

School of Biological Sciences
The University of Hong Kong
Food & Nutritional Science
Dr. Jetty C.Y. Lee



The University of Hong Kong

<http://www.hku.hk/>

- The oldest tertiary education institution in Hong Kong
- Established on March 11th, 1912
- Dr. Sun Yat-Sun was one of our graduate



1912

Arts, Engineering, Medicine



Present

12 Faculties & Departments:

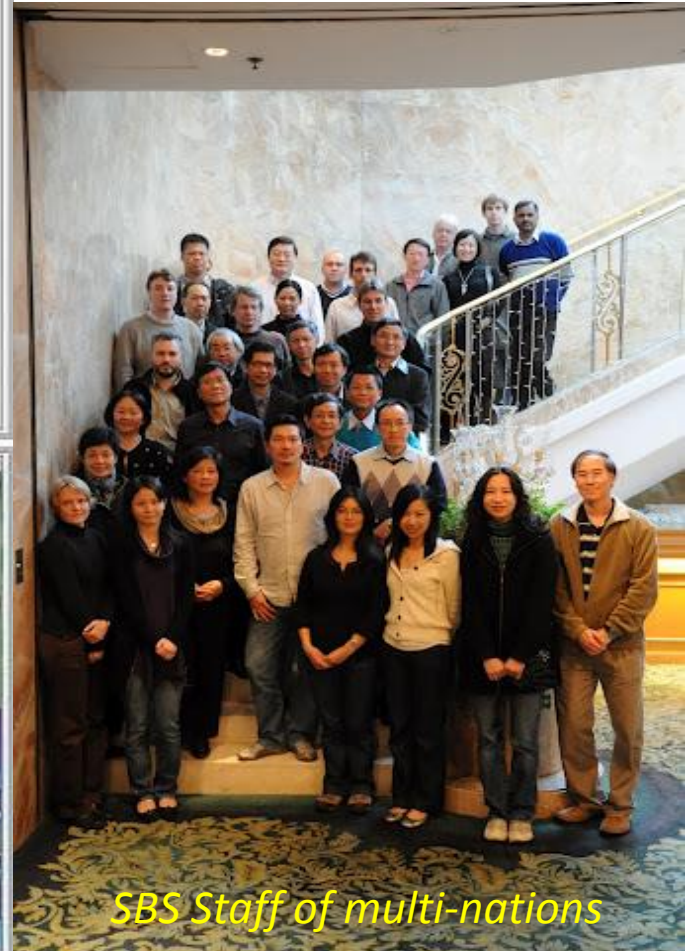
Architecture, Arts, Business and Economics, Dentistry, Education, Engineering, Law, Medicine, Science. Social Sciences, Graduate School, School of Professional and Continuing education (SPACE)

SCHOOL OF BIOLOGICAL SCIENCES

- The Kadoorie Biological Science Building
- Our School:
 - Over 40 academic staffs
 - Over 10 post-doctoral fellows
 - 150 research students
 - 40 technical and administrative staff

