

Topic 1

Superbug War **超級細菌戰**

Professor Shannon Au
Dept of Biochemistry
The Chinese University of Hong Kong

Micro-organism *Staphylococcus aureus* is commonly found on human skin and mucosa, and causes no major problems. However, if it gets into the body, it can cause important infections, like pneumonia and wound infection. In the last few decades, the emergence of drug-resistant *S. aureus* has raised the global health concern as it does not only occur in hospitals, but also in communities. In Sep 2006, the World Health Organization urges world to alert the emergence of another superbug, extensive drug-resistant tuberculosis. Nowadays, prevention and treatment of multi-resistant bacteria is one of the major health challenges. This lecture will review the emergence of drug-resistant bacteria and recent advances in battling the bacteria.

Language of talk: Cantonese

Suitable levels(s): F.4 or above

Audio-visual facilities required: LCD projector, MS PowerPoint presentation, Mic

Professor Shannon Au graduated from Portsmouth University, UK. She received her Ph.D. degree in molecular genetics and structural biology at The University of Hong Kong. She then pursued her postdoctoral training in protein x-ray crystallography at The University of Hong Kong, The University of Oxford and The Institute of Cancer Research, UK. She joined The Chinese University of Hong Kong in 2003 as an assistant professor in the Department of Biochemistry. Her research interest focuses on structural and functional significances of protein post translation modification processes and flagellar assembly pathway in pathogenic bacteria.

Topic 2

Cell Therapy and Diseases

細胞療法與疾病

*Professor Faye S Y Tsang
Department of Biochemistry
The Chinese University of Hong Kong*

Our bodies suffer from various diseases and injuries from time to time, leading to cell damage or cell loss, which can ultimately cause organ malfunction. Cell replacement therapy has great potentials for treatment of various diseases such as heart failure and diabetes. Several areas will be discussed: 1) cells from different adult and embryonic sources and their differences; 2) current cell replacement therapies used in clinics; 3) technical hurdles of putting some of these cells to clinical uses; and 4) ethical issues around the use of some of these cells in human.

Language of talk: Cantonese

Suitable level(s): F.4 or above

Audio-visual facilities required: LCD projector, MS PowerPoint presentation, Mic

Professor Faye S Y Tsang (曾淑瑩) graduated with a Ph.D. degree from the Chinese University of Hong Kong (CUHK). She obtained her postdoctoral training at the Johns Hopkins University and University of California. She joined the Department of Biochemistry, CUHK in year 2006 as an Assistant Professor. Her research focuses on harnessing the potentials of embryonic stem cells for therapeutic and research purposes.

Topic 3

Fun with Phylogenetics: The Origins of Whales and HIV **進化歷史拾趣：追溯鯨魚和 HIV 病毒的起源**

Professor Ka Hou Chu
Department of Biology
Molecular Biotechnology Programme
The Chinese University of Hong Kong

In a letter to his friend Thomas Huxley in 1857, Charles Darwin wrote “The time will come I believe, though I shall not live to see it, when we shall have very fairly true genealogical trees of each great kingdom of nature”. Over the past 150 years, biologists have made major theoretical and technical advances in phylogenetics, the study of the evolutionary relationships (phylogeny) among living organisms, and are now bringing Darwin’s dream into grasp.

In this lecture, the logic of phylogenetic inference based on shared derived homologies and the principle of parsimony will be introduced. Using the origin and evolution of whales as an example, I will explain how biologists reconstruct evolutionary history of organisms using fossil record and information from extant species, including both morphological features and molecular data. Whales are mammals well adapted to ocean life (e.g., stream-lined body, nostrils at the top of the head, swimming by movement of the horizontal flukes, modification of the fore limbs to flippers, and loss of external ears and hind limbs). It is long believed that whales originated from land mammals about 55 million years ago. Paleontologists have recently found a series of fossils which represent the missing links showing how ancient whales gradually adapted to life in the sea, for example, through reduction of hind limbs and drift of nostrils to the top of the head. Analyses based on molecular data demonstrate that whales are hoofed mammals with hippocampus as their closest living relative.

Towards the end of the lecture, I will discuss the applications of phylogenetic analysis in taxonomy, ecology, biogeography, and public health. To highlight the last point, case studies on the origin of human immunodeficiency virus (HIV), the virus that causes acquired immune deficiency syndrome (AIDS), will be elaborated. These examples illustrate why evolutionary analysis is important throughout the biological sciences.

Language of talk: Cantonese or English

Suitable level(s): F.4 or above

Audio-visual facilities required: LCD projector, Computer with PowerPoint presentation

Professor Ka Hou Chu (朱嘉濠) received his bachelor degree from the University of California at Berkeley in 1976 and his doctorate degree from the Massachusetts Institute of Technology/Woods Hole Oceanographic Institution Joint Program in Oceanography in 1984. He is now Professor in Biology Department, Director of the Molecular Biotechnology Programme, and Director of the Simon F.S. Li Marine Science Laboratory, The Chinese University of Hong Kong. From 1990-93, he also served as the Dean of Students at New Asia College and is now a council member of the University. Professor Chu’s academic interest focuses on marine biology and biotechnology, and molecular systematics and ecology. Research projects now under his supervision range from molecular phylogeny and population genetics of marine organisms, crustacean physiology, to shrimp genomics and seafood allergy. Professor Chu has published over 90 papers in scientific journals and made about 200 presentations in international conferences.

Topic 4

Gene Therapy – From Laboratory to Clinical Application **基因治療—從實驗室到臨床應用**

Professor Ming Chiu Fung
Department of Biology
Molecular Biotechnology Programme
The Chinese University of Hong Kong
Tel# 2609-6147
e-mail: mingchiufung@cuhk.edu.hk

The genetic diseases can be simply caused by a mutation of a single gene such as Huntington disease, sickle cell anemia, and color blindness, which are inherited in recognizable patterns of autosomal dominant, autosomal recessive and X-linked, respectively. Some genetic disorders are caused by a combination of environmental factors and mutations in multiple genes (i.e. multifactorial), e.g. obesity and familial hypercholesterolemia. Apart from mutations occur in single gene or multiple genes, abnormalities in chromosome structure such as deletion and translocation will lead to genetic disorders like retinoblastoma (a deletion of in the q arm of chromosome 13) and familial Down syndrome (a translocation of q arm of chromosome 21 to the q arm of chromosome 14). In addition is the rare type of genetic disorder – the maternal inherited mitochondrial disorders.

Many people think that genetic diseases cannot be treated. However, based on the better understanding of the nature and fundamental problem of many genetic diseases, we can develop some strategies to treat genetic disorders. Gene therapy, which is a technique to correct the defective genes for curing the genetic disorders, is the ultimate goal of the scientists to combat inherited genetic disorder or even cancer, the non-inherited disease but caused by genetic defect. In this talk, I will discuss the principle of gene therapy and the current clinical application of gene therapy.

Language of talk: Cantonese or English

Suitable level(s): F.4 or above

Audio-visual facilities required: LCD Projector, MS PowerPoint presentation, Mic

Professor Ming Chiu Fung (馮明釗) who received his Ph.D. degree in Molecular Biology from the Australian National University, Canberra, Australian, is now a professor in the Department of Biology of the Chinese University of Hong Kong. In addition, he serves as a Fellow of the New Asia College of the Chinese University of Hong Kong, visiting professor of the First Military Medical University, China, adjunct professor of Soochow University, China, and editor of the Journal of Tropical Medicine. Professor Fung's research interests centre on the molecular hematology, immunology and parasitology. Professor Fung is now developing a new drug for gene-switch therapy, some anti-cancer drugs and DNA vaccines against parasites.

Topic 5

A New Hope in Medicine: Stem Cell Therapy **醫學的新希望：幹細胞治療**

Professor Kin Ming Kwan
Department of Biology
Molecular Biotechnology Programme
The Chinese University of Hong Kong

Stem cells are pluripotent/multipotent unspecialized cells that have the capacity to divide indefinitely giving rise more stem cells and have the potential to become many different specialized cell types in the body. Thus, stem cells are the cellular origin of many different tissues and organs. By studying the biology of stem cells and research on how to induce stem cells becoming various cell types of different tissues, scientists are finding out new hope in medicine using stem cells to offer the possibility of a renewable source of replacement cells and tissues to treat different diseases, conditions and disabilities such as Parkinson's and Alzheimer's diseases, spinal cord injury, stroke, burns heart disease, diabetes and etc...A broad review and the current advancement of the stem cell therapy will be discussed.

