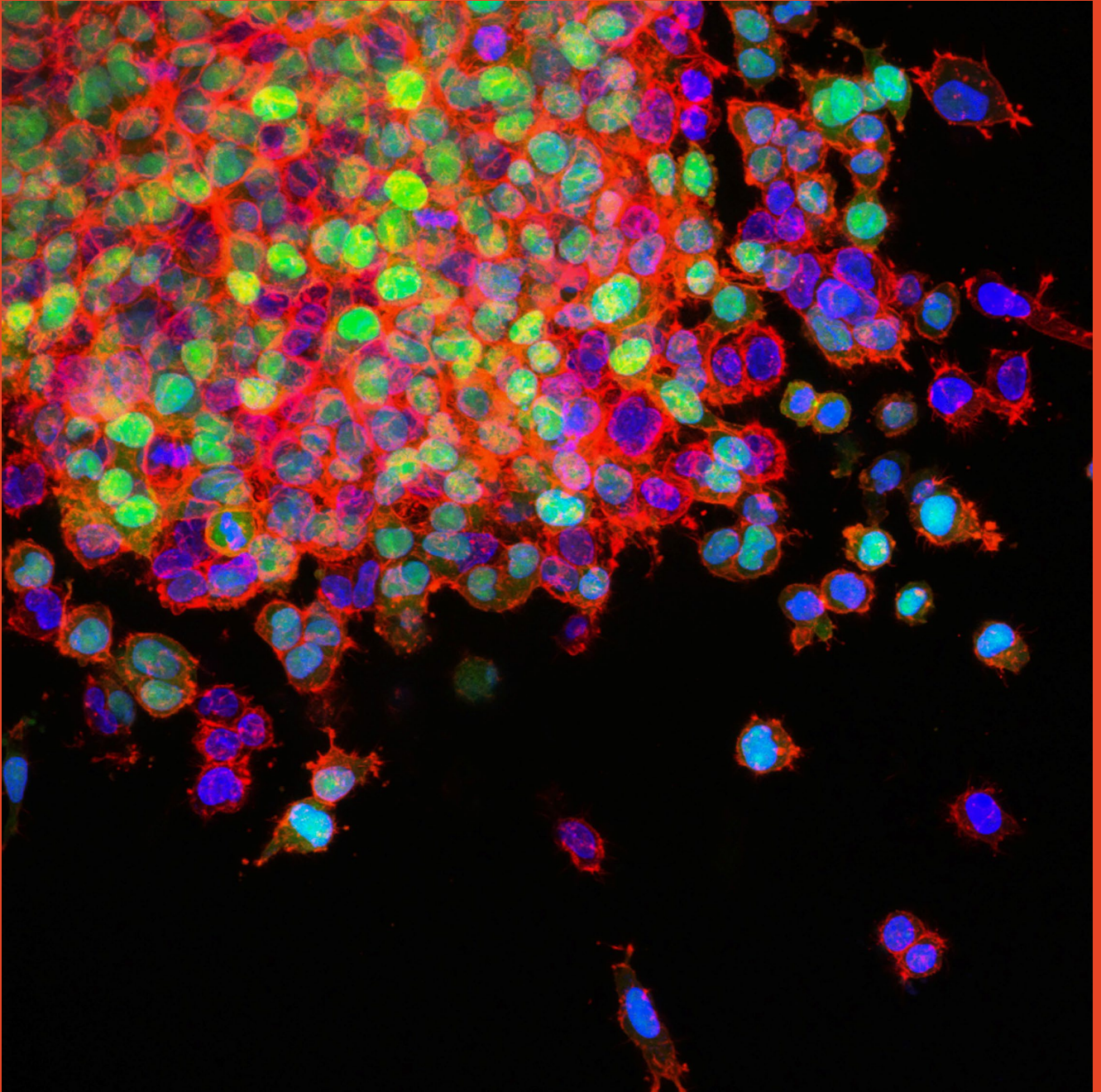




THE UNIVERSITY OF
SYDNEY

Hans Freeman Lecture 2024

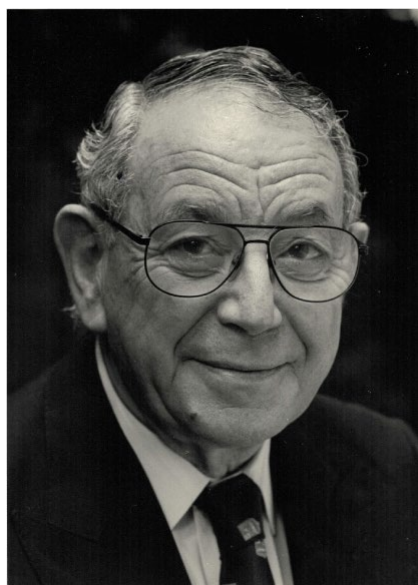
Professor Kenneth Kam-Wing Lo



Tuesday 3rd December 2024

Michael Spence Building - Auditorium 104

Hans Freeman AM, FAA



Hans Freeman, born in 1929 in Breslau, Germany, immigrated to Australia in 1938. He excelled academically, receiving First Class Honours and a University Medal in Chemistry from Sydney University in 1949. Under the guidance of R. J. W. Le Fèvre, he completed his master's degree in 1952 before