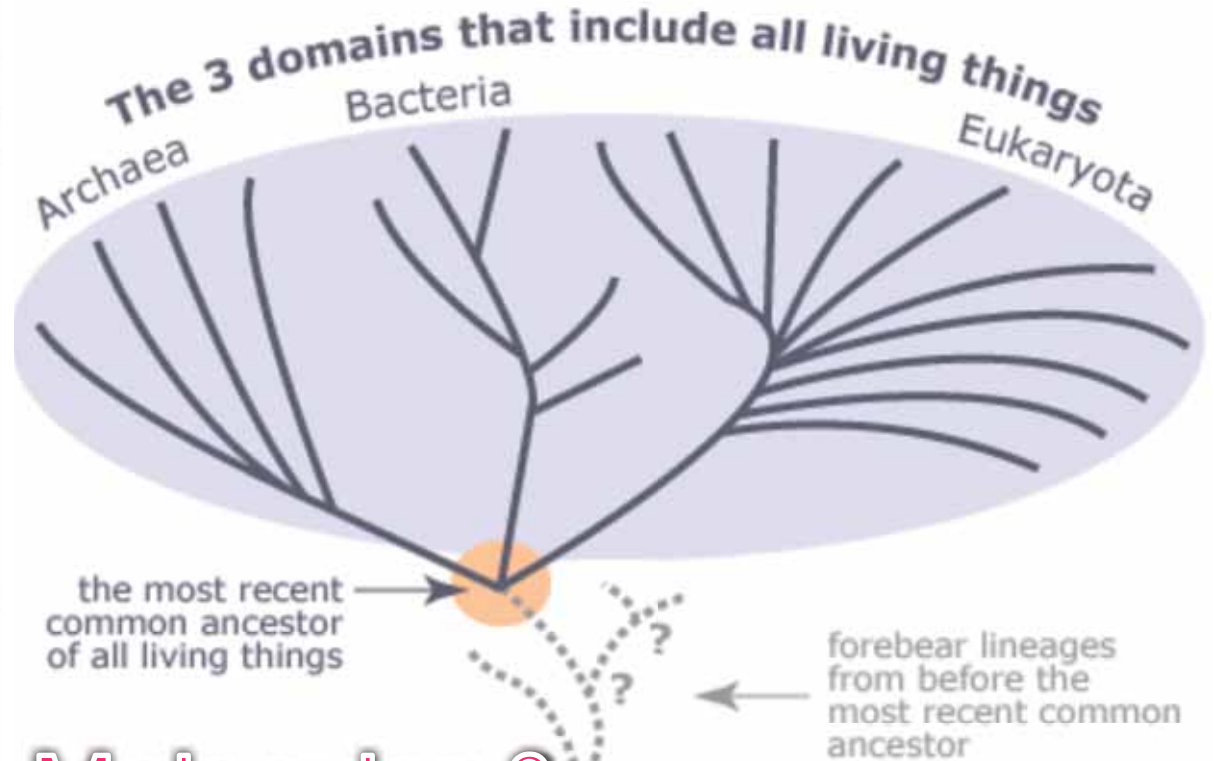
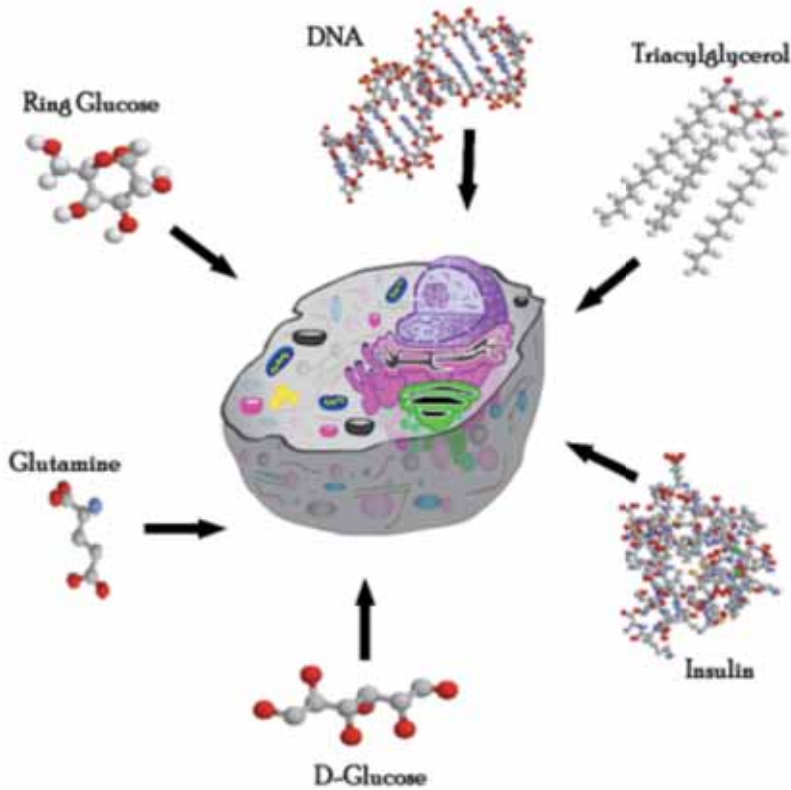
Environmental
Science

Established in 1994

Food &
Nutritional
Sciences

Established in 1998

Molecular
Biotechnology



Biochemistry

Established in 1972

Molecular &
Cell Biology

Established in 2008

Biology

Established in 1963

Foundation Courses

Year 1 Faculty Package	Biology Biodiversity	Chemistry/Lab Organic Chemistry	Physics, Math, or Statistics	General Education Languages
Year 2 (Term 1)	Cell Biology	Biochemistry	Basic Lab Techniques	Scientific Conduct and Ethics (BCHE, ENSC required)
Year 2 (Term 2)	## Introductory Courses from Programs	Ecology/Lab	Genetics/Lab	“Minor Electives” Language
Year 3/4	Program Core Courses	Major Electives	Capstone Courses	Minor Courses

Students may like to take the introductory courses in Year 1.

