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

柳愛華紀念科學講座
Lau Oi Wah Memorial Science Lecture Series

The Second
第二屆

柳愛華紀念科學講座

LAU OI WAH MEMORIAL SCIENCE LECTURE SERIES

理學院及柳愛華紀念基金主辦
Organised by Faculty of Science & Lau Oi Wah Memorial Fund

Location Map 地圖

香港中文大學

柳愛華紀念科學講座
Lau Oi Wah Memorial Science Lecture Series

第二屆柳愛華紀念科學講座
The Second Lau Oi Wah Memorial Science Lecture Series

日期：2007年2月10日 (星期六)
Date: February 10, 2007 (Saturday)

時間：上午9時30分至下午3時15分
Time: 9:30 am to 3:15 pm

地點：香港中文大學邵逸夫堂
Venue: Sir Run Run Shaw Hall, The Chinese University of Hong Kong

程序表 Programme

09:30 - 10:00 開幕禮 *Opening Ceremony*

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10:00 - 10:45 講座一：風險管理、統計與數學之互動
Talk 1: The Interactions Among Risk Management, Statistics and Mathematics
講者：統計學系王海嬰教授
Speaker: Professor Hoi-Ying Wong (Department of Statistics)

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10:45 - 11:30 講座二：科學鑑證面面觀：尋找失落的「觸」跡
Talk 2: Every Contact Leaves a Trace – Forensic Science
講者：化學系陳德華教授
Speaker: Professor Dominic T.W. Chan (Department of Chemistry)

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11:30 - 12:15 講座三：生物複製技術所帶來的希望與挑戰
Talk 3: The Future of Animal Cloning Technology
講者：生物化學系何源遠教授
Speaker: Professor Yuan-Yuan Ho (Department of Biochemistry)

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12:15 - 13:00 講座四：另類園藝 – 栽種硅類納米植物
Talk 4: A New Form of Gardening to Grow Si-Based Nanometer-Sized Plants
講者：物理系吳恆亮教授
Speaker: Professor Dickon H.L. Ng (Department of Physics)

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13:00 - 13:45 講座五：針灸療法的古為今用
Talk 5: Acupuncture: Old Trick for New Time
講者：中醫學院林志秀教授
Speaker: Professor Zhixiu Lin (School of Chinese Medicine)

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13:45 - 14:30 講座六：數學界的莫札特 – 陶哲軒
Talk 6: Mozart of Mathematics – Terence Tao
講者：數學系劉智軒博士
Speaker: Dr. Chi-Hin Lau (Department of Mathematics)

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14:30 - 15:15 講座七：植物生物技術和基因改良食物
Talk 7: Plant Biotechnology & GM Food
講者：生物系姜里文教授
Speaker: Professor Liwen Jiang (Department of Biology)

理學院院長的話
Message from Dean of Science

Remembering Prof. O.W. Lau

Dr. Lau, as I have always called her since my undergraduate's time in the 70's, is a giant figure in my mind. She was a small person with great personality. She was one of the most dedicated people I have ever known, dedicated to whatever tasks placed upon her. Her greatest contribution, of course, was her service as the Dean of the Faculty of Science, CUHK. After a dramatic twist in Dean's elections in 1994, which I witnessed, she took up the deanship of science and served 3 consecutive terms for a total of 9 years until her retirement in August, 2003. During this period of deanship, she showed extraordinary dedication, passion and courage in handling the affairs of the Faculty. Her contribution to the Faculty was tremendous. Science Centre, the home base of the Science Faculty, changed from a run-down old building into its superb condition we appreciate to-day. Introduction of multidisciplinary programmes extended the arms of science from pure science into the community and have since produced a generation of scientists in new areas. She established many measures to promote science education in the universities and high schools. These are but a few examples of the extensive contribution Dr. Lau made during her deanship.

