The Shaw Prize

The Shaw Prize is an international award which honours individuals for achieving distinguished breakthroughs in academic and scientific research or applications, who have made outstanding contributions in culture and the arts, 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 will be given to individuals whose significant work was recently achieved, or whose works' profound impact becomes increasingly apparent.

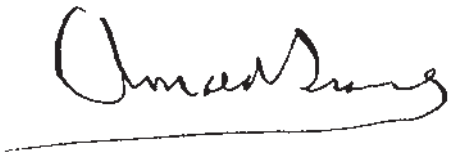
Founder's Biographical Note

The Shaw Prize was established under the auspices of Mr. Run Run Shaw. Mr. Shaw, born in China in 1907, is a native of Ningbo County, Zhejiang Province. He joined his brother's film company in China in the 1920s. In the 1950s he founded the film company Shaw Brothers (Hong Kong) Limited in Hong Kong. He has been Executive Chairman of Television Broadcasts Limited in Hong Kong since the 1970s. Mr. Shaw has also founded two charities, The Sir Run Run Shaw Charitable Trust and The Shaw Foundation Hong Kong, both dedicated to the promotion of education, scientific and technological research, medical and welfare services, and culture and the arts.

Message from the Chief Executive

Breakthroughs in science and technologies rapidly unfold new horizons before us, and the discovery of new knowledge enables us to improve our life. Behind all these achievements is the hard work of scientists and researchers.

The Shaw Laureates are illustrious role models for our young people. The Prize is not just about honouring them for their achievements in their respective fields, but also about learning from them how curiosity can be harnessed to benefit mankind, and how tenacious minds can overcome the toughest obstacles. I congratulate the Shaw Prize winners on their excellent work. I am sure they will continue to be a source of inspiration and encouragement for future generations of scientists and researchers.



Donald Tsang
Chief Executive
Hong Kong Special Administrative Region

THE SHAW PRIZE 邵逸夫獎

Message from the Founder

The pathway to knowledge is charted by remarkable individuals determined to push back the frontiers of learning in pursuit of their goals. Their discoveries created opportunities for academic and scientific breakthroughs vital for the advancement of civilization. The Shaw Prize is founded on the principal of encouraging exceptionally dedicated people in their search for knowledge, and if it can raise awareness of education as a birthright and in any small way advance the progress of challenges yet unconquered, then its aims and our hopes are assured.

Run Run Shaw

Message from Chairman of Board of Adjudicators

This is the second annual Shaw Prize Award Ceremony. In establishing the Shaw Prize Mr. and Mrs. Shaw and the Shaw Prize Council considered various scientific disciplines and selected three fields: Astronomy, Life Science and Medicine, and Mathematical Sciences. These choices were based on the following reasons. All three fields have made fundamental progress in the twentieth century and promise to make further spectacular progress in the twenty-first century. They represent the highest level of intellectual achievement essential for the future of mankind. The Shaw Prize Council is pleased that with the help of the three Selection Committees the prizes awarded last year and this year do indeed fulfill these lofty goals.

Chen Ning Yang

Chen-Ning Yang

The Shaw Prize Medal

The front of the medal displays a portrait of Sir Run Run Shaw, next to which are the words and Chinese characters for the title of "The Shaw Prize". On the reverse, the medal shows the award category, the relevant year and the name of the prizewinner. A seal of imprint of the Chinese phrase "制天命而用之" (quoted from Xun Zi – a thinker in the warring states period of Chinese history in 313 – 238 B.C.) meaning "Grasp the law of nature and make use of it" appears in the upper right corner.

AGENDA

Arrival of Officiating Guests and Winners

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Speech by The Honourable Donald Tsang,
Chief Executive of Hong Kong SAR, People's Republic of China

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Welcome Speech by Professor Chen-Ning Yang
Chairman, Board of Adjudicators, The Shaw Prize

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Speech by Professor Frank H. Shu
Member of Board of Adjudicators
Chairman of the Prize in Astronomy Committee

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Speech by Professor Arthur K. C. Li
Member of Board of Adjudicators
Chairman of the Prize in Life Science and Medicine Committee

****

Speech by Professor Wenjun Wu
Member of Board of Adjudicators
Chairman of the Prize in Mathematical Sciences Committee

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Award Presentation

Grand Hall
Hong Kong Convention and Exhibition Centre
September 2, 2005

AWARD PRESENTATION

(Category listed in alphabetical order)

Astronomy

Professor Geoffrey Marcy

&

Professor Michel Mayor

Life Science and Medicine

Sir Michael Berridge

Mathematical Sciences

Professor Andrew John Wiles

Professor Frank H. Shu
Member of Board of Adjudicators
Chairman of the Prize in Astronomy Committee

Professor Frank Shu is presently the President and Professor of Physics at the National Tsing Hua University in Taiwan and regarded as one of the world's leading authorities in theoretical astrophysics and star formation.

