

Department of Biology

The Department of Biology has 62 active faculty members; 13 are located in the Whitehead Institute, 11 are located in the Center for Cancer Research, 5 are joint appointees with the Department of Brain and Cognitive Sciences, 2 are joint with the Department of Chemistry, 2 are joint with the Biological Engineering Division, and 1 is joint with the Department of Civil and Environmental Engineering. Three faculty members also hold appointments in Biological Engineering. Including active emeritus faculty, the Department has 4 Nobel laureates, 22 members of the National Academy of Sciences, and 11 investigators of the Howard Hughes Medical Institute. The Department of Biology is widely recognized nationally and internationally as a leader in research, scholarship, and education. Its strengths are displayed in the vigor of its research and training activities. Research conducted in the department has produced significant advances in modern biology. A strong tradition and record in training both undergraduate and graduate students as well as postdoctoral fellows has made the department a national resource. Because the Department was one of the first centers of molecular biology, its graduates have played a central role in the explosion of understanding of fundamental biological problems at the molecular level.

Educational Activities

A total of 314 undergraduates were registered as biology majors during the fall 2005 and/or spring 2006 terms; 37 of them left biology for another major during the year, and 56 students declared biology as a major during the academic year. The bachelor of science in biology degree was awarded to 110 students from September 2005 through June 2006, with 86 in the Course 7 Program and 24 in the 7A Program. Sixty-five freshmen declared biology as their major for fall 2006.

Student Awards

Karen Kinnaman '06 from Woodstock, NY, was chosen by the Institute to receive the Malcolm G. Kispert Award.

Varsha Keelara '07 from St. Louis, MO, was awarded a Public Service Fellowship for Independent Activities Period 2006.

The Office of Academic Services awarded Minyoung Jang '08 from East Brunswick, NJ, a Peter J. Eloranta Summer Undergraduate Research Fellowship.

Chris Tostado '06 from Pasadena, CA, received the Star Volunteer Award for four years of inspiration and generosity of spirit from IDEAS.

Huawei Dong '07 from Commack, NY, received the Robert A. Boit Writing Prize.

Uta Maeda '07 from Bel Aire, KS, received first place for the Writing and Humanistic Prize for Engineering Writing.

Zachary Smith '08 from Carlsbad, CA, was awarded second prize for Writing Science Fiction.

Sarah Nelson '06 from Lynnfield, MA, was awarded second prize in the S. Klein Prize for Scientific and Technical Writing.

Patrick Boyle '06 from Wasilla, AR, won the I. Austin Kelly III Essay Prize.

Ji-Eun Park '07 from Springfield, IL, was awarded a Kelly-Douglas Traveling Fellowship for travel that supports studies in the humanities or arts.

Danielle Le '07 from Boston, MA, was chosen to participate in the January Scholars in France program for excellence in the French language.

Fifteen biology majors were chosen for Phi Beta Kappa: Moria Chambers (Ann Arbor, MI), Brian Chase (Leawood, KS), Lara Collazo (Boca Raton, FL), Dennis Ho (Hong Kong), Stephanie Kim (Myersville, MD), Edward Lin (North Potomac, MD), Xiaonan Lin (Mendota Heights, MN), Joshua Michener (Chapel Hill, NC), Catherine Smith (Manchester, MA), Jeanette Tse (Ashburn, VA), Johanna Varner (Salt Lake City, UT), Melanie Worley (Towson, MD), John Yanyun Wu (Bronx, NY), Ryu Yoshida (Bethesda, MD), and Alicia Zhou (Chicago, IL).

Biology Department Awards and Prizes

Adriana Tajonar '06 from Mexico City, Mexico, received the Whitehead Prize for outstanding promise for a career in biological research through academic scholarship as well as contributions to research and the MIT community.

Alejandro Ochoa '06 from El Paso, TX, received the Merck Prize for outstanding research and academic performance in biophysical or bioinformatics sciences.

Alicia Zhou '06 from Chicago, IL, received the Salvador E. Luria Prize for outstanding scholarship and research of publication quality

Lori Huberman '07 from Raleigh, NC, received the Susan Hockfield Prize in Life Sciences, a new award given to a third-year MIT undergraduate student in the life sciences who has demonstrated exceptional performance and promise for graduate study and research.

Xiaonan (Cecelie) Lin '06 from Mendota Heights, MN, received the Ned Holt Prize for demonstrated excellence in scholarship as well as service to the Biology Department and the MIT community.

Melanie Worley '06 from Towson, MD, received the Gene Brown Prize for outstanding academic scholarship and demonstrated excellence as a teaching assistant.

Joe Daniele '06 from La Jolla, CA, received the John L. Asinari Award for outstanding Undergraduate Research Opportunities Program research in the life sciences.

Lori Neal '06 from Omaha, NE, received the John L. Asinari Award for outstanding project lab research in the life sciences.

