MICROFIBERS AND MICROPLASTICS: PURSUING A LIFE-CYCLE APPROACH TO SOLUTIONS

On January 17, 2018, MIT's Environmental Solutions Initiative (ESI) and MIT Corporate Relations are convening researchers and stakeholders to leverage insights from key fields of research including materials science, civil and environmental engineering, and nanotechnology to address the growing problem of microplastic pollution.

MIT Industry Meeting Center | One Main Street, 12th Floor | Cambridge, MA

WEDNESDAY, JANUARY 17

8:30a *continental breakfast and registration*

9:00a Welcome and introduction
John Fernandez, ESI

9:30a Microplastics/microfibers: A brief context
Anna-Marie Cook, EPA Region 9

10:00a Report from the field: One pathway toward solutions
Rachael Miller, Rozalia Project/CoraBall

10:15a Report from the field: Priorities for the outdoor industry
Beth Jensen, Outdoor Industry Association

10:30a Lightning participant introductions

11:00a *break*

11:15a Briefings on novel research: Sensing at the micro- and nano-scale, new fiber technologies, and characterization in the oceans
Greg Rutledge, MIT Chemical Engineering, MIT-AFFOA
Markus Buehler, head, MIT Department of Civil and Environmental Engineering
Admir Masic, MIT Lab for Multiscale Characterization and Materials Design
Benedetto Marelli, MIT Lab for Advanced Biopolymers
Brian Anthony, MIT.nano, sense.nano, and Mechanical Engineering
Scott Gallager, Woods Hole Oceanographic Institution

12:30p *lunch – establish working groups*

1:30p Discussion Session 1: Working groups on each topic

- Materials Design and Manufacture - how can plastic products be designed and produced to minimize eventual micro- and nano-scale emissions?
- Use and Maintenance - how can laundering (and other use) processes and facilities be modified to minimize emissions?
- Emissions, Disposal, Fate and Transport - how can micro- and nano-scale emissions be characterized and captured to minimize their ecological and human health impacts?

3:00p *break*

3:30p Discussion Session 2: Working groups synthesize and summarize

4:30p Closing session
- Working group reports
- Plenary discussion and synthesis
- Next steps

5:30p *adjourn*

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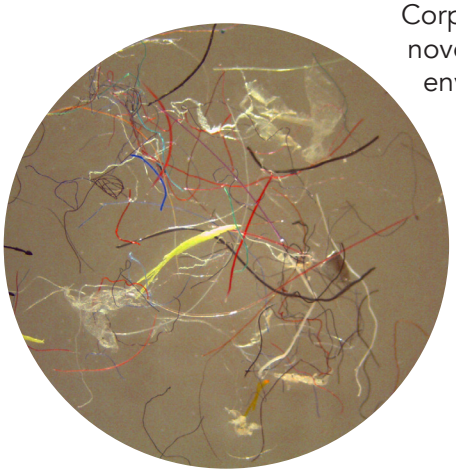
WORKSHOP DESCRIPTION

Concern about plastic pollution is on the rise, particularly in coastal and marine environments where plastic fishing nets, single-use consumables (plastic bottles, straws), and a whole host of other objects are increasingly evident and harmful to marine life. Less visible, but potentially just as concerning, are microplastics – tiny particles of plastic less than 5 mm in length -- that are ubiquitous in the oceans and also found in freshwater systems, soils, and urban air. Due to their small size, microplastics easily disperse widely once released, can be unintentionally ingested or inhaled, and are challenging to trace and capture. They resist biological degradation but can serve as substrates for bacterial communities, raising the possibility that they may alter primary productivity and biogeochemical systems. Microplastics are derived from a wide spectrum of plastic materials that are broken down by mechanical, chemical, or optical processes. Microfibers, a subset of microplastics, are formed by the breakage of tiny fibers from synthetic textiles, often during laundering.

Emerging research into the distribution of microplastics and the frequency of ingestion by marine life suggests that there is cause for concern about potential negative environmental and health impacts. Additional research is needed to fully understand the flow of plastic materials in the environment, where the impacts are most serious, and what strategies are most effective to reduce the release of these materials. Recent discussion led by UC Santa Barbara, the Ocean Conservancy, and the Outdoor Industry Association identified materials flow analysis and risk assessment as top priorities for the academic community's engagement in microplastics pollution.

MIT's Environmental Solutions Initiative (ESI) brings the diverse expertise of faculty from across MIT together with society's most pressing environmental and sustainability challenges, and is investigating how the MIT community may uniquely contribute to research, education, and solutions in plastic pollution. To kick off this effort, ESI and MIT Corporate Relations are holding a one-day workshop in January 2018 to bring novel insights from key fields of research including materials science, civil and environmental engineering, and nanotechnology together with stakeholders at multiple points in plastic production, use, and pollution.



The workshop will foster solutions-oriented research collaboration inspired by questions including, How can synthetic textiles and other plastic products be designed or coated to minimize the release or potential toxicity of microfibers/microplastics? What micro- and nano-scale filtration innovations can be applied in manufacturing, laundering, and treatment facilities? The workshop is intended to inform continuing multi-stakeholder discussions on microplastics as well as identify new partnership pathways for research and solutions in plastic pollution.

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