Professor Shu is known for pioneering theoretical work in a diverse set of fields, including the origin of meteorites, the birth and early evolution of stars, the process of mass transfer in close binary stars, and the structure of spiral galaxies.

Educated at Massachusetts Institute of Technology and Harvard, Professor Shu held faculty appointments at the State University of New York at Stony Brook and University of California at Berkeley before becoming President of the National Tsing Hua University in 2002. From 1994 to 1996 he served as the President of the American Astronomical Society, and is a current member of the National Academy of Sciences, the American Academy of Arts and Sciences, the American Philosophical Society, and the Academia Sinica in Taiwan. He has received a number of honours and awards, i.e., Warner Prize (1977), Oort Professor of Leiden University (1996), Brouwer Award (1996), and Heineman Prize (2000).

THE SHAW PRIZE 邵逸夫獎

The Prize in Astronomy 2005

Geoffrey Marcy

and

Michel Mayor

For finding and characterizing the orbits and masses of the first planets around other stars, thereby revolutionizing our understanding of the processes that form planets and planetary systems.

Geoffrey Marcy

My grandparents met in the Panama Canal Zone. There, Sylvain Misrahi and Pearl Sper (on my father's side) and Saul Moishe (Martin) Isaacs and Ethyl Hiller (on my mother's) gave birth to their only children, Robert Misrahi and Gloria Isaacs, respectively, my parents. Both families encouraged education, music, and sports, all of which filled my childhood in the Los Angeles suburbs of the San Fernando Valley during the 1960's.

My mother and father, with college educations in anthropology and aerospace engineering, respectively, made a home in which curiosity, discussion, and science were common. I can remember vividly my mother actively supporting civil rights for minorities in the early 1960's, and my father explaining the ingenuity behind jet engines, supersonic flight, and the Space Shuttle. When my parents bought me a used, 4 1/4-inch Newtonian telescope, I would climb out my window onto the patio roof every night to examine the planets, nebulae, and the galaxies. Saturn's rings still seem spectacular to me.

I enjoyed the public schools in Los Angeles from 1959 to 1972. I struggled to do well in classes, but was mesmerized by chemistry and physics in high school. The structure of atoms and the grandeur of galaxies seemed intimately linked. At UCLA, I played cello in the orchestra and sports in the intramural leagues. But I spent most of my time in the physics library. Among my many inspiring professors were Ray Orbach, George Abell, and Mike Jura. When I floundered at a simulation of heating and cooling balance in interstellar gas, professor Jura admonished me, "If nature can do it, so can you." That can-do attitude proved invaluable later in detecting planets.

In graduate school at UC Santa Cruz, Dr. George Herbig took me to the Lick Observatory "120-inch" telescope every month, where he taught me the value of painstaking care in observational astrophysics. He taught me stellar spectroscopy, and gave me a project to measure Doppler shifts of "T Tauri" stars. Challenged by invisible systematic errors, I wondered if Doppler shifts could be measured to arbitrarily high precision. Meanwhile, a young professor, Steven Vogt, built new, high resolution spectrometers and detectors that ultimately would make planet detection possible.

After finishing my Ph.D. dissertation on the Zeeman effect in Sun-like stars, I received a Carnegie Fellowship at the "Mt. Wilson and Las Campanas Observatories" in Pasadena. During my first year there, I suffered from feelings of

THE SHAW PRIZE 邵逸夫獎

inadequacy and incompetence. My Zeeman work had been criticized and indeed I saw little future in it. One morning in the shower, I decided to hunt for planets around other stars.

I took a faculty position at San Francisco State University and met a brilliant student there, Paul Butler, who was pursuing both a bachelor's degree in chemistry and a Master's degree in physics. We decided to search for planets, inspired by the Canadian astronomer, Bruce Campbell, who cleverly employed Hydrogen Flouride gas as a wavelength standard. In 1986, Paul hunted for a chemical alternative to hazardous HF gas, finally settling on molecular iodine at 50 C as optimal. We had no access to telescopes, but Lick Observatory generously gave us a few nights on the 24-inch "CAT" telescope and one or two nights during full moon on the "120-inch" telescope each semester. From 1987-1995, we took repeated spectra of 120 nearby stars, but our Doppler shift precision was no better than 15 meters per sec. When we told other astronomers about our search for extrasolar planets, they would usually smile politely, look down at their shoes, and change the subject.

However, Paul and I spent thousands of hours inventing and testing a wide variety of computer algorithms to improve the Doppler precision. A breakthrough came in the early 1990's when we realized that the spectrometer's instrumental profile was smearing the spectrum asymmetrically, causing false Doppler shifts. When Paul went to the University of Maryland to obtain a Ph.D., he continued the development of the Doppler code while we also continued to acquire spectra at Lick. Paul was the engine that powered our planet search to success.