I knew her very well personally. She taught me Analytical Chemistry when I was an undergraduate student and guided me through many stages of my career, as postgraduate student working on chemical analysis of mushroom compost to teaching career in Biology and Food Science. She never failed to

enlighten me, always demanding me to perform well. Her kindness, her admirable personality, and her care about students and staff members alike, remains a source of inspiration for many of us to dedicate to the business of the Science Faculty and to science. Dr. Lau, you will always be a giant figure in my mind. I miss her.

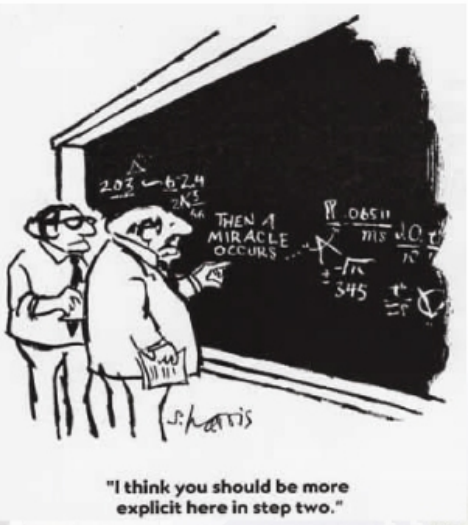
The Lau Oi Wah Memorial Science Lecture Series is the kind of educational activities in science that Dr. Lau would love. The rich programme in the series would indeed make her very happy. The passing on of the passion for science to the high school students would definitely be a continuation of Dr. Lau's legacy. Organisers of the series, I salute you. I am certain that the series will be a great success.

Hoi-Shan Kwan
Dean of Science

The Interactions Among Risk Management, Statistics and Mathematics
風險管理、統計與數學之互動

Professor Hoi-Ying Wong
Department of Statistics, The Chinese University of Hong Kong

Risk Management is an important topic in different industries, especially the financial sector. Nowadays, banks are required to set up a risk management department to independently access the risk level of the bank. The risk measurement and analysis employ knowledge in mathematics and statistics. Typical skills include stochastic calculus, time series analysis, probability, and operation research. Conversely, the development of modern risk management generates interesting new problems to mathematics and statistics. Some new terms are stochastic volatility models, GARCH, jump-diffusion models, and non-convex optimisation. In this talk, we introduce some interesting and typical examples.



"I think you should be more explicit here in step two."

風險管理是各行業重視的課題，尤其是金融業。今天的銀行都設有獨立的風險管理部門，並計算每天的風險值（VaR）。風險的測量和分析往往應用了數學和統計學的知識。當中包括：隨機微積分、時間序列、概率和運籌學等。相反，風險管理的發展過程之中又衍生出不少有趣的數學和統計學的問題。例如：計算方法、隨機波幅模型、跳躍擴散模型和非凸優化等的新題材。在這報告裡，我們會重點介紹有趣和典型的例子。

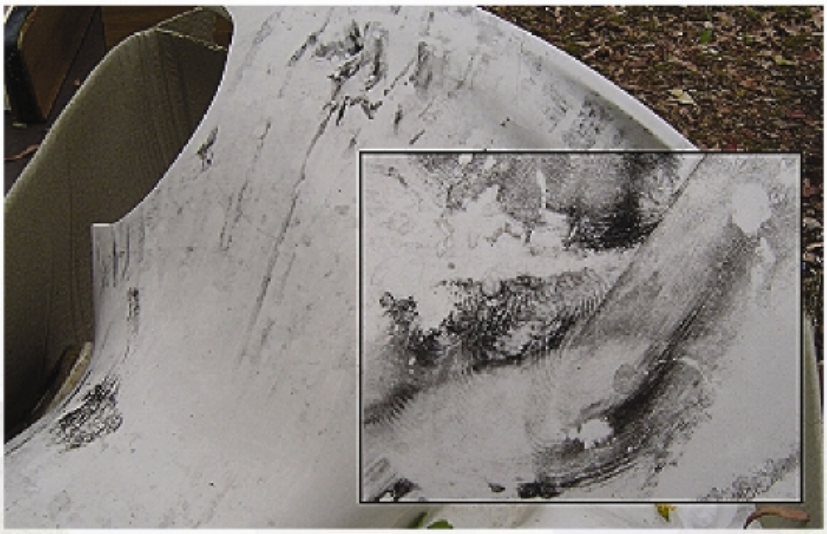
Professor Hoi-Ying Wong received his MPhil and PhD in Mathematics from the Hong Kong University of Science and Technology in 1999 and 2001, respectively. He joined the Department of Statistics of The Chinese University of Hong Kong in 2001. His research interest includes derivatives pricing, financial risk management, interest rate modeling, and statistical finance.

王海嬰教授於香港科技大學數學系獲得碩士及博士學位。他在2001年加入香港中文大學統計系及風險管理課程。他的研究包括：衍生工具定價、金融風險管理、利率模型及統計金融學。

Every Contact Leaves a Trace – Forensic Science
科學鑑證面面觀：尋找失落的「觸」跡

Professor Dominic T. W. Chan
Department of Chemistry, The Chinese University of Hong Kong

In the past, the exploits of a detective attempting to crack a criminal case using deduction and interrogation is far more compelling than the contributions of the scientists in the laboratory to accomplish the same goal using chemical reactions and instrumental measurements. With the launching of moving pictures and television programmes on courtroom and/or the crime scene, the public becomes much more curious to see how forensic scientists contribute their talents to provide information pertaining to the investigation of criminal acts and to the identification of unknown persons. This lecture attempts to provide an overview of scientific methods that are commonly used by the forensic scientists.



Fingerprints on this toilet were at the crime scene after the thief left. Photo thanks to Middlemount Police

以往偵探對罪案推理和審問遠比實驗室裏的科學家對此所做的測量和分析更加引人注目。隨著法庭和罪案場景再現於動畫和電視中，公眾對法證科研究員是如何爲罪案調查以及鑑別疑犯提供相關資訊越來越感興趣。此講座將介紹一些法證科研究員常用的科學方法及其特性。

Professor Dominic Chan obtained his PhD from the University of Warwick in UK. He has taught in the Hong Kong University of Science and Technology after his graduation. He is now a Professor of the Department of Chemistry in The Chinese University of Hong Kong. His research area is the development of mass spectrometry as an analytical tool for structural characterisation of biomolecules like proteins and DNA fragments. Over his past thirteen years of teaching life, he has been invited by renowned universities to give talks, lectures or to establish research collaborations. Professor Chan is currently the reviewer of a number of international academic journals and he actively participates and organises international conferences in his research field.

陳德華教授于英國華威大學獲得博士學位。畢業後他曾任教于香港科技大學，現任香港中文大學化學系教授。他的研究領域包括用質譜作爲對生物分子結構表徵的分析工具，例如蛋白質和DNA碎片。在十三年的教學生涯中，他多次被知名大學邀請作報告，演講以及進行合作研究。陳教授現在是多份國際學術刊物的評審員，他還積極地參加和組織了很多在他研究領域裏的國際會議。

The Future of Animal Cloning Technology
生物複製技術所帶來的希望與挑戰

Professor Yuan-Yuan Ho
Department of Biochemistry, The Chinese University of Hong Kong

The so-called 'animal cloning' is more complicated than just producing one or more identical replicas of an existing living being. A better appreciation of the development and application of cloning technology requires the understanding of the science behind it. This seminar will provide an overview of the principles and applications of the technology from replication of genetic material to the cloning of animals and human embryos. The unprecedented social impacts associated with the application of this technology will be discussed.

