

THE
SHAW
PRIZE
邵逸夫獎



The Shaw Prize Lecture

by Shaw Laureates in Life Science and Medicine 2022

presented by Shaw College

The Chinese University of Hong Kong



Friday
30 September 2022
at 9:30 am (HKT)

Programme

Welcome and introduction of speakers

Professor WONG Wing-tak Jack

Associate Professor, School of Life Sciences

Director of Biotechnology, Entrepreneurship and Healthcare Management
Programme

The Chinese University of Hong Kong

Lecture on “**What Goes Wrong in Cystic Fibrosis and Can It Be Repaired?**”

Professor Michael J WELSH

Investigator, Howard Hughes Medical Institute and

Roy J Carver Chair in Internal Medicine and Molecular Physiology and
Biophysics and

Director, Pappajohn Biomedical Institute, University of Iowa, USA

Lecture on “**Fixing CFTR to Treat Cystic Fibrosis**”

Dr Paul A NEGULESCU

Senior Vice President, Research, Vertex Pharmaceuticals Incorporated

Questions and answers

Moderated by Professor WONG Wing-tak Jack

The Shaw Prize

The Shaw Prize is an international award to honour individuals, regardless of race, nationality, gender and religious belief, who are currently active in their respective fields and who have recently achieved distinguished and significant advances, who have made outstanding contributions in academic and scientific research or applications, or who in other domains have achieved excellence. The award is dedicated to furthering societal progress, enhancing quality of life, and enriching humanity's spiritual civilization. Preference is to be given to individuals whose significant works were recently achieved and who are currently active in their respective fields.

The Shaw Prize, established under the auspices of Sir Run Run Shaw in November 2002, is managed and administered by The Shaw Prize Foundation based in Hong Kong. The Shaw Prize consists of three annual awards: the Prize in Astronomy, the Prize in Life Science and Medicine, and the Prize in Mathematical Sciences. The prizes were first awarded in 2004.

The Shaw Laureates 2022

The Shaw Prize in Astronomy

Professor Lennart LINDEGREN

Professor Michael PERRYMAN

The Shaw Prize in Life Science and Medicine

Dr Paul A NEGULESCU

Professor Michael J WELSH

The Shaw Prize in Mathematical Sciences

Professor Noga ALON

Professor Ehud HRUSHOVSKI

Shaw College

Named after its Founding Patron, Shaw College was made possible by the generosity of Sir Run Run Shaw, who donated HK\$110 million to The Chinese University of Hong Kong for the founding of the fourth constituent college.

The ordinance that gives legal effect to this important development of the University was passed by the Legislative Council in July 1986 and became law on 1 August of the same year. The foundation stone of the College campus was laid by Sir Run Run Shaw, the Founding Patron and Sir David Akers-Jones, the then Acting Governor, on 12 January 1987. On 2 March 1990, Shaw College was officially opened by the then Hong Kong Governor, Chancellor of the University, Sir David Wilson and Sir Run Run Shaw.



The motto of the College “修德講學” comes from a saying of Confucius. In Book VII of The Analects of Confucius, the Master said, “It is these things that cause me concern: failure to cultivate virtue; failure to go more deeply into what I have learned; inability, when I am told what is right, to go over to where it is; and inability to reform myself when I have defects.”

It is interesting that the cultivation of virtue and the going more deeply into what one has learned are placed by Confucius at the head of the list of things that caused him concern. The reason is not far to seek. The former concerns one’s moral character, while the latter is the way to new knowledge. A man of sound moral character eager to make new discoveries on the strength of existing knowledge is, in the eyes of Confucius, close to the ideal of the gentleman.

Founding Aspiration

Learning, innovation and benefitting humankind

College Slogan

Excellence with a soul, Leadership with a heart

Founding Patron of the College

The late Sir Run Run Shaw, world renowned philanthropist and movie and television magnate, was the Founding Patron of Shaw College. With his usual generosity and particular concern for the education of the young, in 1986 he made possible the creation of a fourth college at The Chinese University of Hong Kong, promising learning excellence to future generations.



Sir Run Run Shaw

Sir Run Run was Executive Chairman of two of Hong Kong's most successful entertainment and media listed public companies: Shaw Brothers (HK) Limited and Television Broadcasts Limited (TVB). His contribution to the entertainment industry is legendary, as is his generosity towards education and the arts.