On February 2, 2006, 11 students spoke at the invitation of their research faculty mentors. Of those 11 students, 3 named as prizewinners for their presentation were Course 7 seniors Adriana Tajonar, Johanna Varner, and Xiaonan Lin.

From July 1, 2005, to June 30, 2006, the Department awarded 42 PhD degrees and 1 SM degree in biology; 7 PhD degrees were awarded in the Joint Program in Biological Oceanography with the Woods Hole Oceanographic Institute (WHOI). The maximum number of PhD candidates registered in the Biology Department in 2005–2006 was 228, with another 36 in the Joint Program with WHOI. The incoming class for fall 2006 will be 34 students in the biology doctoral program, with an additional 4 students in the Joint Program in Biological Oceanography with WHOI.

Research

The Department of Biology is widely recognized as one of the best in the country and the world. Its strengths are displayed in the vigor of its research activities. Research conducted in the department has produced major advances in modern biology that have had, and continue to have, an impact on basic science in the applications of biology to medicine and biotechnology. Traditionally, the Department has excelled in research in biochemistry, genetics, microbiology, cancer biology, cell and developmental biology, immunology, neurobiology, virology, and structural biology. The following research achievements have occurred over the past year:

- The Fink lab, along with fellow MIT and Whitehead Institute researchers, discovered a biological “cloaking device” that may help pathogenic fungi hide from the immune system. When this network of genes is disabled, the fungal invaders become vulnerable to the body’s defenses.
- Eric Lander and his colleagues at MIT and Harvard studied the evolutionary split between humans and chimpanzees and determined that it is much more recent and complicated than was previously thought.
- Angelika Amon’s research produced a new understanding of how faithful meiotic chromosome segregation is achieved.
- Peter Sorger and Michael Yaffe along with Douglas Lauffenburger from Biological Engineering applied an engineering approach to cell biology using mathematical and numerical tools that proved the biological processes underlying diseases such as rheumatoid arthritis and cancer are fundamentally linked and should be linked in how they are treated with drugs.
- The Bartel and Burge labs discovered that a class of RNAs called microRNAs influence the evolution of genes far more widely than previous research indicated.

In other research news, the Center for Cancer Research, many of whose faculty are also members of the Biology Department, announced it is planning a new building adjacent to the Koch Building. The center is one of the most effective laboratories of its kind in the world. Two current and three past members have received the Nobel Prize in Physiology or Medicine. The center continues its superb work on the cellular and molecular basis of cancer while fostering important work in new areas, including approaches to the cancer problem that rely heavily on nanotechnology, engineering, and computer modeling.

Personnel

Within the past year, we welcomed several new junior faculty members. Dennis Kim, who moved into the Koch Building in fall 2005, promises to be a leader in the fields of innate immunity and host-pathogen interactions. Michael Hemann has set up his laboratory in the Center for Cancer Research where he is using shRNA libraries to probe the mechanisms underlying tumorigenicity. Aviv Regev and Michael Laub will join us in fall 2006. Aviv's lab will be located in the Broad Institute where she will work on computational and comparative genomic approaches to understanding the organization and evolution of signaling and transcription networks. Michael will move into the Koch Building. He uses biochemical, genetic, genomic, and computational approaches to study two-component signaling systems in bacteria.

Within the past year, Paul Garrity and Luk Van Parijs left the department. Paul is now a faculty member at Brandeis University.

Effective July 1, 2006, the following faculty received promotions:

Professor Christopher Burge was promoted to associate professor with tenure.

Professor Frank Gertler was promoted to full professor.

Professor David Sabatini was promoted to associate professor.

We congratulate them on their achievements.

Honors and Awards

Biology faculty received numerous prestigious awards and honors: Stephen Bell was awarded the School of Science Undergraduate Teaching Prize, Sallie W. (Penny) Chisholm received the 2005 Huntsman Award for Excellence in Marine Science, Robert Horvitz received MIT's Killian Faculty Achievement Award, Tyler Jacks received the 2005 Simon M. Shubitz Lecturer and Award from the University of Chicago for his contributions to cancer research, Susan Lindquist received the 2006 Sigma Xi William Procter Prize for Academic Achievement, Terry Orr-Weaver was elected to the National Academy of Sciences, David Page was named director of the Whitehead Institute, Phillip Sharp was honored with the National Medal of Science, Morgan Sheng shared the 2006 Foundation IPSEN prize for Neuronal Plasticity, and Robert Weinberg received the Kirk A. Landon-AACR Prize for Basic Cancer Research.

The American Society for Biochemistry and Molecular Biology (ASBMB) has notified the Department that, in 2007, Angelika Amon will receive the ASBMB-Amgen Award and Chris Burge will receive the ASBMB/Schering-Plough Research Institute Award.

Chris A. Kaiser

Department Head

Professor of Biology

More information about the Biology Department can be found at <http://mit.edu/biology/www/>.