

**Mines-NREL Joint Workshop**  
***Limits to Waste: Pushing Materials Manufacturing Towards Zero Waste for a Sustainable Future***  
***Fossil Trace, Golden, Colorado***

**Thursday, September 13<sup>th</sup>**

- 13:00 Welcoming remarks  
Paul Johnson, President, Colorado School of Mines  
Bill Tumas, Associate Laboratory Director, National Renewable Energy Laboratory
- 13:10 Introduction and goals of workshop  
Ryan Richards, Colorado School of Mines  
Nancy Haegel, National Renewable Energy Laboratory
- 13:30 Creating a Circular Economy for Materials  
Bill Tumas, Associate Laboratory Director, National Renewable Energy Laboratory
- 14:00 The Mining Industry and the Circular Economy  
Priscilla Nelson, Colorado School of Mines
- 14:30 Mining, Mineral Processing and Land Use: Status and challenges-opportunities for NREL/Mines, short presentations (<10 minutes) followed by interactive panel discussion, Q&A (20 minutes)
- Session Chair- Priscilla Nelson, Colorado School of Mines  
Eric Spiller, Colorado School of Mines  
Barb Filas, Colorado School of Mines  
Harold Cline, TOMRA Sorting  
Jordan Macknick, National Renewable Energy Laboratory
- 15:30 Coffee break
- 15:50 Addressing Environmental Challenges with Chemistry in Industry Research  
Jeannette Garcia, IBM
- 16:20 Plastics reuse, recycle and design: Status and challenges-opportunities for NREL/Mines, short presentations (<10 minutes) followed by interactive panel discussion, Q&A (20 minutes)
- Session Chair-Gregg Beckham, National Renewable Energy Laboratory  
Amy Landis, