

MIT Industrial Liaison Program Faculty Knowledgebase Report

Re-Stream: Sustainable Materials

March 27, 2025 11:00 pm - 12:00
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11:00 PM

Welcome and Opening Remarks
Corey Cheng
Program Director, [MIT Industrial Liaison Program](#)



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Program Director
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Dr. Corey Cheng joined the Office of Corporate Relations (OCR) as an Senior Industrial Liaison Officer in December 2011. He has broad interests in science and technology, and uses his technical research experience to better serve ILP members in Asia and the United States.

Cheng spent six years in industrial research at Dolby Laboratories, San Francisco, where he contributed to sound compression (Dolby Digital, AAC, MP3), wireless networking, fingerprinting, and spatial/"3-D audio" technologies. Later, he was Associate Professor and Director of the undergraduate and graduate programs in music engineering technology at the University of Miami, Florida, where he also held a dual appointment in Electrical and Computer Engineering. Cheng holds various U.S. and international patents, has published technical papers, and has presented at various conferences. His technical work includes collaborations and consulting work with the U.S. Naval Submarine Medical Research Laboratory, Fujitsu-Ten USA, Starkey Laboratories, America Online, and the Chicago Board of Trade (CBOT). Cheng was an IEEE Distinguished Lecturer for the Circuits and Systems Society from 2009-2010, and was a Westinghouse (Intel) Science Talent Search national finalist many years ago.

Cheng holds degrees in Electrical Engineering (Ph.D., M.S.E. University of Michigan), Electro-Acoustic Music (M.A. Dartmouth College), and physics (B.A. Harvard University).

Personally, Dr. Cheng is an American Born Chinese (ABC), serves as his family's genealogist, and traces his roots back to Toi San, Guang Dong Province and Xing Hua, Jiang Su Province, China. He also has a background in music, and his electro-acoustic compositions have been presented at various U.S. and international venues.

Polymer Informatics and High-Throughput Experimentation to Help Us Discover New Sustainable Polymers
Bradley Olsen

Alexander and I. Michael Kasser (1960) Professor, Department Executive Officer,
[MIT Department of Chemical Engineering](#)



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Professor Olsen earned his S.B. in Course 10 (Chemical Engineering) from MIT in June 2003. His undergraduate research with Prof. Karen Gleason focused on understanding the polymerization kinetics of initiated chemical vapor deposition reactions to produce fluorocarbon and organosiloxane polymer coatings for biopassivation and hydrophobic surfaces. He also performed research in analytical food chemistry at General Mills, pressure sensitive adhesives for waterproofing membranes at W.R. Grace, and reactive extrusion and green process development for polymer foam insulation at Dow. He was recognized with the Alpha Chi Sigma award and a Goldwater Scholarship for his undergraduate achievements.

Professor Olsen moved to Berkeley for his graduate work, where he earned a Ph.D. in Chemical Engineering in December 2007. He was a Hertz Fellow, a Tau Beta Pi Fellow, and the first student of Prof. Rachel Segalman. His research developed the first universal phase diagram for rod-coil block copolymers, an emerging category of polymers with importance for producing self-assembled nanomaterials in biotechnology and organic electronics. In addition, he addressed several issues in rod crystallization within nanostructures, thin film self-assembly of rod-coil systems, and surface reconstruction in polymer films. His research was recognized as a Padden award finalist at the American Physical Society March meeting in 2008.

After finishing his Ph.D., Prof. Olsen was an NIH and Beckman Institute Postdoctoral Fellow with Profs. David Tirrell, Julia Kornfield, and Zhen-Gang Wang at Caltech. He applied protein biosynthesis to the design of physically associating telechelic protein hydrogels which were applied as injectable biomaterials. Joint theoretical and experimental investigations were used to gain insight into the properties and design rules governing these systems.

Olsen's interest in polymer science has been longstanding, starting with a high school science fair project on conductive dendrimer films. His current research interests are broadly clustered in the areas of soft condensed matter physics and macromolecular physics, including liquid crystals, biomaterials, colloids, and polymers. He is particularly interested in how biosynthesis can be used as a natural green chemistry for the preparation of designer polymeric materials, how controlled polymerization through biology can give us unique materials that provide insight into polymer physics, and the unique physics of self-assembly in complex protein nanostructures for biotechnology and energy applications. When Prof. Olsen is not doing science, he enjoys underwater photography, hiking, and travel.

Areas of Interest and Expertise

- Block Copolymers
- Soft Condensed Matter Physics
- Protein-Based Materials
- Bioelectronics, Biomaterials and Energy Applications
- Polymer Physics, Including Intelligent Design of Materials
- Controlled-Assembly Processes Incorporating Proteins to Control Polymer Structure

Recent Projects

- 07/10/13 Artificial Chlorosomes for Controlled Exciton Transport
- 07/10/13 Co-Assembly in Di-Block Copolymer-Nanoparticle Mixtures
- 07/10/13 Diffusion of Entangled Rod-Coil Block Copolymers
- 07/10/13 Exploring the Interactions Governing Globular Protein-Polymer Block Copolymer Self-Assembly
- 07/10/13 Responsively Nanostructured Injectable Protein Hydrogels
- 07/10/13 Self-Assembly of Globular Protein-Block-Polymer Block Copolymers
- 07/10/13 Synthetic Physically Crosslinked and Thermoresponsive Gels
- 07/10/13 Theoretical Design Considerations for Development of Nanostructured Biomaterials
- 10/09/13 Self-Assembly of Fusion Proteins to Form Biofunctional Materials

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Featuring: The CRIPT Polymer Database and BigSmiles Polymer Data Representation.

The exponential rise in the production and use of plastics, particularly in single-use

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Multifunctional Concrete
Admir Masic

Associate Professor, [MIT Department of Civil and Environmental Engineering](#)



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Associate Professor, [MIT Department of Civil and Environmental Engineering](#)

Admir Masic is Associate Professor at the Massachusetts Institute of Technology. Masic's research focuses on the science-enabled engineering of sustainable construction materials for large-scale infrastructure innovation. A chemist by training, with expertise in biomineralization, he specializes in the development of multifunctional cement-based materials, ranging from self-healing concrete materials to carbon absorbing concretes and electron conducting cement-based materials. He is a principal investigator in the Concrete Sustainability Hub at MIT, a faculty fellow in Archaeological Materials at MIT's Center for Materials Research in Archaeology and Ethnology (CMRAE), and the faculty director of the Refugee ACTion Hub (ReACT) at MIT. MIT ReACT aims at providing new professional content development for displaced learners around the world.

[View full bio](#)

Featuring MIT Startup Exchange's DMAT Corp.: Self-Healing and Low Carbon Concrete.

Concrete is the most widely used construction material in the world, and because of its carbon- and energy-intensive production, it is responsible for about 8% of global CO₂ emissions. For this reason, we need to entirely rethink concrete's future and develop new methods to reduce its carbon footprint. In this webinar, we will discuss recent innovations in the production of "multifunctional concrete," ranging from new formulations that act as carbon sinks, to Roman-inspired self-healing concretes, and electrically conductive cements. These science-enabled developments all aim to make multifunctional concrete part of the solution for the sustainable development of our built environment in an ever-changing world.

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Closing Remarks
Corey Cheng
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Adjournment