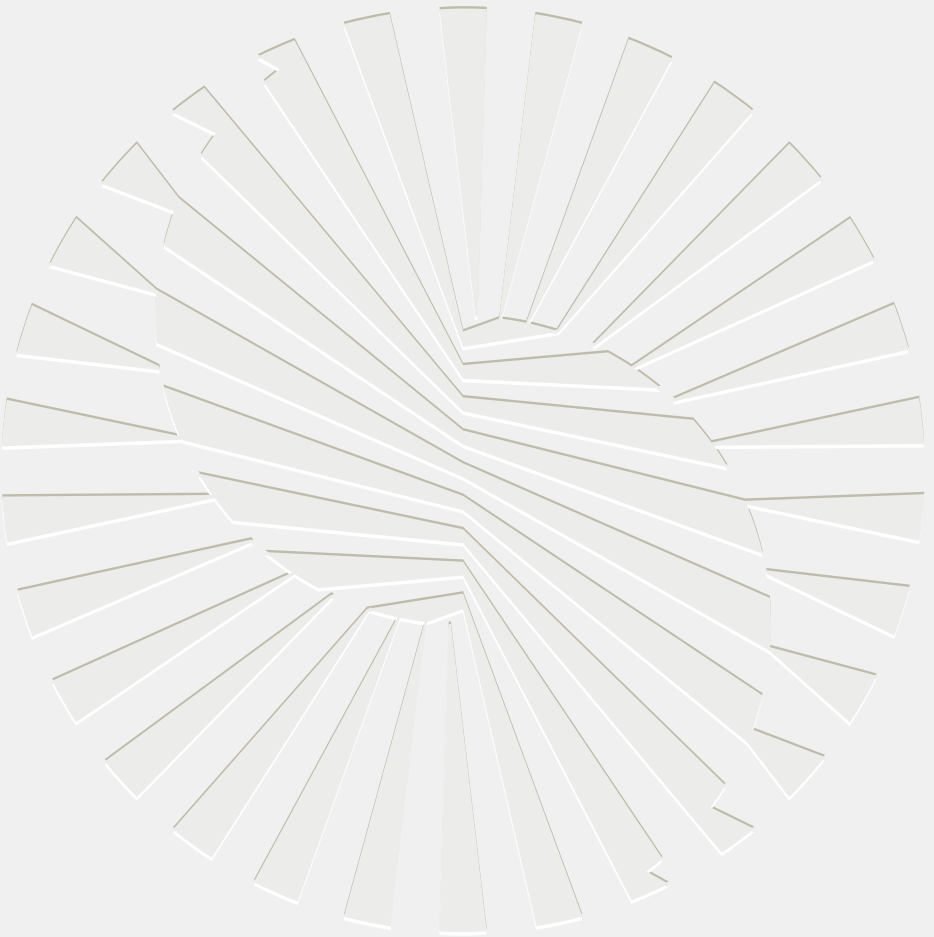


THE SHAW PRIZE
2024 AWARD
PRESENTATION



For the Benefit of
Humankind

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 civilisation.

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
邵逸夫獎

Founder

MR RUN RUN SHAW
(1907-2014)



Mr Shaw, born in China in 1907, was a native of Ningbo County, Zhejiang Province. He joined his brother's film company in China in the 1920s. During the 1950s he founded the film company Shaw Brothers (HK) Limited in Hong Kong. He was one of the founding members of Television Broadcasts Limited (TVB) launched in Hong Kong in 1967. As an established figure in the film and media industry, Mr Shaw gained insight into the needs of the people, and as a visionary he saw how, in addition to the fleeting escapism of entertainment, the more substantial benefits of education and healthcare would greatly impact lives for the better. He established two charities: The Shaw Foundation Hong Kong and The Sir Run Run Shaw Charitable Trust, both dedicated to the promotion of education, scientific and technological research, medical and welfare services, and culture and the arts.

The Shaw Foundation quickly gained momentum in a wide range of philanthropic work: supporting educational institutions as well as hospitals and clinics in Hong Kong, the rest of China and beyond. Expanding his vision into new areas convinced him that the quest for knowledge is key to sustaining the advancement of civilisation, and strengthened his belief that scientists focussed on unmasking the mysteries of nature are pivotal to the well-being of humankind. He decided to use his influence, and with the unfailing support of his wife Mrs Mona Shaw, established The Shaw Prize to inspire and recognise imaginative individuals committed to scientific research and to highlight their discoveries.

The Award continues to gain in stature, casting a beam of recognition on outstanding scientific achievements, and firing the imagination of pioneers who follow him in spirit and in deed, sustaining the continued success of the Shaw Foundation and the Shaw Prize Foundation as lasting tributes to his wisdom and generosity.

Message from the Chief Executive

THE HONOURABLE
JOHN KC LEE



I am honoured and delighted to congratulate the four Laureates of the Shaw Prize 2024. Their lifelong pursuit of scientific progress and their pioneering contributions in the fields of Astronomy, Mathematical Sciences and Life Science and Medicine merit the highest acclaim.

For over two decades, the prestigious Shaw Prize has served as an international beacon, shining a brilliant spotlight on the remarkable individuals who have, with passion and profound commitment, dedicated themselves to unravelling the mysteries of our world and our universe. In doing so, they have made possible wide-ranging breakthroughs in medicine, mathematics and astronomy. In recognising their extraordinary achievements, the Shaw Prize Foundation inspires ground-breaking innovation, while motivating future generations to expand the boundaries of scientific possibility.

The Government deeply appreciates the Foundation's unwavering dedication to scientific achievement. I recognise the vital importance of nurturing talent and encouraging innovation. Which is why my Government supports research within our higher education institutions – a strategic investment that can only boost Hong Kong's competitiveness in an increasingly science- and technology-driven world.

We are also committed to developing Hong Kong as an international innovation and technology (I&T) centre. We have committed substantial resources to building a vibrant I&T ecosystem, launched and implemented a series of important initiatives in a coordinated manner along the development directions and key strategies as promulgated in the Hong Kong I&T Development Blueprint, with a view to facilitating relevant research and development (R&D) activities and transformation of R&D outcomes, as well as attracting leading I&T talent and research teams around the world to come to Hong Kong.

My gratitude goes out to the Shaw Prize Foundation and its Council Members, as well as the Board of Adjudicators and the Shaw Prize Selection Committees. In selecting and honouring Shaw Prize Laureates, year after year, you reward us all.



JOHN KC LEE

Chief Executive

Hong Kong Special Administrative Region

Message from the Chair of the Board of Adjudicators

REINHARD
GENZEL



Welcome to the twenty-first Annual Shaw Prize Award Presentation Ceremony. In 2002 Sir Run Run Shaw and Mrs Mona Shaw established the Shaw Prize to honour scientists in the fields of Astronomy, Life Science and Medicine, and Mathematical Sciences. The inaugural Award Ceremony took place in 2004. In the ensuing years, the Shaws' entrepreneurship and philanthropy inspired the quest for new knowledge, highlighted outstanding achievements, and became a major force for progress in the world.

We are proud to be able to continue the founding vision of Mr and Mrs Shaw in promoting scientific discoveries whose beacons of truth and long-term contributions to society only shine brighter in these difficult times.

This year, we honour four scientists in the three designated fields for their distinguished contributions. They are Professor Shrinivas R Kulkarni in Astronomy, Dr Swee Lay Thein and Professor Stuart Orkin in Life Science and Medicine, and Professor Peter Sarnak in Mathematical Sciences. In the name of the Shaw Prize Council and the three respective Selection Committees, I would like to convey our warmest congratulations to all laureates for their fantastic achievements.

A handwritten signature in black ink that reads "Reinhard Genzel". The signature is fluid and cursive, with the first letter 'R' being particularly large and stylized.

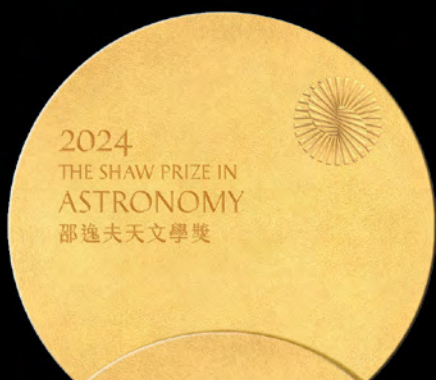
REINHARD GENZEL

Chair, Board of Adjudicators
Shaw Prize 2024

The Shaw Prize Medal

The front of the medal displays a portrait of Mr Run Run Shaw, next to which are the words and Chinese characters for the title of “The Shaw Prize”.

On the reverse side, the medal shows the award category and year, the name of the laureate, and in the upper right corner, the logo mark of the Shaw Prize.



Programme

Grand Hall, Hong Kong Convention and Exhibition Centre–12 Nov 2024

OPENING ADDRESS

Professor Kenneth Young	Chair of the Council Vice Chair of the Board of Adjudicators
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The Honourable John KC Lee	The Chief Executive of HKSAR
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SPEECH ON THE PRIZE IN ASTRONOMY

Professor Scott D Tremaine	Member of the Board of Adjudicators Chair of the Selection Committee for the Prize in Astronomy
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SPEECH ON THE PRIZE IN LIFE SCIENCE AND MEDICINE

Professor Bonnie L Bassler	Member of the Board of Adjudicators Chair of the Selection Committee for the Prize in Life Science and Medicine
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SPEECH ON THE PRIZE IN MATHEMATICAL SCIENCES

Professor Hélène Esnault	Member of the Board of Adjudicators Chair of the Selection Committee for the Prize in Mathematical Sciences
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AWARD PRESENTATION-2024

Professor Shrinivas R Kulkarni The Prize in Astronomy

Dr Swee Lay Thein The Prize in Life Science and Medicine

Professor Stuart Orkin The Prize in Life Science and Medicine

Professor Peter Sarnak The Prize in Mathematical Sciences

AWARD PRESENTATION-2021

Professor Scott D Emr The Prize in Life Science and Medicine

ACCEPTANCE SPEECHES BY SHAW LAUREATES 2024

The Prize in Astronomy

The Prize in Life Science and Medicine

The Prize in Mathematical Sciences

HIGHLIGHT CLIP OF FEATURE STORY OF THE SHAW LAUREATES 2024

The Shaw Prize 2024

Astronomy

BOARD OF ADJUDICATORS

PROFESSOR SCOTT D TREMAINE

Member of the Board of Adjudicators
Chair of the Selection Committee
for the Prize in Astronomy



Professor Scott D Tremaine received his undergraduate degree from McMaster University in Canada and his PhD in Physics from Princeton University. He has held faculty positions at MIT, the University of Toronto, and Princeton University.

