

## Program in Polymers and Soft Matter

The interdepartmental [Program in Polymers and Soft Matter \(PPSM\)](#), established in 1986, offers graduate education in the interdisciplinary field of polymer science and engineering. Its goals are to provide educational opportunities and foster a collaborative, communal spirit among the large and widespread group of students, faculty, and visitors involved in polymer-related activities at MIT. PPSM provides a core graduate polymer curriculum; 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 voluntarily by faculty from the Departments of Materials Science and Engineering (DMSE), Chemical Engineering (ChemE), Mechanical Engineering, Biological Engineering, and Chemistry.

### MIT Polymer Day

Our seventh annual MIT Polymer Day event, held on April 13, was produced by the PPSM Graduate Student Association and was fully underwritten by returning sponsors Cabot Corporation, Cambridge Polymer Group Inc., Arkema, SABIC, and Schlumberger-Doll Research along with one new sponsor, Pall Corporation. We were delighted for the third consecutive year to welcome poster presenters from other universities, including new additions Brandeis, Brown, and Boston University as well as returning participants from the University of Massachusetts Amherst and other area institutions. With 43 posters, two corporate information booths, and more than 150 attendees, this year's poster contest proved to be another exciting success. After the poster session, three short seminars covering a range of topics were presented by MIT graduate students Lionel C.H. Moh, David A. Nicholson, and Reginald Avery. An exciting new student initiative this year was an alumni discussion panel that featured five prominent PPSM alums sharing their career stories and interfacing with current MIT polymer students and postdocs.

### Personnel

AY2017 was another lively year for PPSM. In fall 2016, the program welcomed four new students (two from DMSE and one each through ChemE and Chemistry) and graduated six students (all through DMSE). PPSM's faculty roster grew to 24 this year when ChemE professor Zachary P. Smith joined the program. Key to our success in the past year has been the addition of new student and faculty talent and continued broad-based faculty participation from all of our affiliated departments.

We are pleased to highlight the following selected faculty accomplishments from the past academic year. Daniel Blankschtein's group delivered many invited and regular talks and poster presentations, including presentations at the 252nd American Chemical Society (ACS) National Meeting in Philadelphia; the 11th International Conference on Surfaces, Coatings, and Nanostructured Materials in Aveiro, Portugal; and the 2016 annual meeting of the American Institute of Chemical Engineers in San Francisco. Paula T. Hammond won the 2018 ACS National Award in Applied Polymer Science and was elected to the National Academy of Engineering for her "contributions to self-assembly

of polyelectrolytes, colloids, and block copolymers at surfaces and interfaces for energy and health care applications.”

Darrell J. Irvine was an invited speaker at the National Academy of Engineering 2016 U.S. Frontiers of Engineering Symposium. Jeremiah A. Johnson spearheaded the newly launched minor in polymers and soft matter, with the first new recruits starting in the program this fall, and will share the 2018 ACS Nobel Laureate Signature Award for Graduate Education in Chemistry with graduate student Aleksandr V. Zhukhovitskiy.

Robert Macfarlane won the ACS 2017 Unilever Award and was presented the Air Force Office of Scientific Research Young Investigator Award for “DNA-Programmed Epitaxy of Nanoparticle Superlattices.” Bradley D. Olsen was awarded the Sigma-Aldrich Lectureship at Carnegie Mellon and the Colburn Lectureship at the University of Delaware; also, he received the Kavli Emerging Leader in Chemistry Award and an MIT freshman advising award.

Gregory C. Rutledge was named a fellow of the American Institute of Chemical Engineers. He also assumed the role of lead principal investigator for MIT’s engagement with Advanced Functional Fabrics of America (AFFOA), a manufacturing innovation institute headquartered in Cambridge. AFFOA’s goal is to enable a manufacturing-based revolution in fibers, yarns, and fabrics. Zachary P. Smith was recently presented the North American Membrane Society’s Young Membrane Scientist Award and earned faculty research participant status through the Department of Energy. In April 2017, he co-founded Flux Technologies, a company that focuses on using composite materials as gas-separation membranes.

### **Seminar Series**

The 2016–2017 PPSM seminar series brought leading polymer researchers from a number of US and overseas universities to the Institute and attracted an audience of 50 to 80 students, faculty, and non-MIT attendees to each event. Professors Jeremiah A. Johnson from the Department of Chemistry and Niels Holten-Andersen from the Department of Materials Science and Engineering continue to administer the PPSM seminars. Also, on September 21 our second Aldrich PPSM Lecture was presented by Professor Karen L. Wooley of Texas A&M University. We are grateful for the financial support provided by Sigma-Aldrich, which made this new lectureship possible.

### **Summary**

AY2018 will be PPSM’s 31st year of preparing doctoral polymer researchers to address the engineering challenges of tomorrow, building our diverse campus-wide community of polymer researchers, and sponsoring the popular PPSM seminar series.

The program’s enduring value is evident both in the wide-ranging successes of our many graduates and in the preparation of today’s young MIT researchers for exceptional and influential careers in polymer engineering and related disciplines. Our alums now serve as faculty at universities including Harvard, Stanford, and MIT; as cutting-edge researchers at industrial leaders such as DuPont, Millennium Pharmaceutical, and Boston Scientific; as entrepreneurial trailblazers in the development of innovative new

business opportunities; and as explorers stretching the bounds of human knowledge at the National Aeronautics and Space Administration, the National Institutes of Health, and other government and military agencies in the United States and abroad.

PPSM anticipates an exciting year ahead, furthering polymer education excellence at MIT and continuing to cultivate the program's formidable legacy in the global community of polymer innovators.

**Darrell J. Irvine**

**Director**

**Professor of Materials Science and Engineering and Biological Engineering**

**Investigator, Howard Hughes Medical Institute**