Language of talk: Cantonese or English

Suitable levels(s): F.4 or above

Audio-visual facilities required: LCD projector, computer with PowerPoint presentation

Professor Kin Ming Kwan (關健明) received his Bachelor of Science degree and Ph.D. degree from The University of Hong Kong in 1990 and 1998 respectively. He then pursued his postdoctoral training in transgenic mouse technology and developmental biology at the University of Texas MD Anderson Cancer Center. He joined The Chinese University of Hong Kong in 2006 as an assistant professor in the Department of Biology. His current research interest focuses on mouse developmental biology and organogenesis.

Topic 6

Life in the Plankton

浮游生物

*Professor Chong Kim Wong
Department of Biology
Environmental Science Programme
The Chinese University of Hong Kong*

The term plankton (Greek = wandering) refers to the free-floating drifters of the oceans. Nearly all of the plankton are microscopic. Phytoplankton are free-floating organisms that are capable of photosynthesis. They are the primary producers of the oceans. However, some phytoplankton, such as the red tide dinoflagellate *Noctiluca*, are not photosynthetic, but feed on other microscopic particles. Zooplankton are the free-floating animals. Most zooplankton feed on phytoplankton and live near the base of the marine food chain. The most abundant zooplankton in lakes and oceans are tiny crustaceans called copepods. In addition to their importance in the energy cycle of the ocean, planktonic organisms are interesting because many of them are beautiful and have adapted to the environment in various strange ways. In this lecture, Prof Wong will talk about the life history, behaviour, adaptations and ecology of planktonic organisms.

Language of talk: Cantonese

Suitable level(s): F.4 or above

Audio-visual facilities required: LCD projector, MS PowerPoint presentation, Mic

Professor Chong Kim Wong (黃創儉) graduated from University of Toronto with a degree in zoology in 1978. He then entered the University of Ottawa to study for a M.Sc. in Biology. There he became interested in plankton ecology. After receiving the M.Sc. in 1980, he returned to the University of Toronto with a Canadian National Research Council Postgraduate Scholarship. He studied the feeding behaviour of carnivorous zooplankton and received his Ph.D. in Zoology 1985. From 1985-1987, he studied marine zooplankton as a Canadian National Research Council Postdoctoral Fellow at the Institute of Ocean Science in Victoria. Professor Wong is one of the few scientists to have studied zooplankton both in lakes and oceans. In 1987, he joined the Biology Department of the Chinese University of Hong Kong as lecturer. He was subsequently promoted to Senior Lecturer and Professor. From 1990-2000, he also served as Research Programme Director of the Centre for Environmental Studies of the University. Professor Wong has written over 50 papers on zooplankton ecology. His research interests are primarily on the interactions between zooplankton and phytoplankton and the role of zooplankton in marine and estuarine food webs.

Topic 7

Olympic Chemistry

*Professor Kin Shing Chan
Department of Chemistry
The Chinese University of Hong Kong*

Olympic Chemistry

1. How did they stop the rain the opening ceremony? A chemical umbrella.
2. What makes the Watercube so cute? Power of polymer.
3. How were illegal drugs detected? A chemical 110m-hurdle or marathon.

Language of talk: Cantonese

Suitable level(s): F.1 – F.7 (minimum number of audience: 100)

Audio-visual facilities required: LCD projector, MS PowerPoint presentation, Mic

Professor Kin Shing Chan (陳建成), who received his Ph.D. degree from the University of Chicago, is now a Professor in the Department of Chemistry. Professor Chan's research interests center on organic, organometallic and green chemistry. He has given many popular science talks in high schools.

Topic 8

Painkiller Drugs

*Professor Kin Shing Chan
Department of Chemistry
The Chinese University of Hong Kong*

Painkiller Drugs

1. Pain scale and receptors
2. Pain drugs: green synthesis

Language of talk: Cantonese

Suitable level(s): F.6 – F.7 (minimum number of audience: 100)

Audio-visual facilities required: LCD projector, MS PowerPoint presentation, Mic

Professor Kin Shing Chan (陳建成), who received his Ph.D. degree from the University of Chicago, is now a Professor in the Department of Chemistry. Professor Chan's research interests center on organic, organometallic and green chemistry. He has given many popular science talks in high schools.

Topic 9

Melamine in Milk Powder

三聚氰胺的奶粉

*Professor Kin Shing Chan
Department of Chemistry
The Chinese University of Hong Kong*

Melamine in Milk Powder

1. Why melamine is added to milk powder?
2. How does melamine cause the kidney stone?
3. How can we detect a new melamine derivative in food?

Language of talk: Cantonese

Suitable level(s): F.1 – F.7 (minimum number of audience: 100)

Audio-visual facilities required: LCD projector, MS PowerPoint presentation, Mic

Professor Kin Shing Chan (陳建成), who received his Ph.D. degree from the University of Chicago, is now a Professor in the Department of Chemistry. Professor Chan's research interests center on organic, organometallic and green chemistry. He has given many popular science talks in high schools.

Topic 10

The Chemistry of Some Common Soft Drugs **化學與軟性藥物**

Professor Hung Kay Lee
Department of Chemistry
Environmental Science Programme
The Chinese University of Hong Kong

A drug is a chemical substance that affects an individual in such a way as to bring about physiological, emotional, or behavioural change. A drug can be a natural product (e.g. an alkaloid) or it can be synthesised in laboratories (a semi-synthetic or a synthetic drug). To date, a wide variety of drugs have been developed for medical uses such as diagnose, treatment, or prevention of various diseases. Unfortunately, some of these substances are liable to abuse. Morphine, an alkaloid isolated from opium, is one of the most effective pain-killer drugs. Codeine and heroin are close analogues of morphine. Codeine is used as a cough suppressant, whereas heroin is a powerful narcotic analgesic. Cocaine, comes from the leaves of coca plants, is the most potent stimulant of natural origin. It has been used as a topical anaesthetic. Ketamine is an anaesthetic for veterinary use. Amphetamine and methamphetamine ("ice") are powerful stimulant drugs which have been used as an appetite suppressant and for the treatment of mild depression, whilst the closely related 3, 4-methylenedioxymethamphetamine (ecstasy) is a powerful psychoactive drug with no proper medical use. In this talk, we look at the chemistry, development, and activities of these common soft drugs.

藥物是化學物品，服用後能引致生理上、情緒上及行為上出現改變。藥物大致可分為兩類：一類為天然產物（如生物鹼），另一類可在實驗室裡製備（半合成或全合成藥物）。今天，人們已研製出不同種類的藥物，用作診斷、治療或防治各種疾病。可惜部份藥物常被濫用。嗎啡是一種從罌粟提取出來的生物鹼，具有強力的鎮痛作用。可待因和海洛英可從罌粟經化學方法提煉而成。可待因用作止咳藥物，而海洛英是一種強力的麻醉鎮痛類毒品。可卡因是從古柯樹葉提取出來的一種生物鹼，屬強力興奮劑也曾用作表面麻醉劑。氯胺酮是一種用於動物手術的麻醉劑。安非他明及甲基安非他明（"冰"）屬興奮劑藥物，在醫學上用作減低食慾及治療抑鬱。其衍生物亞甲二氧基甲基安非他明（俗稱搖頭丸）也屬強力興奮劑，但無醫學作用。此講座將探討一些常見軟性藥物的化學結構、研製過程及其特性。

Language of talk: Cantonese or English

Suitable level(s): F.4 or above

Audio-visual facilities required: LCD projector, MS PowerPoint presentation, Mic

Professor Hung Kay Lee (李鴻基) obtained his B.Sc. and Ph.D. degrees at The Chinese University of Hong Kong. After he completed his Ph.D. study, he spent two years as a postdoctoral scholar at California Institution of Technology. He joined The Chinese University of Hong Kong as an assistant professor in the Department of Chemistry in 1997. His research interest focuses on synthesis and structural characterisation of metal complexes with biological relevance.

Topic 11

Origin of Life – A Chemical Perspective
生命起源的化學基礎

Professor Bo Zheng
Department of Chemistry
The Chinese University of Hong Kong

This talk will discuss the process of the origin of life on earth at the molecular level. From 4.6 billions years ago to 3.5 billion years ago, earth evolved from a lifeless rock to a world full of early forms of life. To begin with, the molecules that are essential to these forms of life, such as amino acids, nuclei acids, were synthesized from prebiotic compounds in prebiotic conditions. These molecules then assembled and organized into various forms of life eventually, paving the way of evolution of life in our world. The important experiments that provided clues of the process of the origin of life will be presented, and a few plausible theories based on the current scientific discoveries will also be discussed.

Language of talk: English

Suitable levels: F.5 – F.7

Audio-visual facilities required: projector for PowerPoint presentation; microphone.

Professor Bo Zheng (鄭波) received his B.S. in chemistry at Peking University in 1997. He obtained his Ph.D. in materials chemistry in 2002 from the Chemistry Department of Duke University. He spent two and half years in Professor Ismagilov's group in the Chemistry Department of the University of Chicago as a postdoc, working on the development of microfluidic methods for protein crystallization and bioanalysis. In August 2005, he joined the Chemistry Department of the Chinese University of Hong Kong as an assistant professor. Currently his research focuses on bioanalysis and study of soft materials using microchannels and microreactors.

Acupuncture and Pain Control
針刺和鎮痛

林志秀教授
香港中文大學中醫學院

中醫藥是中國優秀傳統文化寶庫中的瑰寶，數千年來為中國人民的保健事業和中華民族的繁衍昌盛做出了極大的貢獻。而針灸是中醫學中的重要組成部分，在防病治病中具有十分獨特的作用和優勢。針灸這一療法現在已廣泛應用於臨床各科包括內科，骨傷科，婦科和兒科多種疾病的治療，尤其是對各種疼痛為主的一類疾病的治療具有療效好，作用快，無毒副作用的優點，和傳統的藥物治療相比顯示出一定的優勢。

根據中醫的理論，疼痛是因為各種致病原因導致身體的臟腑功能失調，經絡痹阻不通，氣血流通不暢所致，即“不通則痛”的病理性情況。針刺療法則是通過刺激身體特定的經絡穴位，起到疏經活絡，調理臟腑氣血的功能，以達到“通則不痛”的生理平衡狀態。經過近幾十年的研究，針灸的鎮痛機制也得到現代科學的證明。人體的穴位被毫針刺激後，身體相應組織會釋放出一類具有強大生理效能的生物活性物質叫內啡肽。這類物質在體內起到類似嗎啡一樣的鎮痛作用。針刺鎮痛機理的闡明反過來對臨床醫生們更好的運用這一療法來治療各類疼痛疾患起了很大的促進作用。

語言：粵語

對象：中一至中六

視聽設施：電腦光盤 及 多媒體投影機

林志秀教授畢業于海南農墾中學，1982年考入廣州中醫藥大學醫療系，1987年獲得醫學學士學位（中醫學）。畢業後分配到廣東省中醫藥研究所附屬醫院任中醫臨床醫師。1991年赴英國學習語言，後進入倫敦大學國王學院（King's College London）攻讀生藥學哲學博士學位。畢業後受聘到英國中薩大學（Middlesex University）傳統醫學系任中醫學高級講師。2003年加入香港中文大學中醫學院任職助理教授，積極參加學院的教學和科研工作。

Topic 13

The Four Diagnostic Methods in Chinese Medicine
淺談四診

Miss Sarah Sze Nga Chan
School of Chinese Medicine
The Chinese University of Hong Kong

Diagnostic methods are the methods used to collect information related to the disease, including inspection, listening and smelling, inquiry and pulse-taking. By means of the four diagnostic methods, Chinese Medicine practitioner can understand the cause of the disease and analyze the pathogenesis of the disease so as to decide the treatment. The content of these methods and their clinical meaning will be discussed.

Language of talk: Cantonese

Suitable level(s): F.1 – F.7

Audio-visual facilities required: LCD projector, MS PowerPoint presentation, Mic

Miss Sarah Sze Nga Chan (陳詩雅) graduated from the Chinese University of Hong Kong in 2004 and was qualified as a registered Chinese Medicine practitioner in the same year. She obtained her master degree in Chinese Medicine from the Chinese University of Hong Kong in 2006. Ms Chan is now an instructor in the School of Chinese Medicine at the Chinese University of Hong Kong and the Chinese medicine practitioner in the teaching clinic of the university.

Global Warming: Its challenges and Solutions
全球暖化的挑戰與出路

陳竟明教授

香港中文大學生物化學系及環境科學課程副教授

Professor King Ming Chan

Associate Professor

Department of Biochemistry and Environmental Science Programme

The Chinese University of Hong Kong

(email: kingchan@cuhk.edu.hk)

Global warming is caused by the release of carbon dioxide from burning of fossil fuels. Since industrial revolution, human beings have been using those plant materials depressed underground as fuels, such as coal, oil and natural gas, with a low cost without concerning its environmental cost. The burning of these fuels emits carbon dioxide after adding of oxygen to release heat energy. The carbon dioxide released to the atmosphere could absorb out-going radiation reflected from the earth's surface and store it as heat. This is known as green house effect and the consequence is the rise of global air temperature. It is estimated that the end of the century, global air temperature will have an increase of 1.4 to 5.8 degree Celsius, leading to melting of ice and glacier, more droughts and floods, rise of water levels, more germs and bugs, and the change of ecological environment is threatening biodiversity on earth.

The impacts of global warming are here to stay, extreme weathers become more common, we are witnessing stronger storm and heavier rains. Such impacts are not just in remote areas; densely populated regions are in threat with economic loss and loss of human lives due to global warming. Quickly expanding population has enlarged economic growth and the demand of fuels to sustain economic growth. Facing the dilemma of economic growth and environmental crisis, what should we do?

To solve this problem, we must pin point to the source of the problem to restrict the release of carbon dioxide from burning less fossil fuels. Setting emission targets is our common goal world-wide, to meet the targets and stop global warming we must act now to use energy efficiently, use renewable energy, impose tax on fuels, and promote emission trading of clean fuels.

全球暖化，皆因我們燃燒化石燃料，排放二氧化碳所引起。自工業革命之後，人類把由積壓在地下深層的植物而來的化石用作燃料，包括煤、石油和天然氣，燃燒即加氧放熱而釋出二氧化碳回到大氣中，破壞了大氣中的二氧化碳循環的平衡。二氧化碳在大氣層內，把自地面反射回太空的輻射轉為熱量，是為溫室效應，令地球氣溫上升。估計廿一世紀地球平均氣溫上升攝氏 1.4 至 5.8 度，積雪冰川溶解，旱、澇頻生，水位上升，蟲害和細菌增加，而生態改變亦令全球的生物多樣性受到威脅。

全球暖化所帶來的影響，已非遙不可及。全球暖化可令氣候漸趨極端，颶風更強，暴雨更大，均是可以見到和現在發生的事情。這些現象也不只是發生在人跡稀少的地方，而是對人口稠密的地方亦構成威脅了，造成經濟和人命損失。人口暴升，更

形成各國對經濟增長有更大需求，對燃料需求更有增無減。面對經濟和環境問題，人類應如何抉擇？

要解決問題便須針對問題根源，即限制二氧化碳的排放。訂下未來排放二氧化碳上限目標，正是國際共識。節約能源、使用可再生能源、引入稅項和排放交易策略，都是可以控制二氧化碳的排放，解決全球暖化的問題。

Language of talk: Cantonese or English

Suitable level(s): F.4 – F.7

Audio-visual facilities required: LCD projector, PC with PowerPoint (MS2003) presentation

Professor King-Ming Chan (陳竟明) graduated from the Department of Biology, CUHK, with his B.Sc., and M.Phil. He obtained his Ph.D. degree from Memorial University of Newfoundland at St. John's in Canada. Before joining CUHK, he worked at Queen's University in Canada and Center of Marine Biotechnology at Baltimore in the USA. Professor Chan joined the Department of Biochemistry as Lecturer in 1992 and he is now an Associate Professor in the same department and the Environmental Science Program. He involves in teaching of Medical students, and many courses in the Department of Biochemistry and Environmental Science Program. His research interests cover environmental policy, aquatic toxicology, marine biotechnology, molecular biology and recombinant DNA technology. Professor Chan is also member of many professional societies, including American Fisheries Society, Society of Toxicology (USA), Society of Environmental Toxicology and Chemistry (USA), and the Marine Biological Association of Hong Kong, etc. He is Warden of Hostel 2 at Shaw College and had been Part-time member of Central Policy Unit, HKSAR Government from 2004 to 2007 for three years. He is also advisor of several local green groups. He writes weekly for the New Territories Edition of Ming Pao on Environmental Affairs in his own column.