At the University of Toronto he was the first Director of the Canadian Institute for Theoretical Astrophysics, from 1985 to 1996, and at the Princeton University he chaired the Department of Astrophysical Sciences from 1998 to 2006. He was the Richard Black Professor at the Institute for Advanced Study in Princeton from 2007 to 2020. He is currently an Emeritus Professor at Princeton University and the Institute for Advanced Study and a Professor at the University of Toronto.

He is a Fellow of the Royal Societies of London and of Canada and a Member of the US National Academy of Sciences. His awards include the Dannie Heinemann Prize for Astrophysics, the Tomalla Foundation Prize for Gravity Research, the Dirk Brouwer Award, the Henry Norris Russell Lectureship of the American Astronomical Society, and honorary doctorates from McMaster, Toronto, Waterloo, and St Mary's University.

His research has been focused on the dynamics of astrophysical systems, including planet formation and evolution, planetary rings, comets, supermassive black holes, star clusters, galaxies, and galaxy systems.

Shrinivas R Kulkarni

For his ground-breaking discoveries about millisecond pulsars, gamma-ray bursts, supernovae, and other variable or transient astronomical objects. His contributions to time-domain astronomy culminated in the conception, construction and leadership of the Palomar Transient Factory and its successor, the Zwicky Transient Facility, which have revolutionised our understanding of the time-variable optical sky.

AN ESSAY ON THE PRIZE

Although most stars shine steadily for billions of years, some of them vary, pulsate, flare or explode on timescales of years, weeks, or even a fraction of a second. These rapid changes provide unique insights into the death of stars, the behaviour of matter at extremely high temperatures and densities, the size and age of the universe, and aspects of fundamental physics such as the nuclear equation of state and Einstein's theory of general relativity.

Discovering and analysing transient events — the subject of time-domain astronomy — is a challenging task that requires sifting through vast databases, identifying rare anomalies, discarding false positives from terrestrial events and other sources, and notifying the astronomy community, ideally within minutes, to enable follow-up studies from other telescopes.

Throughout his career, Kulkarni has made a sustained series of fundamental discoveries in time-domain optical and radio astronomy. As a student, he and his collaborators discovered the first millisecond pulsar, a rapidly rotating neutron star that emitted precisely spaced pulses over 600 times per second. Known millisecond pulsars now number in the hundreds. They are the most precise astronomical clocks in the universe, and are used to test Einstein's general theory of relativity and to look for gravitational waves from merging supermassive black holes.

Brief, intense bursts of gamma-rays from across the sky were first detected in the 1960s, but their origin remained mysterious for decades. In 1997, Kulkarni and his collaborators made a critical breakthrough by determining the distance to a gamma-ray burst. They showed that the burst originated in the distant universe, far beyond our own Galaxy, and so must have been an extremely energetic event. We now know that most gamma-ray bursts come from similar distances.

Fast radio bursts (FRBs) are intense bursts of radio emission lasting as little as a thousandth of a second. A type of neutron star known as a magnetar, with extremely strong magnetic fields, has long been a candidate for the source of FRBs (the Shaw Prize in Astronomy was awarded in 2021 for work on magnetars and in 2023 for work on FRBs). Kulkarni and his collaborators built — quickly and inexpensively — STARE2, a set of three radio detectors dispersed across the southwestern United States, designed to detect nearby FRBs. In 2020, STARE2 was one of two telescopes that detected an FRB from a magnetar located in our Galaxy, showing for the first time that magnetars can generate FRBs.

Kulkarni's contributions culminated in the construction of the Palomar Transient Factory (PTF, 2009) and its successor, the Zwicky Transient Facility (ZTF, 2017), two novel astronomical surveys using a seventy-year-old telescope at Palomar Observatory in southern California. ZTF scans the entire Northern sky every two days, analyses the data with automated software, and communicates its discoveries

through an alert system that within minutes provides astronomers around the world with notifications of transient events. The flood of data from PTF and ZTF have enabled the discovery of a wide variety of astronomical transients and variable sources. ZTF has discovered thousands of rare events, including extremely bright supernovae, luminous red novae, calcium-rich gap transients, and disruptions of stars by black holes. ZTF has also found a star swallowing one of its planets, one of the nearest and brightest supernovae in history, a new orbital class of asteroids, binary stars with orbital periods as short as seven minutes that are strong sources of low-frequency gravitational radiation, and many other exotic systems and rare events whose properties are just beginning to be understood. PTF and ZTF have trained a generation of young astronomers now leading the field of time-domain astronomy.

This award is also intended to recognise Kulkarni's discoveries in other areas of stellar astronomy, in particular his role in the discovery of one of the first "brown dwarfs" — stars so small that they cannot burn hydrogen by nuclear fusion. Brown dwarfs bridge the gap between giant planets like Jupiter and hydrogen-burning stars like the Sun, and this discovery revealed the existence of brown dwarfs with atmospheric properties similar to planets and set the stage for decades of work on the atmospheres of sub-stellar objects.

Shrinivas R Kulkarni

LAUREATE IN ASTRONOMY 2024



‘First, I do not like to work in fields that are popular. Second, I like to see rapid progress.’

SHRINIVAS R KULKARNI

I was born in a small town in the erstwhile principality of Kurundwad, India and grew up in Hubballi, a provincial town in Northern Karnataka. In 1978 I graduated with a degree in Master of Physics (what would be called Engineering Physics in the US) from the Indian Institute of Technology, Delhi (IITD) and obtained a PhD in radio astronomy from UC Berkeley (UCB) in 1983. I continued as a post-doctoral fellow at UCB and joined Caltech in 1985 where I have been ever since. I served as Executive Officer for Astronomy (1997–2000) and as Director of the Caltech Optical Observatories (COO) from 2006 to 2018.

My father was a government doctor. I was the youngest of four siblings. We were a middle-class family with no ancestral or other wealth and, like many other families in this position, the way forward was through higher education. My parents made studying a priority for all of us.

In high school I was particularly influenced by Mr Shyamsundar (Mathematics) and Mr Satyanarayan Rao (Physics). I decided that I wanted to be a scientist instead of the prevalent choice of engineer. I self-studied for the Joint Entrance Exam in 1973. Separately, I also won a National Science Talent Search (NSTS) fellowship which came with a monthly stipend, a magnificent annual book allowance of INR 1,000 and a choice of an annual summer school.

The 1976 summer school on Astrophysics (Raman Research Institute) was eventful. Upon graduation, desiring to focus on experimental radio astronomy, I applied for a graduate program at UCB. By the end of my first year, I developed a vision for my thesis: learn all the techniques of radio astronomy so that I could investigate a broad range of astronomical phenomenology.

My career in astronomy has been guided by two dicta. First, I do not like to work in fields that are popular. Second, I like to see rapid progress. The resulting *modus operandi* is as follows: [1] Look widely and identify questions in fields which are interesting but not popular and where technological changes are likely to have a big impact. [2] Work in that field, make (ideally) a discovery and then [3] leave the field once it has become popular.

I joined Caltech as a Millikan post-doctoral fellow. I motivated and participated in the discovery of the first millisecond pulsar in globular clusters. Working with Thomas Prince I had a very productive program of pulsars in globular clusters (1987–1992). A chance encounter with astronaut and instrumentation expert Sam Durrance led to a collaboration which eventually resulted in the discovery of the first clear detection of a brown dwarf companion to a nearby star (1995). Desiring to learn X-ray astronomy I undertook a sabbatical to Japan, centered on the launch and commissioning of the ASCA X-ray mission. During this sojourn, I became familiar with gamma-ray burst phenomenology.

LAUREATE IN ASTRONOMY 2024

I proposed that soft gamma-ray repeaters are of Galactic origin, possibly associated with plerionic nebulae. I returned to the US thinking of ways to make progress in gamma-ray bursts (GRBs).

In 1994, influenced by a paper by Paczynski & Rhodes, Dale Frail and I began a program to search for radio afterglow of GRBs. This program blossomed with the launch of the BeppoSAX satellite (1996). We discovered the first radio afterglow and, using the Keck Observatory, showed that GRBs are of not merely extra-galactic origin but cosmological origin. The period 1997–2003 was very fruitful with advances practically every month or so. Upon the launch of Swift X-ray Observatory, a dedicated mission for GRBs, in 2004, I decided to abandon the GRB field.

In Spring 2005 whilst teaching a graduate class on High Energy Astrophysics, I came to realize that the remains of neutron star merger are potentially detectable, but it would require wide-field optical imagers with good sensitivity. However, the rarity of the events meant that one must have a thorough command of the optical transient phenomenology. The Palomar Transient Factory (2009–2012) was designed for a systematic exploration of the dynamic optical sky. Thanks to Joshua Bloom, we were an early adopter of Machine Learning. Robotic spectroscopy was introduced in the intermediate Palomar Transient Factory (2013–2016). The culmination of this program was the Zwicky Transient Facility (ZTF) which saw first light in late 2017.

ZTF was so successful that the National Science Foundation in 2021 decided to fund it for an additional phase. With the funding secured for the second phase, I decided it was time to move on and hand over the project to younger colleagues. I am now working on gas between stars and separately with colleagues on the Ultraviolet Explorer (UVEX) which is expected to be launched in 2030.

The Shaw Prize 2024

Life Science
& Medicine

BOARD OF ADJUDICATORS

PROFESSOR

BONNIE L BASSLER

Member of the Board of Adjudicators
Chair of the Selection Committee
for the Prize in Life Science and Medicine



Professor Bonnie L Bassler is a Member of the US National Academy of Sciences, the National Academy of Medicine, and the American Academy of Arts and Sciences. She is a Howard Hughes Medical Institute Investigator and the Squibb Professor and Chair of the Department of Molecular Biology at Princeton University. Her research focuses on the molecular mechanisms bacteria use for intercellular communication. This process is called quorum sensing. Professor Bassler's discoveries are paving the way to the development of novel therapies for combating bacteria by disrupting quorum-sensing-mediated communication. She received the Shaw Prize in Life Science and Medicine in 2015. Professor Bassler is a Member of the Royal Society and the American Philosophical Society. She served on the National Science Board from 2010–2016 and was nominated to that position by President Barack Obama. The Board oversees the NSF and prioritises the nation's research and educational activities in science, math and engineering.