所謂的「生物複製」，並不是單純的指生產兩個或多個一模一樣的生物體。隨著生物複製技術的成熟，大眾對這門科技的關注與日俱增。我們要由較全面的角度來認識這門技術，其中包括遺傳物質的複製、動物複製、以及人類胚胎複製等；並進而探討複製技術對社會帶來的希望和挑戰。

Professor Yuan-Yuan Ho received her B.Sc. from the National Taiwan University. She pursued her postgraduate training at the Institute of Human Nutrition, Columbia University, New York, where she earned her M.Sc., M.Phil. and Ph.D. degrees. She stayed at the Columbia University and received her postdoctoral training at the Department of Neurology. She joined The Chinese University of Hong Kong in 2001. Her research interests focus on studying the relationship between sugar/lipid transporters and the development of human diseases such as cardiovascular disease and diabetes.

何源遠教授畢業於台灣大學。她接著到美國紐約哥倫比亞大學深造並獲得人類營養學碩士及博士學位，再繼續於哥倫比亞大學神經科學系接受博士後訓練。她在2001年加入香港中文大學生物化學系。她的科研範圍主要包括研究糖類/脂質運載體與心血管疾病和糖尿病等人類疾病的關係。

A New Form of Gardening to Grow Si-Based Nanometer-Sized Plants

另類園藝 - 栽種硅類納米植物

Professor Dickon H. L. Ng
Department of Physics, The Chinese University of Hong Kong

While the world is demanding electronic devices with more compact size, we are thinking of a breakthrough route to fabricate nanometer-sized materials for electronic applications. Have you ever thought of cultivating some nanometer-sized "plants" ? A new form of "gardening" has just evolved. We have successfully transformed bamboo into matrix (soil) for the facile growth of one-dimensional nanometer-sized materials, for examples, silica and silicon carbide nanowires.

Different from the high purity chemicals used in traditional techniques, raw bamboo containing variable amount of impurities which could be applied as starting material. Bamboo, like many other plants, is primarily made up of carbon. By heat treatment, we were able to remove most of the organic volatile groups such that the biomorphic carbon matrix remained. Metal-containing solvents could then be infiltrated into the bamboo. We demonstrated that the internal impurities did not hinder the experiment, but acted as catalysts (in simple term - vitamins) to assist the growth of the nanowires. At different thermal treatments, silica and silicon carbide nanowires were grown, respectively, which appeared like well-grown grass on the bamboo soil. Using inexpensive bamboo as matrix to synthesize Si-based nanowires not only lowers the cost of production, it also generates a new form of gardening for nanometer-sized plants.

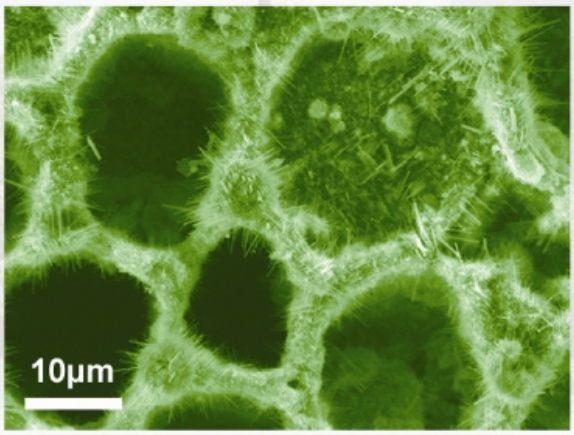


Figure showing nanowires growing on bamboo
圖片所示為竹子表面生長的納米線

目前全世界都在期望電子器材能夠更小，更密集，我們試圖尋找具有電子應用價值的納米材料的新途徑。你可曾想過培育一些有用的納米植物？一種新型的“園藝技術”可以把竹子作“養料”或“土壤”，成功培育出納米材料，如二氧化硅和碳化硅納米線。