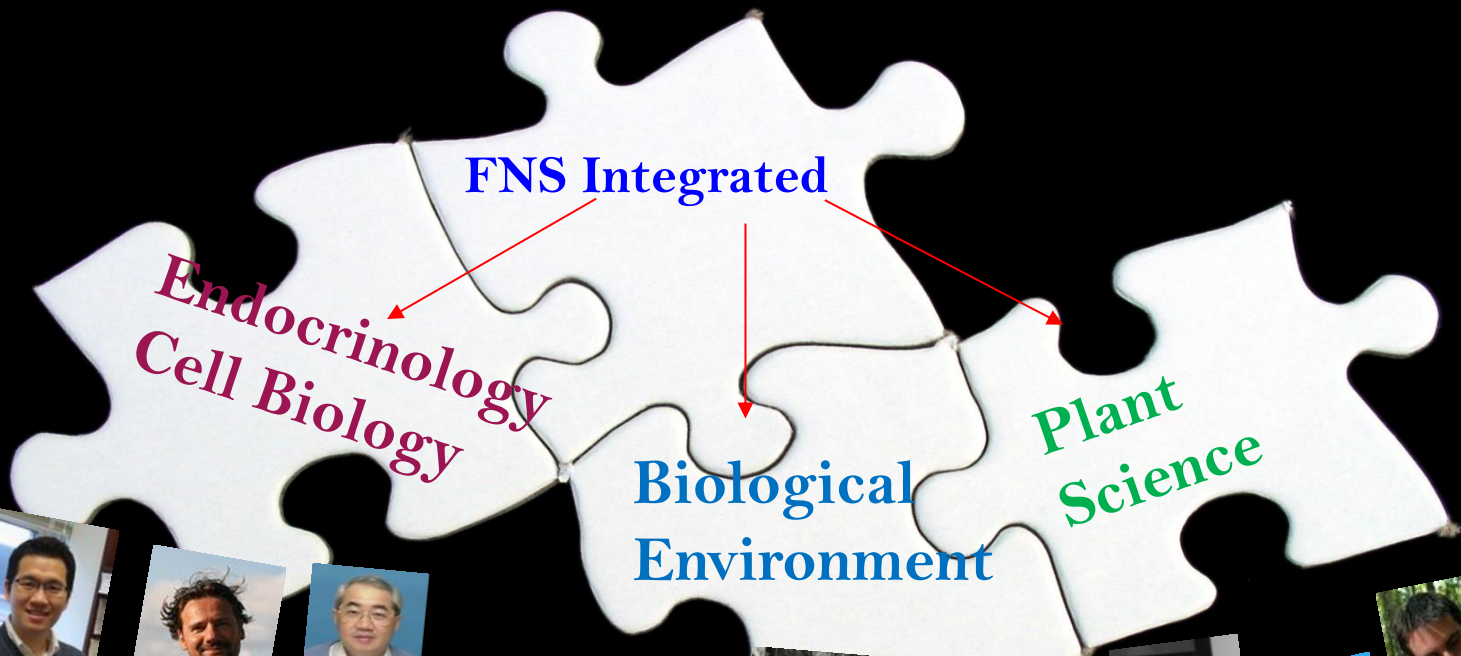


The Kadoorie Building



SBS Staff of multi-nations

<http://www.biosch.hku.hk>



Teaching

Undergraduate Programmes Major/Minor



Biological Sciences



Ecology and Biodiversity



Molecular Biology & Biotechnology



Food and Nutritional Science



B.Sc. in Food & Nutritional Science Major/Minor at HKU



Dr. Jennifer Wan



Dr. Jimmy Louie



Dr. Hani El-Nezami



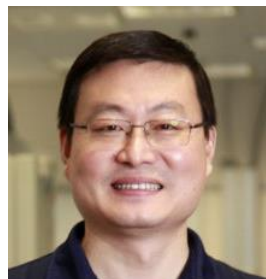
Dr. C.B. Chan



Dr. Jetty Lee



Prof. Nagendra Shah



Dr. Mingfu Wang



Dr. Olivier Habimana

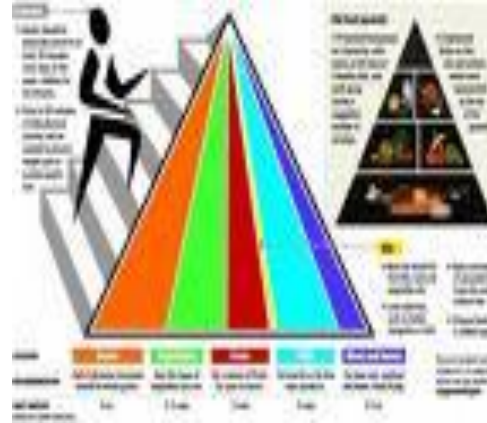


Dr. Tanja Sobko

Since 1991 First Food & Nutrition Program Established in Hong Kong



「健康飲食金字塔」



What is Food Science?

The discovery of knowledge related to food and the processing of biomaterials

Physical and Chemical properties of Food



Food Product & Development

Develop and solve problems with Food Technology

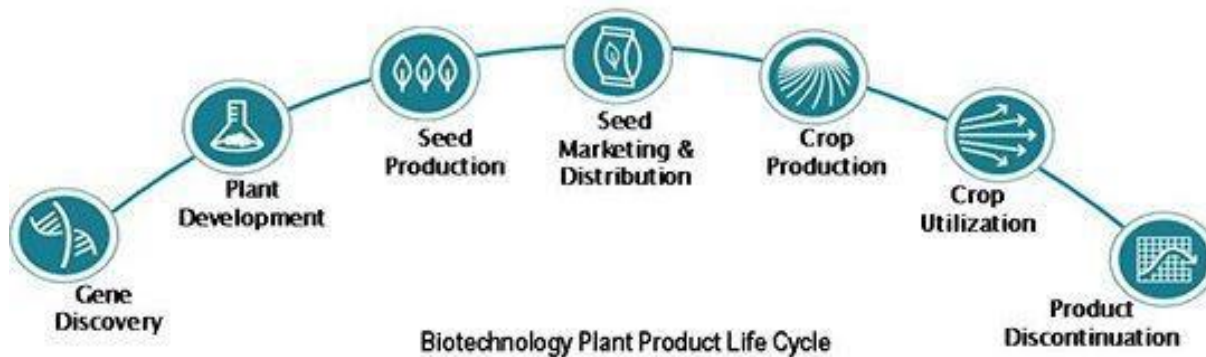


Food Biotechnology

Hydroponic Farming

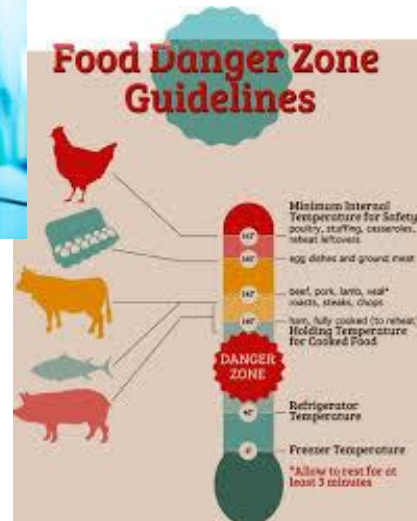


Genetic Modified Food (GM Food)

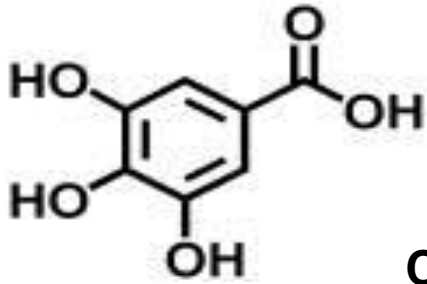


Food Science also Considers...

