

# MANUFACTURING LEADERSHIP SEMINARS

## Low carbon materials processing



### Daniel Cooper

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Online seminar via [zoom](#)

#### ABSTRACT

Industry already accounts for approximately one-third of global emissions and these emissions are growing quickly as the developing world industrializes. We need sustainable materials processing and Re-X (e.g., recycling) solutions that fit the scale of the challenge and can be deployed in the short as well as long term. This talk first highlights the sources of industry emissions now and in the future, and then the opportunity to reduce emissions by increasing material efficiency in all stages of the product life cycle. We present a fast and easily updateable method for calculating material flows and identifying material efficiency opportunities. We then demonstrate the potential for material efficiency across the life cycle; e.g., manufacturing process innovations for reduction and reuse of light metal scrap, and increased end-of-life metal recycling in the face of increased scrap contamination and changing demand. Finally, we explore some of the most critical basic and applied research directions that can address industrial emissions at a relevant scale.

Dan Cooper is an Assistant Professor in the Mechanical Engineering department at the University of Michigan. He heads the *Resourceful Manufacturing and Design (ReMaDe)* group, which is dedicated to pursuing environmental sustainability through process innovations in resource efficiency and optimized manufacturing and recycling supply chains. Dan's work is at the nexus between Industrial Ecology (IE) and Mechanical Engineering (ME): he uses IE methodologies such as material flow analyses and life cycle assessment to identify opportunities and quantify impacts at the process, factory, and supply chain scale, and then pursues an experimental and mechanistic modeling approach to generate the scientific knowledge underlying those opportunities. Dan received all his degrees in Mechanical Engineering from the University of Cambridge before completing a post-doc at MIT. He is the recipient of the 2020 ASME Ben C. Sparks Education Medal, and the 2020 SME Outstanding Young Manufacturing Engineer Award.

### Lightning Talk



### Albert Shih

Professor,  
Mechanical  
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## Machining Inside the Blood Vessel

#### ABSTRACT

The blockage of blood vessel due to clot or plaque is a key threat to a person's health. Machining is an enabling technology for catheter-based minimally-invasive devices to safe and effective removal of clot/plaque to open the blockage inside blood vessels. The research in fabrication of clot/plaque analog, mechanical thrombectomy for cutting of blood clots, and atherectomy for internal grinding of calcified plaque are presented.

#### Sponsors



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