和傳統實驗室用的純度很高的化學藥品不同，含有數量不同的各種雜質的竹子能夠作爲起始材料。竹子和其他許多植物一樣主要由碳組成。將其熱處理能去除竹子中大部分可揮發性的有機物而轉變爲具有生物形態的碳基體，接著將含有金屬元素的溶劑加入到這種生物碳範本中。我們發現竹子本身具備的雜質不會阻礙反應的進行，相反會起到催化劑（維生素）的作用，促進納米線形成及生長。不同的處理溫度會分別得到二氧化硅和碳化硅納米線，就像在竹子“土壤”裏生長出“草”一樣。利用廉價的竹子作爲“土壤”或起始者材料製備納米線不僅降低了成本，而且開闢了一個新穎的園藝技術。

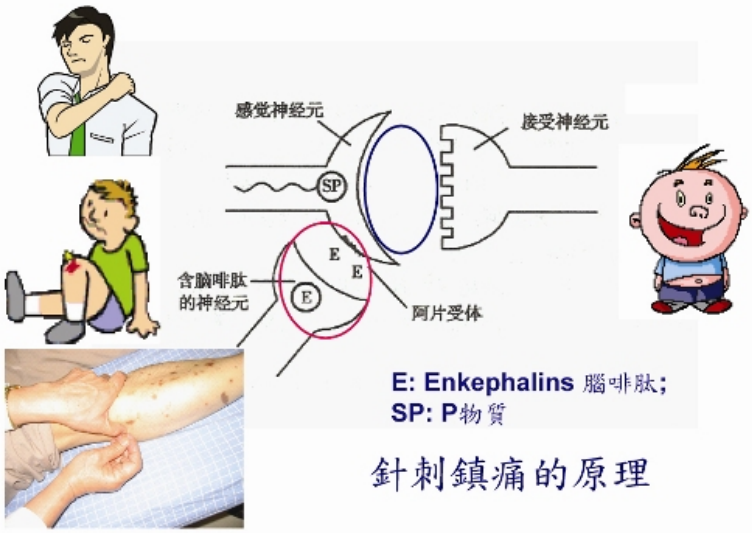
Professor Dickon Ng received his PhD degree from the Department of Physics at the University of Manitoba, Canada. He then pursued his postdoctoral training in the Department of Materials at The University of Oxford UK before joining the Department of Physics at The Chinese University of Hong Kong as a lecturer in 1991. His research interest focuses on biomorphic materials, metal matrix composites, and nano-structured materials. He was a visiting professor at The Wuhan University of Science and Technology between 2002 and 2005, and also a visiting fellow in the Corpus Christi College at The University of Cambridge in 2003.

吳恆亮教授在加拿大曼尼吐巴大學取得博士學位，接著在英國牛津大學材料系進行博士後研究。1991年，他加入香港中文大學物理系爲講師。研究興趣包含：遺態材料，金屬基複合材料，納米結構材料等。他曾於2002-2005擔任武漢科技大學的訪問教授，亦於2003年擔任劍橋大學聖體學院的訪問院士。

Acupuncture: Old Trick for New Time
針灸療法的古為今用

Professor Zhixiu Lin
School of Chinese Medicine, The Chinese University of Hong Kong

Acupuncture has been used in Chinese medicine for thousands of years, and its use for prevention and treatment of diseases has gained more popularity in the West since the 1970s. This presentation introduces the basic theories in acupuncture including meridians and acupoints, how acupuncture can treat and heal and suitable conditions for acupuncture. More emphasis will be given to the modern research findings on the mechanism of action concerning acupuncture for pain management.