Hygiene, Manufacturing, Preservation, Transport and Storage, Quality, Waste Management, ...of Food



How do we connect?



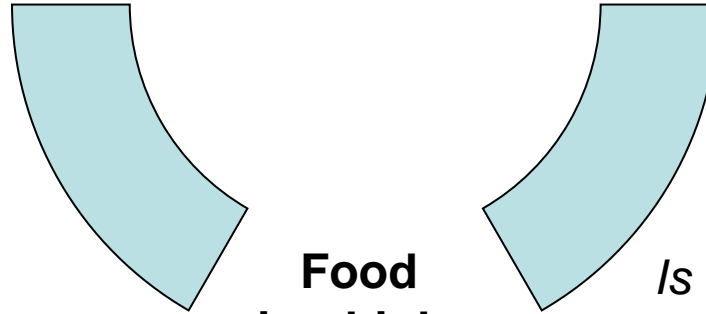
What's good/bad in the food?

Food Chemistry

Food Processing



Dose it change if we process?



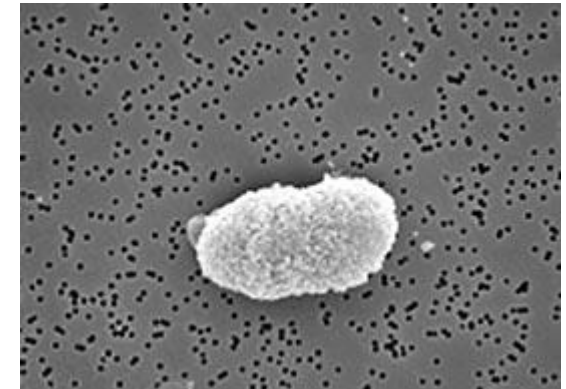
Food microbiology

Is it safe?



Food Technology

- Improving food safety, biosecurity, and product traceability.
- Better nutrient delivery mechanisms in foods.
- Nanomaterials to enhance packaging performance and health impact.
- Nanotechnology for improving food processing, quality and sensory system.



Fluorescent nanoparticles make spotting bad bacteria on food easy.



Functional Foods

Is Food or Medicine ??



Chinese dishes



Haw fruit, *Crataegus pinnatifida*



Food extract



Yoghurt



Kimchi

Food Science



Nutritional Science



HEALTH PROMOTION AND CHRONIC DISEASE PREVENTION

Risk factors for many chronic diseases can begin early in life. But evidence shows that making dietary and lifestyle changes can prevent disease progression and premature death.

CHRONIC CONDITIONS RELATED TO DIET

- 1. HEART DISEASE & STROKE**
 - HEART DISEASE: LEADING CAUSE OF DEATH IN THE U.S.
 - STROKE: 1 IN 18 DEATHS IN THE U.S.
- 2. OBESITY**
 - 1 IN 3 ADULTS IN THE U.S. IS OBESSE
 - 14% OF 4-19 YEAR OLDS ARE OBESSE
- 3. CANCER**
 - CLAIMS MORE LIVES THAN HEART DISEASE
 - CAUSING FACTORS: OBESITY, POOR DIET & PHYSICAL INACTIVITY
- 4. OSTEOPOROSIS**
 - BY 50, 20% OF WOMEN IN THE U.S. ARE AFFECTED
 - BONE DENSITY MEASUREMENTS
- 5. DIABETES**
 - 1 IN 10 U.S. ADULTS DIAGNOSED WITH TYPE 2 DIABETES IN 2008
 - 12.7% OF 12-14 YEAR OLDS HAVE METABOLIC SYNDROME
 - PREDICTORS OF TYPE 2:

RECOMMENDED PHYSICAL ACTIVITY:

- 60 MINS/DAY FOR KIDS**
- 150 MINS/WEEK FOR ADULTS**

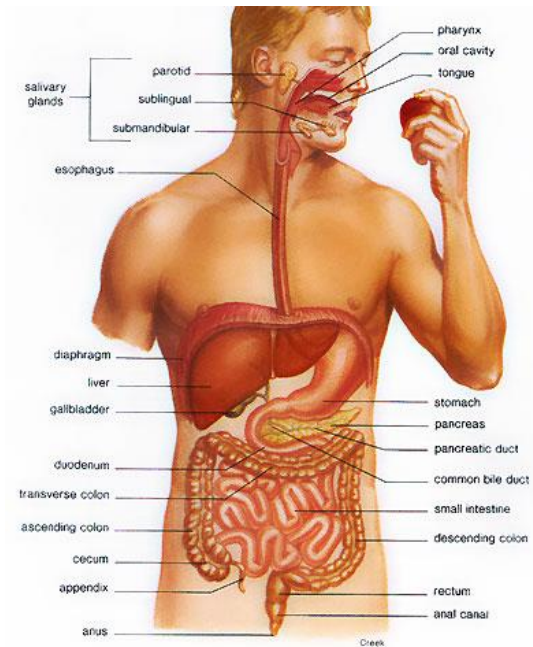
OPTIMAL HEALTH includes physical activity and an overall healthy diet. Registered dietitian nutritionists can provide and refer to provide guidance and they monitor that promote a healthy lifestyle.