Be prepared to take your minor courses

Course	Unit	BCHE	BIOL	CMBI	ENSC	FNSC	MBTE	
BIOL 2120 Cell Biology	3	✓	✓	✓	✓	✓	✓	
BCHE 2030 Fundamentals of Biochemistry	3	✓	✓	✓	✓	✓	✓	
BCHE 2000 Frontiers of Biochemistry	2	✓						
BIOL 2210 Ecology	3		✓		✓			
BIOL 2213 Ecology Lab	1		✓ #		✓			
BIOL 2310 Gen. Mol. Genetics	3	✓	✓	✓		✓	✓	
BIOL 2313 Genetics Lab	1	✓	✓ #	✓				
CMBI 2200 Literature Survey....	2			✓				
ENSC 2270 Intro. Environ. Sci.	3				✓			
FNSC 2003 Food, Nutrition & Health	2					✓		
MBTE2000 Intro. Mol. Biotech	2	Be prepared to take your minor courses						✓
MBTE 2010 Biodiversity of Life: Applications & Sustainability	2						✓	

Revised Bloom's Taxonomy Table

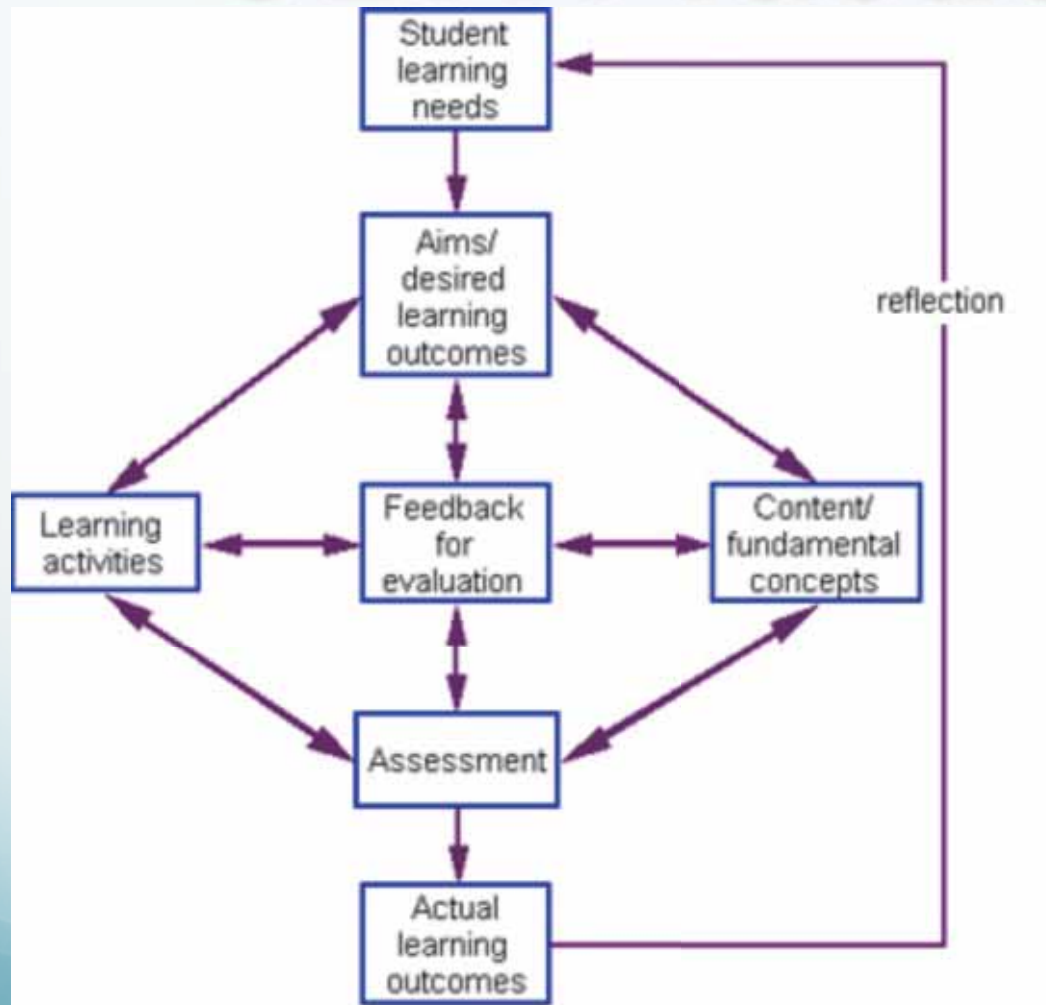
The knowledge dimension	The cognitive process dimension					
	Remember	Understand	Apply	Analyse	Evaluate	Create
Factual knowledge						
Conceptual knowledge						
Procedural knowledge						
Meta-cognitive knowledge						

Assessments
(Affirmative and Summative with Criteria Referencing):

Assignment,
Term Paper,
Poster and Oral Presentations,
Group Project,
Final Examination.

<http://www.cuhk.edu.hk/sci/OBA/information/information01.html>

OBA Practice in CUHK



Feedbacks:

Curriculum Forum,

**Course Teaching
Evaluation.**

**Staff-Student
Consultation Committee**

**Program Committee
Meeting**

Missions of



Professional training:

- ✓ *Concepts and mechanism of biochemical processes.*
- ✓ *Independent research and training on the latest biochemical technology.*

Personal development :

- ✓ *Ability of critical thinking, a proactive and responsible attitude and efficient communication skills.*



Biochemistry Program Requirements

- Frontiers in Biochemistry
- Fundamentals of Biochemistry
- Cell Biology
- Basic Laboratory Techniques in Life Sciences
- Genetics / Lab (optional lab)

Year 2 :
Fundamental Courses
(14 units)

- Proteins and Enzymes
- Bioenergetics and Metabolism/Lab
- Self-Study Modules in Biochemistry
- Methods in Biochemistry/Lab
- Molecular Biology/Lab
- Recombinant DNA Techniques
- Senior Literature Research / Senior Experimental Project

Year 3 - 4:
Fundamental and
Specialized Topics
(23 units)
+
Elective courses
(15 units)

Major Elective Courses for Different Career Paths

BCH program

- Clinical Biochemistry
- Aspects of Neuroscience / Lab.
- Molecular Endocrinology
- Medical Biochemistry Lab.
- Basic and Applied Immunology / Lab.
- Biochemistry for Sport and Exercise
- Biochemistry Forensic Sciences
- Senior Experimental Project I/II/III
- Senior Literature Research

