School of Biological Sciences

Dr. Clive Lo
Associate Professor
About us

School of Biological Sciences:

• ~40 Academic staff from > a dozen of nations (*Scientists in a global village*)
• ~12-15 Post-doctoral fellows
• ~200 Postgraduate research students (PhD and MPhil)
• ~50 Technical and administrative staff
• ~400 Undergraduate students
Biological Sciences Major

- Designed for students seeking a broad-based training in the concepts and methodologies of Biological Sciences.

- Inquiry-driven learning environment to understand and appreciate life processes at different levels of biological organization.

- Emphasizes on both core concepts and applications.

- Experiential learning activities (Capstone experience).

- Emphasizes on problem-based learning, scientific analysis, organization and communication.

- Suitable for students entering the teaching profession or pursuing careers that require comprehensive knowledge in biological sciences.
## Criteria for major in Biological Sciences

<table>
<thead>
<tr>
<th>Components</th>
<th>Courses</th>
<th>No. of credits</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compulsory</td>
<td>Common core English Chinese</td>
<td>36 12 6</td>
<td>22.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(~ 9 courses)</td>
</tr>
<tr>
<td>Specialization</td>
<td>Biological Sciences</td>
<td>96</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(~ 16 courses)</td>
</tr>
<tr>
<td>Electives</td>
<td>Free choices or courses</td>
<td>90</td>
<td>37.5</td>
</tr>
<tr>
<td></td>
<td>leading to a 2(^{nd}) major or minor (s)</td>
<td></td>
<td>(~ 15 courses)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>240</td>
<td>100</td>
</tr>
</tbody>
</table>

- A student usually takes 10 courses (6 credits/course) each year
Biological Sciences Major curriculum

Biological Science Major requirement (96 credits)

University Education (54 credits) + Science Foundation (12 credits) + Majors (78 credits) + Capstone (6 credits) + Minor/Elective (90 credits)

- Introductory level courses (36 Credits)
- Advanced level courses
  - Genetics, Molecular & Cell Biology (12 Credits)
  - Ecology, Systematics, and Evolution (12 Credits)
  - Physiology and Organismic Biology I (6 Credits)
  - Physiology and Organismic Biology II (6 Credits)
  - Physiology and Organismic Biology III (6 Credits)
1. Introductory Courses (48 credits)

Science Foundation Courses (12 credits)
- SCNC1111 Scientific method and reasoning
- SCNC1112 Fundamentals of modern science

Disciplinary Courses (36 credits)
- BIOL1110 From molecules to cells
- BIOL1309 Evolutionary diversity
- BIOL2306 Ecology and evolution
- BIOL2102 Biostatistics
- BIOL2103 Biological sciences laboratory course
- BIOL2220 Principles of Biochemistry (or BIOC2600)
2. Advanced level courses (42 credits)

Students will gain exposure and training in three disciplinary areas:
A. Genetics, Molecular & Cell Biology,
B. Ecology, Systematics, and Evolution
C. Physiology and Organismic Biology
### A. Genetics, Molecular & Cell biology (at least 2 courses)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL3401</td>
<td>Molecular biology</td>
<td>(6)</td>
</tr>
<tr>
<td>BIOL3404</td>
<td>Protein structure and function</td>
<td>(6)</td>
</tr>
<tr>
<td>BIOL3402</td>
<td>Cell biology and cell technology</td>
<td>(6)</td>
</tr>
<tr>
<td>BIOL3408</td>
<td>Genetics</td>
<td>(6)</td>
</tr>
</tbody>
</table>

### B. Ecology, Systematics and Evolution (at least 2 courses)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL3301</td>
<td>Marine biology</td>
<td>(6)</td>
</tr>
<tr>
<td>BIOL3419</td>
<td>Insect ecology</td>
<td>(6)</td>
</tr>
<tr>
<td>BIOL3302</td>
<td>Systematics and phylogenetics</td>
<td>(6)</td>
</tr>
<tr>
<td>BIOL3303</td>
<td>Conservation ecology</td>
<td>(6)</td>
</tr>
<tr>
<td>BIOL3501</td>
<td>Evolution</td>
<td>(6)</td>
</tr>
</tbody>
</table>
C. Physiology and Organismic Biology
(at least one course from each list)