Swee Lay Thein
Stuart Orkin

For their discovery of the genetic and molecular mechanisms underlying the fetal-to-adult hemoglobin switch, making possible a revolutionary and highly effective genome-editing therapy for sickle cell anemia and β thalassemia, devastating blood diseases that affect millions of people worldwide.

AN ESSAY ON THE PRIZE

Sickle cell disease and β thalassemia are blood disorders that affect more than 20 million people worldwide. 5% of the world's population carries the trait genes for hemoglobin disorders and 300,000 babies are born each year with severe hemoglobin disorders. Most people who have sickle cell disease are of African ancestry or self-identify as Black. The sickle cell trait protects against malaria, explaining the prevalence of the sickle gene in populations in particular regions of the world.

The first sickle cell case was documented in 1846 and the disease was named sickle cell anemia in 1922. In people with the disease, red blood cells become abnormally sickle-shaped due to low oxygen levels which are caused by a hemoglobin defect. Hemoglobin is the protein in red blood cells that transports oxygen throughout our tissues. Our blood cells are usually doughnut shaped and flexible whereas sickle cells are rigid and adhesive, impeding blood flow in the body. Sickled red blood cells also die prematurely, further decreasing oxygen throughout the body, resulting in anemia and severe fatigue. Pain crises are also a major symptom of sickle cell disease, due to sickle cells blocking blood flow to the chest, abdomen, and joints. People with sickle cell disease are prone to infections and have shortened lifespans.

Importantly for the work of this year's Shaw Awardees in Life Science and Medicine, it has long been known that shortly after birth, a switch occurs, from a fetal form of hemoglobin to an adult form. Moreover, sickle cell disease severity varies. Indeed, patients with a hereditary condition that results in continued production of fetal hemoglobin makes sickle cell disease milder. This condition is called hereditary persistence of fetal hemoglobin.

Over the course of their distinguished careers, Swee Lay Thein and Stuart Orkin each made wide-ranging, independent contributions to the analysis of blood cell disorders. Their work intersected when they made complementary and reinforcing discoveries that led to the development of a therapy to treat sickle cell disease and β thalassemia.

Swee Lay Thein made a transformative discovery when she performed a genome wide association study of individuals displaying extreme differences in sickle cell and β thalassemia traits. Her goal was to identify genes associated with severity of the disease. She transformed our understanding of how sickle cell disease can vary in severity when she discovered that most variation in hemoglobin production was due to changes in genes encoding components other than hemoglobin. Using a technique called linkage analysis, Thein identified the genetic regions that influenced variation of the sickle trait. She mapped the changes to a gene called BCL11A, making the first connection between the BCL11A protein and red blood cell disorders. She reported that BCL11A encodes a so-called zinc finger DNA binding regulatory protein on chromosome 2. She concluded that the BCL11A protein is the major regulator of fetal

hemoglobin production. Their discovery presaged curative therapies in which manipulation of BCL11A could counteract the sickle cell and β thalassemia disorders by increasing the amount of fetal hemoglobin present in patients with sickle disease and β thalassemia.

In elegant work, Stuart Orkin established that the BCL11A protein is a repressor of the fetal hemoglobin “promoter”. A promoter is a region of DNA that drives production of a particular protein, in this case, fetal hemoglobin. Moreover, it is this promoter that is mutated in humans with hereditary persistence of fetal hemoglobin. Orkin demonstrated that decreased BCL11A expression corrects sickle cell disease in engineered mice, an experiment that was crucial for advancing the exciting notion that altering BCL11A production could indeed be a strategy for the treatment of sickle cell disease and β thalassemia. Orkin next identified a particular site in the BCL11A gene that, when deleted using CRISPR gene editing in blood stem cells, dampened BCL11A expression. This genome alteration reactivated fetal hemoglobin production. Orkin’s mouse work provided the foundation for clinical trials using CRISPR genome editing in patients with sickle cell disease and β thalassemia. The trials yielded transformative results: freedom from sickle crises and anemia in sickle cell disease and transfusion-independence in β thalassemia.

The FDA approved two sickle cell stem cell therapies in December 2023. One is called CASGEVY made by Vertex, and is based on Their and Orkin’s findings. CASGEVY is the first approved therapy that uses CRISPR genome editing.

Their and Orkin’s work exemplifies how basic discovery, disease research, and translational medicine can lay the foundation for development of transformative therapies that save lives.

Swee Lay Thein

LAUREATE IN LIFE SCIENCE
& MEDICINE 2024



SWEE LAY THEIN

I was born the seventh of nine children in Kuantan, a small town in Malaya (now Malaysia), but grew up in various towns in Malaysia. My father was a public servant and was frequently transferred around. My mother, who did not finish school, greatly valued education. She was a hard worker and the single most important role model in my life; she instilled in me strong work ethics that were pivotal to shaping my career. I loved learning, and was particularly drawn to biology, leading me to medicine at the University of Malaya in Kuala Lumpur, Malaysia, where I obtained my MB, BS in 1975.

Personal reasons brought me to the UK, where I completed my postgraduate training and became board certified in internal medicine and hematology. My research career took a significant leap forward in 1982 when I joined the MRC Molecular Haematology Unit at the Weatherall Institute of Molecular Medicine. Through my project with the late Sir David Weatherall, my passion for the hemoglobin field began. Sir David challenged me to investigate why some patients with β -thalassemia are so mild and transfusion-independent unlike the majority, starting me on a life-long career in genotype-phenotype correlation studies. Rising to his challenge, I started collecting blood samples from patients with unusually mild β -thalassemia, together with their family members, which often involved extensive travels across the UK.

As it turned out, most of the thalassemia intermedia patients had an innate ability to produce fetal hemoglobin (HbF), and the family studies indicated that the gene(s) was/were inherited independently of the β -globin gene (the gene responsible for β -thalassemia). I should note that independent segregation of the high HbF gene(s) had been shown by several other groups years before me.

I felt compelled to unravel the genetic architecture and the gene(s) underlying this common variation of HbF production in adults which had a complex inheritance pattern. One of the first families I studied grew to 270 members spanning seven generations and involved a field trip to Malawi, Africa. At this critical time of my research, I was fortunate to meet Mark Lathrop, a Canadian Biostatistician who was then in Oxford and who introduced me to Florence Demenais, another Biostatistician. Together, we located the first transacting gene (quantitative trait locus (QTL)) on chromosome 6q modifying HbF in this family that was not on the β -globin complex. However, this chromosome 6q QTL could not explain the high HbF levels in the other families which were too small for traditional genetic linkage association studies. At this roadblock, I had to first convince myself and the sceptics that it was worthwhile chasing after the other gene(s). But we were able to jumpstart the research again when I heard of Tim Spector (then director of the Twin Research Unit in Guy's and St Thomas' Hospital, London) who was actively recruiting twins for various studies. I overcame my own doubts by first doing traditional twin

studies, comparing the similarity of HbF levels in identical twins vs non-identical twins. Those findings convinced me that there was indeed a huge genetic component to the level of HbF that was worth pursuing.

In 2000, I moved to King's College London. I returned to my first calling as a physician, taking over the care of patients with sickle cell disease (SCD), another inherited disorder of β -hemoglobin but with different patient demographics and disease manifestation than β -thalassemia. The common feature in both these single gene disorders is the remarkable variation in disease severity; they shared similar genetic modifying factors, one of which is the innate ability to produce HbF which resuscitated the challenge for me to locate the other QTLs for HbF. Expanding our twin collection to over 5000 individuals, I collaborated with Mark Lathrop, applying the first genome-wide association study (GWAS) to identify key loci controlling HbF production in adults. The GWAS not only 'rediscovered' the 6q QTL but also discovered *BCL11A*, which was until then, known as an oncogene involved in leukemogenesis, and its relevance to HbF and erythropoiesis, unsuspected. We published our findings in 2007, which were replicated a year later by another group in a Sardinian population. The seminal finding that the *BCL11A* gene is a key suppressor of HbF has enabled the development of treatments that increase HbF by suppressing *BCL11A* expression. I am honored to share the Shaw Prize with Stu Orkin, who has done so much to reveal the workings of *BCL11A*.

In March 2015, I relocated to the NIH/NHLBI in the US where I continue to focus on SCD. While discovery of the *BCL11A* gene remains the most hard-won and personally important to me, my current goal is to find more drugs for treating SCD, as genetic therapy will not be accessible any time soon for most of the 8 million people affected.

Stuart Orkin

LAUREATE IN LIFE SCIENCE
& MEDICINE 2024



STUART ORKIN

I am the David G Nathan Distinguished Professor of Pediatrics at Harvard Medical School, and HHMI Investigator at Boston Children's Hospital. I was born and raised in New York City. As a young boy, I was most interested in math, science, baseball, and the New York Yankees. Upon graduating high school, I entered MIT in Cambridge, Massachusetts, with the intention of studying physics or chemistry. However, an introductory biology class taught by Salvador Luria, who was later to receive a Nobel Prize for pioneering genetic research, introduced me to the life sciences. I switched to biology as a major and was immersed in courses in cell and biochemistry. Following graduation with a BS degree from MIT, I entered the MD program at Harvard Medical School. As a medical student, I became interested in genetic diseases and how fundamental science might help explain the underlying causes and eventually lead to therapies. Upon receiving my MD degree, I was trained in pediatrics at Boston Children's Hospital. As an alternative to military service, I spent 2 years in the Public Health Service in the laboratory of Philip Leder at the NIH. There, I began molecular studies of blood cells. In 1975 I returned to Boston Children's Hospital for a fellowship in pediatric hematology/oncology and was recruited to the faculty by David G Nathan, as an Assistant Professor, Harvard Medical School, two years later. I was promoted to Professor in 1986. I served as Chairman of the Department of Pediatric Oncology at the Dana Farber Cancer Institute from 2000 to 2016, and currently hold the David G Nathan Distinguished Chair at Harvard Medical School. I have been an Investigator of the Howard Hughes Medical Institute from 1986 to the present.