In 1995, our algorithms were finally achieving a precision of 5 meters/sec, just as the Swiss team led by Michel Mayor announced the first extrasolar planet. We confirmed it within a week, and then used our new technique to process the spectra from the 120 stars we had been observing. We announced our first two planets two months later, orbiting 70 Virginis and 47 Ursae Majoris. Within a couple of years we found 10 more, and to date (August, 2005) our team has found 107 exoplanets (the smallest being 7 Earth-masses) without a single false claim.

In 1999 we discovered the first multiple-planet system (upsilon Andromedae) which had the clear architecture of a planetary system, and we also co-discovered a transiting planet that dimmed the star, proving the planet's existence (for those who doubted). Most naysayers about the existence of our planets were satisfied.

The discovery of extrasolar planets has sparked a new search for habitable worlds. Indeed, my research group, led by Paul and Drs. Debra Fischer and Steven Vogt, is building a new 2.4-meter telescope designed to find the rocky, terrestrial planets. Meanwhile, I get the greatest pleasure from bringing the news of other worlds to students, who will lead the next-generation quest for life in the universe.

Michel Mayor

I was privileged as a young student to benefit from the teaching of several exceptional professors who knew how to awaken interest in the sciences. As I studied at Lausanne University I was fascinated by the beauty of physics, particularly thanks to the courses of theoretical physics given by Prof. K.G. Stueckelberg.

During the 1960s C.C. Lin and F. Shu were the first to explain the spiral shape observed in several galaxies, including the Milky Way. My doctoral thesis carried out at Geneva University was devoted to the search for evidence of spiral structure in the Milky Way in the velocity distribution of stars close to the Sun. Kinematics data existing at that time in literature was scarce. In particular, acquiring radial velocities was a long and fastidious process. Upon completing my thesis I therefore decided to develop a specific spectrograph to measure stellar radial velocity. This was the start of my interest in stellar kinematics. This research led to various fields of interest, among which was the study of statistical characteristics of solar-type binary stars. This latter study was carried out in collaboration with Antoine Duquennoy and we were naturally driven to study small mass companions to stars analogous to our Sun. We then discovered that the mass of some of these companions could be sub-stellar. By the end of the 1980s the evolution of technology was such as to allow for the development of a new spectrograph. ELODIE, a spectrograph built at the Haute-Provence Observatory, reached a level of precision of 10 m/s, thus permitting detection of extra-solar planets.

Didier Queloz, a young PhD student, and I then measured, night after night, some 140 stars similar to our Sun. Our study aimed at discovering brown dwarfs as well as giant planets. Our measuring strategy, disregarding any constraints of presumed giant planet periods, enabled us to discover short period companions.

At the end of our first season measuring with the ELODIE spectrograph, we noted that the velocity of the star 51 Pegasi showed a periodic variation which could be interpreted as that caused by the influence of a planet: a planet of a smaller mass than that of Jupiter. We observed an orbital period of 4.2 days, which disagreed

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with theoretical predictions. It was only after the second season and after ascertaining that the effect was still there that we ventured to announce the discovery of the first extra-solar planet. The discovery of this first planet having a very short orbital period made it necessary to take into account the orbital migration of planets during their formation in an accretion disk. This mechanism had already been studied fifteen years before the discovery of 51 Pegasi. However, the prediction of the migration of exoplanets had never been used to build observing strategies! From then on I was caught in the whirl of the search for exoplanets, a whirl that constantly drives us to new research and new discoveries. Upon detecting another very short period planet in the summer of 1999 we were able to predict the exact time when that planet might transit in front of its star. At the predicted time, on September 9 of that year, D. Charbonneau observed the first planetary transit, which proved that we were indeed observing gas planets such as Jupiter or Saturn.

The new spectrograph built in 2004 and installed at La Silla in Chile was ten times more sensitive and permitted detection of ever lighter planets, only a few times the mass of the Earth. To this day our group has discovered some 70 exoplanets, although every time with the same enthusiasm in view of the diversity of each planetary system. The number of exoplanets is already large enough to permit insight into their statistical properties, while always bearing in mind constraints dictated by the formation mechanisms of planetary systems.

Fortunately this professional excitement is counterbalanced by a peaceful family life. My wife Francoise and I were married at the beginning of my career as an astrophysician and we have had three children. Now that they are adults they provide us with new insight into other fields of scientific research: Anne is an archaeologist into African prehistory; Claire is confronted with human misery as a neuro-pediatrician and Julian, a physicist, has recently completed a PhD in neurosciences. The whole family enjoys the same attraction for outdoor activities and nature. And already a new generation brings happiness and liveliness to our family. It may be that in two or three decades they will have a chance to live at an epoch where we will have a first answer to the long-standing and fascinating question of the plurality of life in the Universe.