Topic 15

Sustainable Development and Environmental Policy of HKSAR Government **持續發展：特區政府的環保政策和可持續發展策略**

陳竟明教授

香港中文大學生物化學系及環境科學課程副教授

Professor King Ming Chan

Associate Professor

Department of Biochemistry and Environmental Science Programme

The Chinese University of Hong Kong

(email: kingchan@cuhk.edu.hk)

After the Second World War, Hong Kong began its rapid industrialization, commercialization, and urbanization. The past 50 years' development has totally transformed the landscape of Victoria Harbour and many rural areas. Our population has also expanded from 4.5 million in early eighties to close to 7 million today, and the figure is expected to rise. Alongside with population growth, gross domestic production, housing development, pollution and waste production are in the rise too. With limited land space in Hong Kong; we have entered into a crisis of unsustainable urbanization with major city facilities and city planning policy for waste treatment, transportation, and housing development lagging behind.

A new concept of sustainable development is badly needed to reconsider the economic, environmental and societal development of Hong Kong. We need new concepts of waste reduction, better city planning to accommodate people, more clean and efficient energy to sustain our developments for many generations to come without down grading our environmental quality or quality of life and to enjoy our natural environment. This lecture reviews the historical background and the policies of HKSAR government on environmental protection and sustainable development. Hong Kong has also entered into a civil society; decision making processes for all the aforementioned policies should also be formulated from every citizen bottom up instead of from top-down. Democratization and democratic politics could improve better decisions to take care of social development, fair use of resources and sustainable development; however they are still being neglected.

香港自第二次世界大戰之後，即迅速開展其工業化，商業化和都市化發展。過去五十多年的發展，亦早已把維多利亞港和鄉郊地區的地貌也改變了。我們的人口由八十年代的四百五十萬增加至今天的近七百萬，而未來的人口正在增加。隨著人口增加，國民生產總值和經濟增長，房屋需求增加，以致污染和廢物棄置量亦大增。香港的土地資源有限，我們正步入不可持續發展的危機當中，城市規劃措施和現有設施並不能有效地解決廢物處理，交通，房屋發展等問題。

嶄新的可持續發展理念急需要確立以解決香港的經濟、環境、社會的發展。我們需要新減廢方案，更佳城市規劃，更清潔而又高效益的能源，以達致可持續發展，避免環境質素和生活條件下降，同時可令子孫後世仍享有現在的自然環境。這講座回顧過去香港的發展歷史和分析政府的環保政策和可持續發展策略。香港現已發展為一公民社會，上述政策的制定過程更應由全民參與，而非由上而下。民主化及民主政制能

對社會發展、公平的資源運用、以及維持可持續發展起到促進作用，但卻仍然為人所忽略。

Language of talk: Cantonese or English

Suitable level(s): F.4 – F.7

Audio-visual facilities required: LCD projector, PC with PowerPoint (MS2003) presentation

Professor King-Ming Chan (陳竟明) graduated from the Department of Biology, CUHK, with his B.Sc., and M.Phil. He obtained his Ph.D. degree from Memorial University of Newfoundland at St. John's in Canada. Before joining CUHK, he worked at Queen's University in Canada and Center of Marine Biotechnology at Baltimore in the USA. Professor Chan joined the Department of Biochemistry as Lecturer in 1992 and he is now an Associate Professor in the same department and the Environmental Science Program. He involves in teaching of Medical students, and many courses in the Department of Biochemistry and Environmental Science Program. His research interests cover environmental policy, aquatic toxicology, marine biotechnology, molecular biology and recombinant DNA technology. Professor Chan is also member of many professional societies, including American Fisheries Society, Society of Toxicology (USA), Society of Environmental Toxicology and Chemistry (USA), and the Marine Biological Association of Hong Kong, etc. He is Warden of Hostel 2 at Shaw College and had been Part-time member of Central Policy Unit, HKSAR Government from 2004 to 2007 for three years. He is also advisor of several local green groups. He writes weekly for the New Territories Edition of Ming Pao on Environmental Affairs in his own column.

Topic 16

Is Zero Waste Possible?

零廢料可能嗎？

陳竟明教授

香港中文大學生物化學系及環境科學課程副教授

Professor King-Ming Chan

Associate Professor

Department of Biochemistry and Environmental Science Programme

The Chinese University of Hong Kong

(email: kingchan@cuhk.edu.hk)

Hong Kong is a city of over-consumption and a high waste society. In the past decades, construction wastes had been in the rise until the implementation of construction waste charging scheme and sorting facility, the amount of construction waste was drastically reduced 38% in 2006 compared to 2005. Despite the reduction of construction waste, municipal waste going to the landfills remain unchanged, reaching 3.4 million tonnes per year. We are still facing the problem of early run of space in the existing strategic landfills, therefore extension of landfills and building of incinerators have been proposed. It's a total waste of resources by burning them if we have not fully implemented our waste reduction and recycling schemes and introduced "recycling economy" in Hong Kong.

Our domestic waste recovery is around 20% despite the overall waste recovery could reach 50%. Our government has not fully implemented the separation and recycling at source scheme and thus the recovery rates remain low. Due to the limitation of resources and most wastes have their price tags, with the pushes of Household Waste Charging Scheme (like Tai Pei) with multiple green taxes and laws; we could increase our waste recovery rate. The government has proposed the Product Eco-responsibility Bill for implementing the producer responsibility scheme to enhance the reuse of wasted tyre, plastic bags, electronic devices, containers, etc. However, one important concept of producer responsibility is to stop the production and use of non recyclable materials to achieve zero waste. In addition, Packaging Laws should be implemented to control the use of packaging materials, and we need to provide more incentives to recycling company for better recovery of plastic and glass bottles.

If all materials could be recovered, it is not impossible to achieve zero waste. Even zero waste may not be achieved immediately; zero landfill should be our prime target. If we could achieve zero waste, building more incinerators would be a total waste!

香港是一個過度消費城市，更是一“高廢社會”。過去幾十年，建築廢料不斷上升，但自從實施了建築廢料收費和填料分流計劃，棄置在堆填區的建築廢料量，在 06 年便比 05 年大幅下降了 38%。棄置在堆填區的建築廢料雖然大減，但以堆填方式而擱置的廢物仍未改善，每年仍有約 340 萬噸，而堆填區的容量由原來設計時是 2020 才滿溢，變成 2012 年快爆滿。於是，政府除了要擴充堆填區外，更會興建焚化設施來處理固體廢物的問題。但在政府未全力推動循環經濟和加強減廢回收之際，採用焚化爐燒垃圾，極度浪費資源！

香港的整體廢物回收率雖可近 50%，但家居垃圾的回收率就很低，只有約 20%。過往政府並沒有積極推行廢物源頭分類的計劃，令各種可循環再造廢物的回收率偏低。現時資源短缺，廢物有價，再引入如台北的家居廢物棄置收費、另有其他環保稅項和法例配合，應可提高回收率。政府提出《產品環保責任條例草案》，為廢車胎、膠袋、電子設備、飲品容器等產品，推行生產者責任計劃。但生產者責任制更重要的概念，是要取締生產及使用不能回收再用的廢物，目標是達到零廢料。所以，除了引入新稅項規管包裝物料和減用膠袋，亦須引入『包裝法』規管使用不能回收物料，並可以優惠回收行業來加強玻璃及膠樽的回收。

假如所有物料，盡可回收再造，零廢料並不是不可能的事情。即使零廢料未必能夠立刻成功，但香港應可以是以零堆填為目標。但如果可以達成零廢料，沒有可焚化的垃圾，多建的垃圾焚化爐，不是會變為垃圾嗎？

Language of talk: Cantonese or English

Suitable level(s): F.4 – F.7

Audio-visual facilities required: LCD projector, PC with PowerPoint (MS2003) presentation

Professor King-Ming Chan (陳竟明) graduated from the Department of Biology, CUHK, with his B.Sc., and M.Phil. He obtained his Ph.D. degree from Memorial University of Newfoundland at St. John's in Canada. Before joining CUHK, he worked at Queen's University in Canada and Center of Marine Biotechnology at Baltimore in the USA. Professor Chan joined the Department of Biochemistry as Lecturer in 1992 and he is now an Associate Professor in the same department and the Environmental Science Program. He involves in teaching of Medical students, and many courses in the Department of Biochemistry and Environmental Science Program. His research interests cover environmental policy, aquatic toxicology, marine biotechnology, molecular biology and recombinant DNA technology. Professor Chan is also member of many professional societies, including American Fisheries Society, Society of Toxicology (USA), Society of Environmental Toxicology and Chemistry (USA), and the Marine Biological Association of Hong Kong, etc. He is Warden of Hostel 2 at Shaw College and had been Part-time member of Central Policy Unit, HKSAR Government from 2004 to 2007 for three years. He is also advisor of several local green groups. He writes weekly for the New Territories Edition of Ming Pao on Environmental Affairs in his own column.