Clinical / Biomedical Sciences

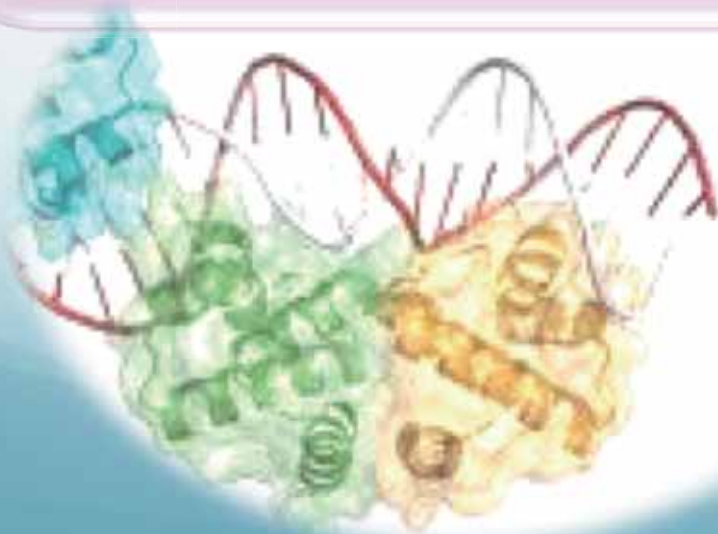
- Nutrition and Human Development
- Introduction to Medical Nutritional Therapy
- Human Genetics
- Statistical Techniques in Life Sciences

Research / Biomedical technology

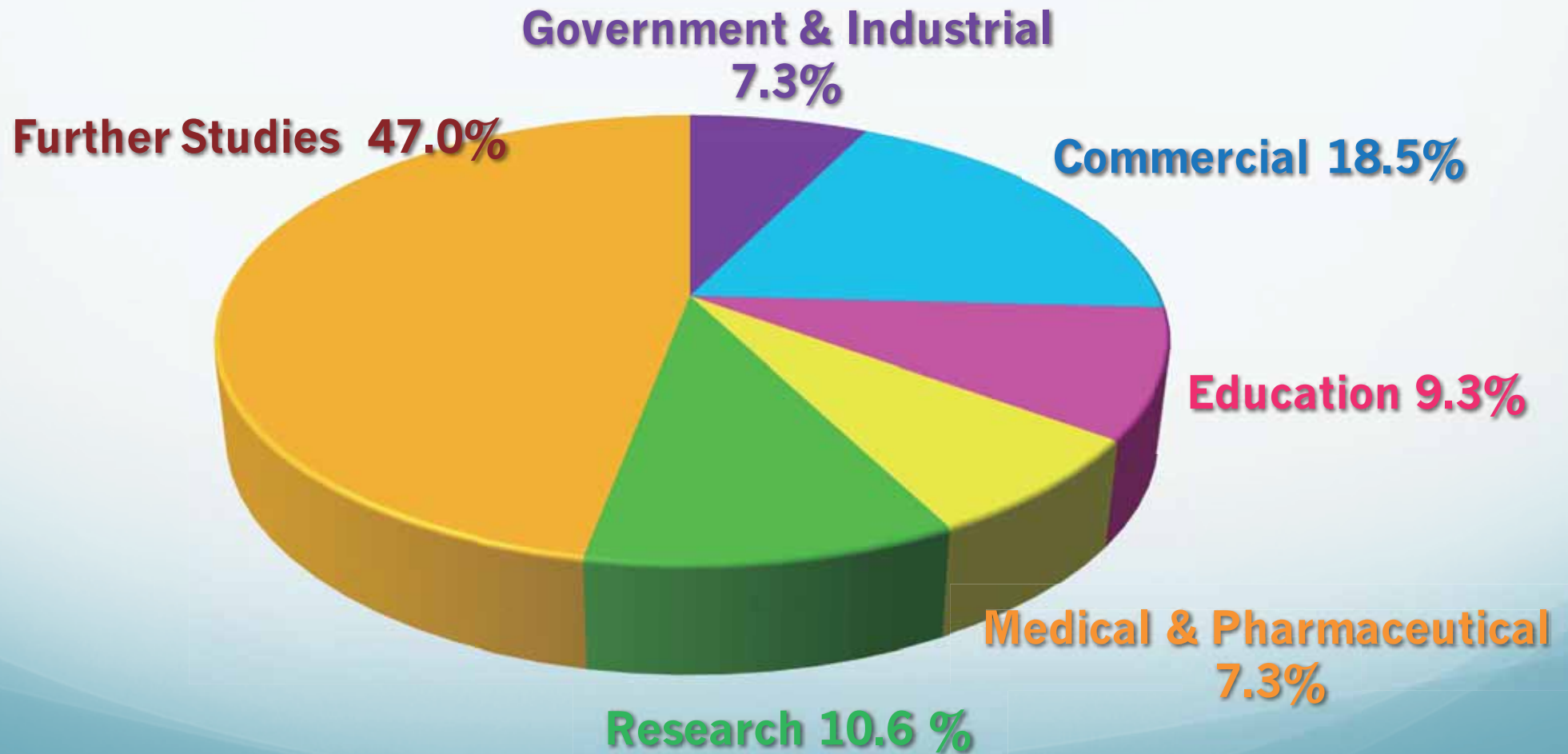
- Protein Folding, Proteomics
- Animal / Microbial Biotechnology
- Biochemical Toxicology/Lab
- Statistical Techniques in Life Sciences
- DREAM, iGEM

Biochemistry for environment

- Animal Biotechnology
- Environmental & Biochemical Toxicology/Lab
- Methods in Toxicology Research/Lab
- Environmental Health/Lab
- Statistical Techniques in Life Sciences



Careers of Biochemistry Graduates (2010-13)



BIOLOGY PROGRAM

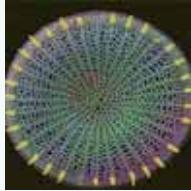
Our Missions

1. To provide our students with the core knowledge in biological sciences
2. To prepare our students with great competence in understanding biological issues and appreciation of biological knowledge, with awareness in biological conservation and other environmental issues
3. To develop students' generic skills in scientific thinking and communication, problem solving and IT