Professor Arthur K. C. Li
Member of Board of Adjudicators
Chairman of the Prize in Life Science and Medicine Committee

Professor Arthur K. C. Li is the Secretary for Education and Manpower of the HKSAR. Before taking up this post in August 2002, he was the Vice-Chancellor of The Chinese University of Hong Kong. Formerly he was the Professor of Surgery and Dean of the Faculty of Medicine.

Professor Li has received many honours, including the Gold Bauhinia Star, the President's Gold Medal of the Royal College of Surgeons of Edinburgh, UK, honorary Doctorate of Science by The University of Hull, Honorary Doctorate of Letters by The Hong Kong University of Science and Technology, Honorary Doctorate of Laws by The Chinese University of Hong Kong and honorary Doctorate by Soka Univesity, Tokyo. He also holds honorary fellowships of various prestigious medical bodies such as the American College of Surgeons, the Royal College of Physicians and Surgeons of Glasgow, the Royal College of Surgeons of Ireland, the Association of Surgeons of Great Britain & Ireland, the Royal Society of Medicine, UK, and the Royal College of Physicians of England.

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The Prize in Life Science and Medicine 2005

Sir Michael Berridge

For his discoveries on calcium signalling in the regulation of cellular activity.

Sir Michael Berridge

I was born in 1938 in Gatooma, a small town in the middle of Rhodesia, which is now Zimbabwe. I began my education at Jameson High School where I was fortunate enough to be taught biology by Pamela Bates, because she fostered my academic interests and encouraged me to pursue a scientific career. I enrolled in the University of Rhodesia and Nyasaland in Salisbury to read Zoology and Chemistry where I received my B.Sc. in 1960. I then travelled to England to begin research on insect physiology with Sir Vincent Wigglesworth at the University of Cambridge and was awarded my Ph.D. in 1964. I then travelled to the United States to begin a period of post-doctoral study first at the University of Virginia and later at Case Western Reserve University in Cleveland. During my stay in Cleveland I became fascinated about how cells communicate with each other and obtained valuable advice from Dr Ted Rall who a few years earlier had worked together with Earl Sutherland who received a Nobel Prize for his discovery of the second messenger cyclic AMP. Full of enthusiasm I returned to Cambridge in 1969 to take up an appointment at the AFRC Unit of Insect Neurophysiology and Pharmacology. Currently I am an Emeritus Babraham Fellow at The Babraham Institute Laboratory of Molecular Signalling.

A few years after returning to Cambridge, I was lucky enough to discover that inositol trisphosphate (IP_3) is a second messenger, which plays a universal role in regulating many cellular processes including cell growth and information processing in the nervous system. My studies on cell signalling began with an interest in trying to understand the control of fluid secretion by an insect salivary gland. This simple model system enabled me to unravel the major features of this new signalling pathway and this led to the discovery of a novel second messenger system responsible for regulating intracellular calcium signalling.

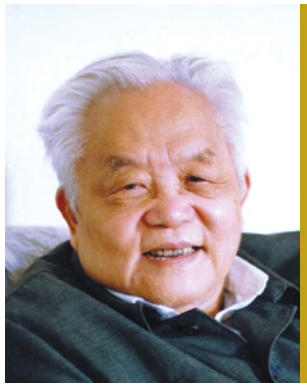
A role for second messengers in controlling fluid secretion was first recognised when cyclic AMP was found to mimic the stimulatory action of 5-hydroxytryptamine. Subsequent studies revealed that calcium was also important and I was one of the first to draw attention to the integrated action of the cyclic AMP and calcium messenger systems. I showed that signal calcium could be derived from both external and internal reservoirs and was puzzled, like many

THE SHAW PRIZE 邵逸夫獎

others, about how cells gained access to their internal stores of calcium. The answer lay in Michell's hypothesis that the hydrolysis of inositol lipids played a role in calcium signalling. I developed a new approach to study receptor-mediated inositol lipid hydrolysis by measuring inositol phosphate formation. Of particular significance was the introduction of the lithium amplification technique to provide an exquisitely sensitive method for measuring inositol lipid turnover. My work on lithium provided new insights into how this drug controls manic-depressive illness. Using the lithium amplification method, I demonstrated that hormones stimulated a rapid formation of IP_3, which led me to propose that this metabolite might function as a second messenger. Such a messenger role was rapidly verified when IP_3 was found to mobilize calcium when injected into cells. It is now apparent that the IP_3/calcium signalling system regulates a wide range of cellular processes such as fertilization, secretion, metabolism, contraction, cell proliferation and information processing in the brain. This work has sparked a worldwide interest in the role of this signalling system in cell regulation.

