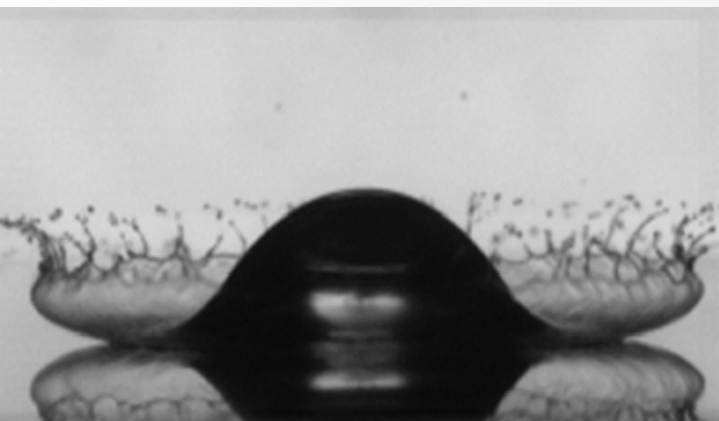


# The Secret of Splashing

水滴飛濺的秘密



## Abstract 摘要

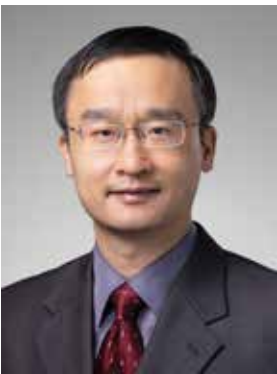
Liquid drops always splash when they impact smooth surfaces with high enough speeds. This common phenomenon is crucial in many important fields such as agriculture, printing, surface coating, and spray cooling. However, despite extensive studies over one century, the origin of splashing remains a big mystery. Combining experiment with model, we show that the air trapped under the liquid drop forms a special flow within a nanoscale gap. This airflow in the Knudsen regime produces a stress 10 times stronger than the common airflow and generates small Kelvin–Helmholtz instabilities that trigger splash.

當液滴以足夠高的速度撞擊光滑表面時，它們總是會飛濺。這種普遍現象在農業、印刷、表面塗層和噴霧冷卻等許多重要領域。然而，儘管經過一個多世紀的廣泛研究，液滴飛濺的起源仍然是一個很大的謎團。結合實驗和模型，我們表明被困在液滴下的空氣在納米級間隙內形成了一種特殊的氣流。這種 Knudsen 狀態下的氣流產生的動量輸運效率是普通氣流的 10 倍，並產生 Kelvin-Helmholtz 不穩定性，從而引發飛濺。

## Speaker Biography 講者簡介

Professor Lei XU from the Department of Physics, The Chinese University of Hong Kong graduated from the Department of Physics, University of Science and Technology of China with a bachelor's degree, and a Ph.D. from the Department of Physics, University of Chicago. After Postdoctoral research at Harvard University he joined the Department of Physics, The Chinese University of Hong Kong in 2009. The research in Professor Lei XU's laboratory focuses on soft condensed matter physics, which studies everyday phenomena such as drop splashing, water freezing and particle packing. Through these common everyday phenomena, Professor XU hopes to discover new physics and novel materials to improve people's everyday life.

香港中文大學物理系徐磊教授本科畢業於中國科學技術大學物理系，博士畢業於芝加哥大學物理系，在哈佛大學進行博士後研究並於2009年加入香港中文大學物理系。徐磊教授帶領的軟物質物理實驗室一直致力於研究日常生活中的常見現象，例如液滴飛濺、水珠結冰及顆粒堆積等現象，從中發掘新物理和新材料，以改善大眾的生活質素。



**Professor XU Lei 徐磊教授**  
Department of Physics 物理系



**Professor CHEN Ye 陳也教授**  
Department of Chemistry 化學系



# Nanoscience Around You

你身邊的納米科學



## Abstract 摘要

Nanoscience is an emerging science that focuses on studying fundamental properties of matter at the nanoscale. Nanoscience is considered to be the cutting-edge science that promotes the revolution of future science and technology. Although it has only been developed for a few decades, nanomaterials and nanotechnology have gradually entered our daily lives. This lecture will start from the nanoscience near us. Through examples in energy, electronics and biomedicine, the rise and future of nanoscience will be introduced. Let us together appreciate the charm of nanoscience.

納米科學是一個新興科學，專注於在納米尺度研究物質的基本特性。納米科學被認為是推動未來科技革新的前沿科學，儘管發展不過二十載，納米材料與納米科技已逐漸走入我們的生活。本講座將從我們身邊的納米科學講起，通過展示納米科技在能源、電子、生物醫藥中的應用案例，介紹這一新興科學的興起和未來，帶領大家一起領略納米科學的魅力。

## Speaker Biography 講者簡介

Assistant Professor Chen Ye joined The Chinese University of Hong Kong in 2020. She obtained her bachelor and Ph.D. degrees in Materials Science and Engineering from Nanyang Technological University, Singapore, in 2015 and 2019, respectively. Professor Chen has been working on research related to nanoscience for almost a decade. Her current research interest focuses on controlled synthesis and applications of novel nanomaterials.

陳也助理教授於2020年加入香港中文大學化學系，她分別於2015年和2019年獲得新加坡南洋理工大學材料科學與工程專業的學士和博士學位。陳教授近十年來一直致力於納米科學的相關研究，主要研究內容包括新型納米材料的可控製備和應用。



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



## The 17<sup>th</sup> Lau Oi Wah Memorial Science Lecture Series 第十七屆柳愛華紀念科學講座

**Organized 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

**14 April 2023 (Friday)**  
**4:30 pm - 6:30 pm**

**LT5, Yasumoto International Academic Park (YIA), CUHK**  
香港中文大學康本國際學術園5號演講廳

## 鳴謝 Acknowledgements





# Message from the Dean of Science

## 理學院院長的話



Welcome to the 17th 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 BSc 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 having been awarded the Leverhulme Foundation Fellowship in 1971 by Imperial College, London and the Honorary Research Fellowship in 1978 by 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 the academic career in research, Professor Lau was promoted to Senior Lecturer in 1982; Reader in 1993; and was 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 7 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 had successfully pushed for the establishment of many interdisciplinary teaching and research programmes, a philosophy of which continues to be a direction for curricula developments of 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 as we all wish.

2023 marks the 60th anniversary of CUHK and the Faculty of Science, it is also an important milestone to mark our efforts made in science education. We will continue to carry on Professor Lau's legacy and hope today's lectures might ignite your passion for science.

Chunshan SONG  
Dean, Faculty of Science  
Wei Lun Professor of Chemistry

# Programme Rundown

## 程序表

16:30

Opening Ceremony  
開幕禮

16:45

The Secret of Splashing  
水滴飛濺的秘密

by Professor XU Lei  
Department of Physics  
物理系 徐磊教授

Break  
小休

17:40

Nanoscience Around You  
你身邊的納米科學

by Professor CHEN Ye  
Department of Chemistry  
化學系 陳也教授

# 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 recognized the importance of nurturing young minds of 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。柳教授亦明白到，必須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。

