Program in Polymer Science and Technology

The Program in Polymer Science and Technology (PPST), founded in 1986, is an interdepartmental program offering graduate education in the interdisciplinary field of polymer science and engineering. Its goals are to provide educational opportunities and to foster a spirit of community and collaboration among the large and widespread group of students, faculty, and visitors involved in polymer-related activities at MIT. PPST provides a core graduate curriculum on polymers; written and oral doctoral qualifying examinations; seminars presented by prominent visitors from industry, government agencies, and academia; and special student-driven events. The program is administered on a voluntary basis by faculty from the Departments of Materials Science and Engineering (DMSE), Chemical Engineering (ChemE), Mechanical Engineering, and Chemistry.

PPST continues to maintain a steady academic course. Sixteen students enrolled in PPST for AY2011, with home departments in DMSE and ChemE. Graduate students in the program obtained official Institute recognition for the PPST graduate student association, PGSA, and they used PPST financial support to produce a successful polymer poster session that drew 70 participants and more than 150 attendees to the Building 13 lobby in March 2011. Faculty participation in PPST remained strong, with the addition of two new faculty members: professor Katharina Ribbeck (Biological Engineering), and professor Hadley Sikes (ChemE). These additions brought the total number of core PPST faculty to 19.

PPST faculty have garnered a number of notable honors over the past year:

- Daniel Blankschtein was elected to the editorial board for Marcel Dekker's Surfactant Science Series, and he received the 2011 Outstanding Faculty Award from ChemE graduate students.
- Karen Gleason's group was recognized at Printed Electronics and Photovoltaics Europe 2010, in Dusseldorf, Germany, with the Technical Development Materials Award. Prototype photovoltaic cells and arrays produced by the group, in collaboration with professor Vladimir Bulovic's laboratory, have been viewed at the request of notable leaders, including the chief executive officer of Eni S.p.A., the president of Italy, and president Barack Obama's science and technology advisor, John Holdren, and have also been featured on numerous news outlets, including CNET, Discovery News, and CNN. This important award was not mentioned in last year's annual report because it fell between reporting years.
- Linda Griffith was elected to the bioengineering section of the National Academy of Engineering.
- Paula Hammond's work on the generation of layer-by-layer nanoparticles with pH-shreddable outer layers was featured as a cover article in the American Chemical Society's journal ACS Nano in June 2011, and was covered by the science press. Her collaboration with Angela Belcher led to a new paper in Nature Nanotechnology on virus-based solar devices. Professor Hammond was also recognized as one of the top 100 materials scientists by Times Higher Education (Thomson Reuters) as a part of its One Hundred Years of Chemistry celebration.

- Bradley Olsen's group published its first paper in ACS Nano on the topic of globular protein self-assembly using diblock copolymers, and he was awarded the 2011 American Physical Society Division of Polymer/UK Polymer Physics Group Exchange Lectureship.
- Gregory Rutledge delivered two multi-lecture series—on the crystallization and morphology of semi-crystalline polymers using molecular simulation techniques; and on the technology of electrospinning for the fabrication of novel nanofibers and membranes for a variety of applications, ranging from chemical protection materials to water-desalination membranes—at the University of Bayreuth (Germany) and Tsinghua University (Beijing). He also delivered numerous keynote and invited lectures at universities and international conferences.
- Hadley Sikes was honored by her undergraduate institution, Tulane University, with the 2011 School of Science and Engineering Outstanding Young Alumna award. She presented some of her group's work at the Society for Biological Engineering's International Conference on Biomolecular Engineering in January 2011 and at the Burroughs Wellcome Fund Career Awards at the Scientific Interface meeting in June 2011.
- Krystyn Van Vliet was selected for participation in the Institute for Defense Analyses 2012 class of the Defense Science Study Group. The group introduces outstanding young professors of science and engineering to the challenges facing national security.
- Ioannis Yannas was honored by the inauguration of an annual award established in his name by the American Burn Association for the best publication or accomplishment in treatment of burns in the area of bioengineering. The new award was named the Burke/Yannas Bioengineering Award to commemorate the discovery by professor John Burke (Harvard Medical School) and Professor Yannas of what became known as "artificial skin"; their discovery is today recognized as the first successful regeneration of an organ in an adult.

The PPST weekly seminar series was well attended and attracted an average of 50–80 students, faculty, and visitors per seminar. This past year, lectures were presented by leading polymer faculty from a number of United States and overseas universities. Professors Alfredo Alexander-Katz (DMSE) and Bradley Olsen (ChemE) administer the PPST seminars.

In AY2011, PPST's efforts focused on important program needs—specifically, student recruitment and intensified community building. PGSA engaged in the recruitment of new students during the various visitation weekends for accepted graduate students that are offered by participating departments in PPST. The student association's beneficial role in boosting PPST's visibility to prospective graduate students led to a significant increase in the recruitment yield in the past year. The fruitful PGSA collaboration with PPST faculty leadership will be nurtured and sustained in the future as the program expands its efforts to serve the broad and diverse polymer community at MIT.

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