My most recent work has concentrated on the spatial and temporal aspects of calcium signalling. I discovered that the level of calcium oscillates when a hormone stimulates cells. What was very exciting was the fact that oscillation frequency varied with agonist concentration, which led me to propose that the signalling system was frequency-modulated. My earlier discovery of the IP_3/calcium pathway then provided an explanation of such oscillatory activity. My laboratory has also been interested in exploiting rapid confocal imaging techniques to characterize the elementary events of calcium signalling. This radically new understanding of how calcium signals are produced has provided new insights into both neural and cardiac cell signalling.

I became a Fellow of Trinity College in 1972 and was elected a Fellow of The Royal Society in 1984. In 1999 I was elected to the National Academy of Sciences and the American Academy of Arts and Sciences. For my work on second messengers I have been fortunate to receive numerous awards and prizes, including The King Faisal International Prize in Science, The Louis Jeantet Prize in Medicine, The Albert Lasker Medical Research Award, The Heineken Prize for Biochemistry and Biophysics, The Wolf Foundation Prize in Medicine and The Shaw Prize in Life Science and Medicine. In 1998 I went to Buckingham Palace to be knighted by HM Queen Elizabeth II for services to science.



Professor Wenjun Wu
Member of Board of Adjudicators
Chairman of the Prize in Mathematical Sciences Committee

Professor Wenjun Wu is a Fellow of the Chinese Academy of Sciences and fellow of the Third World Academy of Sciences. He is presently the Deputy Director and Researcher of the Institute of Systems Sciences, Academy of Mathematics and Systems Sciences at the Chinese Academy of Sciences.

Professor Wu first founded and developed the methods to demonstrate geometric theorem and solve equation by machine and he also advanced a brand-new theory in automatic inference research, both of which had a significant effect on the development of geometry.

He has received several awards: National Natural Science First Prize Award (1956), Mathematics Prize from the Third World Academy of Sciences, and the Chen Jiageng Mathematics and Physics Science Prize. He was awarded the Prominent Scientist Prize by Hong Kong Qiushi Foundation (1994), Herbrand Prize - the highest prize of automated reasoning (1997), and the State Pre-eminent Science and Technology Award (2000).

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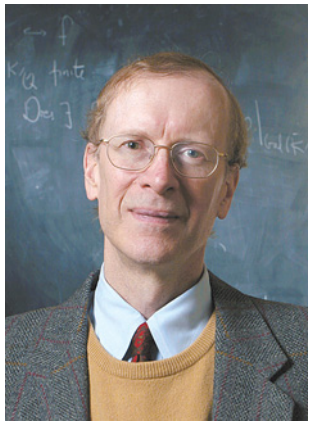
The Prize in Mathematical Sciences 2005

Andrew John Wiles

For his proof of Fermat's Last Theorem.

Andrew John Wiles



Perhaps the most important encounter with mathematics in my schooldays was when I found a copy of E.T. Bell's 'Fermat's Last Theorem' in my local library. As a ten year old I was immediately captivated by this three hundred year old problem. The question was clearly stated on the cover: can you prove that there are no solutions in rational numbers, none of which are zero, to the equation

$$x^n + y^n = z^n$$

when n is an integer greater than or equal to three? Fermat had claimed in the margin of his copy of a book of the classical Greek mathematician Diophantus that he 'truly had a wonderful proof but this margin is to small to contain it'.

I passed many hours of my childhood in trying to solve this problem. Neither of my parents was a mathematician but they were both sympathetic to the field. My mother had studied mathematics and physics and my father was a theologian but he always enjoyed puzzles and had been a codebreaker during the war. After undergraduate studies at Oxford I went to Cambridge as a graduate student in number theory, the branch of mathematics that tries to solve problems like the one of Fermat.

Together with my supervisor John Coates I worked on problems to do with elliptic curves. These problems go back a thousand years but the modern study of them began with Fermat. We were successful in making the first progress on a fundamental conjecture in the subject due to Birch and Swinnerton-Dyer.

After finishing my graduate studies in Cambridge I went on to my first position at Harvard, where after two years learning about modular forms and modular curves I began a very successful collaboration with Barry Mazur. This resulted in the resolution of the Iwasawa conjecture.

In 1982 after an interlude in Europe I moved to Princeton where I have remained, except for leaves abroad, ever since. For the first few years I pursued a generalization of what I had been doing at Harvard. However in 1986 after returning from a leave in Paris I heard the news that a new approach to Fermat's Last Theorem had opened up, thanks to new ideas of Frey, Serre and Ribet. This

THE SHAW PRIZE 邵逸夫獎

transformed my working life. The methods that I had tried to use in childhood and during my student days were tired and when I had started graduate studies I had put them aside. Now I had a new opportunity to work on the problem this time using the theories of elliptic curves and modular curves. Moreover these were exactly the theories that I had been studying in my Cambridge and Harvard days. The challenge proved irresistible.