Topic 17

Is it Possible to Prevent Cancer from Development?
可否防止癌症形成嗎？

Professor John W S Ho
Department of Biochemistry
Environmental Science Programme
The Chinese University of Hong Kong

Cancer is an uncontrollable growth of cells. There are different schools of thought on the cancer. Recent studies suggest it can be epigenetic. That is both the gene and the environmental factor may be involved in cancer. However, the causal relation between these factors is still under investigation. Although chemotherapy and surgical removal of tumor are common ways to eliminate cancer, the treatment may stop cancer growth for a few years. Cancer may reappear again. More recent study suggests that every person has cancer cells in the body. Cancer cells occur a few times in a person's lifetime. These cancer cells can grow out of control due probably to illness associated with immune system, stress and nutritional deficiencies. These could be due to genetic, environmental, food and lifestyle factors. The present talk will provide information on these inter-related factors and a recent study on alternative cancer therapy with naturally occurring small molecules.

Language of talk: Cantonese or English

Suitable level(s): F.1 – F.7

Audio-visual facilities required: PC with MS PowerPoint

Professor John W.S. Ho (何永成) obtained his B.Sc. degree from the University of Alberta, Canada, his MA and PhD in 1985 from the State University of New York at Buffalo, USA and received post-doctoral training at SUNYAB and the University of Utah. His current post in CUHK is Associate Professor. His research interests center around chemical carcinogenesis and protein study.

Topic 18

The Science behind Gourmet Food
美食背後的科學

Professor Peter C K Cheung
Department of Biology
Food and Nutritional Sciences Programme
The Chinese University of Hong Kong

Gourmet foods prepared by chefs are characterized by excellent flavor color, texture and appearance. The cooking skills can be acquired by practice but the principles behind the making of gourmet foods involve more than just practical know-how. Modern food science offers scientific explanations to all the essential characteristics of gourmet foods. In this presentation, the science of cooking will be illustrated by some traditional foods that have local relevance. Moreover, the application of the principles and tools of science for the development of novel dishes with non-traditional ingredients and preparation techniques in what being described as molecular gastronomy will also be discussed.

Language of talk: Cantonese

Suitable level(s): F.4 or above

Audio-visual facilities required: LCD projector, MS PowerPoint presentation, Mic

Professor Peter C K Cheung (張志強) is at present an Associate Professor of the Biology Department and the Director of Studies of Food & Nutritional Sciences Programme at the Chinese University of Hong Kong. He is also the adviser of the Hong Kong Food Science and Technology Association. His research interests are in the chemical structures and biological functions of dietary fiber; nutritional evaluation of food; and development of functional food products.

Topic 19

Trans-Fatty Acids: What Are They and How Can We Avoid Them?

*Prof Georgia S Guldan
Department of Biochemistry
Food and Nutritional Sciences Programme
The Chinese University of Hong Kong*

Even though Hong Kong people have become more health-conscious, eating habits and food choices still cause many of our common health problems. Our food choices are influenced by many things, such as taste, price, convenience, our family and friends, nutrition knowledge, advertising, tradition and culture.

Soon we will have new nutrition labeling on packaged foods in Hong Kong. But one food component, trans fats, that can have negative effects on our health if eaten in excess, will not be listed on the new required labels, even though some countries like Denmark and cities like New York have banned them from their food supplies!

Although trans fatty acids occur naturally in some foods, they also appear in many of our processed foods and baked and fried foods, and their excessive consumption can lead to heart disease. Do you know how to protect yourself from too many of them?

This talk will introduce you to trans fats. After the talk, you will know what they are, where you can find them and why they can be a problem. The talk will also reveal some of our local foods' trans fat contents, which can be 'hidden' from us by unclear or incomplete labels. Finally, you will learn how to identify which foods have them, so you can protect yourselves and make healthier choices.

Language of talk: English

Suitable level(s): F.4 or above

Audio-visual facilities required: LCD projector, MS PowerPoint presentation, Mic

Professor Georgia S Guldan (喬治婭戈登) is a nutritionist with a B.Sc. in zoology from the University of Wisconsin and postgraduate training from the Tufts University School of Nutrition Science and Policy (USA), where she received her M.Sc. and Ph.D. degrees in Nutrition. She joined The Chinese University of Hong Kong in 1994, after working at the West China University of Medical Sciences in Chengdu, Sichuan. Her research interests include developing nutrition promotion programs for populations in Hong Kong and China, particularly school-based programs for the younger generation. Besides China, she has worked in other Asian countries, including Malaysia, Thailand, and Bangladesh. She is also created, along with her students, the bilingual student nutrition promotion website: <http://www.cuhk.edu.hk/fns/fun-in-seven>.

Topic 20

Microbial Hazards and Food Safety **微生物風險與食物安全**

Professor Hoi Shan Kwan
Department of Biology
Food & Nutritional Sciences Programme
Molecular Biotechnology Programme
The Chinese University of Hong Kong

Food-borne diseases and food safety issues have been quite common in Hong Kong in the last few years. Many of the outbreaks and incidences made news headline. A variety of foods have been implicated as the source of food poisonings and different kinds of microorganisms and viruses have been involved. Food-borne pathogens are in fact worldwide problems, not only for developing countries with less vigorous hygienic systems, but also for developed countries with good hygienic systems. I will discuss the recent food poisonings in Hong Kong and I will also describe the common food pathogens. Special attentions will be given to the potential hazards in the eating habits of Hong Kong people and special problems of the food systems in Hong Kong as related to food-borne diseases. Prevention measures will be discussed.

Language of talk: English/Cantonese/Mandarin

Suitable level(s): F.4 or above

Audio-visual facilities required: LCD projector, MS PowerPoint presentation, Mic

Professor Hoi Shan Kwan (關海山) received his B.Sc. (Hon) and Master of Philosophy (M.Phil.) from the Chinese University of Hong Kong, majoring in Biology, Post-graduate Diploma in Microbiology and Biotechnology from Osaka and Kyoto Universities, and Ph.D. from University of California, Davis, majoring in Microbiology. He has been teaching at Department of Biology, The Chinese University of Hong Kong since 1984. Since 1993, he had been the Director/Associate Director for the Food and Nutritional Sciences Programme for more than 10 years. He is now the Dean of Science Faculty, CUHK, Chairman of the Expert Committee on Food Safety, HKSAR and Chairman of the Accreditation Advisory Board, HKSAR. His wide research interests include molecular biology and genomics of mushrooms, plants, and shrimps, development of pharmaceuticals from traditional Chinese medicinal plants, and food microbiology.

Topic 21

Functions of Vitamins **維他命的功用**

Professor Lai K Leung
Department of Biochemistry
Food & Nutritional Sciences Programme
The Chinese University of Hong Kong

Vitamins are vital factors in maintaining good health. Diseases caused by vitamin deficiency have been well documented. Since we only need minute amounts for the maintenance of our body, vitamins are known as micronutrients. The functions of vitamins and some mechanistic explanations will be introduced.

A new concept of functional food has been introduced recently, and researches indicate that taking vitamin supplements may be beneficial in preventing some chronic diseases. On the other hand, ingesting too much vitamin supplements may be toxic to our body. Vitamin pills are available over-the-counter without doctor's prescription. In the U.S., the maximum daily intake for some vitamins has also been established and served as a guideline to avoid vitamin overdose. Should we follow their policy on vitamin supplements?

Language of talk: Cantonese/English

Suitable level(s): F.5 – F.7

Audio-visual facilities required: LCD projector, MS PowerPoint presentation, Mic

Professor Lai K Leung (梁禮國) obtained his Ph.D. degree in Nutritional Sciences from the University of Kentucky, U.S.A. and received his postdoctoral training from the University of Maryland and National Cancer Institute. He joined the Chinese University of Hong Kong as Assistant Professor in 1999, and is a member of the Food & Nutritional Sciences Programme. He is interested in the effect of nutrients or phytochemicals on gene expression.

Topic 22

The Upcoming Nutrition Labelling Scheme in Hong Kong
快將推行的營養標籤制度

Professor Ka Hing Wong
Food & Nutritional Sciences Programme
Food Research Centre
The Chinese University of Hong Kong

Owing to the increasing public awareness of the nutritional value of food consumed and produced in Hong Kong, nutrition label becomes an important tool for consumers to choose their food. Food and Drugs (Composition and Labelling) (Amendment: Requirements for Nutrition Labelling and Nutrition Claim) Regulation 2008 (Amendment Regulation) was enacted by the Legislative Council on 28 May 2008 and will come into effect on 1 July 2010. Apart from the exempted products, it is mandatory for all prepackaged foods to carry nutrition labels, which must list information on energy plus 7 core nutrients. Moreover, nutrition labels must list the amounts of nutrients related to claims. There will be a two-year grace period for the local food industry to prepare.

Funded by The Hong Kong Jockey Club Charities Trust and supported by Centre for Food Safety, Food and Environmental Hygiene Department, Food Research Centre of The Chinese University of Hong Kong initiated to set up the first Food Composition Database in Hong Kong which has been commenced to operate since July 2007. Apart from analyzing over 1,000 food ingredients and products commonly used in the local territory in the next 2 years, the Database will provide detailed food composition reference data and technical support for the local food industry (especially small and medium enterprises) via its website with an aim to assist the industry to comply with the upcoming Amendment Regulation. Besides, in addition to disseminating the latest progress of the Amendment Regulation, the Database will regularly promote the concept of nutrition label and balanced diet to the local food industry and the public via various channels such as our website, poster, brochure, workshops and forums.

Language of talk: Cantonese/English

Suitable level(s): F.1 – F.7

Audio-visual facilities required: LCD projector, MS PowerPoint presentation, Mic

Professor Ka-Hing Wong (黃家興) received his Bachelor of Science, Master of Philosophy and Doctor of Philosophy degrees in the Department of Biology at The Chinese University of Hong Kong, in 1997, 1999 and 2004, respectively. He is now research assistant professor at The Chinese University of Hong Kong. Professor Wong's current research interest includes molecular method development for food authentication, immunomodulatory and anti-tumor activities of natural food products, and structure-function relationships of food components especially dietary fiber. He is now serving as the project manager of Food Composition Database which is one of the Chief Executive's Community Project List 2006 project (S/N Ref 2006/CP01) funded by The Hong Kong Jockey Club Charities Trust.

Topic 23

Fields and Constructibility Problems **數體與構作問題**

Dr Wing Chung Fong
Department of Mathematics
The Chinese University of Hong Kong

The algebraic concept of fields comes from the study of polynomial equations. A construction problem is a geometric question with which one considers whether a certain geometric figure can be constructed with compass and straightedge alone. Such a geometric problem may be reduced to an algebraic one concerned with fields. We discuss the interplay between algebra and geometry in some classical construction problems.

Language of talk: Cantonese

Suitable level(s): F.4 – F.6

Audio-visual facilities required: Computer with acrobat reader; whiteboard/blackboard

Dr. Wing Chung Fong graduated from the University of Hong Kong in 1997 and obtained his Ph.D. degree from the University of Oxford in 2005. Dr. Fong is now an instructor in the Department of Mathematics of the Chinese University of Hong Kong.

Topic 24

Calculus: Its History and Development

微積分：它的歷史和發展

Dr Chi Hin Lau

Department of Mathematics

The Chinese University of Hong Kong

Calculus is considered to be one of the most important discoveries in the history of mathematics. This powerful mathematical tool is undoubtedly the most important foundation of all modern science and technology. In this talk, we will discuss how Newton and Leibniz discovered calculus independently in the 17th century and its importance in the development of modern science.

Language of talk: Cantonese

Suitable level(s): Secondary 3 or above

Audio-visual facilities required: Projector, PowerPoint

Dr. Chi Hin Lau (劉智軒) holds a B.Sc. and M.Phil. degree from The Chinese University of Hong Kong and Ph.D. degree in Mathematics from The University of Hong Kong. He was the leader of the International Mathematics Olympiad Hong Kong Team held in Mexico. He is currently an Instructor in the Department of Mathematics at The Chinese University of Hong Kong and a member of International Mathematics Olympiad Hong Kong committee.

Topic 25

Mathematical Games and Magic
數學遊戲與魔術

Dr Chi Hin Lau
Department of Mathematics
The Chinese University of Hong Kong

In this talk, we will discuss the mathematical principles behind some games and magics. After this talk, student will find that mathematics is fun and mathematical principles can be applied to many different things in our life.

Language of talk: Cantonese

Suitable level(s): S.1 – S.3

Audio-visual facilities required: PowerPoint

Dr. Chi Hin Lau (劉智軒) holds a B.Sc. and M.Phil. degree from The Chinese University of Hong Kong and Ph.D. degree in Mathematics from The University of Hong Kong. He was the leader of the International Mathematics Olympiad Hong Kong Team held in Mexico. He is currently an Instructor in the Department of Mathematics at The Chinese University of Hong Kong and a member of International Mathematics Olympiad Hong Kong committee.

Topic 26

An introduction to Diophantine equations
淺談丟番圖方程

Dr. Charles Li
Department of Mathematics
The Chinese University of Hong Kong

Diophantine equations are a set of algebraic equations defined over integers. Usually one is interested in integer solutions. They are named after the Hellenistic mathematician of the 3rd century, Diophantus of Alexandria. For example a linear Diophantine equation in two variables has the form $ax + by = c$, where a, b, c are integers. The equation has infinitely many solutions over real numbers. Our attention is on the existence of integer solutions. Generally, it is not an easy task to find all the solutions of Diophantine equations. In this talk, we will give an introduction to the theory of Diophantine equations.

Language of talk: Cantonese

Suitable level(s): F.4 – F.6

Audio-visual facilities required: LCD projector, computer with PowerPoint presentation

Dr. Charles Li graduated from the Chinese University of Hong Kong in 1995 and received his Ph.D. degree from University of California in 2001. Dr. Li is now an instructor of Department of Mathematics at the Chinese University of Hong Kong. His research interest is number theory.

Topic 27

The Mystery of “Mad Cow” Disease
瘋牛症

Professor Ming Chiu Fung
Department of Biology
Molecular Biotechnology Programme
The Chinese University of Hong Kong
Tel# 2609-6147
e-mail: mingchiufung@cuhk.edu.hk

The first case of “mad cow” disease was found in April, 1985 in the Plurenden Manor farm in England. The affected cow has started aggressive, rather nervous, knocking other cows, bashing other cows and was dangerous to handle. It was suspected of causing by some sorts of infection. However, the causing agent was unknown. 1986 found three other cases in far away counties. Since the herds involved were closed, with no contact with other cattle and no importation, it could not explain how did the disease jump from one end of England to the other. Not until late 1986, the EM results of the brain of diseased cows demonstrate spongiform damage and the brown stars of astrogliosis. This symptom resembles the scrapie disease in the sheep. In the summer of 1987, scientists found scrapie-associated fibrils in the bovine brain samples. They coined a new term “bovine spongiform encephalopathy” (BSE) for this new disease commonly called “mad cow” disease.

In order to control this disease, millions of cows had been slaughtered in the United Kingdom and other countries in the past two years. The spreading of this disease has been slow down but new cases have been reported in Japan just recently. There are evidences that this disease can be transmitted to human via food contamination.

In this talk, I will discuss the transmission and the causing agent of this disease, the similar disease occurs in human and other animals, the new biological phenomenon and inspiration that we have gained from this disease.

