

The Guard of Secrets: Statistical Privacy

秘密守護者：統計隱私



Abstract 摘要

In the era of big data, where vast amounts of information are generated and collected, safeguarding privacy has become one of the most concerning issues regarding the ethical use of data. Since there is always a tradeoff between data privacy and data utility, deriving a statistically insightful procedure that can sufficiently protect privacy at a desired level is, therefore, an important task for statisticians and data scientists. In this talk, the speaker will demonstrate that anonymization by removing identifying information is not sufficient to protect privacy. To handle this problem, the speaker will present two statistical methods for protecting privacy: randomized response and differential privacy. Examples will also be presented to illustrate the principles.

在大數據時代，隨著大量數據的生成和收集，保護隱私已成為關於倫理使用數據最為關注的問題之一。由於數據隱私和數據效用之間總是存在權衡，因此統計學家和數據科學家的任務是提供一個能夠在所需水平上充分保護隱私的有效統計程序。在本次演講中，講者將證明僅通過去除識別信息進行匿名化是不足以保護隱私的。為了解決這個問題，講者將介紹兩種保護隱私的統計方法：隨機回應和差分隱私。同時，講者還將提供示例來說明這些原理。

Speaker Biography 講者簡介

Professor CHAN Kin Wai is an Assistant Professor in the Department of Statistics at The Chinese University of Hong Kong. He obtained his B.Sc. and M.Phil. in Risk Management Science from CUHK in 2013 and 2015, respectively. He obtained his M.A. and Ph.D. in Statistics from Harvard University in 2018. His research focuses on statistical inference for dependent data, incomplete data, and high-frequency data. He has received several prestigious awards for his research and teaching, including the Faculty Exemplary Teaching Award in 2019, 2021 and 2023 the University Grants Committee of Hong Kong Early Career Award in 2019, and the University Education Award in 2023.

陳健威教授是香港中文大學統計學系的助理教授。他於2013年和2015年分別獲得香港中文大學風險管理科學學士和碩士學位，及後於2018年獲得哈佛大學統計學碩士和博士學位。他的研究專注於時間序列、不完整數據及高頻數據的統計推斷。他因其研究和教學而獲得多個重要獎項，包括2019年、2021年及2023年的學院模範教學獎，2019年的香港研究資助局青年學者獎以及2023年的博文教學獎。

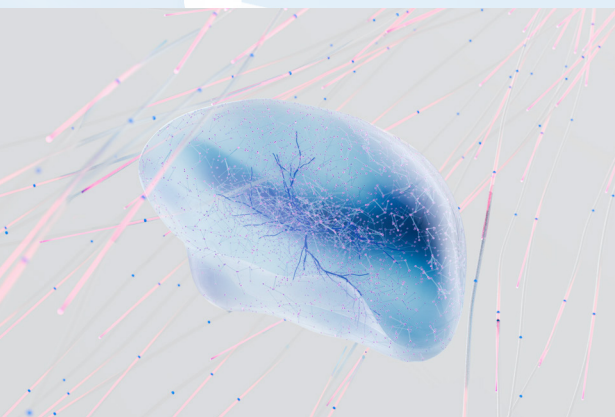


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Hundred Years of Good “Learning” : To Improving Learning and Memory

百年好「學」：來改善學習和記憶



Abstract 摘要

“Without memory, we are nothing.” Memory is essential to all our lives. Without memory of the past, it is impossible to operate in the present or plan for the future. Without memory, we wouldn't be able to learn anything at all. Since ancient times, enhancing memory has been one of mankind's greatest dreams. Our brain is made up of approximately 100 billion neurons. During learning, neurons must construct new synapses to communicate with one another, thereby forming a neural network; and our memories rely on these synapses and networks to be maintained. Thus, synaptic plasticity is the basis of learning and memory. To date, scientists have accumulated over 150 years of research on learning and memory. What have we learned so far? Are there “super drugs” for memory? Can we apply this knowledge in the clinical setting to help patients of neurodegenerative diseases? How about in the educational setting to improve student learning? In this lecture, we will discuss some of the scientific milestones and explore some of the answers.