Throughout my career, I have focused on the molecular basis of human blood disorders and mechanisms governing blood cell development, as well as aspects of stem cell biology and oncogenesis. I provided the first comprehensive molecular dissection of an inherited disorder (the thalassemia syndromes), and characterized genes responsible for other human blood disorders, including X-linked chronic granulomatous disease (the first positional cloning). I identified the first hematopoietic transcription factors (the GATA family) and characterized their roles in blood cell development and cancer. This work laid the foundation for the field of molecular hematology. My studies of *BCL11A*, a repressor of fetal hemoglobin (HbF), have elucidated the regulation of globin gene switching and led to novel genetic approaches to the thalassemias and sickle cell disease, including the first approved gene editing therapies. I and my trainees demonstrated how *BCL11A* acts directly in the switch from fetal to adult hemoglobin, and can be manipulated genetically to turn fetal hemoglobin back on to treat the hemoglobin disorders. My laboratory is currently studying *BCL11A* protein with the goal of developing small molecule therapeutics for treatment of the hemoglobin disorders on a global scale.

LAUREATE IN LIFE SCIENCE & MEDICINE 2024

I was elected to the National Academy of Sciences (NAS), National Academy of Medicine (NAM), American Academy of Arts and Sciences, and the American Philosophical Society. My honors and awards include the E. Mead Johnson Award, Warren Alpert Prize, Helmut Horten Foundation Prize, Distinguished Research Award from the Association of American Medical Colleges (AAMC), E. Donnall Thomas, Dameshek and Basic Science Mentor Awards of the American Society of Hematology (ASH), Jessie the Stevenson Kovalenko Medal of the National Academy of Sciences (2013), William A. Allan Award of the American Society of Human Genetics (2014), George M. Kober Medal of the American Association of Physicians (2018), Mechthild Esser Nemmers Prize in Medical Science of Northwestern University (2018), King Faisal Prize in Medicine (2020), Harrington Prize for Innovation in Medicine (2020), Tobias Prize Lecture of the International Society of Stem Cell Research (2021), Gruber Prize in Genetics (2021), Canadian Gairdner International Award (2022), Society of Memorial Sloan Kettering Prize (2023), George Stamatoyannopoulos Mentorship Award of the American Society of Gene and Cell Therapy (2023), Honorary Doctorate (PhD *honoris causa*) University of Montreal, the Elaine Redding Brinster Prize (2024), TIME100 list, and the Ernest Beutler Lecture and Prize (2024). These awards recognize the outstanding work of trainees in my laboratory. I have always considered working in academic medical research a privilege granted to few.

The Shaw Prize 2024

Mathematical
Sciences

BOARD OF ADJUDICATORS

PROFESSOR HÉLÈNE ESNAULT

Member of the Board of Adjudicators
Chair of the Selection Committee
for the Prize in Mathematical Sciences



Professor H el ene Esnault is a French and German mathematician working in Algebraic-Arithmetic Geometry. She studied at the  cole Normale Sup erieure, got a PhD and a Doctorat d' tat from the University Paris VII, and a Habilitation from the University of Bonn. She held a Chair at the University of Essen (1990–2012), then became an Einstein Professor at the Freie Universit t Berlin, Germany until 2019. She is a part-time Professor at the University of Copenhagen and an Associate Faculty at Harvard University.

She received the Paul Doisteau–Emile Blutet Prize of the Academy of Sciences in Paris (2001), the Leibniz Prize of the German Research Council DFG (2003), an ERC Advanced Grant (2009), a Chaire d'Excellence de la Fondation Math matique de Paris (2011), the Cantor Medal (2019), honorary Doctorate degrees of the Vietnam Academy of Sciences and Technology (2009), University of Rennes (2013), and the University of Chicago (2023). She was an invited speaker at the ICM Beijing 2002 and the ECM Krakow 2012. She was a Chern Professor at MSRI (Berkeley) (2019), a guest Professor at the Institute for Advanced Studies, Princeton (2019/20).

She is a Member of the Academies of North Rhine-Westphalia since 2005, of the German National Academy (Leopoldina) since 2008, of Berlin–Brandenburg since 2010, of the European Academy (Academia Europaea) since 2014.

Peter Sarnak

For his development of the arithmetic theory of thin groups and the affine sieve, by bringing together number theory, analysis, combinatorics, dynamics, geometry and spectral theory.

AN ESSAY ON THE PRIZE

A natural number is called a prime number if it is larger than 1 and is not the product of two strictly smaller natural numbers which themselves are larger than 1. For example 2 is a prime number, but $4 = 2 \times 2$ is not. The ancient Greek mathematician Euclid proved around 300 BCE that any natural number other than 0 and 1 is the product of prime numbers, and that there are infinitely many prime numbers. The study of the distribution of the prime numbers is a core topic in Number Theory.

The French mathematician de Polignac proposed in 1849 a still unsolved problem in number theory stating that any even number can be expressed as the difference of two consecutive primes, and this can be achieved in infinite ways. If the even number is chosen to be 2, it asserts that there are infinitely many pairs $(p, p+2)$ for which both p and $p+2$ are prime numbers, such as for example $(5,7)$ or $(17,19)$. This is called the Twin Prime Conjecture.

The Chinese mathematician Jingrun Chen made in 1973 a huge step towards the Twin Prime Conjecture. He proved that if b is a positive even integer, there are infinitely many prime numbers p such that $p+b$ is a product of at most two prime numbers. In our days, there are several statues of Jingrun Chen in China, and a prize named after him for young mathematicians. Chen used sieve methods to count the cardinality of prime or almost prime numbers (that is a bounded product of such). These two concepts, sieve methods and almost primes, take us to the foundations of the work of Sarnak, the 2024 Shaw Laureate for mathematics.

One looks for polynomial functions $f(x)$ such that $f(x)$ is prime for infinitely many integers x . Euclid's theorem says that $f(x) = x$ is one such function. One enlarges the problem by requiring that $f(x)$ be almost prime valued. For example, the Twin Prime Conjecture is equivalent to the statement that $f(x) = x(x+2)$ is a product of two primes for infinitely many integers x . One may also restrict the set of x considered by requiring them to lie in a sparse subset of the integers. A similar problem can be posed for any polynomial with integer coefficients in several variables.

Sarnak pioneered the search for almost prime values of polynomials in sparse subsets arising as the orbit of a thin group. A thin group is a subgroup of an arithmetic group with a Goldilocks property: it is neither too large (being of infinite index) nor too small (having the same Zariski closure as the arithmetic group). Thin groups arise very naturally in pure and applied mathematics. For example, the symmetry group of integral Apollonian circle packings is a thin group. In addition, there is an abundance of Kleinian groups, or more generally monodromy groups of differential equations, that are thin groups.

Expanders are highly connected sparse graphs widely used in computer science. Foreseeing how the expander property of finite quotients of a thin group could be used to produce almost primes, Sarnak

developed the affine sieve. Sarnak, together with Bourgain and Gamburd, produced expanders out of some thin groups. The construction relies on earlier foundational work by Sarnak and Xue in which they showed a relation between the minimal dimension of representations of finite linear groups and expanders.

Sarnak, together with Bourgain and Gamburd, obtained a precise counting and equidistribution result for integral vectors on an orbit of a thin group which take almost prime values when one applies a given polynomial function to them.

Sarnak, together with Gölsefidy, has established that, under some natural hypotheses, an integral polynomial function produces almost primes in a Zariski dense subset of a thin orbit.

Sarnak's introduction of combinatorial and ergodic theoretical methods to Diophantine problems has had a profound impact. His original and deep vision has launched a vast research programme that brings together number theory, combinatorics, analysis, dynamics, geometry and spectral theory.

Peter Sarnak

LAUREATE IN
MATHEMATICAL SCIENCES 2024



PETER SARNAK

I was born on December 18 1953 in Johannesburg, South Africa. My parents were pharmacists, who by example set high moral standards and a work ethic that has served my two brothers and myself throughout our lives. I spent most of my time at school playing competitive chess becoming one of the top players in Southern Africa. I was eager to move to Europe and play chess on the international circuit, but luckily for me, my father insisted that I go to University first and study Mathematics and Physics, the subjects that came naturally to me. As soon as I was introduced to modern and abstract mathematics at the University of Witwatersrand, I was smitten by its beauty and challenges, and I have never looked back. Even today, learning of a new idea that solves a problem, or developing a tool that leads to the solution of a central problem is what draws me and I think many others, to mathematics.

I went to Stanford to do a PhD with Paul Cohen who in 1963 revolutionized set theory solving the first of Hilbert's problems from 1900. By the time I arrived at Stanford in 1976, Paul's interests had turned to another of Hilbert's problems — the Riemann Hypothesis, and not surprisingly his ideas led him to study Atle Selberg's works. Selberg had thought in depth about this problem and had developed powerful tools to study related problems in the theory of numbers. I was very fortunate that Paul took me on as a not completely unequal partner in filling in the details of some of Selberg's work. My mathematical taste and style is due largely to these two singular mathematicians. While both of them worked by themselves, I have always enjoyed and benefited greatly from working jointly with others. Any achievements that I can claim owe immeasurably to my co-authors as well as achievements of others. For me fundamental problems rather than fields of specialization drive research, and progress is often decisive when unexpected disciplines are combined. My collaborations with Ralph Phillips, Alexander Lubotzky, Ilya Piatetski-Shapiro, Henryk Iwaniec and Nicholas Katz were transformative for me in this and other ways.

My mathematical horizons were opened broadly after completing my PhD in 1980 when I moved to the Courant Institute. In particular, my view that there is little difference between mathematics and applied mathematics, was solidified. I moved back to Stanford University in 1984 and then to Princeton University in 1991 where I continue to serve as a Professor in the Mathematics department. From 2001–2005 I was half time at the Courant Institute, and from 2007–2024 half time as Professor at the Institute for Advanced Study in Princeton moving there recently to emeritus status.

At an International number theory conference in Hangzhou in 2005, an answer to one of the many interesting questions that were posed was provided by solutions to the classical (1879) Markoff Diophantine equation, with a twist that the solutions should satisfy certain divisibility

properties. The standard approach to such problems is to apply a “sieve”, which is an elaborate inclusion/exclusion counting procedure. However, in this exotic setting there were no tools at the time. My longtime collaborator Alexander Gamburd and I started then and continue today to develop this theory, now known as the “Affine Sieve”. We were quickly joined by the brilliant Jean Bourgain (a former Shaw Prize winner and who passed away way too young) and we were able to overcome the novel challenges that present themselves in the simplest settings. One such was to show that certain related combinatorial structures are “expanders”. This property has wide applications in engineering as it allows for the construction of sparse but highly connected communication networks. Lubotzky, Phillips and I had used sophisticated number theoretic methods to construct optimal such expanders known as “Ramanujan Graphs”. Interestingly in this exotic setting the roles are reversed and a key input in the affine sieve is established using tools from combinatorics and computer science. Alireza Golsefidy and I completed a general theory of the affine sieve in the linear setting. We made crucial use of related developments at that time by Helfgott, Varju, Pyber-Szabo and Breuillard-Green-Tao. The soil on which the affine sieve is built is an orbit of an affine action and what makes it exotic is when this group is number theoretically deficient or “Thin”. A flourishing Dynamical and Diophantine theory of thin matrix groups has been developed more recently. For nonlinear affine actions, the theory is still at its infancy, though progress has been achieved for the original Markoff equation by Bourgain, Gamburd, Amit Ghosh and myself, and by William Chen.

