Quite early on the morning of Tuesday, October 5, 2004, Frank Wilczek, Herman Feshbach Professor of Physics at MIT, was standing dripping wet, straight out of the shower, when he learned that he was the winner of the 2004 Nobel Prize in Physics (along with David Gross and David Politzer). The long-awaited phone call from Stockholm was a dream fulfilled for Wilczek, who was cited by the Royal Swedish Academy of Sciences as awarding him the Nobel Prize “for the discovery of asymptotic freedom in the theory of the strong interaction.” This work, which involves the dominant force between quarks, is fundamental to understanding several major problems in particle physics and beyond.

While the week of Nobel festivities, which take place early December in Sweden, is crowned by the ceremonial, prize-giving banquet itself, other important, if uniquely Swedish, events also take place. Frank Wilczek describes one such occasion, and his ad-hoc, “literary” response to it.

“After a week of official Nobel Foundation events and festivities, the student unions of Stockholm University invite the new laureates to become candidates for induction into the Supreme Order of the Ever Jumping and Smiling Green Frog. The exact nature of the tests and trials to which candidates are subjected, and of the initiation rites, are secrets that cannot be betrayed with impunity. Multiple rounds of bonding through Skol and rendition of appropriate Swedish drinking songs precede these mysteries. Midway through the softening-up process, i.e., after about five rounds, I was informed that the youngest laureate is expected to send people home with an appropriate speech. Here is how I scribbled seven rhyming pairs, and rose to the occasion.”
For further details of Prof. Wilczek’s 2004 Nobel Prize in Physics and related events, please visit his faculty web page at web.mit.edu/physics/facultyandstaff/faculty/frank_wilczek.html.

On May 24, 2004, members of the MIT Center for Theoretical Physics (CTP) welcomed the Morningstar Visiting Professor, Ashoke Sen, to MIT. The Department hosted a reception in the lobby of Building 6 in honor of Jane Morningstar (see profile, p. 59), in appreciation of her invaluable contributions to the Department of Physics and for the establishment of the Morningstar Visiting Professorship. Professor Sen spends two months each year with the String Theory group in the CTP as the Morningstar Visiting Professor.

On October 3, 2004, over 150 members of the MIT physics community, including faculty, staff, and friends, joined Department Head Marc Kastner and his wife, Marcia, for the Annual Fall Reception. As if by habit, the weather cleared just in time for guests to enjoy the sun and warmth of early October on the grounds of the MIT Endicott House in Dedham, MA. Faculty and staff were pleased to spend the afternoon with special friends of the Department, such as Neil Pappalardo and his daughter Bethany, Mort Goulder, and Bill and Lex Layson. It was a pleasurable opportunity for our faculty, their families, and new members of the Department to mingle and relax at the start of one of the busiest times in the academic year.
APSELL DINNER FOR ALAN GUTH

Physics alumnus Sheldon Apsell and his wife Paula hosted a lovely dinner at their home in Newton on October 12, 2004, in honor of Victor F. Weisskopf Professor of Physics Alan H. Guth. Twenty-five friends of the Department enjoyed an opportunity to speak one-on-one with Alan over hors d’oeuvres and cocktails. During dinner, the guests, who included Robert Rines and Joanne Hayes-Rines, Robert and Mary Cowen, Naimish Patel, Neil and Jane Pappalardo, and Mort Goulder, had the chance to hear Alan present an informal talk, “Cosmic Inflation and Dark Energy.” Guests stayed long after dessert was served to converse further with Alan, and each other, about topics ranging from the cosmos to finance.

PAPPALARDO DISTINGUISHED LECTURE IN PHYSICS

On October 28, 2004, Dr. Maria Zuber, E. A. Griswold Professor of Geophysics, and Head, Department of Earth, Atmospheric, and Planetary Sciences at MIT, gave the annual Pappalardo Distinguished Lecture in Physics. Her connection to MIT and her involvement in the Mars Global Surveyor Mission was of particular interest to the audience in attendance at her lecture, “Seasonal Changes and Present-day Volatile Abundances on Mars.” In the talk, Prof. Zuber described ongoing orbital observations of carbon dioxide and water on Mars, and how the data is being used to search for evidence of present-day climate change.