針刺鎮痛的原理

針刺是一種獨特而常用的傳統中醫治療方法，近數十年來已經廣泛被西方國家所接受。本講座將介紹中醫針灸的基本理論，包括經絡和穴位，針灸治病的原理以及針灸治療的適應症。同時重點介紹針刺療法的現代研究，包括闡明針刺鎮痛的原理。

Professor Zhixiu Lin graduated from the Guangzhou University of Chinese Medicine in 1987 with a BSc in Chinese Medicine. After graduation, he worked as a Chinese medicine doctor at the Affiliated Hospital of Guangdong Provincial Research Institute of Chinese Medicine. In 1991 he moved to England to study English language, which was followed by a PhD degree study at the Department of Pharmacy, King College, University of London. He obtained his PhD degree in Pharmacognosy in 1999. In 1998, he was employed as a Senior Lecturer on the Chinese Medicine Programme, Middlesex University in London where he was involved with basic and clinical teachings of Chinese medicine. Professor Lin joined The Chinese University of Hong Kong in 2003 as an Assistant Professor at the School of Chinese Medicine. He is now engaged in the teaching of Chinese medicine as well as supervising postgraduate students' research projects.

林志秀教授1987年畢業於廣州中醫藥大學醫療系。畢業後從事中醫臨床工作。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。1998年受聘到英國中薩大學(Middlesex University) 傳統醫學系任中醫學高級講師，從事中醫藥和針灸的基礎和臨床教學工作。2003年加入香港中文大學中醫學院，任職助理教授。現擔任本科《中醫基礎理論》、《中醫診斷學》以及參與研究生班《內科學》和《針灸學》的教學工作，同時指導院內博士生的研究課題。

DEPARTMENT OF MATHEMATICS

Mozart of Mathematics – Terence Tao

數學界的莫札特 - 陶哲軒

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

In Aug 2006, a Fields Medal, which is often described as the "Nobel Prize of mathematics" and is widely reported to be the top honor a mathematician can receive, was awarded to a mathematics genius Terence Tao (陶 哲 軒). Tao was born on July 17, 1975 at Australia. His parents were immigrants from Hong Kong. Tao exhibited mature mathematical abilities from an early age. He attended university at the age of nine. In 1988, He won a gold medal in the International Mathematical Olympiads when he just turned thirteen and remains the youngest gold medalist in the tournament's history. He received his bachelor's and master's degrees at the age of 17 from Flinders University. In 1996, Tao received his Ph.D. at the age of 20 from Princeton University. He joined UCLA's faculty that year and became a full professor at 24.

Terence Tao is a supreme problem-solver whose spectacular work has had an impact across several mathematical areas including PDE, combinatorics, harmonic analysis and additive number theory. One of the most remarkable results is his work with Ben Green that there exists arbitrarily long arithmetic sequence of prime numbers. In this talk, we will briefly discuss some of his works.

Terence Tao (陶哲軒)

2006年8月在西班牙馬德里的國際數學家大會上，華裔澳洲籍數學家陶哲軒 (Terence Tao) 獲得了被認爲是數學最高榮譽的菲爾茲獎，陶哲軒於1975年在澳洲出生，他的父母是香港移民，陶哲軒自小便顯示出數學的極佳天賦，9歲已經開始修讀大學的數學課程，在1986年、1987年和1988年，陶哲軒是國際數學奧林匹克最年輕的參賽者，依次贏得銅牌、銀牌和金牌，他未到13歲已贏得金牌，這項紀錄至今無人打破。他17歲在南澳Flinders University獲得學士及碩士學位，20歲獲普林斯頓大學博士，24歲成爲加利福尼亞大學洛杉磯分校教授。

陶哲軒是一個超級解難高手，他出色的數學工作推動了多個數學範疇的發展，其中包括偏微分方程、組合數學、調和分析及數論等，其中最著名的成果是他與Ben Green合作一起證明了素數包含任意長的等差數例這個數百年難題，是次講座將對陶哲軒的工作及生平作一簡單介紹。

