



Maarten Schmidt (left) and Donald Lynden-Bell (center) receive the Kavli Prize from Crown Prince Haakon Magnus in Stockholm.

FACULTY FILE

SCHMIDT WINS KAVLI PRIZE

Maarten Schmidt, the Moseley Professor of Astronomy, Emeritus, has been awarded the \$1 million Kavli Prize for his contributions in astrophysics. He is one of the seven first recipients of the prize, and shares the astrophysics award with **Donald Lynden-Bell**, of Cambridge University, who was a Caltech postdoc from 1961 to 1962.


Schmidt and Lynden-Bell are known for discovering that quasars are galaxies harboring supermassive black holes billions of light-years away—and not stars in our own galaxy, as was once believed. The Kavli Astrophysics Prize Committee said, “Maarten Schmidt and Donald Lynden-Bell’s seminal work dramatically expanded the scale of the observable universe and led to our present view of the violent universe in which massive black holes play a key role.”

In 1963, using the 200-inch Hale Telescope on Palomar Mountain, Schmidt studied the visible-light spectrum of quasar 3C273. He discovered that its spectrum was shifted toward longer wavelengths, a phenomenon called the Doppler effect, in which the emitted light from a source depends on its motion relative to the observer. Called a redshift, this difference in wavelength meant the quasar was speeding away from Earth at 47,000 kilometers per second. Looking at the spectrum of another quasar, the astronomers found it was sprinting away at twice the speed of 3C273. Schmidt calculated that these objects lay beyond our galaxy, and he immediately realized that they

must be emitting hundreds of times more energy than the 10 billion stars of the Milky Way. Later, researchers learned that this glut of energy spews from a volume of space no larger than the size of our own solar system. It was Lynden-Bell who suggested that a supermassive black hole feasting on matter at the center of distant galaxies was generating the prodigious amounts of energy. And after studying the evolution and distribution of quasars, Schmidt discovered that quasars were more abundant when the universe was younger.

“I’m delighted with the award. It is in particular a most pleasant surprise after so many years,” Schmidt says. “After all, it’s been 45 years since I found the red shift in quasar 3C273.”

Schmidt was the executive officer for astronomy at Caltech from 1972 to 1975 and chaired the Division of Physics, Mathematics and Astronomy for the following three years; he then served as the last director of the Hale Observatories from 1978 to 1980. Despite being named an emeritus professor 12 years ago, he has continued his research, studying evermore-distant quasars and peering farther into the universe’s past.

The other Kavli Prize recipients are being recognized for contributions in nanoscience and neuroscience. The prize was established through a partnership between the Norwegian Academy of Science and Letters, the Kavli Foundation, and the Norwegian Ministry of Education and Research, and the Norwegian Ministry of Foreign Affairs. The winners received the prizes at an award ceremony in Oslo on September 9. —EN 

HONORS AND AWARDS

R&D magazine has honored the work of Liepmann Professor of Aeronautics and professor of bioengineering **Morteza Gharib** (PhD '83) and his team, including **Emilio Graff** (PhD '07) and postdoctoral fellow **Francisco Pereira** with the R&D 100 Award. The group designed a camera that creates a three-dimensional image by extracting information from a series of images. The researchers say the camera has a myriad of applications, including underwater surveillance, analyzing a person’s gait, and assisting surgeries. The award recognizes 100 of the most significant, commercialized technologies from the past year.


Julia Greer, assistant professor of materials science, has been recognized by *Technology Review* magazine as one of the world’s top innovators under the age of 35 for her work with materials on a nanoscale level. Selected from more than 300 nominees by a panel of expert judges and the editorial staff of *Technology Review*, the TR35 is an elite group of accomplished, young innovators. —JW 



OBITUARY

NEW DIVISION CHAIRS

Andrew Lange, the Goldberger Professor of Physics, has been tapped as the new chair of the Division of Physics, Mathematics and Astronomy. Lange has been at Caltech since 1994, developing experiments to study the early universe.

Richard Murray (BS '85), the Everhart Professor of Control and Dynamical Systems and director of Information Science and Technology, is now the interim chair of the Division of Engineering and Applied Science. Having served as the chair from 2000 to 2005, Murray will hold the position until the next division chair is found. 

PHILIP G. SAFFMAN

1931-2008

Philip Geoffrey Saffman, an influential teacher and noted researcher in fluid mechanics, died peacefully after a long illness on Sunday, August 17, in Pasadena. He was 77 years old.

Saffman, the Theodore von Kármán Professor of Applied Mathematics and Aeronautics, Emeritus, studied vortex instability and the dynamics of arrays of vortices. In particular, he looked into the phenomenon of viscous fingering, which became known as the Saffman-Taylor instability. This occurs when a low-viscosity fluid is injected into a higher-viscosity fluid.

His work with vortices also led him to a new mathematical analysis of the wake turbulence caused by jets as they take off, resulting in a theory describing the conditions behind several aircraft accidents.

"Saffman was one of the leading figures in modern fluid mechanics," said Dan Meiron, the Jones Professor of Applied and Computational Mathematics and Computer Science. "His research had an impact in almost every part of the field." A prolific scholar with a dry sense of humor, he was able to focus on the essence of a problem and explain its complex results in a simple way, Meiron said.

Saffman even formed an unlikely collaboration with his neighbor, Rud-

dock Professor of Biology and Nobel Laureate Max Delbrück. Delbrück was studying the diffusion of protein and lipid molecules in biological membranes, and he would walk around the corner to Saffman's house for ideas. In 1975, the two scientists from disparate fields published a paper, "Brownian Motion in Biological Membranes," that remains well cited today.

Born in Leeds, England, Saffman received his BA, MA, and PhD from the University of Cambridge. In 1964 he accepted Caltech's appointment as a full professor in fluid mechanics within the Division of Engineering and Applied Science. He was named von Kármán Professor in 1995.

He was a Fellow of the American Academy of Arts and Sciences and in 1988 was elected a Fellow of the Royal Society, England's premiere scientific organization. He also received the Otto Laporte Award from the American Physical Society.

Saffman served as associate editor for both the *Journal of Fluid Mechanics and Physical Review Letters* and was most recently an editorial board member for the journal *Studies in Applied Mathematics*.

Saffman is survived by his wife, Ruth; children Louise, Mark, and Emma; and grandchildren Timothy, Gregory, Rae (née Sarah), Jenny, Nadine, Aaron, Miriam, and Alexandra. —JW 