I first met my wife Helen Nissenbaum in a logic class at the University of Witwatersrand in 1972. She is a Philosopher and did her PhD at Stanford as well. We were married in San Francisco in 1977. She is the Andrew H and Ann R Tisch Professor at Cornell Tech where she is in the Information Science Department. That I could flourish in my long mathematical pursuits has only been possible thanks to Helen’s continued support, understanding and partnership. The same goes for our wonderful three daughters Dana, Zoe and Ann who mostly allow me to operate cluelessly.

Organisation Preparatory Committee 2003

FIRST ROW, FROM RIGHT TO LEFT

Professor Kwok-Pui Fung Member	Head, United College, The Chinese University of Hong Kong
The late Professor Ma Lin (1924–2017) Promoter	Chairman, Board of Trustees, Shaw College, The Chinese University of Hong Kong
Professor Chen-Ning Yang Chairman, Board of Adjudicators	
The late Mr Run Run Shaw (1907–2014) Founder of The Shaw Prize	
Professor Yue-Man Yeung Chairman	Director, Hong Kong Institute of Asia- Pacific Studies, The Chinese University of Hong Kong
The late Mrs Mona Shaw (1934–2017) Member	Chairperson, The Shaw Prize Foundation

TITLES OF MEMBERS WERE THEN AS OF JULY 2003



BACK ROW, FROM RIGHT TO LEFT

Mr Raymond Wai-Man Chan Member	Director, Shaw Movie City, Hong Kong Limited
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Professor Pak-Chung Ching Member	Dean of Engineering, The Chinese University of Hong Kong
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Professor Samuel Sai-Ming Sun Member	Chairman, Department of Biology, Faculty of Science, The Chinese University of Hong Kong
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Professor Kwok-Kan Tam Member	Department of English, Faculty of Arts, The Chinese University of Hong Kong
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Professor Sunny Kai-Sun Kwong Member	Associate Professor, Department of Economics, Faculty of Social Sciences, The Chinese University of Hong Kong
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Mr Charles Cheuk-Kai Cheung	
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Mr Koon-Fai Chor Secretary	
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THE SHAW PRIZE 2004



FROM RIGHT TO LEFT

The late Sir Richard Doll (1912–2005)	Laureate in Life Science and Medicine
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Professor James Peebles	Laureate in Astronomy
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Professor Stanley Cohen	Laureate in Life Science and Medicine
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The late Mr Run Run Shaw (1907–2014)	Founder of The Shaw Prize
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Mr Chee-Hwa Tung	The then Chief Executive of HKSAR
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Professor Herbert W Boyer	Laureate in Life Science and Medicine
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Professor Yuet-Wai Kan	Laureate in Life Science and Medicine
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The late Professor Shiing-Shen Chern (1911–2004)	Laureate in Mathematical Sciences
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THE SHAW PRIZE 2005



FROM RIGHT TO LEFT

Professor
Michel Mayor

Laureate in Astronomy

Professor
Geoffrey Marcy

Laureate in Astronomy

The late
Mr Run Run
Shaw (1907–2014)

Founder of The Shaw Prize

Mr Rafael Hui

The then Acting Chief Executive of
HKSAR

The late
Sir Michael Berridge
(1938–2020)

Laureate in Life Science and Medicine

Professor
Andrew Wiles

Laureate in Mathematical Sciences

THE SHAW PRIZE 2006



FROM RIGHT TO LEFT

Professor Brian Schmidt	Laureate in Astronomy
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Professor Adam Riess	Laureate in Astronomy
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Professor Saul Perlmutter	Laureate in Astronomy
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Mr Donald Tsang	The then Chief Executive of HKSAR
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The late Mr Run Run Shaw (1907–2014)	Founder of The Shaw Prize
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Professor Xiaodong Wang	Laureate in Life Science and Medicine
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Professor David Mumford	Laureate in Mathematical Sciences
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The late Professor Wentsun Wu (1919–2017)	Laureate in Mathematical Sciences
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THE SHAW PRIZE 2007



FROM RIGHT TO LEFT

Professor
Peter Goldreich

Laureate in Astronomy

Professor
Robert Lefkowitz

Laureate in Life Science and Medicine

The late
Mr Run Run Shaw
(1907–2014)

Founder of The Shaw Prize

Mr Henry Tang

The then Acting Chief Executive of
HKSAR

Professor
Robert Langlands

Laureate in Mathematical Sciences

Professor
Richard Taylor

Laureate in Mathematical Sciences



FROM RIGHT TO LEFT

Professor
Reinhard Genzel

Laureate in Astronomy

The late
Sir Ian Wilmut
(1944–2023)

Laureate in Life Science and Medicine

The late Professor
Keith H S Campbell
(1954–2012)

Laureate in Life Science and Medicine

The late
Mr Run Run Shaw
(1907–2014)

Founder of The Shaw Prize

Mr Donald Tsang

The then Chief Executive of HKSAR

Professor
Shinya Yamanaka

Laureate in Life Science and Medicine

The late Professor
Vladimir Arnold
(1937–2010)

Laureate in Mathematical Sciences

The late Professor
Ludwig Faddeev
(1934–2017)

Laureate in Mathematical Sciences

THE SHAW PRIZE 2009



FROM RIGHT TO LEFT

The late Professor Frank H Shu (1943–2023)	Laureate in Astronomy
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The late Professor Douglas L Coleman (1931–2014)	Laureate in Life Science and Medicine
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The late Mr Run Run Shaw (1907–2014)	Founder of The Shaw Prize
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Mr Donald Tsang	The then Chief Executive of HKSAR
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Professor Jeffrey M Friedman	Laureate in Life Science and Medicine
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Professor Simon K Donaldson	Laureate in Mathematical Sciences
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Professor Clifford H Taubes	Laureate in Mathematical Sciences
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THE SHAW PRIZE 2010



FROM RIGHT TO LEFT

Professor
Charles L Bennett

Laureate in Astronomy

Professor
Lyman A Page Jr

Laureate in Astronomy

Professor
David N Spergel

Laureate in Astronomy

The late
Mr Run Run Shaw
(1907–2014)

Founder of The Shaw Prize

Mr Donald Tsang

The then Chief Executive of HKSAR

Professor David Julius

Laureate in Life Science and Medicine

The late Professor
Jean Bourgain
(1954–2018)

Laureate in Mathematical Sciences

THE SHAW PRIZE 2011



FROM RIGHT TO LEFT

Dr Enrico Costa

Laureate in Astronomy

Dr Gerald J Fishman

Laureate in Astronomy

Professor
Jules A Hoffmann

Laureate in Life Science and Medicine

Professor
Ruslan M Medzhitov

Laureate in Life Science and Medicine

The late
Mr Run Run Shaw
(1907–2014)

Founder of The Shaw Prize

Mr Donald Tsang

The then Chief Executive of HKSAR

Professor
Bruce A Beutler

Laureate in Life Science and Medicine

Professor
Demetrios
Christodoulou

Laureate in Mathematical Sciences

Professor
Richard S Hamilton

Laureate in Mathematical Sciences

THE SHAW PRIZE 2012



FROM RIGHT TO LEFT

Professor Arthur L Horwich Laureate in Life Science and Medicine

Professor Franz-Ulrich Hartl Laureate in Life Science and Medicine

Mr C Y Leung The then Chief Executive of HKSAR

Professor David C Jewitt Laureate in Astronomy

Professor Jane Luu Laureate in Astronomy

Professor Maxim Kontsevich Laureate in Mathematical Sciences

THE SHAW PRIZE 2013



FROM RIGHT TO LEFT

Professor Michael W Young	Laureate in Life Science and Medicine
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Professor Michael Rosbash	Laureate in Life Science and Medicine
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Professor Jeffery C Hall	Laureate in Life Science and Medicine
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Mr C Y Leung	The then Chief Executive of HKSAR
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Professor David L Donoho	Laureate in Mathematical Sciences
-----------------------------	-----------------------------------

Professor Steven A Balbus	Laureate in Astronomy
------------------------------	-----------------------

The late Professor John F Hawley (1958–2021)	Laureate in Astronomy
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FROM RIGHT TO LEFT

Professor Daniel Eisenstein Laureate in Astronomy

Professor Shaun Cole Laureate in Astronomy

Professor John A Peacock Laureate in Astronomy

Mr C Y Leung The then Chief Executive of HKSAR

Professor Kazutoshi Mori Laureate in Life Science and Medicine

Professor Peter Walter Laureate in Life Science and Medicine

Professor George Lusztig Laureate in Mathematical Sciences



FROM RIGHT TO LEFT

Mr William J Borucki

Laureate in Astronomy

Professor
Bonnie L Bassler

Laureate in Life Science and Medicine

Professor
E Peter Greenberg

Laureate in Life Science and Medicine

Mr C Y Leung

The then Chief Executive of HKSAR

Professor
Gerd Faltings

Laureate in Mathematical Sciences

Professor
Henryk Iwaniec

Laureate in Mathematical Sciences

THE SHAW PRIZE 2016



FROM RIGHT TO LEFT

Professor
Kip S Thorne

Laureate in Astronomy

Professor
Rainer Weiss

Laureate in Astronomy

Mr C Y Leung

The then Chief Executive of HKSAR

Professor
Adrian P Bird

Laureate in Life Science and Medicine

Professor
Huda Y Zoghbi

Laureate in Life Science and Medicine

Professor
Nigel Hitchin

Laureate in Mathematical Sciences

REMARKS

The late Professor
Ronald W P Drever
(1931–2017)