What is Nutritional Science?

Nutritional Science looks at the connection between diet and health. Students learn how diet can play a crucial role in the cause, treatment, and prevention of many diseases

About how human beings can:

- ingest,
- digest,
- absorb,
- transport,
- utilize nutrients

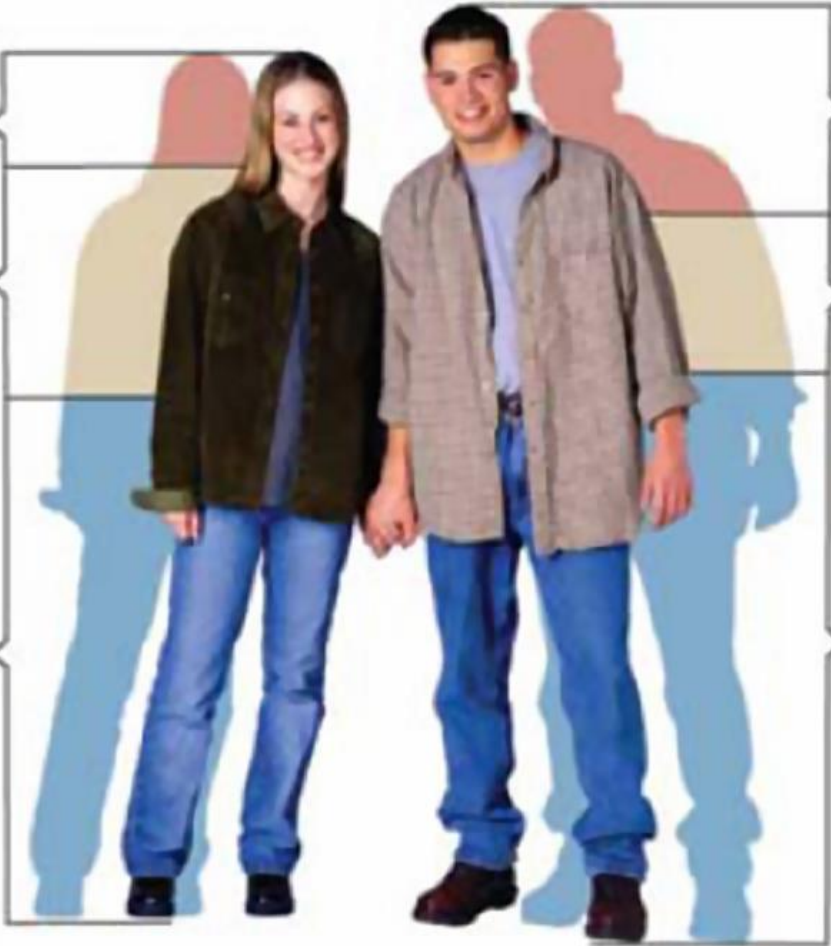


Human Health

Carbohydrates
Proteins
Vitamins
Minerals

Fat

Water

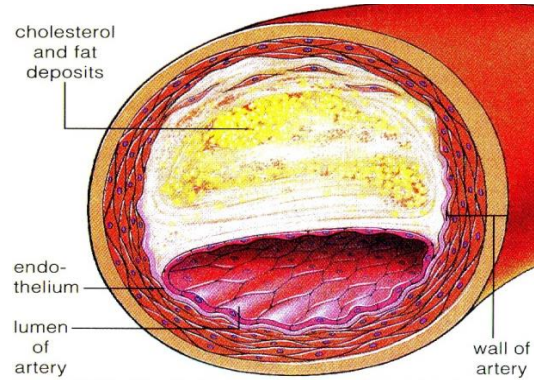
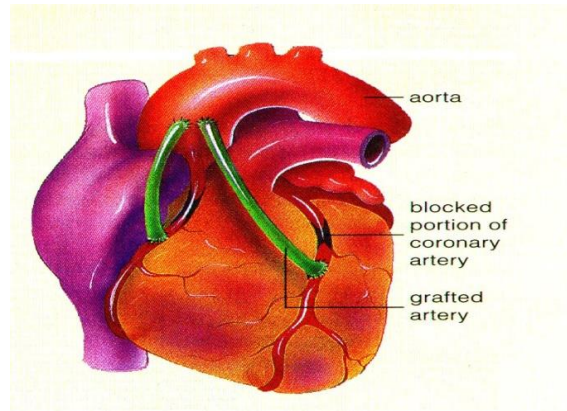