being granted a Rotary Foundation Fellowship to pursue a year of further studies at the California Institute of Technology, where he worked with the renowned crystallographer, Linus Pauling.

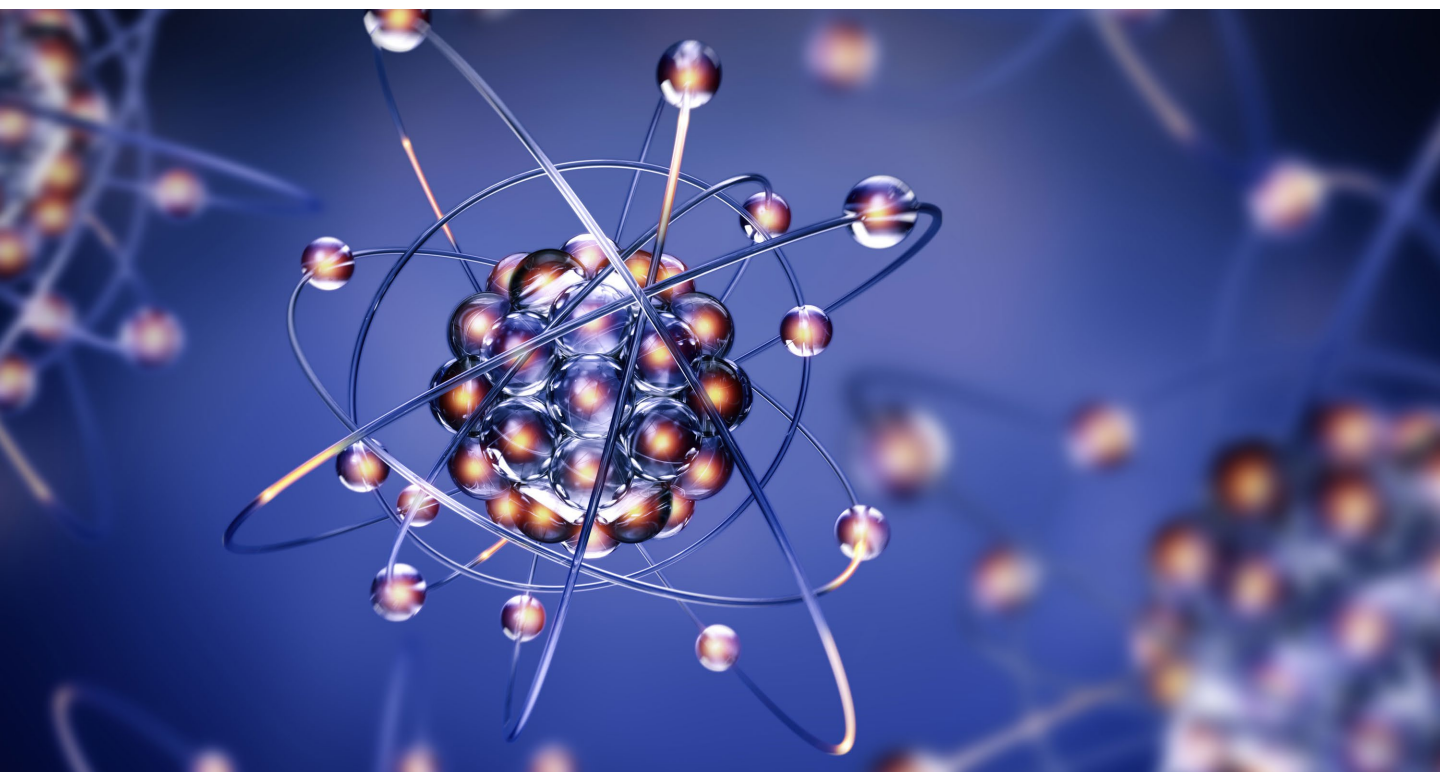
Upon returning to Sydney, Freeman completed his PhD under Le Fèvre's guidance, focusing on investigating the crystal structures of metal complexes with biological ligands to understand the function of metals in biological systems. He joined the School of Chemistry in 1954 and became Professor of Inorganic Chemistry in 1971.