Laureate in Astronomy
was unable to participate in the ceremony

THE SHAW PRIZE 2017



FROM RIGHT TO LEFT

Professor
Simon D M White

Laureate in Astronomy

Professor
Ronald D Vale

Laureate in Life Science and Medicine

Mrs Carrie Lam
Cheng Yuet-ngor

The then Chief Executive of HKSAR

Professor János Kollár

Laureate in Mathematical Sciences

Professor Claire Voisin

Laureate in Mathematical Sciences

REMARKS

The late Professor
Ian R Gibbons
(1931–2018)

Laureate in Life Science and Medicine
was unable to participate in the ceremony



FROM RIGHT TO LEFT

Dr Jean-Loup Puget

Laureate in Astronomy

Mrs Carrie Lam
Cheng Yuet-ngor

The then Chief Executive of HKSAR

Professor
Mary-Claire King

Laureate in Life Science and Medicine

Professor
Luis A Caffarelli

Laureate in Mathematical Sciences

THE SHAW PRIZE 2019



FROM RIGHT TO LEFT

The late Professor
Edward C Stone
(1936–2024)

Laureate in Astronomy

Mrs Carrie Lam
Cheng Yuet-ngor

The then Chief Executive of HKSAR

Professor Maria Jasin

Laureate in Life Science and Medicine

Dr Michel Talagrand

Laureate in Mathematical Sciences

THE SHAW PRIZE 2020 (VIRTUAL)



FROM RIGHT TO LEFT

Professor
Roger D Blandford

Laureate in Astronomy

Professor
Gero Miesenböck

Laureate in Life Science and Medicine

Professor
Peter Hegemann

Laureate in Life Science and Medicine

Professor Georg Nagel

Laureate in Life Science and Medicine

Professor
Alexander Beilinson

Laureate in Mathematical Sciences

Professor
David Kazhdan

Laureate in Mathematical Sciences

THE SHAW PRIZE 2021 (VIRTUAL)



FROM RIGHT TO LEFT

Professor Jeff Cheeger Laureate in Mathematical Sciences

Professor Laureate in Mathematical Sciences
Jean-Michel Bismut

Professor Scott D Emr Laureate in Life Science and Medicine

Professor Laureate in Astronomy
Victoria M Kaspi

Professor Laureate in Astronomy
Chryssa Kouveliotou

THE SHAW PRIZE 2022 (VIRTUAL)



FROM RIGHT TO LEFT

Professor Lennart Lindegren	Laureate in Astronomy
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Professor Michael Perryman	Laureate in Astronomy
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Dr Paul A Negulescu	Laureate in Life Science and Medicine
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Professor Michael J Welsh	Laureate in Life Science and Medicine
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Professor Noga Alon	Laureate in Mathematical Sciences
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Professor Ehud Hrushovski	Laureate in Mathematical Sciences
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FROM RIGHT TO LEFT

Professor
Matthew Bailes

Laureate in Astronomy

Professor
Duncan Lorimer

Laureate in Astronomy

Professor
Maura McLaughlin

Laureate in Astronomy

Professor
Reinhard Genzel

Chair of the Board of Adjudicators

Professor
Patrick Cramer

Laureate in Life Science and Medicine

Professor
Eva Nogales

Laureate in Life Science and Medicine

Professor
Vladimir Drinfeld

Laureate in Mathematical Sciences

Professor
Shing-Tung Yau

Laureate in Mathematical Sciences

The Shaw Prize is managed and administered by The Shaw Prize Foundation, with a four-tier organisation.

The Shaw Prize
Council
Founding Members

FOUNDING MEMBERS



MRS MONA SHAW (1934–2017)

Mrs Mona Shaw uplifted her husband's idea of creating an award to honour and highlight international scientific achievements and together with Mr Run Run Shaw and esteemed academics, brought the concept to fruition with the founding of the Shaw Prize. Advancing the Shaw focus on education, and in the firm belief that the sharing of knowledge is key to discovery, the Prize aims to inform the world's budding scientists of major breakthroughs in diverse scientific fields, and through widely disseminated Shaw Laureate lectures, inspire them to be future trailblazers. Herself a highly respected leader in business, advancing the arts and philanthropy, Mrs Mona Shaw orchestrated the format of the annual Awards Ceremony and her remembered presence is warmly cherished.



PROFESSOR MA LIN (1924–2017)

A founding member of the Shaw Prize, Professor Ma's ideals have indelibly marked the Prize, and together with his legacy of love for the creation and application of knowledge, continue to fuel its advancement. An internationally acclaimed biochemist and gifted leader, on his watch the Chinese University of Hong Kong established the Department of Biochemistry, the Faculty of Medicine, and later the founding of Shaw College. As a scientist and educator his expertise melded well with Mr Run Run Shaw's quest to inspire scientific research and expand discovery. The founding of the Shaw Prize embodied their shared vision of societal progress through the advancement of knowledge.

FOUNDING MEMBERS



PROFESSOR CHEN-NING YANG

Professor Chen-Ning Yang, an eminent physicist, was Albert Einstein Professor of Physics at the State University of New York at Stony Brook until his retirement in 1999. He has been Distinguished Professor-at-large at The Chinese University of Hong Kong since 1986 and Professor at Tsinghua University, Beijing, since 1998.

Professor Yang has received many awards: Nobel Prize in Physics (1957), Rumford Prize (1980), US National Medal of Science (1986), Benjamin Franklin Medal (1993), Bower Award (1994) and King Faisal Prize (2001). He is a Member of the Chinese Academy of Sciences, the Academia Sinica in Taiwan, the US Academy of Sciences, the Royal Society of London, the Russian Academy of Sciences and the Japan Academy.

Since receiving his PhD from the University of Chicago in 1948, he has made great impacts in both abstract theory and phenomenological analysis in modern physics.

The Shaw Prize
Council
Council Members

COUNCIL MEMBERS



PROFESSOR KENNETH YOUNG

Chair of the Council
Vice Chair of the Board of Adjudicators

Professor Kenneth Young is a theoretical physicist, and is Emeritus Professor of Physics at The Chinese University of Hong Kong. He pursued studies at the California Institute of Technology, USA, 1965–1972, and obtained a BS in Physics (1969) and a PhD in Physics and Mathematics (1972). He joined The Chinese University of Hong Kong in 1973, where he has held the position of Chairman, Department of Physics and later Dean, Faculty of Science, Dean of the Graduate School and Pro-Vice-Chancellor.

He was elected a Fellow of the American Physical Society in 1999 and a Member of the International Eurasian Academy of Sciences in 2004. He was also a Member of the University Grants Committee, HKSAR and Chairman of its Research Grants Council. He served as Secretary and then Vice-President of the Association of Asia Pacific Physical Societies. He is a Director of the Council of the Hong Kong Laureate Forum. His research interests include elementary particles, field theory, high energy phenomenology, dissipative systems and especially their eigenfunction representation and application to optics, gravitational waves and other open systems.



DR WAI-MAN CHAN RAYMOND

Dr Raymond Chan joined the Shaw Brothers (Hong Kong) Ltd in January 1994. He was invited to join the Preparatory Committee of the Shaw Prize in 2002. Since 2012, he has been a Member on the Board of Advisors of Sir Run Run Shaw Charitable Trust. In 2017, he was successively appointed Managing Director of the Shaw Group of Companies, Chairman of the Shaw Foundation and the Shaw Prize Foundation.

Dr Chan studied in the United Kingdom gaining BA (Hons) and B Arch (Hons) and became a Member of the Royal Institute of British Architects and Hong Kong Institute of Architects. He is also a registered architect under the Architect Registration Board in both UK and Hong Kong. In 2022, he received an Honorary Degree of Doctor of Laws from the University of Liverpool, UK.

He is on the Board of Trustees of Shaw College, The Chinese University of Hong Kong, an Honorary Trustee of Peking University and Trustee of Zhejiang University. Dr Chan is also a Member of the Council of the Hong Kong Laureate Forum. He was awarded Honorary Fellowship by The Chinese University of Hong Kong, The Hong Kong University of Science and Technology and The University of Hong Kong.

COUNCIL MEMBERS



PROFESSOR WAI-YEE CHAN

Professor Wai-Yee Chan is Pro-Vice-Chancellor/Vice-President, Li Ka Shing Professor of Biomedical Sciences and Director of the Institute for Tissue Engineering and Regenerative Medicine, The Chinese University of Hong Kong (CUHK). Professor Chan obtained his BSc (First Class Honours) in Chemistry from CUHK in 1974 and PhD in Biochemistry from the University of Florida, Gainesville, Florida, USA in 1977. Prior to joining CUHK in June of 2009, he was Professor of Pediatrics, Georgetown University Medical Center, Washington, DC, and Head and Principal Investigator, Section on Developmental Genomics, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health, Bethesda, Maryland, USA.

His expertise is in developmental genomics and molecular genetics of endocrine disorders. He received the 1988 Merrick Award for Outstanding Biomedical Research and the 2008 Presidential Award from the Association of Chinese Geneticists in America. He serves on the editorial boards of a number of international scientific journals and on review panels of regional and international research funding agencies.



PROFESSOR PAK-CHUNG CHING

Professor Pak-Chung Ching is Director of Shun Hing Institute of Advanced Engineering and Research Professor of Electronic Engineering of The Chinese University of Hong Kong. He received his Bachelor in Engineering (First Class Honours) and PhD from the University of Liverpool, UK, in 1977 and 1981 respectively. Professor Ching is a Fellow of IEEE, IET, HKIE and HKAES. He was Chairman of the Veterinary Surgeons Board of Hong Kong (2012–2023) and Chairman of the Board of Directors of the Nano and Advanced Materials Institute (2018–2023). Professor Ching was awarded the IEEE Third Millennium Award (2000) and the Bronze Bauhinia Star (2010) and Silver Bauhinia Star (2017) of the HKSAR; he was admitted to the HKIE Hall of Fame (2010). His research interests include adaptive digital signal processing, time delay estimation and target localization, blind signal estimation and separation, automatic speech recognition, speaker identification/verification and speech synthesis, and advanced signal processing techniques for wireless communications.

COUNCIL MEMBERS



PROFESSOR REINHARD GENZEL

Chair of the Board of Adjudicators

Professor Reinhard Genzel, born in 1952 in Germany, is the Director at the Max Planck Institute for Extraterrestrial Physics, Garching, Germany, Honorary Professor at the Ludwig Maximilian University, Munich since 1988 and Professor in the Graduate School, UC Berkeley since 2017.