「沒有記憶，我們甚麼也不是。」記憶對我們一生至關重要。沒有過去的記憶，就不可能在當下運作或計劃未來。沒有記憶，我們根本無法學習任何事物。從古至今，增強記憶是人類最大的夢想之一。我們的大腦由大約 1000 億個神經細胞組成。學習時，神經細胞之間必須要建造新突觸來傳達訊息，繼而形成神經網絡。而記憶就是依靠這些突觸和網絡來維持。因此，突觸可塑性就是構成學習和記憶的關鍵及基礎。至今，人類對學習和記憶的科學研究已有超過150年歷史。我們到底學到了什麼？有沒有能提高記憶力的「超級藥物」？我們可以將這些知識應用到臨床環境中來幫助神經退化性疾病患者嗎？這些知識能應用於教育環境中去改善學生的學習嗎？在本次講座中，我們將討論一些科學研究的里程碑，並探討上述問題的一些答案。

Speaker Biography 講者簡介

Dr. KOON Chun Alex is a Senior Lecturer in the School of Life Sciences at The Chinese University of Hong Kong. He has over 20 years of experience as a neuroscience researcher, focusing on topics, such as synaptic plasticity, learning & memory, and neurodegenerative diseases. As a full-time educator, he now actively promotes a lively/relaxing/humorous teaching style to create a more enjoyable learning experience for students and to enhance their learning effectiveness.

管進博士乃香港中文大學生命科學學院的高級講師，曾擔任了超過 20 年的神經科學研究工作，專注於突觸可塑性、學習和記憶、以及神經退化性疾病等主題。現在作為全職教育者的他主張以生動、輕鬆、幽默的型式教學，令大家更能享受學習的趣味，從而提升學習的效率。



Dr. KOON Chun Alex 管進博士
School of Life Sciences 生命科學學院



The 18th Lau Oi Wah Memorial Science Lecture Series 第十八屆柳愛華紀念科學講座

Organised by The CUHK Faculty of Science and The Lau Oi Wah Memorial Fund
香港中文大學理學院與柳愛華紀念基金主辦

27 April 2024 (Saturday)
10:00 am – 12:00 nn

LT3, Yasumoto International Academic Park (YIA), CUHK
香港中文大學康本國際學術園3號演講廳

鳴謝 Acknowledgements



Message from the Dean of Science

理學院院長的話



Welcome to the 18th Lau Oi Wah Memorial Science Lecture Series at The Chinese University of Hong Kong (CUHK). Commencing in 2005, this annual lecture series is organised in recognition of Professor Lau Oi Wah's contribution to promoting science education.

Having obtained a B.Sc. degree from The University of Hong Kong, Professor Lau joined Chung Chi College of CUHK as an Assistant Lecturer in 1968, whilst still working on her PhD thesis. She became a Lecturer at CUHK upon the completion of her doctoral degree in inorganic chemistry in 1970. After receiving the Leverhulme Foundation Fellowship in 1971 at Imperial College, London, and the Honorary Research Fellowship in 1978 from the University of Birmingham, Professor Lau became a Chartered Chemist and an elected Fellow of the Royal Society of Chemistry, U.K., in 1981. Following her success in research in academia, Professor Lau was promoted to Senior Lecturer in 1982, Reader in 1993, and was then elected to the Deanship of the Faculty of Science for three successive terms, from 1994 until her retirement in 2003.

Professor Lau was a dedicated teacher and a caring research advisor, who always put her students' learning and benefits first. During her academic career, she supervised seven PhD students and about 30 M.Phil. students. To those who knew her well, she was undoubtedly a passionate educator with a warm personality. During her Deanship, she successfully pushed for the establishment of many interdisciplinary teaching and research programmes, a philosophy of which continues to be a direction for curricula developments at the Faculty of Science. In addition to university teaching, Professor Lau had also initiated efforts to promote science education in local secondary schools.

After the passing of Professor Lau, her friends and students established the Lau Oi Wah Memorial Fund in order to commemorate her commitment to education. Supported by the fund, the Lau Oi Wah Memorial Science Lecture Series runs annually to promote public engagement in science. The Lecture Series continues to inspire young people to pursue further studies and careers in scientific fields. Professor Lau's legacy has indeed lived on through the gift of learning.