Hans Freeman played a pioneering role in advancing X-ray crystallography in Australia, constructing his own crystallographic apparatus and mastering the necessary computations, initially performed by hand, and later aided by programs he developed for the SILLIAC computer. He was actively involved in connecting local organisations with international bodies of crystallographers, including his membership and chairmanship of Australia's National Committee on Crystallography, which was linked to the International Union of Crystallography. As a member of the committee, Hans represented Australia as a delegate in international congresses of crystallography from 1984 to 1990. He was also instrumental in the development of synchrotron science in Australia.

Hans Freeman's remarkable contributions to crystallography, his pioneering spirit, and his dedication to advancing scientific knowledge have left an enduring legacy in the field.

About the Hans Freeman Lectureship

The Hans C. Freeman Lectureship was established in 2010 by the Foundation for Inorganic Chemistry within the University of Sydney, with generous support from the Freeman family and many other generous donors, to mark both the many outstanding contributions of Professor Hans Freeman AO, to Australian science and his co-founding of the Foundation with Dr Alexander Boden AO. The aim of the lectureship is to enhance the international standing of the School of Chemistry and the University by fostering new collaborations and linkages with outstanding academics from around the world. The recipient of the annual lectureship will have an outstanding record in any field related to inorganic chemistry or its teaching and will present a series of lectures within the School of Chemistry over a period of weeks. During their stay at the University, the lecturer will be expected to interact with postgraduate and honours students in a way that will enhance their appreciation of science and the international opportunities that it offers.



Previous Lecturers

- 2010** [Emeritus Professor Trevor Hambley](#)
University of Sydney, Australia
- 2011** [Professor Harry B. Gray](#)
California Institute of Technology, USA
- 2012** [Professor Ed Solomon](#)
Stanford University, USA
- 2013** [Professor Ken Raymond](#)
University of California, Berkeley
- 2014** [Emeritus Professor Alan Bond](#)
Monash University, Australia
- 2015** [Professor Alison Butler](#)
University California Santa Barbara, USA
- 2016** [Professor Erwin Reisner](#)
University of Cambridge, UK
- 2017** [Professor Paul Mulvaney](#)
University of Melbourne, Australia
- 2018** [Professor Seth Cohen](#)
University of San Diego, USA
- 2022** [Professor Martina Stenzel](#)
University of New South Wales, Australia
- 2023** [Professor Katherine Franz](#)
Duke University, USA

Professor Kenneth Kam-Wing Lo

City University of Hong Kong



Prof. Kenneth Kam-Wing Lo obtained his BSc (1993) and PhD (1997) degrees from The University of Hong Kong. His PhD research focused on the design of luminescent transition metal complexes for use as DNA and metal-ion probes, as well as the photophysical and photochemical studies of luminescent polynuclear coinage metal chalcogenide complexes. From 1997 to 1999, he worked as a Croucher Foundation Postdoctoral Research Fellow at the Inorganic Chemistry Laboratory, University of Oxford. During this time, he conducted research on the genetic engineering and electrochemistry of cytochrome P450cam and putidaredoxin.