For the next seven years I worked on this approach to Fermat. The period was a private one for I soon found that it was inadvisable to discuss what I was working on. It was a period of intense work, searching for clues in what had been done, trying and retrying ideas until I could force them to take shape, a period of frustration too but punctuated by sudden thrilling insights that encouraged me to think I was on the right track. Then after five years I made a profound discovery. I could reduce the problem to a question that was precisely of the type I had studied in Harvard and during my first years at Princeton.

During the next two years I worked frantically to try to finish it and finally in May 1993 I believed I had done so. I presented the results of my work in June 1993 at a conference in Cambridge. At the end of the summer a problem was pointed out to me that led me to an error in one part of the proof, and I had to set about finding an alternative path for that section. It took me until September of 1994 to find the remedy, during which time I had the assistance first of a colleague Nick Katz (who had pointed out the first problem to me) and then of a former student of mine, Richard Taylor, with whom part of the final version was jointly written. The moment of illumination when I found the final key was one of unparalleled excitement and relief.

The year that I spent in correcting the argument was not an easy one. Happily during 1988 I had married my wife Nada and we had two daughters by the time of the Cambridge conference. Our third was born in May of 1994 in time for the final resolution. I cannot imagine that period without the support and demands of a family. It was hard to tear myself away from thinking about the problem every waking moment but fortunately my daughters managed to distract me just enough to keep some balance in my life.

The proof was published in May 1995 in the Annals of Mathematics, some 350 years after Fermat first wrote down the problem.

Organization

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The Chinese University of Hong Kong

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The Shaw Prize

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Professor Yue-Man Yeung (Chairman of committee)
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Chairman, Board of Adjudicators

Professor Chen-Ning Yang

Professor Chen-Ning Yang, an eminent contemporary 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 Ji-Bei Hoang and Kai-Qun Lu Professor at Tsinghua University, Beijing, since 2005.

Professor Yang received many awards: Nobel Prize in Physics (1957), Rumford Prize (1980), U.S. National Medal of Science (1986), Benjamin Franklin Medal (1993), Bower Award (1994) and others. He is a member of the Chinese Academy of Sciences, the Academia Sinica in Taiwan, the U.S. Academy of Sciences, Royal Society of London, and the Russian Academy of Sciences.

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

Selection Committee (2003-2005)

(in alphabetical order)

Member of Astronomy Committee

Professor Guoxiang Ai

Professor Guoxiang Ai is an astrophysicist, graduated from Geophysics Department of Peking University in 1963. He is currently the Professor and Director of National Astronomical Observatories of the Chinese Academy of Sciences. He was selected a Member of the Chinese Academy of Sciences in 1993, Member of the National Space High Technology Committee and Chairman of the International Astronomical Union Commission 10 (1997-2000), Director of Divisions of Mathematics and Physics of Chinese Academy of Sciences from 2002-2004.

Professor Ai invented the real-time, two-dimensional spectrometer based on a birefringent filter. This contribution has forwarded the development of solar magnetic field measurement by three generations. He was awarded three first prizes of the Science and Technology Progress Award of the Chinese Academy of Sciences and one first prize and one second prize of the National Science and Technology Progress Award. He was awarded the HLHL Prize (by Ho Leung Ho Lee Foundation) in 1996.

Now he applies himself to the development of space astronomy and proposed a large project that is Space Solar Telescope and the phase A (assessment study) of it was completed and design (phase B) of it was basically completed. The telescope is under development.

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Member of Astronomy Committee

Professor Jiansheng Chen

Professor Jiansheng Chen is a reputed astrophysicist and Fellow of the Chinese Academy of Sciences. He is currently Head of Department of Astronomy at Peking University (Beijing University).

Professor Chen is also the former Deputy Director of the Academic Division of Mathematics and Physics of the Chinese Academy of Sciences (1998-2002), the Chairman of the Astronomical Advisory Board of Chinese Academy of Sciences, member of the Academic Degree Committee of the State Council and member of the Expert Group for Post-doctorates of the Personnel Ministry, Director of the Department of Astronomy of Peking University.

He has been primarily engaged in research in the fields of QSO absorption line, QSO survey, Galactic Physics and Large scale astronomy and is now the PI of the National Major Research Project (973 Project) : "The Galaxy Formation and Galactic Evolution"; he has also been in charge of key projects of the National Science Foundation.

Member of Astronomy Committee

Professor Joseph Hooton Taylor

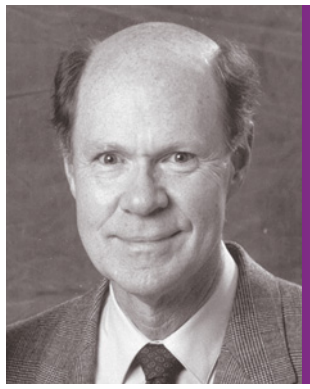
Professor Joseph Taylor, an American, is the James McDonnell Distinguished University Professor of Physics at Princeton University and works in the field of radio astronomy. He co-discovered the first binary pulsar and was awarded the Nobel Prize for Physics in 1993.