Carbohydrates
Proteins
Vitamins
Minerals

Fat

Water

Diet and Diseases



Obesity

Cardiovascular Diseases



Hypertension



<http://hk-diabetes.com/index2.htm>

Diabetes

Food and Nutritional Science Disciplines

Biology

Technology

Chemistry

Food processing

Metabolism

Product

Immunology

Environment

Physiology

Nutraceuticals

Microbiology

Food Hygiene &
Quality Control

Genetics

Food Economy

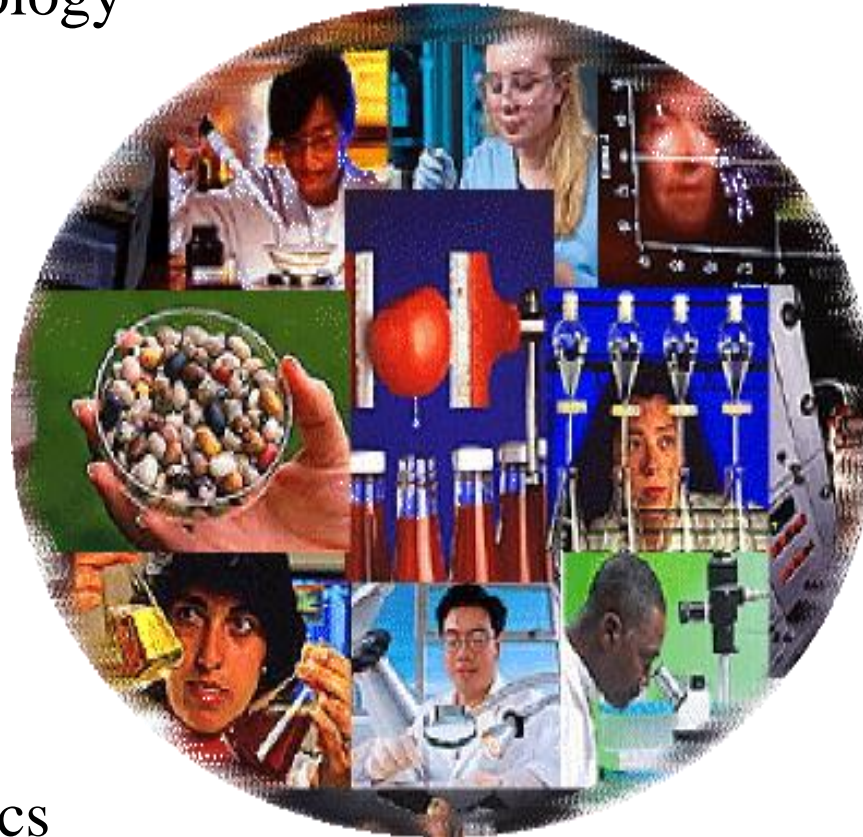
Psychology

Marketing

Sociology

Toxicology

Retailing & Food Services



Teaching

Undergraduate programme



**Gastrointestinal
Physiology**

**Meat, Dairy &
Grain Sciences**

Nutrigenomics

Functional Foods

**Introduction to
Food Science**

Dietary Assessment

Food Chemistry

**Public Health &
Nutrition**

**Food Processing &
Engineering**

Clinical Nutrition

**Food Waste
Management**

**Nutrition &
Life Cycle**

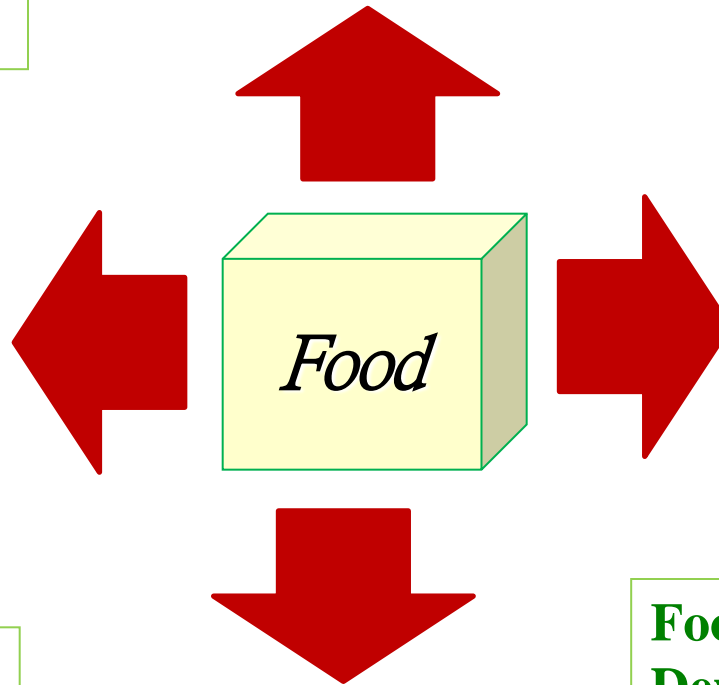
Food Toxicology

**Food Analysis & Product
Development**

**Food Hygiene &
Quality Control**

**Food
Microbiology**

Food



What do we teach?