Directly following the lecture, faculty and benefactors of the Department joined the Pappalardo family at a dinner at the Charles Hotel, Cambridge, MA, in their honor. Joining Maria Zuber and her husband, and Department Head Marc Kastner and his wife Marcia, were Jay Stein and his wife Gretchen Fox, Andy Jarrell and his wife Valerie Norwood, the Pappalardo Fellows in Physics, and members of the physics faculty.

The Pappalardo Distinguished Lecture in Physics was established in 1999 in honor of Neil and Jane Pappalardo, friends of the Department of Physics who believe in broadening scientific frontiers for the good of humanity.

BREAKFAST LECTURE SERIES:
JOHN JOANNOPOULOS AND NERGIS MAVALVALA

The Francis Wright Davis Professor of Physics, John D. Joannopoulos, presented the November 16, 2004, breakfast talk to a crowd of alumni and friends of the Department at the MIT Faculty Club. John’s talk highlighted his work with “photonic crystals,” a new class of materials whose properties can be tailored to control the flow of light. Also on hand at the talk was one of John’s former students, Udi Meirav, who presented a demonstration of the LED lights in varying strengths developed from their research. In addition to having had the opportunity to don their 3-D shades during the LED demonstration, friends of physics Neil Pappalardo, Donald Steinbrecker, and Ian Eslick...
enjoyed the chance to chat with colleagues, many of whom stayed long afterward to ask questions of John and Udi about their research.

On April 13, 2005, alumni and friends of the Department gathered again at the Faculty Club for a breakfast talk by the Cecil and Ida B. Green Career Development Professor and astrophysicist Nergis Mavalvala on “Detecting Gravitational-Waves with Interferometers.” Nergis’s research efforts have been focused on interferometric gravitational wave detection, using tools such as the Laser Interferometer Gravitational-Wave Observatory (LIGO), which she described to the more than 50 guests in attendance. At the start of the breakfast, Department Head Marc Kastner greeted the guests with an introductory presentation of the various award winners that the Department can be proud of, including faculty and alumni who have won Nobel Prizes in Physics. In attendance were a number of physics alumni, including Joe Hrgovcic and Norman Doelling.

Physics alumnus Mark Mueller returned to campus during the 2005 Independent Activities Period (IAP) to talk with students in the sciences about how skills in physics or mathematics could transfer to a career in finance. Mueller, who began his career in theoretical physics research, is a partner and the director of quantitative research in the global fixed income group at GMO, a global investment management firm. Mueller’s presentation ranged from the practical aspects of job-hunting to philosophical questions about the role of mathematical models in describing and organizing what is observed in financial markets. After the talk, Mueller was on hand to answer questions from students at all levels of study, including those who were anxiously approaching graduation. And, as it never hurts to have connections, he was happy to supply his business card to students looking to broaden their network.

The Department’s flagship postdoctoral fellowship program completed its sixth annual competition in January 2005 with the acceptance of three new fellows for the 2005–08 term. The nearly 180 candidates reviewed by faculty members of the program’s Executive Committee were nominated by physics faculty and senior researchers from around the world, and demonstrated the impressive level of talent that exists amongst the current generation of young physicists who aspire to an MIT Pappalardo Fellowship in Physics.

The 2005–08 Pappalardo Fellows, who began their appointments at MIT in September, will do independent research in the areas of string theory (Henriette Elvang), experimental nuclear and particle physics (Michael Miller) and soft condensed matter theory (Olivia White). Full biographies with research summaries and publications for each Fellow can be found on the Pappalardo Fellowships web pages at web.mit.edu/physics/research.
Fellows departing the program are Joshua Folk (condensed matter experiment), currently working as a postdoctoral associate at the University of Delft before beginning a faculty position at the University of British Columbia, Vancouver; David Kielpinski (atomic physics), who’ll begin a faculty position later this year at Griffith University, Brisbane, Australia; Carlos Nunez (string theory), who accepted a faculty position at the University of Swansea, Wales; Katherine Rawlins (gravitational-wave astronomy), who accepted a faculty offer from the University of Alaska; and Arpita Upadhyaya (biophysics) who’ll be joining the physics faculty of the University of Maryland.