He has been Professor of Physics at Princeton since 1980, and served as Dean of the Faculty there from 1997 to 2003. He taught at the University of Massachusetts, Amherst, from 1969 to 1980.

He is a member of the National Academy of Sciences and the American Philosophical Society and a fellow of the American Academy of Arts and Sciences and the American Physical Society. He was co-chair of the National Research Council's Decade Survey of Astronomy and Astrophysics from 1999 to 2002. He earned his BA degree with honors in physics from Haverford College and his Ph.D. degree in Astronomy from Harvard University.

Professor Taylor has received numerous awards including the Dannie Heineman Prize of the American Astronomical Society and American Institute of Physics, a MacArthur Fellowship, and the Wolf Prize in Physics.

THE SHAW PRIZE 邵逸夫獎



Member of Astronomy Committee

Dr. Robert Woodrow Wilson

Dr. Robert W. Wilson is a Senior Scientist at the Smithsonian Astrophysical Observatory of the Harvard Smithsonian Center for Astrophysics in Cambridge Massachusetts. He is technical leader of the Sub-Millimeter Array, a recently completed 8 element synthesis radio telescope.

Dr. Wilson received a B.A. from Rice University in 1957 and a Ph.D. from the Caltech in 1962. After a one year postdoc at the Caltech, he joined Bell Laboratories. From 1977 until 1994 Dr. Wilson was Head of the Radio Physics Research Dept. in Holmdel, NJ.

His early work was in the fields of Galactic radio astronomy and precision measurement of radio source strengths. He was a co-discoverer in 1964 of the 3K cosmic background radiation which originated in the Big Bang and for which he shared the 1978 Nobel Prize in Physics. In 1970 he and his co-workers discovered a number of interstellar molecules including Carbon Monoxide in the 2-3 mm band. This opened up the study of molecular clouds and star forming regions.

He is a member of the American Astronomical Society, the American Academy of Arts and Sciences, the International Astronomical Union, the International Union of Radio Science, the American Physical Society, the National Academy of Sciences.

Member of Life Science and Medicine Committee

Professor Tai-Fai Fok

Professor Tai-Fai Fok is presently the Dean of Medicine of The Chinese University of Hong Kong and Chairman of the Department of Paediatrics.

His research interests are neonatology in general, neonatal pulmonology and aerosol therapy and environmental pollution, energy expenditure and oxygen consumption of newborns.

He is also active in formulating government policy and providing consultancy advice to professional bodies. He is a council member of Hong Kong Medical Council, and member of the Nursing Council of Hong Kong, Health and Welfare Bureau. He has been the President of Hong Kong College of Paediatricians since 2003.

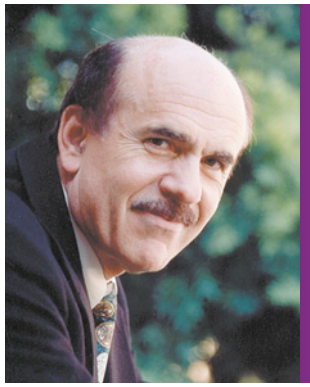
THE SHAW PRIZE 邵逸夫獎

Member of Life Science and Medicine Committee

Dame Deirdre Hine

Dame Deirdre Hine is a prominent leader in public health and medicine, and has played leading role in regulating the regime and the progress of medicine in the United Kingdom. In 1997, she was awarded the DBE for Services to Medicine.

Deirdre Hine was Chief Medical Officer for Wales, UK from 1990 to 1997. She is a Public Health Physician with experience in the fields of Paediatrics, Geriatric Medicine and Cancer Services. Since her "retirement" she has been President of the Royal Society of Medicine and Chair of the UK Government's Commission for Health Improvement. She is currently the Chair of the BUPA Foundation, a Member of the Board of the Pfizer UK Foundation, Chairman of the Royal Society of Medicine Press and an Independent Member of the House of Lords Appointment Commission. She has been elected President of the British Medical Association for 2005-2006.



Member of Life Science and Medicine Committee

Professor Louis J. Ignarro

Professor Louis J. Ignarro is a leading specialist in Pharmacology and Toxicology. He was one of three American pharmacologists whose research led to the discovery that nitric oxide is used as a unique signalling molecule in the cardiovascular system. The discovery has led to the development of new medical treatments. For this discovery, he won the 1998 Nobel Prize in Physiology or Medicine with colleagues Robert Furchgott and Ferid Murad.