He received his PhD from the University of Bonn in 1978. He was a Postdoctoral Fellow at Harvard-Smithsonian Center for Astrophysics, Cambridge, Massachusetts, an Associate Professor of Physics and Associate Research Astronomer at Space Sciences Laboratory and a Full Professor of Physics at UC Berkeley.

Professor Genzel has received many awards, including Balzan Prize (2003), Stern-Gerlach Medal (2003), Petrie Prize (2005), The Shaw Prize in Astronomy (2008), Jansky Prize (2010), Karl Schwarzschild Medal (2011), Crafoord Prize in Astronomy (2012), Tycho Brahe Prize (2012), Herschel Medal (2014), Great Cross of Merit (with Star) of Germany (2014), Harvey Prize in Science and Technology (2014) and the Bavarian Maximilian Order for Science and Art (2021). In 2020, he received the Nobel Prize in Physics, jointly with Andrea Ghez, for the discovery of a supermassive compact object at the centre of our galaxy.



PROFESSOR YUET-WAI KAN

Professor Yuet-Wai Kan, the Louis K Diamond Professor of Hematology at the University of California, San Francisco, USA, is a world-leading expert on the use of gene and cell therapy to treat sickle cell anemia and thalassemia. Professor Kan was born in Hong Kong, graduated from the Faculty of Medicine at the University of Hong Kong and trained at Queen Mary Hospital, Hong Kong, before going to the United States for further studies.

Professor Kan's contributions to DNA diagnosis and his discovery of human DNA polymorphism have found wide application in genetics and human diseases. For his work, he has received many national and international awards including the Albert Lasker Clinical Medical Research Award, the Gairdner Foundation International Award and the Shaw Prize. He is the first Chinese elected to the Royal Society, London, and is a Member of the US National Academy of Sciences, Academia Sinica, the Third World Academy of Sciences and the Chinese Academy of Sciences. He has received honorary degrees from The University of Cagliari, Italy, The Chinese University of Hong Kong, The University of Hong Kong and The Hong Kong Metropolitan University (formerly the Open University of Hong Kong).

The Shaw Prize
Board of Adjudicators

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VICE CHAIR

Professor Kenneth Young	Emeritus Professor of Physics, The Chinese University of Hong Kong, Hong Kong
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Professor Bonnie L Bassler	Chair of the Selection Committee in Life Science and Medicine HHMI Investigator and Squibb Professor and Chair, Department of Molecular Biology, Princeton University, USA
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Professor Hélène Esnault	Chair of the Selection Committee in Mathematical Sciences Einstein Professor of Mathematics, Emeritus, Mathematisches Institut, Freie Universität Berlin, Germany
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The Shaw Prize
Selection Committees

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ASTRONOMY SELECTION COMMITTEE

Professor Gilles Chabrier	Professor, Centre de Recherche Astrophysique de Lyon, Ecole Normale Supérieure de Lyon, France and Professor of Astronomy, University of Exeter, UK
Professor You-Hua Chu	Professor Emerita, Department of Astronomy, University of Illinois at Urbana-Champaign, USA
Professor Eiichiro Komatsu	Director, Department of Physical Cosmology, Max Planck Institute for Astrophysics, Germany
Professor Elaine M Sadler	Professor of Astrophysics, School of Physics, The University of Sydney, Australia

SELECTION COMMITTEES

LIFE SCIENCE AND MEDICINE SELECTION COMMITTEE

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Professor Dennis YM Lo	Vice-Chancellor and President Designate, Li Ka Shing Professor of Medicine and Professor of Chemical Pathology, The Chinese University of Hong Kong, Hong Kong
Professor Joan A Steitz	Sterling Professor of Molecular Biophysics and Biochemistry, School of Medicine, Yale University, USA
Professor Marc Tessier-Lavigne	President Emeritus and Professor of Biology, Stanford University, USA
Professor Fiona M Watt	Professor of Regenerative Medicine and Director of Centre for Stem Cells & Regenerative Medicine, King's College London, UK
Professor Huda Y Zoghbi	HHMI Investigator, Professor of Pediatrics, Molecular and Human Genetics, Neurology and Neuroscience, Baylor College of Medicine, USA

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PROFESSOR GILLES CHABRIER

Astronomy Committee



Professor Gilles Chabrier graduated in theoretical physics. He did his PhD at the International Center for Theoretical Physics, in Trieste, Italy, and in Paris. He switched to astrophysics as a postdoctoral fellow at the University of Rochester, USA. He is the Founder and the Head of the astrophysics group of Ecole Normale Supérieure de Lyon, France, and a professor at the University of Exeter, UK.

Professor Chabrier received several national and international awards, Johann Wempe Prize (2004), Silver Medal of CNRS (2006), Grand Prix Jean Ricard of the French Physical Society (2010), Eddington Medal of the Royal Astronomical Society (2011), Grand Prix Ampère of the Académie des Sciences (2014), Fred Hoyle Medal and Prize of the Institute of Physics (IOP) (2019). He has been elected Fellow of the Institute of Physics (FInstP).

His research ranges from dense matter physics to stellar and planetary physics, star formation and galactic astronomy.

PROFESSOR
YOU-HUA CHU

Astronomy Committee



Professor You-Hua Chu received her PhD in Astronomy from the University of California at Berkeley, USA. She was a Professor in the Astronomy Department of the University of Illinois, USA, and was the Department Chair in 2005–2011. In 2014, she moved to Taiwan and was the Director of the Institute of Astronomy and Astrophysics, Academia Sinica (ASIAA) until 2020. She is currently a Chair Research Fellow of the National Sun Yat-sen University, a Distinguished Visiting Scholar at ASIAA and a Professor Emerita of the University of Illinois.

She was the President of IAU Division VI (2009–2012), the President of the Astronomical Society of the Republic of China (ASROC, 2014–2020). She is a Fellow of the American Astronomical Society, and a Fellow of the Physical Society of Taiwan. She received the Heaven Quest Award from the ASROC in 2021, NAOJ Director General’s Award in Engineering and Development Category in 2021, and R M Petrie Prize from the Canadian Astronomical Society in 2023.

Her research is in multi-wavelength observations of stellar energy feedback and interactions with the interstellar medium, using the Magellanic Clouds as an astrophysical laboratory.

SELECTION COMMITTEE MEMBERS

PROFESSOR EIICHIRO KOMATSU

Astronomy Committee



Professor Eiichiro Komatsu uses theoretical physics and observational data to study the origin, evolution, and constituents of our Universe. He has been Director of the Department of Physical Cosmology at the Max Planck Institute for Astrophysics in Garching, Germany, since 2012. Prior to this he was a postdoctoral fellow at Princeton University and a professor in the Department of Astronomy and Director of Texas Cosmology Center at the University of Texas at Austin. He obtained his PhD from Tohoku University in Sendai, Japan, in 2001.

He is a Fellow of American Physical Society. He received awards for his work including Alfred P Sloan Fellow, the Nishinomiya-Yukawa Memorial Prize, the Gruber Cosmology Prize, the Lancelot M Berkeley Prize of the American Astronomical Society, the Chushiro Hayashi Prize of the Astronomical Society of Japan, the Breakthrough Prize in Fundamental Physics, the Inoue Prize for Science, and the Nishina Memorial Prize.

His scientific achievements include the most stringent test of the physics of the very early Universe known as “cosmic inflation”, innovative explorations of dark matter, dark energy and neutrinos in cosmology, and astrophysics of galaxy clusters.

PROFESSOR
ELAINE M SADLER

Astronomy Committee



Professor Elaine M Sadler received her PhD in Astronomy from the Australian National University and held postdoctoral positions in Germany and the USA before returning to Australia, where she is currently a Professor of Astrophysics at the University of Sydney. From 2014–18 she was Director of the ARC Centre of Excellence for Allsky Astrophysics (CAASTRO) and since 2018 she has also been affiliated with the Australia Telescope National Facility at the Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia’s national science agency.

Her research area is observational astronomy and astrophysics, with a particular focus on galaxy evolution, active galaxies, stellar populations and transient objects. Much of her research is based on the analysis of data from large-area optical and radio surveys, and she has designed and carried out several major radio surveys of the southern sky. She regularly serves on national and international advisory committees, and is actively involved in planning for next-generation telescopes and facilities.

Professor Sadler was elected to the Australian Academy of Science in 2010 and served as the Academy’s Foreign Secretary from 2018 to 2022.

SELECTION COMMITTEE MEMBERS

PROFESSOR MICHAEL N HALL

Life Science and
Medicine Committee



Professor Michael N Hall received his PhD from Harvard University and was a postdoctoral fellow at the Pasteur Institute, France, and the University of California, San Francisco. He joined the Biozentrum of the University of Basel, Switzerland, in 1987 where he is currently Professor and former Chair of Biochemistry. Professor Hall is a pioneer in the fields of TOR signaling and cell growth control. In 1991, Professor Hall and colleagues discovered TOR (Target of Rapamycin) and subsequently elucidated its role as a central controller of cell growth and metabolism. The discovery of TOR led to a fundamental change in how one thinks of cell growth. It is not a spontaneous process that just happens when building blocks (nutrients) are available, but rather a highly regulated, plastic process controlled by TOR-dependent signaling pathways. As a central controller of cell growth and metabolism, TOR plays a key role in development, aging, and disease. Professor Hall is a Member of the US National Academy of Sciences and has received numerous awards, including the Breakthrough Prize in Life Sciences (2014) and the Albert Lasker Award for Basic Medical Research (2017).

PROFESSOR
DENNIS YM LO

Life Science and
Medicine Committee



Professor Dennis Lo is the Vice-Chancellor and President Designate and the Li Ka Shing Professor of Medicine of The Chinese University of Hong Kong (CUHK), and he is also the President of the Hong Kong Academy of Sciences. His research interests focus on the biology and diagnostic applications of cell-free nucleic acids in plasma. In particular, he discovered the presence of cell-free fetal DNA in maternal plasma in 1997 and has since then been pioneering non-invasive prenatal diagnosis using this technology. This technology has been adopted globally and has created a paradigm in prenatal medicine. He has also made many innovations using circulating nucleic acids for cancer detection, including the screening of early stage nasopharyngeal cancer.