Study Packages

BIOLOGY

Organismic Biology



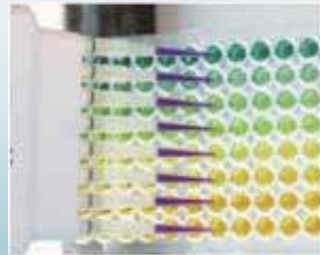
BIOL3530 Plant Physiology
BIOL3630 Animal Physiology
BIOL3710 Marine Biology*
BIOL4010 Evolutionary Biology*
BIOL4012 Field and Environmental Biology
BIOL4260 Conservation Biology
BIOL4510 Hong Kong Flora and Vegetation

Biology for Teaching Career

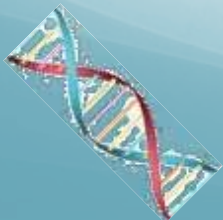


BIOL3310 Human Biology or FNCS5130 Human Physiology
BIOL3530 Plant Physiology*
BIOL3630 Animal Physiology*
BIOL3710 Marine Biology
BIOL4120 Developmental Biology
BIOL4210 Environmental Pollution and Toxicology
BCHE4010 Molecular Biology or MBTE4320 Genetic Engineering

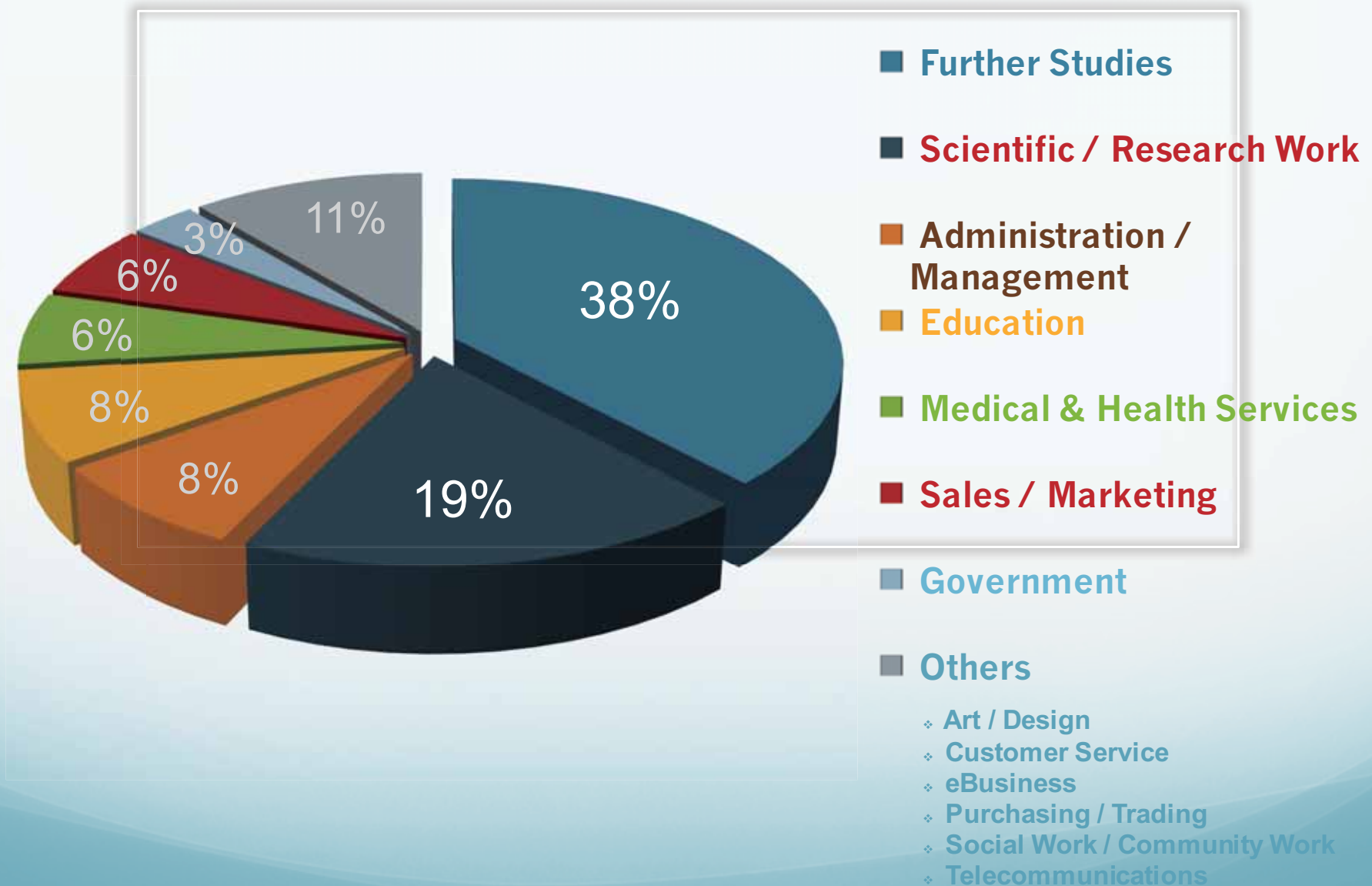
Human Biology



BIOL3310 Human Biology*
BIOL4120 Developmental Biology
BIOL4310 Human Genetics*
BCHE4040 Aspects of Neuroscience
BCHE4060 Basic and Applied Immunology
CMBI4101 Cancer Cell Biology
CMBI4102 Stem Cell Biology
FNCS3010 Nutrition and Human Development
FNCS5130 Human Physiology



Career Prospects of Biology Graduates 2012-14



Cell and Molecular biology (CMB) Curriculum

YEARS 1 & 2

General Science Courses (Faculty Package)

**Fundamental courses in Life Sciences
Introduction to Scientific Writing & Communication**

YEARS 3 & 4

**STudent-Oriented
Teaching (STOT)**

*1-on-1 meetings
with professors
to learn a
CMB-related
topic in 1 year*

**Diversity in
Core Courses**

*Organelle Structure
& Function
Genomics &
Transcriptomics
Cancer Cell Biology
Neuronal Cell Biology
Stem Cell Biology*