Food Chemistry

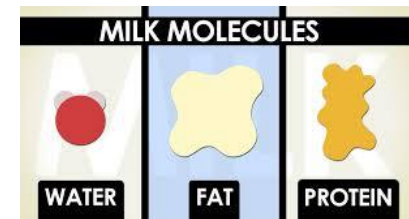
- *Chemical components and function*
- *Chemical changes during processing and storage*

Nutrition & Life Cycle, Nutrigenomics

- *Genes*
- *Metabolism*

Food Processing and Engineering, Meat, Dairy & Grain Sciences

- *Pasteurization and sterilization*
- *Packaging*
- *Heat transfer UHT-milk*
- *Refrigeration*



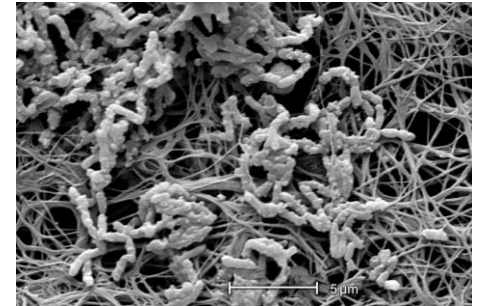
Food Microbiology

- *Good bugs*, e.g. milk $\xrightarrow{\text{Lactic bacteria}}$ yoghurt
- *Bad bugs*



Food Waste Management, Food Hygiene, Food Environment & Health

- *Biofilms*
- *Bugs in our environment*



Food Analysis & Product Development

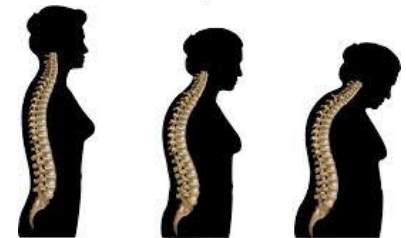
- *Analysis of food components & physical properties*
- *R&D for new food products*



Dietary Assessment, Clinical Nutrition, Public Health, Nutrition and Sports Performance

- *Nutrition and health*
- *Community diet and health status*
- *Diseases*

Osteoporosis



Food & Nutritional Science Lab

The Kadoorie Biological Sciences Building

FNS Teaching Lab (1/F)
Kitchen & Nutrition Room (5/F)
Food Lab (5/F)



Courses to Major in FNS

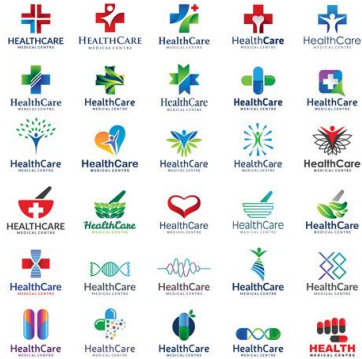
- Science foundation courses
- Disciplinary courses (5)
- Disciplinary core courses (3)
- Disciplinary electives (4)*
- Capstone learning requirement (1)

FNS Capstone (Year 3-4)

- Project (Final year and directed studies)
- Internship (hospital, food companies, NGO)
- Product development & Evaluation
- Advanced Practicum for Food & Nutrient Analysis



Job Opportunities



Healthcare



Agriculture



Environment



Industry



International
Organization for
Standardization

Safety



Retail



Personalised Nutrition

JOBS in the FOOD INDUSTRY



CATHAY PACIFIC
CATERING SERVICES



city'super



Food Industry

- Manufacturing
- QA/QC
- R&D
- Marketing & Retailing
- Food Services (e.g. hotels, restaurants, catering)
- Logistics
- Procurement



Plan your career with FNS

Disciplinary core courses

- From molecules to cells
- Introduction to food and nutrition
- Principles of food chemistry
- Biostatistics
- Biological Sciences laboratory course
- Principles of biochemistry

Advanced disciplinary core courses

- Nutritional biochemistry
- Food microbiology
- Food and nutrient analysis

Advanced disciplinary electives

- Food and nutritional toxicology
- Food hygiene and quality control
- Food processing and engineering
- Food waste management

Capstone

- Food and nutritional science internship e.g. quality assurance, quality control



- **Quality control/quality assurance**
- **Hygiene inspector**
- **Food safety**

Plan your career with FNS

Disciplinary core courses

- From molecules to cells
- Introduction to food and nutrition
- Principles of food chemistry
- Biostatistics
- Biological Sciences laboratory course
- Principles of biochemistry

Advanced disciplinary core courses

- Nutritional biochemistry
- Food microbiology
- Food and nutrient analysis

Advanced disciplinary electives

- Food and nutritional toxicology
- Functional foods
- Food processing and engineering
- Food waste management

Capstone

- Food product development and evaluation
- Internship/Research

- **Product development in industry**
- **Research and analytical laboratory e.g. centre of food safety, consumer council**



Jobs in Health Sectors:

Hospital, Institution, Schools:

- Dietitian, Nutritionists
- Consultants
- Nutrition Product Specialist
- Health Inspector





Research: M.Phil. & Ph.D.

M.Sc. in Food Industry:
Management & Marketing
Health Sectors

M.Sc. in Food Safety and
Toxicology

FNS

PgD Dietetics (HKUSPACE)

MSc Dietetics (Overseas)

Plan your career with FNS- *NEW!*

Disciplinary core courses

- From molecules to cells
- Introduction to food and nutrition
- Principles of food chemistry
- Biostatistics
- Biological Sciences laboratory course
- Principles of biochemistry

Advanced disciplinary core courses

- Nutritional biochemistry
- Food microbiology
- Food and nutrient analysis

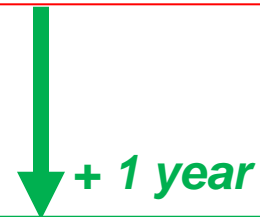


Advanced disciplinary (choose to select) electives

- Food and nutritional toxicology
- Functional foods
- Nutrition and life cycle
- Food processing and engineering
- Meat, dairy and grain sciences
- Plant and food biotechnology
- Food waste management
- Food hygiene and quality control
- Clinical nutrition
- Public health nutrition

Capstone

- Food product development and evaluation (and/or)
- Advanced practicum on food and nutrient analysis



- M.Sc. in Food Industry: Management & Marketing Health Sectors
- OR
- M.Sc. in Food Safety and Toxicology

Dietitian

There are 2 main options

- Enroll in the PgD/MSc program run by HKUSPACE
- Enroll in a BSc or Masters program majoring in dietetics in one of the following countries
 1. United Kingdom
 2. United States
 3. Canada
 4. Australia



For the HKUSPACE program

- Joint program with University of Ulster
- First enrolled into the PgD in Human Nutrition
- Need good GPA to upgrade to PgD or MSc in Dietetics, i.e. not a guaranteed entry
- Program NOT offered annually – need to keep an eye on website to check for opening of application
- Intake quota ~25-30 – limited by Hospital Authority so no scope to increase in near future
- Overseas applicant also eligible – competition is fierce
- More information could be found on program website:
<http://hkuspace.hku.hk/prog/msc-in-human-nutrition-dietetics>

Dietitian (Others)



Entry requirements

Most Masters level programs have similar entry requirements as those are required by the DAA

In general, as a minimum:

1. 2 x biochemistry (course code 3000 or above), e.g. BIOL3202 + an elective
 - Some 2000 level courses may be acceptable, e.g. BIOL2220 – check with the university as they are the ones who make the decision
2. 2 x physiology (course code 3000 or above), e.g. BIOL3205 + an elective
3. 2 x basic chemistry courses e.g. CHEM1042, CHEM2442

Need to check with the respective universities for the actual requirement

You need to provide them with course outline/description

IDP Australia in Wan Chai offers free admission advice to prospective students which may be helpful in this case

<https://www.idp.com/hongkong/studyabroad>

Some courses not included in the FNS curriculum. You may need to take them in Chemistry and Biomedical Sciences.

PLAN EARLY!!

Plan your career with FNS: Dietitian (HKUSPACE & Australia)

Disciplinary core courses

- From molecules to cells
- Introduction to food and nutrition
- Principles of food chemistry
- Biostatistics
- Biological Sciences laboratory course
- Principles of biochemistry

Advanced disciplinary core courses

- Nutritional biochemistry
- Food microbiology
- Food and nutrient analysis

- *Application (July-September)*



Advanced disciplinary electives

- Nutrition and the life cycle
- Dietary Assessment
- Clinical Nutrition
- Public health nutrition
- Human physiology

Additional courses (not in the curriculum)

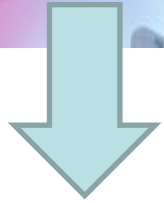
- Foundation chemistry (if DSE chemistry was not taken)
- General chemistry
- Fundamentals in Organic Chemistry
- Molecular biology
- Endocrinology: human physiology II

Capstone

- Food and nutritional science internship e.g. public health, community nutrition, health company, hospital authority, NGO

Research

Research



FNS & Endocrinology

- **Focus** on food for health and discovery of bioactive food components.
- Over 10 staffs: Prof Shah; Drs – Chan, Lee, Louie, Habimana, El-Nezami, Wan, Wang



- **Food Science**
- **Food and Virology**
- **Food and Nutrition Toxicology**
- **Nutrogenomics**
- **Nutrition and Public Health**
- **Chinese herbal Medicine**
- **Novel Food and Bioactive food components**