Sir Run Run began his close association with the Chinese University in 1967 when he became a Member of the Board of Trustees of United College. Later, he served as a Member of the University Council and Chairman of United College for many years. In March 1992, he was appointed as a Life Member of the University Council and Permanent Honorary Chairman of United College.

Widely acclaimed for his long years of community service, Sir Run Run received international awards from several countries, including the United Kingdom, Belgium and France, and in July 1998 was awarded Hong Kong's highest honour the Grand Bauhinia Medal by the HKSAR Government. Moreover, he received honorary doctorate degrees from the UK and the USA, and nearer to home from China, Macau and Hong Kong. A staunch advocate for the Hong Kong Red Cross, he served as President for over twenty-six years and in 1998 became Vice Patron.

In his later years, Sir Run Run resolved to use his modest influence in the global advancement of knowledge and research and together with his wife, the late Mrs Mona Shaw, established the Shaw Prize to recognize imaginative individuals who have contributed to furthering societal progress, enhancing quality of life, and enriching humanity's spiritual civilization. The Shaw Prize continues to move forward under the direction of the Shaw Prize Foundation.

Lecture Synopsis

“What Goes Wrong in Cystic Fibrosis and Can It Be Repaired?”

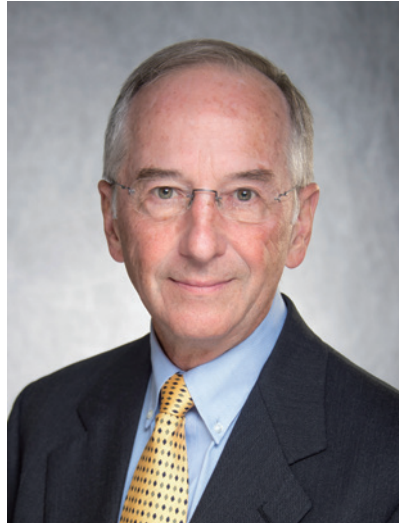
- **Professor Michael J WELSH**

I discuss studies describing mechanisms that transport chloride across epithelia that line the lung's airways and abnormalities in the genetic disease cystic fibrosis (CF). When the gene Cystic Fibrosis Transmembrane Conductance Regulator (CFTR) affected in CF was identified, my colleagues and I discovered that CFTR protein forms a channel for chloride and bicarbonate to flow across epithelia. We showed how CF mutations disrupt CFTR channel function. Moreover, we discovered that function can be restored to mutated CFTR. This research provided a classification scheme for understanding how mutations disrupt CFTR function, knowledge for assay development, and a roadmap that has guided strategies for developing mutation-specific therapies.

Biography

Professor Michael J WELSH

Professor Michael J WELSH is currently Professor of Internal Medicine-Pulmonary, Critical Care and Occupational Medicine, Professor of Neurosurgery, Neurology, Molecular Physiology and Biophysics and Director of Pappajohn Biomedical Institute, University of Iowa, USA. He received his MD from the University of Iowa, USA in 1974. He was a Research Fellow at the University of California, San Francisco, USA and the University of Texas, USA. He then worked at the University of Iowa, where he was successively Assistant Professor (1981–1984), Associate Professor (1984–1987), Professor of Internal Medicine (1987–), Director of Cystic Fibrosis Research Center (1988–) and Professor of Molecular Physiology (1989–). He is also an Investigator of the Howard Hughes Medical Institute (1989–), a member of the US National Academy of Sciences, the US National Academy of Medicine and the American Academy of Arts and Sciences.



Lecture Synopsis

“Fixing CFTR to Treat Cystic Fibrosis”

- Dr Paul A NEGULESCU

I summarize the discovery and development of Cystic Fibrosis Transmembrane Conductance Regulator (CFTR) modulators to treat cystic fibrosis. I begin by explaining how understanding the molecular defects caused by the *F508del CFTR* mutation informed a therapeutic approach to rescue the function of the defective F508del-CFTR protein. I then describe the discovery and development of two types of medicines: 1) correctors of CFTR protein processing and 2) potentiators of CFTR channel gating. I explain the sequential discovery of the CFTR potentiator (ivacaftor), the correctors (lumacaftor, tezacaftor and elexacaftor), and their development alone or as combinations. This work culminated in the triple combination therapy Trikafta (ivacaftor/tezacaftor/elexacaftor) with potential to treat 90% of people with cystic fibrosis (CF). The lecture acknowledges the role diverse aspects of research, development and commercialization and of patients and advocates in bringing forward these medicines.