**Laboratory
Training**

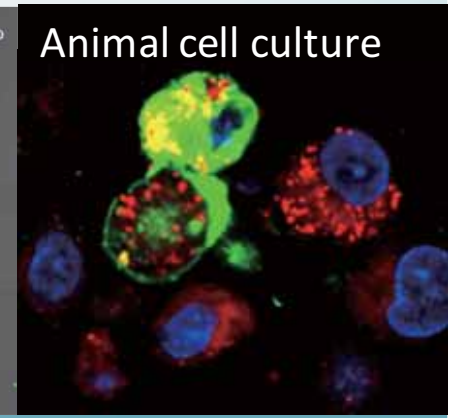
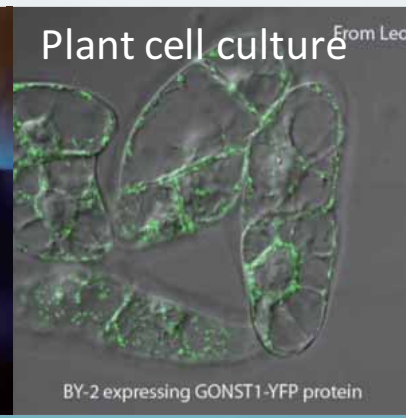
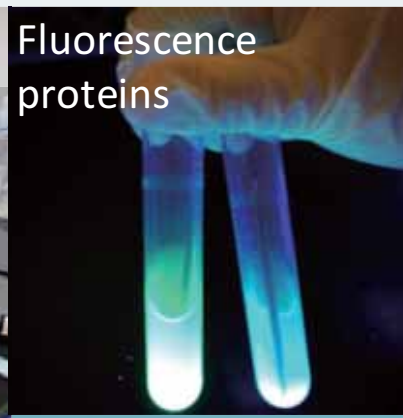
*Project-based lab
courses span the
entire year 3*

*Final Year
Project lets you
work in a real
research lab*

CMB FEATURES

細胞及分子生物學課程特色

- Small class size (小班教學)
- Scientific writing, thinking and self-motivated learning (訓練寫作, 思考, 自發學習)
- Lots of student-teacher interactions (師生充分交流)
- Extensive supervision by a professor to learn a CMB-related topic (教授一對一指導)
- Comprehensive laboratory training with project-based experiments (全面實驗課程)



What CMB students say about the program?

我一直想做研究，覺得CMB是一個專門設計的課程，去培養一班做研究的人一直讀上去。

Many CMB courses have a small class size. I have more chances to interact with my professors and ask them for their advice.

I've always wanted to do research. I believe the CMB program is designed to prepares me for post-graduate studies

我很喜歡它 (CMB 課程) 人數小，很多課程人數都很多，所以你沒辦法和教授講話。CMB 的課程人數比較少，你可以跟教授講話，拿到反饋和討論。他們也可以引導你做研究。

WHAT CMB STUDENTS DO OUTSIDE OF CLASSES?



Summer internships

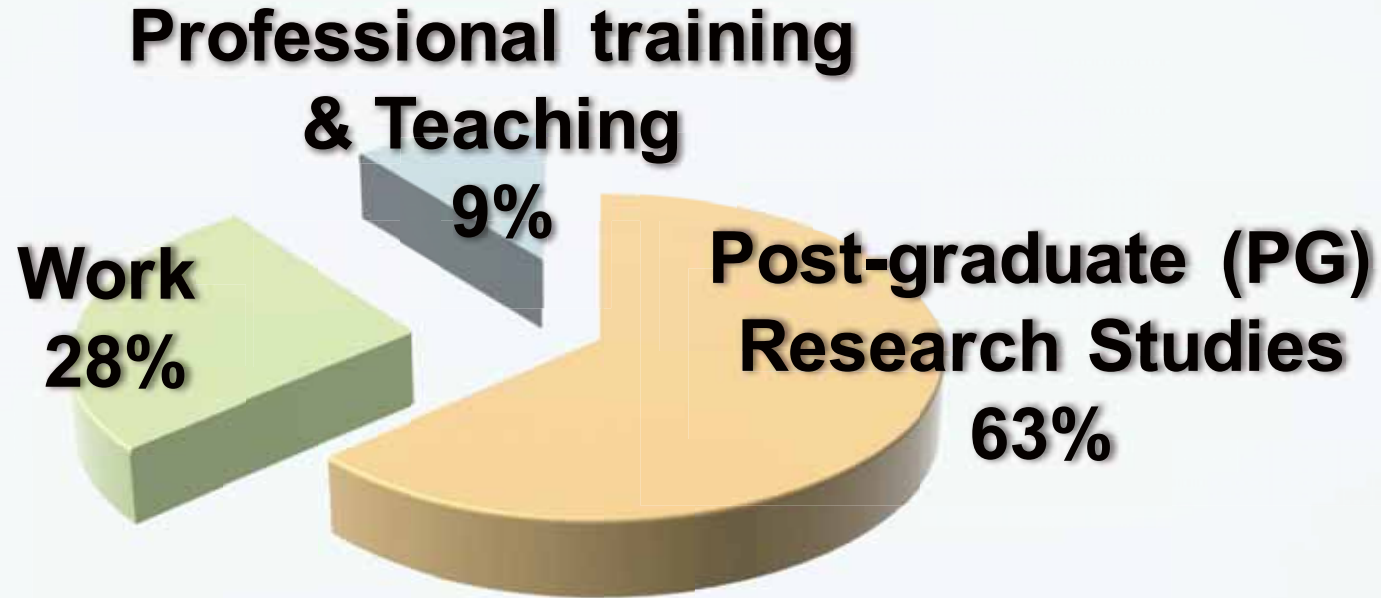


Overseas Exchange Studies



International science competition (IGEM)

Career Paths of CMB Graduates



Year	Total # of graduates	% students entering PG studies	Examples of Study Program
2013 to 2015	30	63%	6 PhD (CUHK, CMB); 3 PhD (CUHK, Other Programs); 1 PhD (Stanford, USA); 1 PhD (UC Riverside, USA); 1 PhD (Karolinska Institute, Sweden) 1 PhD (Johns Hopkins, USA) 2 MPhil (CUHK, CMB); 1 MPhil (HKU, BCH)

ENVIRONMENTAL SCIENCE PROGRAM



Selected Job Profiles:

Mr. Chickee Chow

Consultant, Environmental Resources Management (ERM)

Ms. Anna Chung

Sustainability Development Manager, Mass Transit Railways Corporation

Miss Carol Kwok

Assistant Environmental Health and Safety Manager, Swire Resources

Dr. Eric Sze

Assistant Professor, Open University of Hong Kong

Mr. Alfred Tang

Senior Compliance Engineer, Avery Dennison

Ms. Felice Wong

Senior Environmental Engineer, Mass Transit Railways Corporation

Mr. F F Yeung

Country Parks Officer, AFCD, HKSAR Government

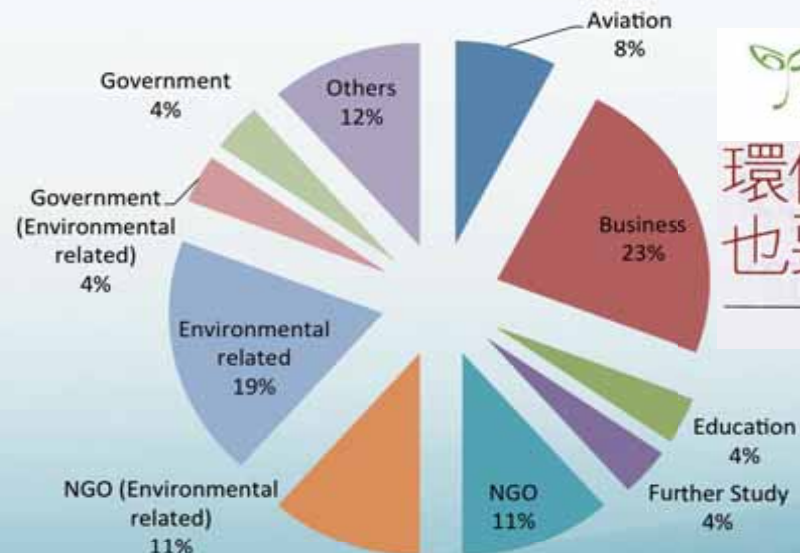
Miss W Y Yiu

Environmental Protection Officer, EPD, HKSAR Government

OUR MISSIONS

1. To provide students with a wide **multidisciplinary** background of Environmental Science.
2. To prepare students with a high level of competence in **scientific understanding** of various environmental issues.
3. Two concentrations: Environmental **Management** and Environmental **Technology**.

Career Field of 2013 Full-Time First Degree in Environmental Science Programme



Core courses

2/4 (Basic Courses)

- Cell Biology (BIOL2120)
- Basic Laboratory Techniques in Life Sciences (LSCI2002)
- Fundamentals of Biochemistry (BCHE2030)
- Introduction to Environmental Science (ENSC2270)
- Ecology/Lab (BIOL2210/2213)



3/4 (Fundamental & Specialized Courses)

- Environmental Chemistry/Lab (ENSC2515/2517)
- Environmental Instrumentation Techniques/Lab (ENSC3415/3417)
- Environmental & Biochemical Toxicology/Lab (ENSC3520/3820)

4/4 (Research/Guided Study) min. 4 Units

- Senior Experimental Project I, II, III/
Or Senior Literature Research (ENSC4901/4902/4903/
LSCI4000; 2 units – 6 units)
- Internship (ENSC4906) 2 Units or
- Field Study(ENSC4907) 2 units



Major Elective Courses (> 23 units)

ENSC3230 Principles of Environmental Protection & Pollution Control (3 U)

ENSC4240/4242 Environmental Impact Assessment/Lab (3 + 2 U)

ENSC4250/4252 Environmental Health (3 U)

ENSC4310/4510 Methods in Toxicological Research/ Lab (3 + 2 U)

ENSC4525 Advanced Environmental Chemistry (3 U)

ENSC4535 Chemical Treatment Processes (3 U)

At least 12 units from above



Course Code	Course Title	Unit
BIOL3012	Biodiversity Laboratory I	2
BIOL3022	Biodiversity Laboratory II	2
BIOL3410	General Microbiology	3
BIOL3550	Plant Biology	4
BIOL3560	Biology of Fungi and Non-Vascular Plants	2
BIOL3570	Biology of Vascular Plants	2
BIOL3610	Invertebrate Form and Function	2
BIOL3620	Vertebrate Life	2
BIOL3630	Animal Physiology	3
BIOL3710	Marine Biology	3
BIOL4012	Field and Environmental Biology	2
BIOL4260	Conservation Biology	3
BIOL4220	Environmental Biotechnology	3
BIOL4510	Hong Kong Flora & Vegetation	3
CHEM4400	Advanced Analytical Chemistry	2
CHEM4430	Practices in Testing Laboratory	2
CHEM4280	Chemistry in Biofuel	2
CHEM4440	Food Testing and Environmental Analysis	2
ENER3020	Energy Utilization and Human Behaviour	3
ESSC3200	Atmospheric Science	3
ESSC3300	Introduction to Physical Oceanography	3
ESSC3600	Understanding Our Biosphere	3
ESSC4400	Hydrology	3
GRMD3202	Environmental Management	3
GRMD3203	Urban Environmental Problems	3
GRMD3323	Urban and Regional Planning	3
GRMD4203	Ecosystem Restoration and Management	3
MBTE2010	Diversity of Life: Applications & Sustainability	3
PHPC2009	Environment and Work	3
PHPC2015	Biostatistics	3
PHPC2017	Epidemiology	3
PHPC3016	Environment and Health	3
STAT3210	Statistical Techniques in Life Sciences	3

Scholarships



Chevening Aberdeen Scott Scholarship

http://www2.cuhk.edu.hk/gss/download/pdf/Scholarship/Scholarship_20141003_1.pdf



French Scholarships

<http://www.iso.cuhk.edu.hk/english/publications/newsletter/article.aspx?articleid=61846>

College Scholarships and Activity Funds

Food & Nutritional Sciences



Programme Objectives

1. To equip students with in-depth, up-to-date and practical knowledge in Nutrition, Food Science and Technology
2. To devise and implement strategies independently to solve problems related to food and nutrition in technological contexts
3. To prepare students to further their studies and lifelong learning in food and nutrition