Language of talk: Cantonese or English

Suitable level(s): F.4 or above

Audio-visual facilities required: LCD Projector, MS PowerPoint presentation, Mic

Professor Ming Chiu Fung (馮明釗) who received his Ph.D. degree in Molecular Biology from the Australian National University, Canberra, Australian, is now a professor in the Department of Biology of the Chinese University of Hong Kong. In addition, he serves as a Fellow of the New Asia College of the Chinese University of Hong Kong, visiting professor of the First Military Medical University, China, and the treasurer of the Hong Kong Society for Immunology. Professor Fung’s research interests centre on the molecular immunology, molecular parasitology. Professor Fung is now developing some anti-cancer drugs and DNA vaccines against some parasites.

Topic 28

Bioinformatics: A Marriage between Biology and Computers
生物信息學：生物學與電腦之結合

Professor Diane Dianjing Guo
Department of Biology
Molecular Biotechnology Programme
The Chinese University of Hong Kong

Bioinformatics is the field of science in which biology, computer science, and information technology merge into a single discipline. Several important applications of bioinformatics, including gene identification, sequence analysis, protein structure prediction will be discussed. Some biological databases commonly used for bioinformatics research will also be introduced.

Language of talk: English

Suitable levels: F.4 or above

Audio-visual facilities required: LCD projector, computer with PowerPoint presentation

Professor Diane Dianjing Guo (郭殿京) obtained her Ph.D. degree from the Institute of Genetics, Chinese Academy of Sciences in 1998. She also received postdoctoral training in bioinformatics at the Virginia Bioinformatics Institute in the United States. Professor Guo is now an assistant professor in the Department of Biology at the Chinese University of Hong Kong. Her research interests include using combined computational and experimental approach to identify new genes and regulators involved in medicinal plants and plant stress response.

Topic 29

Epigenetics
表觀遺傳

Professor Sai Ming Ngai
Department of Biology
Molecular Biotechnology Programme
The Chinese University of Hong Kong

Epigenetics. It is an emerging field that promises new definition and perceptions in the field of both medical and biotechnological research in the near future. It could be described as the inheritance of changes in gene regulation without any alternations of the nucleotide sequence in the genes of the living organism. Epigenetic signaling also plays a vital role in tumorigenesis. The well known epigenetic related modifications in living cells are DNA methylation, post-transcriptional histone modifications which include methylation, acetylation, ubiquitylation and phosphorylation. In this presentation, I will discuss the relevant aspects in epigenetics. Basic molecular biology techniques and selected investigative case related to the topics will be also be introduced.

Language of talk: Cantonese

Suitable level(s): F.6 – F.7

Audio-visual facilities required: LCD projector, MS PowerPoint presentation, Mic

Professor Sai Ming Ngai (倪世明), who received his Ph.D. degree from the University of Alberta is now an Assistant Professor in the Department of Biology and a part-time Professor of Peking University. His research interests include: 1. Bioinformatics and Proteomics; 2. Protein/peptide structural and functional studies and; 3. Research and development on Modern Chinese Medicine.

Topic 30

The Active Earth **活力地球**

鄭啟明博士
香港中文大學物理系高級導師

數十億年前，地球只不過是宇宙裡一顆毫不起眼的熾熱石頭。今天，它已搖身一變成為太陽系中最獨特、最生氣勃勃的行星。在講座中我們將回顧地球的過去，追溯它與太陽和其它行星間的關係；剖析它曾經歷的種種際遇，如何造就它走上這段不平凡的演化歷程。同時，我們亦會討論地球現在的處境，探討它和人類未來的方向。

語言：粵語

聽眾程度：中四至中七

設備要求：電腦（MS PowerPoint）及投映機

鄭啟明博士畢業於香港大學，分別在 1988 年及 1994 年取得理學士及哲學博士學位。1994 年，鄭博士加入香港中文大學工作，現職物理系高級導師。鄭啟明博士曾任教多個不同物理主修課程及大學通識課程，其中包括天文學及氣象學概論等。在研究方面，鄭博士主要從事理論物理學中有關超對稱量子力學及幾何相位等範疇的研究。自 2000 年起，鄭啟明博士獲委任為香港中文大學新亞書院天文台管理委員會主席，及在 2002 年起成為香港中文大學崇基學院鄧雁玲科學普及教育中心管理委員會委員。在推廣天文學普及教育方面，鄭博士在 2000 年開發了「天文園」網頁，並聯同香港太空館、香港天文學會合辦「中學生天文訓練計劃」，計劃至今已至第九屆。另外，鄭啟明博士與王永雄博士合著的科學通識讀物《物理縱橫》於 2005 年出版。

Topic 31

The Brief History of the Universe **宇宙史話**

鄭啟明博士
香港中文大學物理系高級導師

神秘的宇宙，逮住了人類好奇的心靈。大膽的猜想、獨到的見解、精闢的理論，全為了解讀宇宙的秘密——它的誕生、演化及未來。在講座裡，我們將重溫人類如何認識宇宙，從神秘到了解，從了解到更神秘；宇宙的面紗一張比一張令人驚訝，但亦一張比一張更令人神往！

語言：粵語

聽眾程度：中四至中七

設備要求：電腦（MS PowerPoint）及投映機

鄭啟明博士畢業於香港大學，分別在 1988 年及 1994 年取得理學士及哲學博士學位。1994 年，鄭博士加入香港中文大學工作，現職物理系高級導師。鄭啟明博士曾任教多個不同物理主修課程及大學通識課程，其中包括天文學及氣象學概論等。在研究方面，鄭博士主要從事理論物理學中有關超對稱量子力學及幾何相位等範疇的研究。自 2000 年起，鄭啟明博士獲委任為香港中文大學新亞書院天文台管理委員會主席，及在 2002 年起成為香港中文大學崇基學院鄧雁玲科學普及教育中心管理委員會委員。在推廣天文學普及教育方面，鄭博士在 2000 年開發了「天文園」網頁，並聯同香港太空館、香港天文學會合辦「中學生天文訓練計劃」，計劃至今已屆第九屆。另外，鄭啟明博士與王永雄博士合著的科學通識讀物《物理縱橫》於 2005 年出版。

Topic 32

Laser Principles and Applications
激光原理和應用

Professor Wing Kee Lee
Department of Physics
The Chinese University of Hong Kong

The first laser was demonstrated about in 1957. Since then, hundreds of different types of lasers have been invented. Despite the relatively young history of lasers, they have numerous applications in scientific research, industry, communication, medicine, and home appliances. In this talk, the principles of He-Ne laser, semiconductor laser, dye laser, and Ti:sapphire laser will be briefly described. Selected applications of lasers will be reviewed. The current frontiers of laser research will be mentioned. Several optical phenomena, such as diffraction and retroreflection, will be demonstrated by using He-Ne laser.

Language of talk: Cantonese or English

Suitable level(s): F.5 – F.7

Audio-visual facilities required: Microcomputer with MS PowerPoint and projector, room should be darkened for demonstration.

Professor Wing Kee Lee (李榮基) received his B.Sc. and M.Phil from the Chinese University of Hong Kong. He got his Ph.D. degree from the University of Cincinnati in 1979. He has hands-on experiences in using CO₂, Nd:YAG, N₂, argon ion, semiconductor, as well as Ti:sapphire lasers in his research. His interests include laser interactions with solids, optical resonances, optical properties of microdroplets, ultra-short laser pulse generation, high-order rainbows, nonlinear optics, liquid crystal optics, and dye lasers.

Topic 33

Binomial Distribution and Its Applications
二項分佈及其應用

Professor Siu Hung Cheung
Department of Statistics
The Chinese University of Hong Kong

The binomial distribution is a discrete probability distribution with many everyday applications. This talk will cover the history of the development of the binomial distribution as well as some of its interesting applications.

Language of talk: Cantonese

Suitable level(s): F.6 or above

Audio-visual facilities required: Computer-assisted projector with PowerPoint presentation

Professor Siu Hung Cheung (張紹洪) [M.A. in Sociology, M.S. in Statistics (University of Georgia, USA), Ph.D. in Statistics (Temple University, USA)] is now a professor in the Department of Statistics. Professor Cheung's research interests are prediction and forecasting with time-series models, and multiple comparisons in biomedical experiments.

Topic 34

Probability with Applications to Insurance

概率：保險業之應用

Dr Kwok Wah Ho
Department of Statistics
Chinese University of Hong Kong

Insurance is a fast growing industry in Hong Kong. We are familiarized with terms like life insurance, car insurance and home insurance. These insurance contracts provide us protection against various risks in our life. But how can insurance companies provide these protections? In order to understand the underlying principles and practical issues of this business, it is important to have some concepts and knowledge in Probability.