Biography

Dr Paul A NEGULESCU

Dr Paul A NEGULESCU is currently Senior Vice President and Site Head, San Diego Research, Vertex Pharmaceuticals Incorporated, USA. He received his BS and PhD in Physiology from the University of California, Berkeley, USA in 1986 and 1990 respectively. He carried out postdoctoral works at the University of California, Berkeley and the University of California, Irvine. He joined Aurora Biosciences, San Diego, USA in 1996 as one of the first employees and grew with the company to become a Senior Vice President of Discovery Biology (1999–2001). He has been appointed Senior Vice President of Research (2001–) after Vertex acquired Aurora in 2001.



The Shaw Prize Lectures

held at

Shaw College, The Chinese University of Hong Kong

Year	Name of Laureate(s)	Award Category	Lecture Title
2021	Professor Victoria M KASPI	Astronomy	Magnetars and Anomalous X-ray Pulsars [#]
	Professor Chryssa KOUVELIOTOU		Magnetars: extremes of the High Energy Universe [#]
2020	Professor Alexander BEILINSON	Mathematical Sciences	Zeta values and motivic periods [#]
	Professor David KAZHDAN		Symmetry through the Representation Theory [#]
2019	Professor Maria JASIN	Life Science and Medicine	Genome Modification by Natural and Artificial DNA Breaks
2018	Dr Jean-Loup PUGET	Astronomy	Space observations of the Cosmic Backgrounds from Infrared to Microwave and Their Implications for Galaxy Evolution and Cosmology

[#] Lecture was held online due to COVID-19.

Year	Name of Laureate(s)	Award Category	Lecture Title
2017	Professor Claire VOISIN	Mathematical Sciences	Projective Geometry, Kähler Geometry and Hodge Theory
	Professor János KOLLÁR		Circles and Algebraic Surfaces
2016	Professor Adrian P BIRD	Life Science and Medicine	From DNA Methylation to Brain Function
	Professor Huda Y ZOGHBI		Rett Syndrome : From the Clinic to Genomes, Epigenomes, and Neural Circuits
2015	Mr William J BORUCKI	Astronomy	Kepler Space Mission: A Step in the Search for Life in our Galaxy
2014	Professor George LUSZTIG	Mathematical Sciences	Algebraic and Geometric Methods in Representation Theory

Year	Name of Laureate(s)	Award Category	Lecture Title
2013	Professor Jeffrey C HALL	Life Science and Medicine	Everybody's a Dreamer, and Everybody's a Star
	Professor Michael ROSBASH		The Circadian Feedback Loop: Twenty Years and Counting
	Professor Michael W YOUNG		Genes Controlling Sleep and Circadian Rhythms
2012	Professor Jane LUU	Astronomy	Expanding the Solar System: The Kuiper Belt Discovery
	Professor David C JEWITT		Kuiper Belt: What We Know and What We Don't
2011	Professor Demetrios CHRISTODOULOU	Mathematical Sciences	Spacetime Geometry and the Einstein Equations*
	Professor Richard S HAMILTON		Hot Geometry*
2010	Professor David JULIUS	Life Science and Medicine	From Peppers to Peppermints: Natural Products as Probes of the Pain Pathway

* Lecture was cancelled due to the hoisting of Typhoon Warning Signal No.8.

Year	Name of Laureate(s)	Award Category	Lecture Title
2009	Professor Frank H SHU	Astronomy	The Formation of Stars and Planetary Systems
2008	Professor Vladimir ARNOLD	Mathematical Sciences	Mathematics of Chaos
	Professor Ludwig FADDEEV		What is Quantum Mathematical Physics
2007	Professor Robert LEFKOWITZ	Life Science and Medicine	Seven Transmembrane Receptors
2006	Professor Saul PERLMUTTER	Astronomy	Dark Energy and the Accelerating Universe: Past, Present and Future
	Professor Adam RIESS		
	Professor Brian SCHMIDT		
2005	Professor Andrew J WILES	Mathematical Sciences	Solving Equations
2004	Professor P James E PEEBLES	Astronomy	The Discovery of The Expanding Universe



Shaw College, The Chinese University of Hong Kong

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