He is currently the Distinguished Professor of Pharmacology at the University of California, Los Angeles (UCLA). He has received numerous awards i.e. ten Golden Apple Awards at UCLA, Merck Research Award 1974, U.S.P.H.S. Career Development Award 1975-1980, Edward G Schlieder Foundation Award 1973-1976, and the Lilly Research Award 1978. He has been elected to the National Academy of Sciences and the American Academy of Arts and Sciences.

THE SHAW PRIZE 邵逸夫獎

Member of Life Science and Medicine Committee

Professor Lap-Chee Tsui

Professor Lap-Chee Tsui is a famous geneticist and presently the Vice-Chancellor of the University of Hong Kong. Prior to taking up his present appointment in September 2002, Professor Tsui was Geneticist-in-Chief at The Hospital for Sick Children in Toronto and Head of the Genetics and Genomic Biology Program of its Research Institute. He was also the holder of the H.E. Sellers Chair in Cystic Fibrosis and University Professor at the University of Toronto.

He received international acclaim in 1989 when he identified the defective gene (viz. Cystic Fibrosis Transmembrane Regulator (CFTR)) that causes cystic fibrosis, which is a major breakthrough in human genetics.

Professor Tsui has published over 350 scientific articles and received numerous awards, including: Distinguished Scientist of the Medical Research Council of Canada, Fellow of the Royal Society of Canada, Fellow of the Royal Society of London, Member of Academia Sinica, Honorary Fellow of World Innovation Foundation, and Foreign Associate of the National Academy of Sciences of the United States. He also received the Order of Canada (Officer) and Order of Ontario.

Member of Mathematical Sciences Committee

Professor Jean-Pierre Bourguignon

Professor Jean-Pierre Bourguignon, a French mathematician, is a Director of Research at the Centre National de la Recherche Scientifique. He has directed the Institut des Hautes Études Scientifiques since 1994 and is also professor at the École Polytechnique. He was President of the Société Mathématique de France from 1990 to 1992 and of the European Mathematical Society from 1995 to 1998.

A differential geometer by training, he has since pursued his interest in mathematical aspects of theoretical physics, from Yang-Mills theory to general relativity.

Professor Jean-Pierre Bourguignon is a Member of the Academia Europaea and a foreign member of the Royal Spanish Academy. He received the Rayonnement Français Prize in Mathematical Sciences and Physics under the auspices of the Académie des Sciences de Paris in 1997.

THE SHAW PRIZE 邵逸夫獎

Member of Mathematical Sciences Committee

Professor Phillip A. Griffiths

Professor Phillip A. Griffiths, a renowned mathematician specialized in algebraic geometry, is presently professor of Mathematics at the Institute for Advanced Study, where he served as Director from 1991 to 2003.

Prior to joining the Institute, he was Provost and James B. Duke Professor of Mathematics at Duke University for eight years. From 1972 to 1983 he was a Professor of Mathematics at Harvard University. He has also taught at Princeton University and the University of California, Berkeley. He was a Member of the Institute's School of Mathematics from 1968-1970. He is the Chairman of the Science Initiative Group and the Secretary of the International Mathematical Union in the United States.

Professor Griffiths is a member of the National Academy of Sciences, the American Philosophical Society, and the Council on Foreign Relations. He is a Foreign Associate of the Third World Academy of Sciences and of the Accademia Nazionale dei Lincei and an Honorary Fellow of the Indian Academy of Sciences. He was a member of the National Science Board from 1991 to 1996 in the USA.

Member of Mathematical Sciences Committee

Professor Chang-Shou Lin

Professor Chang-Shou Lin is an academician of Academia Sinica. He is currently the Professor of the Department of Mathematics of National Chung Cheng University, Taiwan.

His research interest is differential geometry and partial differential equations. He received the first Morningside Medal of Mathematics in 1998 and President Science Award of Taiwan in 2001.

He graduated from National Taiwan University and attained his Ph.D. in Mathematics at the Courant Institute of Mathematical Sciences, New York University. He has taught at the Institute for Advanced Study of Princeton University and University of California, San Diego and the National Taiwan University.

THE SHAW PRIZE 邵逸夫獎

Member of Mathematical Sciences Committee

Professor Le Yang

Professor Le Yang is a Fellow of Chinese Academy of Sciences since 1980. He presently serves as the Acting Director of the Morningside Center of Mathematics at the Chinese Academy of Sciences.

Professor Yang was the Director of Institute of Mathematics (1987-1995) and the President of Academy of Mathematics and System Science (AMSS, 1998-2002), Chinese Academy of Sciences. He is the current Professor and Chairman of Scientific Committee of AMSS. He was the Secretary-General (1983-1987) and the President (1992-1995) of the Chinese Mathematical Society.

Mainly engaged in the research on complex analysis, he has made a through study of deficient values and deficient functions and singular directions of meromorphic functions.

Special Acknowledgement

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