In 1999, Prof. Lo joined the Department of Biology and Chemistry (now the Department of Chemistry) at City University of Hong Kong as an Assistant Professor. He was promoted to Associate Professor (Scale B) in 2003, Associate Professor (Scale A) in 2007, and Professor in 2011. In 2023, he was appointed as a Chair Professor. He is currently the Program Leader of BSc (Chemistry) and the Director of the Talent and Education Development Office.

Professor Kenneth Kam-Wing Lo

Prof. Lo's research interests revolve around the use of luminescent inorganic and organometallic transition metal complexes as biomolecular and cellular probes. His work focuses on the development of intracellular sensors, photoactive labels, bioimaging reagents, and photocytotoxic agents. He received the APA Prize for Young Scientist from the Asian and Oceanian Photochemistry Association in 2005, the Distinguished Lectureship Award from the Chemical Society of Japan in 2011, and the Elsevier Lectureship Award from the Japanese Photochemistry Association in 2024. He was also awarded a Croucher Senior Research Fellowship in 2015 and became a Fellow of the Royal Society of Chemistry (FRSC) in 2018. Additionally, he received the CityU College of Science Inaugural Teaching Excellence Award (2021-2022) and the CityU Teaching Excellence Award (2022-2023).

Prof. Lo has been actively involved in various academic and editorial roles. He was one of the Chairs of the Gordon Research Conference Metals in Medicine in 2018 and was the Chair of the 23rd International Symposium of the Photochemistry and Photophysics of Coordination Compounds (ISPPCC 2019). Additionally, he organized the Josef Michl ACS Award in Photochemistry Symposium at ACS National Meeting Spring 2022 and is currently involved in organizing a symposium entitled "Photofunctions of Metal Complexes: From Fundamental Aspects to Applications" as part of the 2025 International Chemical Congress of Pacific Basin Societies (Pacifichem 2025). He served on the Advisory Board of *RSC Advances* (2013-2015) and the Editorial Advisory Board of *Inorganic Chemistry* (2015-2017). He has been an International Advisory Board Member of *European Journal of Inorganic Chemistry* (2020-present), an Editorial Advisory Board Member of *Chemical & Biomedical Imaging* (2022-present), and an Advisory Board Member of *Aggregate* (2024-present). He was an Associate Editor for *RSC Advances* (2015-2020) and has been an Associate Editor for *Inorganic Chemistry* since 2020. He has been an Executive Member of The Asian and Oceanian Photochemistry Association since 2024.

Illuminating Biological Systems with Luminescent Transition Metal Complexes

Molecular imaging is a non-invasive technique for visualizing and characterizing biological processes at both the cellular and subcellular levels in living subjects. Among various molecular imaging modalities, optical imaging with fluorescent probes has gained significant attention due to its high sensitivity, spatial resolution, safety, low cost, and ease of use. These remarkable properties have not only facilitated the understanding of biological processes such as biomolecular interactions and complex signaling networks in cells and tissues, but have also enabled disease diagnosis and image-guided surgery. Consequently, the development of advanced imaging reagents has been a cornerstone of modern healthcare. While conventional fluorescent proteins and organic dyes have long dominated this field, luminescent transition metal complexes have emerged as promising alternatives due to their attractive photophysical properties. Additionally, many of these complexes are efficient photosensitizers for cytotoxic reactive oxygen species, enabling their development as theranostic agents with both therapeutic and diagnostic capabilities. In this lecture, I will discuss our recent work on the development of luminescent transition metal complexes for use as biomolecular labels, cellular probes, intracellular sensors, bioimaging reagents, and photocytotoxic agents. I will also highlight the exciting opportunities that photofunctional transition metal complexes offer for biological and biomedical applications.