<table>
<thead>
<tr>
<th>List I</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL3105 Animal physiology (6)</td>
<td></td>
</tr>
<tr>
<td>BIOL3205 Human physiology (6)</td>
<td></td>
</tr>
<tr>
<td>BIOL3403 Immunology (6)</td>
<td></td>
</tr>
<tr>
<td>BIOL3503 Endocrinology (6)</td>
<td></td>
</tr>
<tr>
<td>BIOL3406 Reproduction and reproductive biotechnology (6)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>List II</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL3107 Plant physiology (6)</td>
<td></td>
</tr>
<tr>
<td>BIOL3314 Plant structure and evolution (6)</td>
<td></td>
</tr>
<tr>
<td>BIOL4411 Plant and food biotechnology (6)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>List III</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL3108 Microbial physiology (6)</td>
<td></td>
</tr>
<tr>
<td>BIOL3109 Environmental microbiology (6)</td>
<td></td>
</tr>
<tr>
<td>BIOL3405 Molecular microbiology (6)</td>
<td></td>
</tr>
<tr>
<td>BIOL3203 Food microbiology (6)</td>
<td></td>
</tr>
</tbody>
</table>
You are **strongly encouraged** to take a second SBS Major or a SBS minor:

- Major/minor in Ecology and Biodiversity
- Major/minor in Food and Nutritional Science
- Major/minor in Molecular Biology and Biotechnology
- Minor in Marine Biology
- Minor in Plant Science

Overlapping courses
- no double counting
- replacement courses are needed
- Capstone requirement may be exempted
Biological Sciences Major & HKDSE Biology curriculum
At least ONE from below:

- **BIOL3113** Directed studies in biological sciences
- **BIOL4113** Biological sciences project (12 credits)
- **BIOL4114** Biological sciences internship
Internship

- Students have a chance to experience work in commercial and government settings
- Where they gain at least 160 hours valuable workplace training

Jobs offered in previous years
- Faculty of Science and Faculty of Medicine, HKU
- Kunming Institute of Zoology, Chinese Academy of Sciences
- Environmental Protection Dept., HKSAR Government
- HK Adventist Hospital
- Kwong Wah Hospital
- Asia Ecological Consultants Ltd.
- HK Science & Technology Parks Corporation
- Castco Testing Centre Ltd.
- Cathay Pacific Catering Services (HK) Ltd.
- Gate Gourmet Hong Kong
- LSG Lufthansa Service HK Ltd.
- St James’ Settlement
- Intertek Testing Services HK Ltd.
Undergraduate Life at SBS
Our graduates took up careers as
  - civil servants;
  - secondary school teachers,
  - scientific officers,
  - lab technicians, or in pharmaceutical industry, healthcare industry
  - environmental consultancy, etc.

(Hong Kong, Mainland and overseas)
Postgraduates

• SBS have ~200 postgraduates from local and international cities
Biological Sciences
Major Coordinators:

Dr. Stefano Cannicci
cannicci@hku.hk

Dr. Clive Lo
clivelo@hku.hk

Dr. Karen Yuen
kwyyuen@hku.hk

General Enquiry: 2299 0800
Email: biosch@hku.hk
Website: http://www.biosch.hku.hk
Student Peer Advisers in 2018-19

• General roles
  – to offer advice in relation to academic studies to freshmen; and
  – to facilitate freshmen’s smooth transition from secondary to university education

• You are highly encouraged to contact the following Student Peer Advisers (SPAs) if you have any questions about your study (their contacts can be found at the Faculty’s website)
  – Mr CHU Lok Hang Vincent (BSc Year 4)
  – Miss WAN Lok Yee (BSc Year 4)
Understanding life and living at the level of molecules, cells and whole systems, the biological and external factors that influence survival and death, the evolutionary process, and conserving life on Earth in the face of development, remains a challenge for scientists in the 21st century.

Scientific breakthroughs in the biological sciences in recent years have underpinned advances in animal and plant conservation, medicine, biotechnology, food production and food safety, as well as nutrition and health science.

With a strongly research-led focus, the School contributes to a broad portfolio of programmes in the biological sciences and life sciences.