Language of talk: Cantonese

Suitable level(s): F.6 – F.7

Audio-visual facilities required: LCD projector, MS PowerPoint presentation, Mic

Dr Kwok-Wah Ho (何國華) holds a BBA, BSc, MPhil and Ph.D. degree from the Hong Kong University of Science and Technology. Dr. Ho is currently an Instructor in the Department of Statistics at the Chinese University of Hong Kong. His research interests cover MCMC algorithms, Bayesian statistics, financial time series and credit risk models.

Topic 35

Risk: Everything You Wanted To Know But Were Afraid To Ask **風險：來龍去脈**

Professor Hoi Ying Wong
Department of Statistics
Risk Management Science Programme
The Chinese University of Hong Kong

“There is risk management,” said a chief executive of The Stock Exchange of Hong Kong when asked about investing in a capricious market. Financial crises during the late 1990s and the recent September 11 incident in New York have stimulated not only public interest in risk management, but also their awareness of its importance in today’s political climate.

Risk means exposure to the chance of loss. In other words, we relate risk to a bad outcome. But what is a bad outcome? Here are some examples:

1. Real estate market downfall, negative equity.
2. Terrorist attacks in the World Trade Center, global economic slowdown.
3. Bird flu, public health risk.
4. Computer system failure, virus attacks, etc.

Risk management means taking deliberate actions to shift the odds in our favor, i.e., increasing the odds of a good outcome and reducing the odds of a bad outcome. In this context, we are all risk managers. The key issue is how to become a better one. Put it differently, although the future is uncertain, it is not unmanageable. In this talk, we shall discuss the various issues related to risk and methods developed in risk management. Emphasis will be placed in illustrating the role of risk management and its impact on everyday life both at a personal and institutional level. Recent examples will be presented to illustrate these ideas.

Language of talk: Cantonese or English

Suitable level(s): F.6 or above

Audio-visual facilities required: LCD projector, MS PowerPoint presentation, Mic

Professor Hoi Ying Wong (王海嬰) received his Ph.D. degree in Mathematics from the Hong Kong University of Science and Technology (HKUST) in 2001, working under Professor Kwok Yue Kuen. He has been a teaching assistant and teaching assistant coordinator at the HKUST before joining the Chinese University of Hong Kong. His research interest is in pricing financial derivatives, interest rate models and financial risk analysis.

Topic 36

Drug Test
藥物測試

Professor Eden K H Wu
Department of Statistics
The Chinese University of Hong Kong

In pharmaceutical industry, the development of a new drug is a lengthy process involving drug discovery, laboratory experiments and clinical trials. Statistical methods are usually employed as a useful tool in design and analysis in various stages of drug development. When a new drug is discovered, a simple but important question that may be asked is: “Is there enough evidence that the new drug has a higher cure rate than the standard medication?”

In this talk, a few basic ideas of how to perform a drug test will be introduced. Important concepts such as Type I and Type II error and testing statistical hypotheses will be discussed.

Language of talk: Cantonese

Suitable level(s): F.6 or above

Audio-visual facilities required: LCD projector, MS PowerPoint presentation, Mic

Professor Eden K H Wu (胡家浩), who received his Ph.D. in Statistics from University of Alberta, Canada, is now an Associate Professor in the Department of Statistics.

Topic 37

Using Fruit Fly to Study Human Diseases **有益的“害蟲”－果蠅**

Professor Edwin H Y Chan
Department of Biochemistry
Molecular Biotechnology Program
The Chinese University of Hong Kong

相信大家應該到過街市吧？經過賣水果的攤檔，定會看過不少圍繞著水果飛舞的細小昆蟲：果蠅。這些看似微不足道、時常為一般人忽略的果蠅，其實早於一個世紀之前已被科學家選擇作為生物研究的對象。今天，科學家更利用果蠅作為藥物開發研究的工具。真想不到，看似‘害蟲’的果蠅，竟在醫學研究上，有這麼大的貢獻呢！

雖然果蠅的體型微小得很-----身長不足兩毫米，卻擁有與人類相似的器官及結構，包括：眼睛、內臟及精細的腦袋（試想想：小小的果蠅身手是何等的敏捷！想徒手捕捉牠們可說是難比登天！）。而且，這些小生物更可在實驗室的環境中大量地培育；由卵發育至成蟲，只需十天的時間。更重要的是，在果蠅的基因譜中可找到超過百分之六十的人類致病基因；而當中帶病的果蠅亦擁有與人類相類似的病徵。基於以上種種的特點，科學家遂選取果蠅作為研究人類各種遺傳病的模型。

Language of talk: Cantonese

Suitable level(s): F.5 – F.7

Audio-visual facilities required: LCD projector, MS PowerPoint presentation, Mic

Professor Edwin H Y Chan (陳浩然) is Assistant Professor at the Biochemistry department of The Chinese University of Hong Kong. He is also affiliated to the Molecular Biotechnology Programme. He received his B.Sc. degree in Biochemistry from The Chinese University of Hong Kong and his Ph.D. degree in Genetics from the University of Cambridge (UK). He did postdoctoral research studies at the University of Pennsylvania (USA) and the University of Cambridge (UK). His research opens up new directions for the treatment of Parkinson's Disease. Prof. Chan is the recipient of a number of awards including the prestigious Human Frontier Science Program Long-term Fellowship and the Wellcome International Traveling Research Fellowship. His main research interest is on the modeling of human degenerative brain disease including Parkinson's and Alzheimer's Diseases.

Topic 38

DNA Barcode: The Magic Bullet for Species Diagnosis? **DNA 條碼是否鑒定物種的「魔術子彈」?**

Professor Ka-Hou Chu
Department of Biology
Molecular Biotechnology Programme
The Chinese University of Hong Kong

There are between 3.6 to 100 million species on Earth. While this rich biodiversity represents a most valuable resource for the human civilization, only 1.7 million species have been described. The loss of biodiversity is widely recognized as a global environmental problem. A major obstacle in biodiversity conservation is the lack of expertise and tools for species diagnosis and classification. It has recently been proposed that DNA barcode, i.e., short DNA sequence from a standardized region of the genome, can be used for species diagnosis. Specially, the construction of a database of the mitochondrial cytochrome *c* oxidase I (COI) gene has been initiated towards the goal of rapid and cost-effective species identification of all animals. DNA barcode is a powerful tool for ecological surveys as it can be applied to organisms with few recognizable morphological features and complex life history. Since DNA barcode works on fragments of tissues, it can be used to identify biological materials in processed foodstuff as well as in commercial products from regulated species. Proponents of DNA barcode also believe that it flags out specimens that probably represent new species. The DNA barcode system may provide a way for the construction of a catalogue of life on Earth and an electronic hand-held device for species identification in the field. While many ecologists and conservation biologists are enthusiastic on the idea of a DNA barcode system, there have been criticisms from other biologists. The values of short DNA sequences, particularly those from a single gene, in defining species and discovering new species are questioned. The construction of the DNA barcode system may also divert research funds from other more worthwhile studies on taxonomy and biodiversity. In this talk, I will first introduce the rationale, methodology, data interpretation, and applications of DNA barcode. Then I will review its pros and cons in species identification and study of biodiversity.

Language of talk: Cantonese/English

Suitable level(s): F.4 – F.7

Audio-visual facilities required: LCD projector, MS PowerPoint presentation, Mic

Professor Ka Hou Chu (朱嘉濠) received his bachelor degree from the University of California at Berkeley in 1976 and his doctorate degree from the Massachusetts Institute of Technology/Woods Hole Oceanographic Institution Joint Program in Oceanography in 1984. He is now Professor in Biology Department, Director of the Molecular Biotechnology Programme, and Director of the Simon F.S. Li Marine Science Laboratory, The Chinese University of Hong Kong. From 1990-93, he also served as the Dean of Students at New Asia College and is now a council member of the University. Professor Chu's academic interest focuses on marine biology and biotechnology, and molecular systematics and ecology. Research projects now under his supervision range from molecular phylogeny and population genetics of marine organisms, crustacean physiology, to shrimp genomics and seafood allergy. Professor Chu has published over 90 papers in scientific journals and made about 200 presentations in international conferences.