In recognition of his research, Professor Lo has been elected as Member of the Chinese Academy of Sciences (CAS), Founding Member of the Hong Kong Academy of Sciences, Fellow of the Royal Society and Foreign Associate of the US National Academy of Sciences. Professor Lo has won numerous awards, including the 2014 King Faisal International Prize in Medicine, the 2016 Future Science Prize in Life Science, the 2019 Fudan-Zhongzhi Science Award, the 2021 Breakthrough Prize in Life Sciences, the 2021 Royal Medal, the 2021 ESHG Mendel Award, the 2022 ISPD Pioneer Award, the 2022 Lasker-DeBakey Clinical Medical Research Award, the 2023 inaugural Tengchong Science Prize and the 2024 Jiménez Díaz Lecture Award.

SELECTION COMMITTEE MEMBERS

PROFESSOR JOAN A STEITZ

Life Science and
Medicine Committee



Professor Joan A Steitz earned her BS in chemistry from Antioch College in 1963. Significant findings from her work emerged as early as 1967, when her Harvard PhD thesis with Jim Watson examined the test-tube assembly of a ribonucleic acid (RNA) bacteriophage (antibacterial virus) known as R17.

Professor Steitz spent the next three years in postdoctoral studies at the Medical Research Council Laboratory of Molecular Biology in Cambridge, England, where she used early methods for determining the biochemical sequence of RNA to study how ribosomes know where to initiate protein synthesis on bacterial mRNAs. In 1970, she was appointed assistant professor of Molecular Biophysics and Biochemistry at Yale, becoming full professor in 1978. At Yale, she established a laboratory dedicated to the study of RNA structure and function. In 1979, Steitz and her colleagues described a group of cellular particles called small nuclear ribonucleoproteins (snRNPs), a breakthrough in understanding how RNA is spliced. Subsequently, her laboratory has defined the structures and functions of other noncoding RNPs, such as those that guide the modification of ribosomal RNAs, microRNAs and several produced by transforming herpesviruses.

Professor Steitz, a former investigator of the Howard Hughes Medical Institute, is a member of the American Academy of Arts and Sciences, National Academy of Sciences, Institute of Medicine, and the Royal Society of London. Her many honors include: National Medal of Science (1986); RNA Society Lifetime Achievement Award (2004); Gairdner Foundation International Award (2006); Lasker-Koshland Special Achievement Award in Medical Science (2018); and 21 honorary degrees.

PROFESSOR MARC TESSIER-LAVIGNE

Life Science and
Medicine Committee



Professor Marc Tessier-Lavigne became Chief Executive Officer of Xaira Therapeutics in 2024. He is also President Emeritus and Professor of Biology (on leave) at Stanford University and was the university's 11th president (2016–2023). He returned to Stanford, where he had been a faculty member, after serving as president of The Rockefeller University in New York. He also previously held a faculty position at the University of California, San Francisco, and executive positions at biotechnology company Genentech.

Professor Tessier-Lavigne has been a leader in understanding the mechanisms that direct the wiring up of the brain during embryonic development. He has also helped elucidate mechanisms of neurodegeneration. He is the recipient of numerous scientific awards, including the 2020 Gruber Neuroscience Prize, and has been elected to multiple learned societies, including the US National Academy of Sciences, the National Academy of Medicine, the American Academy of Arts and Sciences and the American Philosophical Society. In 2020 he was named an Officer of the Order of Canada.

SELECTION COMMITTEE MEMBERS

PROFESSOR FIONA M WATT

Life Science and
Medicine Committee



Professor Fiona M Watt obtained her first degree from Cambridge University and her DPhil, in cell biology, from the University of Oxford. She was a postdoc at MIT, where she first began studying differentiation and tissue organisation in mammalian epidermis. She established her first research group at the Kennedy Institute for Rheumatology in London and then spent 20 years at the CRUK London Research Institute. She helped to establish the CRUK Cambridge Research Institute and the Wellcome Trust Centre for Stem Cell Research and in 2012 she moved to King's College London to found the Centre for Stem Cells and Regenerative Medicine. From 2018 to 2022 she was on secondment as Executive Chair of the UK Medical Research Council. She is currently EMBO Director.

Professor Watt has received numerous awards and honours. She is a Fellow of the UK Royal Society and Academy of Medical Sciences, a Member of the European Molecular Biology Organisation and an International Member of the US National Academy of Sciences.

PROFESSOR
HUDA Y ZOGHBI

Life Science and
Medicine Committee



Professor Huda Y Zoghbi is the Ralph D Feigin Professor of Pediatrics at Baylor College of Medicine, where she is also Professor of Molecular and Human Genetics, Neurology and Neuroscience. She has been an Investigator with the Howard Hughes Medical Institute since 1996. She is also the Founding Director of the Jan and Dan Duncan Neurological Research Institute at Texas Children's Hospital.

Professor Zoghbi's interest is in understanding healthy brain development as well as what goes awry in specific neurological conditions. She has published seminal work on the cause and pathogenesis of Rett syndrome and late-onset neurodegenerative diseases, and has trained over 110 scientists and physician-scientists. In 2000 she was elected to the Institute of Medicine, and in 2004 she was elected to the US National Academy of Sciences. Among Professor Zoghbi's recent honours are the Shaw Prize, the Breakthrough Prize, Canada's Gairdner Prize, the Brain Prize and the Kavli Prize.

SELECTION COMMITTEE MEMBERS

PROFESSOR NGAIMING MOK

Mathematical Sciences
Committee



Professor Ngaiming Mok obtained his MA from Yale University and his PhD from Stanford University, and started his career at Princeton University. He then taught at Columbia University and Université de Paris-Sud, Orsay, and had been Full Professor at both universities, before taking up a Chaired Professorship at the University of Hong Kong (HKU) in 1994. Currently he is the Edmund and Peggy Tse Professor in Mathematics, Chair of Mathematics and Director of the Institute of Mathematical Research of HKU.

Professor Mok is a world-renowned mathematician dedicated to solving analytic and geometric problems on the interface of complex analysis, differential geometry, algebraic geometry and number theory. He has served on the editorial board of *Inventiones Mathematicae* and on the Fields Medal Committee in the International Congress of Mathematicians.

Professor Mok's outstanding achievements have earned him many international honours including the Sloan Fellowship, the Presidential Young Investigator Award of the US, the Croucher Senior Fellowship Award of Hong Kong, the State Natural Science Award (Class II) of China and the Bergman Prize of the American Mathematical Society. He was elected Academician of the Chinese Academy of Sciences in 2015, and Fellow of the Hong Kong Academy of Sciences in 2017. In 2022 Professor Mok was recipient of the Future Science Prize in Mathematics and Computer Science, and the Tan Kah Kee Science Award in Mathematics and Physics of the Chinese Academy of Sciences.

PROFESSOR
HEE OH

Mathematical Sciences
Committee



Professor Hee Oh is the Abraham Robinson Professor of Mathematics at Yale University. She earned her BS from Seoul National University in 1992 and her PhD from Yale University in 1997. Before joining Yale, she held faculty positions at Princeton University, California Institute of Technology and Brown University.

Her research interests lie in Discrete subgroups of Lie groups, Dynamics, Geometry and their connections to Number theory.

Professor Oh has received various honours, including the Satter Prize in 2015, Guggenheim Fellowship in 2017, and the Ho-Am Prize in Science in 2018. She was an invited speaker at the 2010 International Congress of Mathematicians and was on the Fields Medal committee for the 2018 ICM. She is an inaugural Fellow of the American Mathematical Society and was the Vice President of the AMS for 2021–2024. In 2024, she was elected as a member of the American Academy of Arts and Sciences.

SELECTION COMMITTEE MEMBERS

PROFESSOR HORNG-TZER YAU

Mathematical Sciences
Committee



Professor Horng-Tzer Yau is currently the Merton Professor of Mathematics at Harvard University. He received his BS in Mathematics from Taiwan University and PhD in Mathematical Physics from Princeton University (1987). Before joining Harvard University, he was a faculty member at New York University and Stanford University. In 2013–2014, he was a distinguished visiting professor at the Institute for Advanced Study in Princeton.

Professor Yau worked on a wide range of problems in mathematical physics and probability theory. The topics include quantum many-body systems, quantum dynamics, interacting particle systems and random matrix theory.

He delivered the Marston Morse Lecture at the Institute for Advanced Study in 2022. Professor Yau received various honours, including the Packard Fellowship (1991), MacArthur Fellowship (2000), Henri Poincaré Prize (2000), Simons Investigator Award (2012), and American Mathematical Society Eisenbud Prize (2017). He is a member of the Academia Sinica and the US National Academy of Sciences.

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MS ASTRID CHAN

Project Producer and Corporate Trainer



Ms Astrid Chan is a highly accomplished professional with a remarkable 30-year career in the performing arts industry. She has excelled as a versatile performer, corporate trainer, and emcee for prominent events.

Her hosting expertise spans diverse occasions such as the “New Year’s Eve Countdown”, “Miss Chinese International Pageant” and the opening ceremony of the “Hong Kong Palace Museum”. She has also showcased her acting talent in classic dramas like “Healing Hands” and “When Heaven Burns”.

In 2016, Ms Chan received the prestigious “Outstanding Women Award” in recognition of her remarkable achievements.

MR LEON KO

Composer



Mr Leon Ko received a Richard Rodgers Development Award in the US for his musical “Heading East”. His musical “Takeaway” premiered in London in 2011. In Hong Kong, he won ten awards for his stage musicals, and his current one “I Am What I Am” is touring in China. Mr Ko was the musical director of Jacky Cheung’s world tour of “Snow, Wolf, Lake”. His film music has garnered him a Golden Horse Award in Taiwan, two Hong Kong Film Awards, and an ASCAP screen award in the US. Mr Ko is the curator of “Time In A Bottle”, showcasing the artistry of vintage perfume bottles in the context of theatre.

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BIOGRAPHICAL NOTE

Scott D Emr was born in 1954 in Jersey City, New Jersey, USA and is currently the Nancy M and Samuel C Fleming Professor of Molecular Biology and Genetics, Cornell University, USA. He received his PhD in Molecular Genetics from Harvard Medical School, USA in 1981. He was a Miller Research Scholar at the University of California, Berkeley, USA (1981–1983). He then worked at the California Institute of Technology, USA, where he was successively Assistant Professor and Associate Professor (1983–1991). Prior to joining the faculty at Cornell, he was a Distinguished Professor at the School of Medicine, University of California, San Diego, USA and an Investigator of the Howard Hughes Medical Institute (1991–2007). He is a member of the US National Academy of Sciences and the American Academy of Arts and Sciences.



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