MAJORS
- Biological Sciences
- Ecology and Biodiversity
- Food and Nutritional Science
- Molecular Biology and Biotechnology

MINORS
- Ecology & Biodiversity
- Food & Nutritional Science
- Marine Biology
- Molecular Biology & Biotechnology
Marine science: challenges for a growing ‘blue economy’

AUSTRALIA 2020: How will science address the challenges of the future? In collaboration with Australia’s chief scientist Ian Chubb, we’re asking how each science discipline will contribute to Australia now and in the future. Written by luminaries and accompanied by two expert commentaries to ensure a broader perspective, these articles run fortnightly and focus on each of the major scientific areas. In this instalment we dive into marine science.

1. **sovereignty, security, natural hazards**: needs improved operational oceanographic forecasting and increased effort on fine-scale hydrographic data and charts
2. **energy security**: needs support for developing energy resources, particularly liquid natural gas and renewable energy and research to support carbon sequestration
3. **food security**: needs research to support a booming aquaculture industry, as well as data and tools to improve management of wild-catch fisheries
4. **biodiversity conservation and ecosystem health**: needs environmental baselines, effective indicators of ecosystem health to guides national marine environmental monitoring, and tools to predict impacts of development on marine biodiversity
5. **dealing with changing climate**: needs enhanced understanding and skill in prediction of the impacts of sea level rise, increasing sea temperature and ocean acidification and the role of the ocean as a carbon sink
6. **optimal resource allocation**: needs integrated social, economic and environmental information and tools to assist transparent, robust and accountable decision-making.
Minor in Marine Biology

Dr. Juan Diego Gaitán-Espitia
Minor in Marine Biology

Dr Juan Diego Gaitán-Espitia
Minor in Marine Biology

Professionals with skills and knowledge

Ocean & Coastal Management

Review
Improving knowledge exchange among scientists and decision-makers to facilitate the adaptive governance of marine resources: A review of knowledge and research needs

This minor will provide students from diverse backgrounds (e.g. business, engineering and social science) an excellent opportunity to enter into a career or research in marine environment-related fields such as:

- Coastal ecosystem management & Marine environmental protection
- Fisheries and marine resource management
- Climate change adaptation & mitigation
- Biodiversity assessments and projections
- Among others
Minor in Marine Biology

Dr Juan Diego Gaitán-Espitia

Required courses (36 credits)

1. Introductory level courses (12 credits)

Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses:

- **BIOL1309**  Evolutionary diversity (6)
- **ENVS1301**  Environmental life science (6)
- **BIOL2306**  Ecology and evolution (6)
Minor in Marine Biology

Required courses (36 credits)

2. Advanced level courses (24 credits)

Disciplinary Core Courses (12 credits)

BIOL3301  Marine biology (6)
ENVS3313  Environmental oceanography (6)
Required courses (36 credits)

2. Advanced level courses (24 credits)

Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses:

- BIOL3303 Conservation biology (6)
- BIOL3305 Tropical and temperate marine ecology field course (6)
- BIOL3318 Experimental intertidal ecology (6)
- BIOL3320 The biology of marine mammals (6)
- BIOL3322 Marine invertebrate zoology (6)
- BIOL3328 Nearshore marine and estuarine ecology (6)
- BIOL4301 Fish and fisheries (6)
Hands on learning

16 courses with field courses offered
Overseas field courses

- Australia
- British Colombia (Canada)
- Hainan (China)
- India
- Philippines
- Sri Lanka
- South Africa
SWIMS focus
to investigate the responses of marine ecosystems to multiple stressors, and therefore solutions to safeguard the integrity and biological functioning of coastal seas into the future.
• Research facility of the Faculty of Science
• Postgraduate Students and overseas researchers
• Supports > 50 people
Current Research Areas

- **Marine Biodiversity & Biogeography**
- **Ecosystem Restoration**
- **Sustainable Fisheries & Mariculture**
- **Marine Ecology**
  - Intertidal, Mangrove, Subtidal, Coral Reef)
- **Conservation & Marine Resource Management**
- **Marine Ecology**
  - Intertidal, Mangrove, Subtidal, Coral Reef)
- **Ecosystem Function**
- **Larval Ecology & Ecophysiology**
- **Climate Change Impacts**
- **Stable Isotope & Biogeochemistry**
- **Marine Pollution**
  - Eutrophication; Water Quality Management
- **Paleoecology**
  - Ostracods & Foraminifers