Integration of Food and Nutrition

Nutritional Science



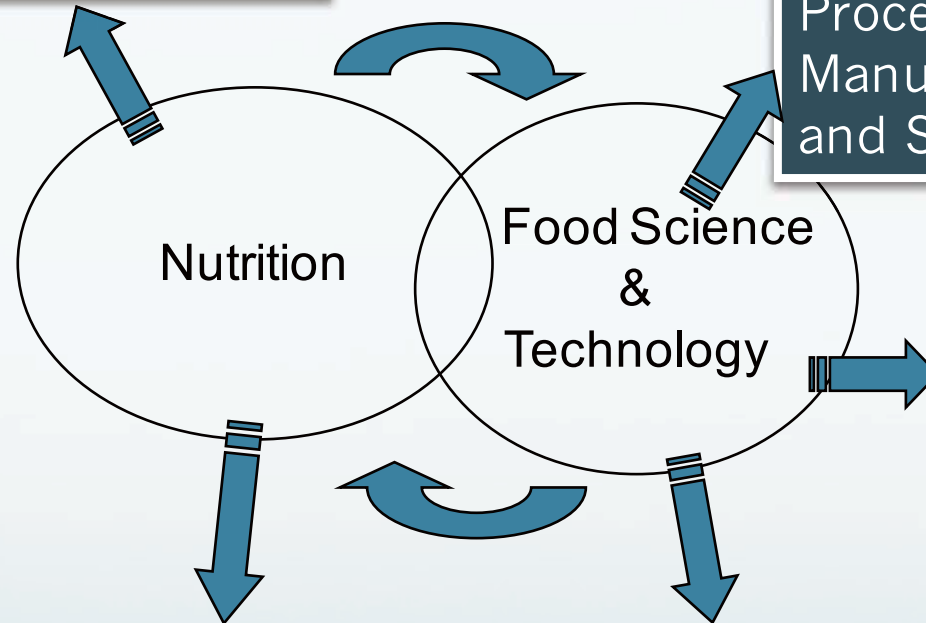
Food Science



Individual and Family Health

Topics

- Nutrition requirement
- Non-communicable Disease
- Diet Therapy
- Weight Management
- Immunity
- Functional Food
- Traditional Chinese Medicine



Food Processing, Manufacturing and Storage

Topics

- Food characteristics
- Food analysis
- Food spoilage
- Food preservation

Topics

- Food Safety
- HACCP,
- ISO9000, 22000
- Food Legislation
- Quality Management

Food Quality Control & Safety

Topics

- Creation & Development of New Products
- Sensory Evaluation
- Food Biotech: Molecular Biology, Bioprocess Engineering, Microbial Biotechnology

Topics

- Public Health
- Nutrition Education
- Nutrition Policy

Community Health

Product Development and Production

Molecular Biotechnology: Applications in Medicine, Agriculture, Energy, and Environment

TIME Magazine U.S.
The Biotech Century
By WALTER ISAACSON Monday, Jan. 11, 1999

November 2, 2008
Purple Rain: Tomatoes Get New Color Scheme




Turning Data into Genomic Medicine
Navigating the Path between the Lab and the Clinic Is Becoming More Straightforward
Nick Lesch

Genetic data is pouring out of academic and government research labs, but it's rarely reaching doctors' offices. Now, thanks to a new technology, doctors are starting to use genomic data to help diagnose and treat patients. The technology is called "next-generation sequencing" and it's making it easier to read the "code" that determines a person's genetic makeup.

Tissue Engineering Revenues Rise




More than half (52%) of the companies comprising the tissue engineering (TE) and stem cell industries are revenue-generating, compared to about 21% four years ago, according to an analysis published in *Tissue Engineering Part B*.

Of these companies, 65% have commercial products and 21% are revenue-focused, another 30% have products in clinical trials. "Today, the industry has begun to understand how to commercialize and market TE and stem cell products, ensuring self and self-growth," concludes a recent analysis led by Arthur Lange, Ph.D., Ford II, Beckman Professor with Merit from the University of Michigan.

The data collected by Dr. Lange and colleagues between 2007 and 2011 "suggests the TE and stem cell industry has matured and is on a path toward overall commercial success," says the authors in the study entitled "Progress in the Tissue Engineering and Stem Cell Industries: Are We There Yet?"

They expect that the industry's real promise potential will also remain exciting. \$1.1 billion and industry spending is projected to hit \$1.5 billion, and "expect to see more products" although they disagree "but there may be growth pains in the industry's infancy."

nature genetics
VOLUME 42 NUMBER 12 DECEMBER 2010
www.nature.com/naturegenetics



Soybean genome diversity
Gene expression in the maize leaf
De novo mutations in mental retardation

Published online 27 January 2010 | nature 463, 409 (2010) | doi:10.1038/463409a

Altered microbe makes biofuel

Bacterium could work directly on grass or crop waste.

Jeff Tollefson

In a bid to overcome the drawbacks of existing biofuels, researchers have engineered a bacterium that can convert a form of raw plant biomass directly into clean, road-ready diesel.

So far, biofuels have largely been limited to ethanol, which is harder to transport than petrol and is made



Switchgrass could be made into diesel cleanly and quickly. PHOTO: COMSIL/ALAMY

GEN Genetic Engineering & Biotechnology News

Feature Articles | May 1, 2011 (Vol. 21, No. 5)

Cancer Detection Improved with Noninvasive Testing

Search for Novel Biomarkers Detectable in Accessible Bodily Fluids Proves Promising

Nick Lesch

TIME

CLONE ON THE MARCH? BY DOUGLAS COUPLAND



Will There Ever Be Another You?
A SPECIAL REPORT ON CLONING

Molecular BioTechnology Program

Our missions

High quality education in preparing for R & D in biotechnology
Training in scientific way of knowing and problem solving

Introduction to Molecular
Biotechnology (MBTE2000)
Diversity of Life (MBTE2010)



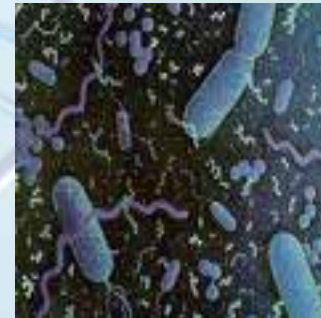
Cell biology
Genetics / Molecular Biology
Biochemistry
Genetic Engineering



Animal Biotechnology



Plant Biotechnology



Microbial Biotechnology

Outstanding MBT students

Miss Serena Yichen Dai

- 2016 Rhodes Scholar
- Eligible for a scholarship of more than one million Hong Kong dollars to further her studies at the University of Oxford in the UK