Research

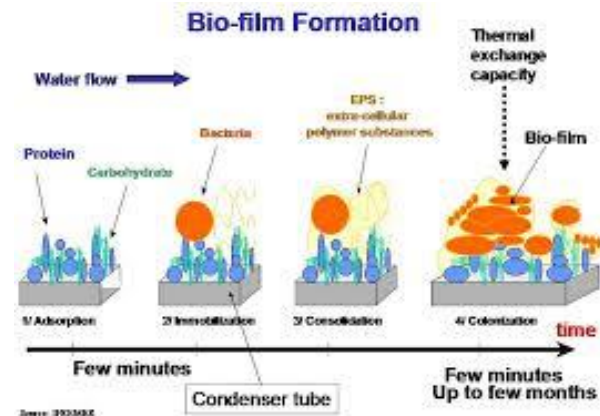
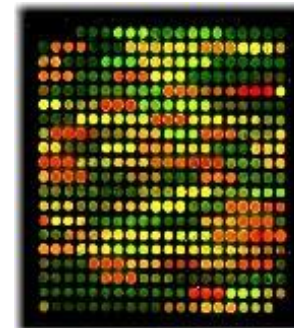
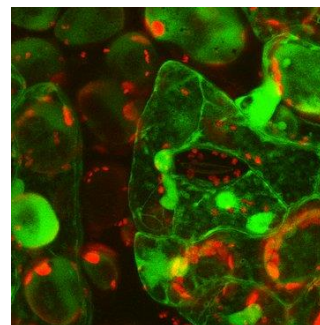
FNS & Health

Food Contaminants, Prebiotics, Probiotics, Dairy products, Dietary habits, Functional Food, Fats, Chinese medicine



FNS & Biological Environment

Water Quality Monitoring, Rapid detection of toxicants in seafood, Food & Environment, Biofilms



PLAY & GROW
HongKong

FNS & Innovative Products

**Nutrition Labeling, Dietetics and Public Health.
Novel Foods, Natural Products, Chinese Medicated Diet
and Functional Food development for Health Product in
Hong Kong.**



Facilities

Human Nutrition Laboratory



Swire Marine Institute (SWIMS)



Animal House



Biological Science Museum



Facilities

Large Scale Aquarium



Plant Growth Chamber



Fresh Water Aquarium



Tissue Culture Room



Green House



Facilities



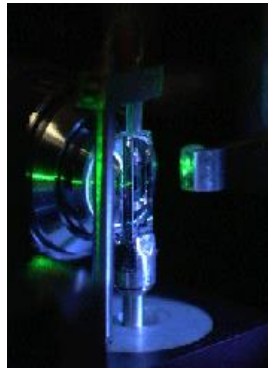
Pasteuriser



Texture Analyser



ICP-OES/ICP-MS



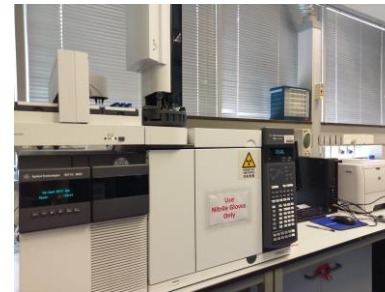
Flow cytometer



LC-(QToF)MS/MS



*Microcalorimeter,
GE Micro iTC 200*



GC-MS



*Confocal
microscope*



Real-Time PCR



*Atomic Absorption
Spectrometer*



HPLC



Genetic Analyzer

SBS have over 1500 undergraduates from local and international cities

Undergraduates' Life at SBS



Experiential Learning



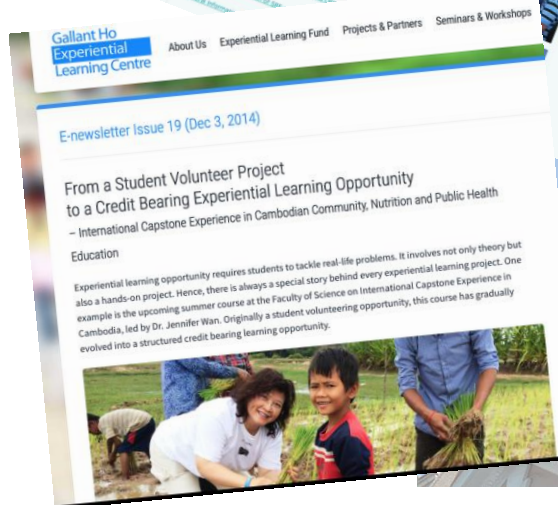
Undergraduates of FNS Students


300 closed group members



Science Student Ambassadors Scheme

With the initiative to promote science education and the 6901 Bachelor of Science Programme of Faculty of Science, teachers from the Faculty have been visiting secondary schools upon request, to deliver Science Talks on different science disciplines, or Admission Talks on the admission policy and curriculum. To make the events achievable, the Faculty has recruited students as the Science Student Ambassadors to share their University lives and learning experience with prospective students via school talk programme, campus visit and also being the student representatives in various Faculty-wide functions. In the last 4 years, over 100 BSc and BSc(AC) students were recruited as our Science Student Ambassadors.



 **HKU Information Day for Undergraduate Admissions**
Oct 29, 2016 09:00-18:00

HKU Information Day 2015 JUPAS Admissions Talk Highlights



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 CHAN Chi Him Jeffrey (BSc Year 4)
 - Miss CHENG Pui Sum (BSc Year 4)
 - Miss CHEUNG Hui In (BSc Year 4)
 - Mr CHEUNG Wing Ming (BSc Year 4)
 - Miss CHOI Vivian Wai Wan (BSc Year 3)
 - Mr LEE Wang Yan (BSc Year 3)

Let's talk to
our SPAs!

<http://www.scifac.hku.hk>
FNS Lead Coordinator: jettylee@hku.hk

Q & A
Thank you!!