**Bilingual**

- **海洋生物多样性及分布**
- **生态功能**
- **幼体生态、生态生理**
- **气候变化之影响**
- **生态系统恢复**
- **可持续渔业及海产养殖**
- **海洋生态文明**
- **稳定同位素和生物地球化学**
- **海洋污染**
  - (富营养化；水質管理)
- **古生态学**
  - (介形虫及有孔虫)
A diverse and talented team of researchers

SWIMS staff

Resident Scientists

- Gray A Williams
- ThiyagaRAJAN Vengatesen
- Bayden Russell
- Stefano Cannicci
- David Baker
- Christelle Not
- Benoit Thibodeau
- Juan D. Gaitan-Espitia
SWIMS staff

Non- Resident Scientists

• Yvonne Sadovy
• Kenny MY Leung
• Moriaki Yasuhara

A diverse and talented team of researchers
Student Peer Advisers in 2018-19

• General roles
  – to **offer advice** in relation to academic studies to freshmen; and
  – to **facilitate** freshmen’s **smooth transition** from secondary to university education

• You are highly encouraged to contact the following **Student Peer Advisers (SPAs)** if you have any questions about your study (their contacts can be found at the Faculty’s website)
  – Mr CHU Lok Hang Vincent (BSc Year 4)
  – Miss WAN Lok Yee (BSc Year 4)
THANK YOU!

Minor in Marine Biology
Dr Juan Diego Gaitán-Espitia
School of Biological Sciences
Minor in Plant Science

Do you appreciate the beauty and diversity of plants?

What are the evolutionary relationships in plants?

Why are plants important to our lives?

How is growth and development regulated in plants?

How could genes be modified in plants?
Teachors in Plant Science

Professor ML Chye (Plant Biotechnology)

Dr Wing Kin Yip (Plant Physiology)

Dr Mingfu Wang (Plant Natural Products)

Professor Richard Saunders (Plant Systematics)

Dr Wallace Lim (Plant Bioenergy)

Dr Clive Lo (Plant Biochemistry)
# Plant Science Minor Curriculum

## Required courses (36 credits)

1. Introductory level course (12 credits)
   At least 12 credits from the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL1110</td>
<td>From molecules to cells</td>
<td>6</td>
</tr>
<tr>
<td>BIOL1309</td>
<td>Evolutionary diversity</td>
<td>6</td>
</tr>
<tr>
<td>BIOL2103</td>
<td>Biological science laboratory course</td>
<td>6</td>
</tr>
<tr>
<td>BIOL2220</td>
<td>Principles of Biochemistry</td>
<td>6</td>
</tr>
</tbody>
</table>

2. Advanced level courses (24 credits)
   At least 24 credits selected from the following courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL3107</td>
<td>Plant Physiology</td>
<td>6</td>
</tr>
<tr>
<td>BIOL3210</td>
<td>Grain production and utilization</td>
<td>6</td>
</tr>
<tr>
<td>BIOL3314</td>
<td>Plant structure and evolution</td>
<td>6</td>
</tr>
<tr>
<td>BIOL3408</td>
<td>Genetics</td>
<td>6</td>
</tr>
<tr>
<td>BIOL4209</td>
<td>Functional foods</td>
<td>6</td>
</tr>
<tr>
<td>BIOL4411</td>
<td>Plant and food biotechnology</td>
<td>6</td>
</tr>
</tbody>
</table>
1. Appreciation of plants as an important part in our life, culture, and environment.

2. Understanding of fundamental concepts in different disciplines of plant science – evolution, anatomy, biochemistry, physiology, and biotechnology.

3. Acquisition of academic and practical skills for careers in government agencies (e.g. Agriculture, Fisheries and Conservation Department; Tree Management Office), private agencies (seed trade, horticulture, landscaping, organic farming, etc.), postgraduate research in different areas of plant science.
Plant Science Minor Course Selection Advisors

Dr. Clive Lo
Office: 7N-03 Kadoorie Biological Sciences Building
Email: clivelo@hku.hk
Tel: 2299-0337

Dr. Wing Kin Yip
Office: 7S-09 Kadoorie Biological Sciences Building
Email: wkyip@hku.hk
Tel: 2299-0328