Research Publications:

Miss Yu Mei Hui (2015 graduate)

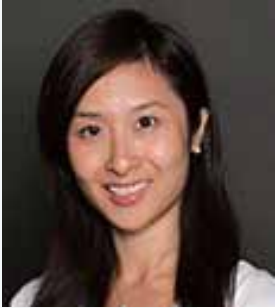
- ATP binding by the P-loop NTPase OsYchF1 (an unconventional G protein) contributes to biotic but not abiotic stress responses. *Proc Natl Acad Sci U S A* (2016)



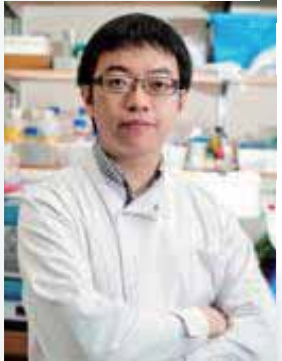
Miss Dai Yichen and Miss Huang Duo (2016 graduates)

- Recent developments of omics research in soybean salt tolerance. *Soil and Crop* (2015)

Alumni Highlighted



- ❖ **Dr. Lam, Hung-Ming**
- ❖ **Assistant Professor**, University of Washington, Seattle, USA
- ❖ 2002 graduate



- ❖ **Dr. Chan, Chi Wai Martin**
- ❖ **Research Assistant Professor**, Department of Microbiology, CUHK
- ❖ 2001 graduate



- ❖ **Dr. Leung, Lai Han**
- ❖ **Assistant Professor**, Macau University of Science & Technology, Macao SAR
- ❖ 2001 graduate



- ❖ **Dr. Ng, Ka Leung Andy**
- ❖ **Lecturer**, The Office of University General Education, CUHK
- ❖ 2005 graduate



- **Dr. Lau, On Sun**
- **Assistant Professor**, Department of Biological Sciences, National University of Singapore
- Ph.D. at Yale University
- 2001 graduate



- **Dr. Chu, Wai Kit**
- **Assistant Professor**, Department of Ophthalmology & Visual Sciences, The Chinese University of Hong Kong
- 2004 graduate



- **Dr. Cheung, Yin Chun Louisa**
- **Assistant Professor**, Department of Medicine, Karolinska Institutet, Sweden
- 2001 graduate



- **Dr. Lam, Wun Jessica**
- Post-doctoral Fellow, Cambridge University, UK
- Obtain Sir Edward Youde Memorial Scholarships
- 2003 graduate

**Outside of the classroom experiences
and research opportunity**

**DREAM Program
Field Study Workshop
iCARE Program
iGEM Competition
Internship Program
SMART Program**

Our Hong Kong-CUHK iGEM teams

7 October 2013

CUHK Undergraduate Students Win Silver Medal at iGEM Asia Heading to US Next Month for World Championship



26 October 2012

CUHK Students Win Gold Medal at iGEM Asia Again Heading to US Next Month for World Championship



October 25, 2011

CUHK Undergraduate Students Win Gold Medal at iGEM Asia Heading to US Next Month for World Championship



November 24, 2010

Biochemistry Students Win Gold at MIT Competition for Proving Bacteria DNA as Device for Information Storage

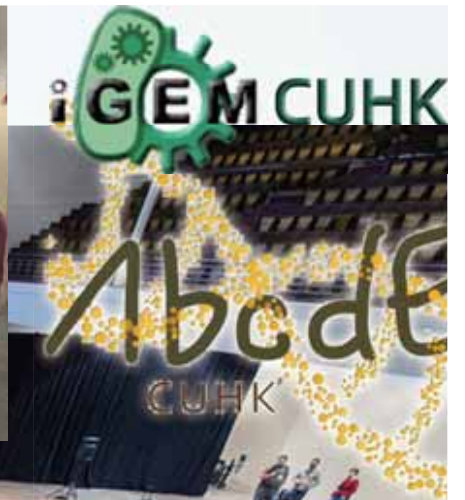
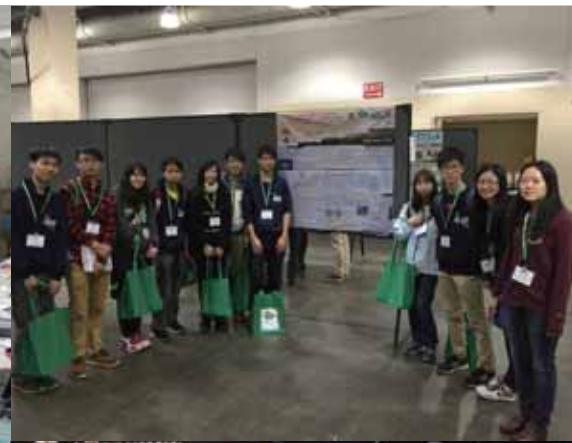
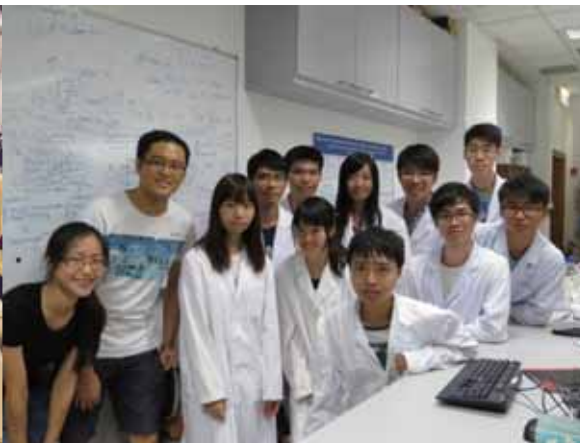


In collaboration with
Faculty of Engineering;

Team work

Innovative

All round presentation
and communication
skills



THE CUHK GENETIC ENGINEERING TEAM WON GOLD AWARD AT BOSTON (2014)

Dedicated Research Exchange And Mentorship



Scientist Mentorship And Research Training



Our students have plenty of Internship and Exchange opportunities



香港特別行政區政府
漁農自然護理署



Law Offices of Albert Chan, New York



Life as a Life Science undergraduate



Active learning



Research Opportunity



Exchange with prominent scientists



Summer Internship



Extracurricular activities organized by Student and Staff

Good Teacher-Student Relationship



Thank You for Your Attention

Q & A