The Faculty of Science will continue to carry on Professor Lau's legacy and devotion to promoting science to the general public. I hope today's lectures will ignite your passion for science.

Chunshan SONG
Dean of Science
Wei Lun Professor of Chemistry

Programme Rundown

程序表

10:00

Opening Ceremony
開幕禮

10:15

The Guard of Secrets:
Statistical Privacy
秘密守護者：統計隱私

by Professor CHAN Kin Wai
Department of Statistics
統計學系 陳健威教授

11:00

Hundred Years of Good
“Learning” : To Improving
Learning and Memory
百年好「學」：來改善學習和記憶

by Dr. KOON Chun Alex
School of Life Sciences
生命科學學院 管進博士

Biography of Professor Lau Oi Wah

柳愛華教授生平



The late Professor Lau Oi Wah devoted herself to promoting science education in both university and high school, and left a legacy of 35 years of service to The Chinese University of Hong Kong. As a Professor in the Department of Chemistry who also served as Dean of the Science Faculty from 1994 to 2003, Professor Lau Oi Wah recognised the importance of nurturing young minds of the next generation and the necessity to bringing scientific knowledge and advancement to the public.

Professor Lau joined the Department of Chemistry of Chung Chi College in 1968, and retired from the Faculty of Science of The Chinese University of Hong Kong in 2003. Active in affairs at both the college and university levels, Professor Lau served as Member of the University Council (1983 – 1986, 1994 – 2003), Member of College Assembly of Fellows (1980 – 2003), Member of College Board of Trustees (1986 – 1995), Chairperson of College Scholarships, Awards and Financial-Aid Committee (1977 – 1985), and Chairperson of College Physical Education Committee (1987 – 2003). During the nine years as the Dean of Science, Professor Lau led the Faculty of Science in building bridges between scientific frontiers and the masses, showing how science is an inherent as well as an integral part of everyday life. Even after her retirement, Professor Lau continued to assist Chung Chi College in promoting campus health education.

After the passing of Professor Lau in 2004 at the age of 63, her former colleagues at the Faculty of Science wished to continue Professor Lau's legacy in promoting science education to the young people of Hong Kong. First held in 2005, the annual Lau Oi Wah Memorial Science Lecture Series – jointly sponsored by the Faculty of Science and the Lau Oi Wah Memorial Fund – has been one of the ways the members of the Faculty of Science at The Chinese University of Hong Kong carry on Professor Lau's dedication to igniting a passion for science among high school students.

柳愛華教授一生致力在大學及高中推廣科學教育，於中大春風化雨三十五載。柳教授一九六八年加入崇基學院化學系任教。二零零三年自中大榮休。在職期間，積極參與大學教務以及書院服務，柳教授於一九九四至二零零三年期間擔任中大理學院院長達九年，八三至八六年以及九四至零三年出任香港中文大學校董，於一九八零年至二零零三年參與崇基學院院務委員會工作，八六至九五年代表院務委員會出任崇基學院校董。一九七七年至一九八五年出任崇基學院獎學金委員會主席，又於一九八七年至二零零三年出任崇基學院體育委員會主席。柳教授於零三年榮休後，仍繼續匡助崇基學院的發展，出任學院資深導師，輔助推廣校園健康教育。

出任大學理學院院長九年期間，在柳教授的領導下，理學院擔任前線科學家及普羅市民的橋樑，與大眾一同分享科研成果。柳教授致力培養年輕一輩學子對科學的熱情，以及將科學知識傳遞至各階層人士，拉近科學與香港市民的距離。

理學院全人非常認同柳教授在香港年輕人間推動科普教育的理念，所以當柳教授在二零零四年辭世後，理學院也肩負起延續這份跟社會大眾傳達科學知識的重任。自二零零五年起，每年香港中文大學理學院與柳愛華紀念基金都會舉行「柳愛華紀念科學講座」，以延續柳教授獻身於推廣高中科普教育的無私精神。