The MIT Pappalardo Fellowships in Physics program was initiated, and is sustained, by funds generously provided by Neil (EE ’64) and Jane Pappalardo.

**FORD/MIT NOBEL LAUREATE LECTURE**

The Institute’s seventh Ford/MIT Nobel Laureate lecture was given by 2004 Nobel Laureate and Herman Feshbach Professor of Physics Frank Wilczek to a standing-room-only crowd in Kresge Auditorium on March 7, 2005. The talk, “The Universe is a Strange Place,” included the eminent theoretical physicist’s description of recent discoveries in physics that demonstrate how “the world is even stranger than we’ve understood so far.” The lecture was videotaped and is now available as a free webcast on MITWorld at http://mitworld.mit.edu/video/253/.

**HARRIS DISTINGUISHED LECTURE**

Dr. Peter Goldreich, Professor Emeritus at the University of Chicago and faculty member at the Institute for Advanced Study in Princeton, NJ, was the 2005 David and Edith Harris Distinguished Lecturer. On March 10, 2005, Dr. Goldreich lectured on the “Progress and Problems in Understanding Planet Formation.” He reviewed the modern scenarios of planet formation and addressed three major questions regarding solar system planets: What determined their number? Why are their orbits nearly circular and coplanar? And, How long did they take to form?

Following the lecture, a reception and dinner was held at the Inn at Harvard in honor of Dr. Goldreich and in celebration of the generosity of Edith and David Harris. Members of the Harris family, many who traveled from Illinois to attend this year’s lecture, joined Department Head Marc Kastner and his wife Marcia and physics faculty for the dinner. Also in attendance were friends of the Department Neil Pappalardo, his daughter and two of his grandsons, as well as Eric and Helga Cosman and current MIT graduate student David Harris, grandson of David and Edith.

The Harris lecture was established by Edith Harris in honor of her husband, MIT physics alumnus David H. Harris (SB ’22), for a life and career dedicated to education.
On March 15, 2005, **Wolfgang Ketterle**, 2001 Nobel Laureate and John D. MacArthur Professor of Physics, gave the 33rd Annual Killian Lecture, as the winner of MIT’s James R. Killian Jr. Faculty Achievement Award. In his talk, “When Freezing Cold Is Not Cold Enough,” Ketterle described work that opens a new door to the quantum world where particles behave as waves and ‘march in lockstep.’ For details on recent advances discovered by Prof. Ketterle and his research group in the field of ultra-cold forms of matter, please visit [http://cua.mit.edu/ketterle_group/](http://cua.mit.edu/ketterle_group/).

The Department closed another eventful year on May 13, 2005, with the annual symposium of its preeminent postdoctoral fellowship program, where five of the Pappalardo Fellows in Physics shared highlights from their independent research to members and friends of the MIT physics community. The physics research showcased at the event ranged from atomic physics to string theory, and featured speakers **David Kaplan** (experimental astrophysics), **David Kielpinski** (atomic physics), **Carlos Nunez** and **Matthew Headrick** (string theory), and **Margaret Gardel** (biophysics). The overflow crowd at the MIT Faculty Club included program founders and benefactors **Neil** and **Jane Pappalardo**, their **son Michael**, **daughters Bethany** and **Melissa** and sons-in-law **Todd Lemke** and **Christopher Frost**, as well as Department friends such as alumnus **Curt Marble** and **Colleen** and **Howard Messing**, who joined Department faculty, students and staff.

For more information on all aspects of the Pappalardo Fellowships in Physics program, please visit the program’s pages in the Research section of the Department’s web site at [web.mit.edu/physics/research](http://web.mit.edu/physics/research).