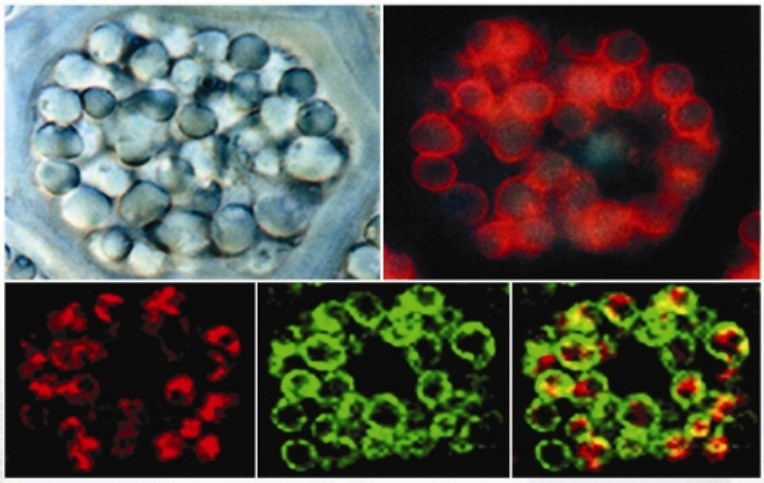
Dr. Chi-Hin Lau holds a B.Sc. and M. Phil. degree from The Chinese University of Hong Kong and Ph.D. degree in Mathematics from The University of Hong Kong. He was the leader of the International Mathematics Olympiad Hong Kong Team held in Mexico. He is currently an Instructor in the Department of Mathematics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

劉智軒—香港中文大學理學士、哲學碩士，香港大學哲學博士；現爲香港中文大學數學系導師，主要研究複幾何，並教授高等微積分、線性代數及通識科目—博奕論。劉博士現爲國際數學奧林匹克香港委員會委員，多年來參與國際數學奧林匹克香港代表隊領隊及訓練工作。

Plant Biotechnology & GM Food
植物生物技術和基因改良食物

Professor Liwen Jiang
Department of Biology, The Chinese University of Hong Kong

Recombinant DNA technology has contributed greatly to the development of plant and agricultural biotechnology. Scientists are now capable of transferring anti-insect and anti-disease traits into plants via genetic engineering. Genetically modified (GM) plants can also be used as bioreactors to produce pharmaceutical proteins. GM foods have become part of our daily life. Where does GM foods come from? Is GM food safe? Is there any difference between GM food and traditional food? This talk will discuss some of these questions.



DNA重組技術爲農業生物技術帶來了令人振奮的進展。科學家可以將抗蟲或者抗病菌等特性轉入植物裏。轉基因植物還可以作爲生物反應器來製造藥用蛋白。基因改良食物已經成爲我們日常生活的一部分。基因改良食物來自何處？食用基因改良食物安全嗎？基因改良食物和傳統食物有不同嗎？本講座將會探討這些問題。

Professor Jiang Liwen received his Bachelor of Science degree from South China Agricultural University in 1984 and Master of Science degree from University of British Columbia, Canada in 1992. After obtaining his PhD degree from Simon Fraser University, Canada in 1996, he moved to Institute of Biological Chemistry, Washington State University to work as a research associate. Since joining the Department of Biology of The Chinese University of Hong Kong in 2000, he has been teaching a variety of undergraduate and graduate courses, including general microbiology, microbial biotechnology, molecular biology and genetic engineering, methods in molecular biotechnology, business and social aspects of biotechnology, plant biotechnology and advanced topics. His current research areas are plant cell biology and plant biotechnology.

姜里文教授1984年獲華南農業大學理學學士學位，1992年獲加拿大不列顛哥倫比亞大學理學碩士學位。1996年姜教授獲加拿大西蒙佛斯大學理學博士學位後，擔任華盛頓州立大學生物化學系的博士後研究員。2000年起姜教授任教于香港中文大學生物系，現職副教授，從事本科生和研究生的各種課程教育，包括普通微生物學，微生物技術，分子生物學和遺傳工程，分子生物技術方法學，生物技術的經濟學和社會倫理學，植物生物技術及專題討論。姜教授的研究工作涉及植物細胞生物學和植物生物技術。

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