

Program in Polymers and Soft Matter

The interdepartmental [Program in Polymers and Soft Matter \(PPSM\)](#), established in 1986, offers graduate and undergraduate education in the interdisciplinary field of polymer and soft-matter 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 and soft matter-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. In the last year we have added a Polymer Minor for undergraduates that has received very good acceptance. The program is administered voluntarily by faculty from the Departments of Materials Science and Engineering (DSME), Chemical Engineering (ChemE), Mechanical Engineering, Biological Engineering (BE), and Chemistry.

MIT Polymer Day

Our eighth annual MIT Polymer Day event held on April 11, 2018, was again produced by the PPSM Graduate Student Association (PGSA) and was fully underwritten by returning sponsors Cabot Corporation, Cambridge Polymer Group Inc., Arkema, and two new sponsors, Exponent and Millipore Sigma. For the fourth consecutive year, we were delighted to welcome poster presenters from other universities including the University of Massachusetts at Amherst and Tufts University. With 45 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 PPSM graduate students Brett C. Geiger, German Parada, and Wade Wang. In response to last year's successful introduction of an alum panel discussion, this year a new panel of four prominent PPSM alums—Amy Grayson '03, Erik S. Handy '99, Alice M. Leung '99, and Jessica Liao '07—who shared their career stories and counseled current MIT polymer students and postdocs.

Personnel

AY2018 was another year of growth for PPSM. In fall 2017, PPSM welcomed eight new students, six through DMSE, and one each through ChemE, and Chemistry; such growth appears to be sustainable, as in the fall of 2018 we are expecting 10 new students for the program. The program also graduated two students: Aaron Huang (through ChemE) and Reginald Avery (through BE).

PPSM experienced major retirements this year, with the departure of two former program directors: Professors Robert E. Cohen, program founder (1984–1987, 2009–2012), and Michael F. Rubner (1995–2000). Today's thriving, diverse eco-system of interdisciplinary polymer and soft-matter research at MIT owes much to their contributions.

We also celebrate the addition of new faculty and continued broad-based faculty participation from all of our affiliated departments. In the past year, we were pleased to welcome new affiliate faculty member Professor Rafael Gomez-Bombarelli (DMSE).

Below are some notable faculty milestones and awards from the past year:

Alfredo Alexander-Katz received the Graduate Materials Council (GMC) Best Advisor Award for his dedication to mentorship and his investment in all of his students, in and out of the classroom. One nominating student explained, “He is incredibly encouraging and knowledgeable. He knows how to motivate us to be productive researchers, but is very supportive when we hit a road block or are dealing with things outside of school.”

Niels Holten-Andersen received the Graduate Materials Council (GMC) Best Teacher Award for his unparalleled approachability and enthusiasm during his classes. His ability to communicate ideas and appeal to his students in new and interesting ways piqued many students’ interests. Professor Holten-Andersen was hailed by one student nominator as “the best teacher I’ve had in DMSE.”

Jeremiah A. Johnson joined the faculty of the Koch Institute for Integrative Cancer Research and was also named an associate editor for *Polymer Chemistry*.

Bradley D. Olsen was awarded the 2018 John H. Dillon Medal from the American Physical Society. The citation reads: “for significantly expanding our understanding of the physics of polymers, including the self-assembly of block copolymers incorporating a fully folded protein, the influence of polymer shape on diffusion; for engineering novel gels; and for updating the theory of the modulus of a network.”

Hadley Sikes, in partnership with the American Institute of Chemical Engineers (AIChE) Society for Biological Engineering, launched the first International Conference on Epigenetics and Bioengineering and served as its Chair. She is contributing to the launch of the new journal *ACS Applied Bio Materials* by serving on its first editorial board. Sikes was also honored by the National Academy of Engineering as an innovative young engineer in its Frontiers of Engineering Symposium.

Zachary P. Smith received an American Chemical Society Petroleum Research Fund (ACS PRF) Doctoral New Investigator Award to investigate solubility and diffusion in fluorinated polymers, and also a US Department of Energy Early Career Award to study new materials for polymer-based membrane separations.

Additionally, three PPSM Faculty members—Paula T. Hammond, Bradley D. Olsen, and Hadley Sikes—were among the recipients of MIT’s AY2018 “Commitment to Caring” (C2C) Award. C2C honors professors who build inclusive cultures in their labs and classrooms, who support their students’ mental and emotional health, and who actively support their students’ scholarly pursuits.

Seminar Series

The 2017–2018 PPSM seminar series again brought leading polymer researchers from a number of US and overseas universities to MIT and attracted an audience of 50 to 80 students, faculty, and non-MIT attendees to each seminar. DMSE professors Rob Macfarlane and Niels Holten-Andersen administered the PPSM seminars.

Summary

AY2018 was PPSM's 31st year of preparing doctoral polymer and soft-matter researchers to address tomorrow's engineering challenges, building our diverse campus-wide community of soft-matter researchers, and sponsoring the popular PPSM Polymer Seminar series.

This Program's enduring value is evident both in our many graduates' wide-ranging successes and the preparation of today's young MIT researchers for leadership roles in polymer engineering and related disciplines. Our alums now serve as faculty at universities including Harvard University, Stanford University, and MIT; cutting-edge researchers at industrial leaders such as DuPont, Millennium Pharmaceutical, and Boston Scientific; entrepreneurial trail-blazers in the development of innovative new business opportunities; and explorers stretching the bounds of human knowledge at the National Aeronautics and Space Administration (NASA), the National Institutes of Health (NIH), and other government and military agencies in the US and abroad.

PPSM anticipates an exciting year ahead, furthering polymer and soft-matter education excellence at MIT, and continuing to cultivate our widening influence in the global community of innovators.

Alfredo Alexander-Katz

Director

Professor, Department of Materials Science and Engineering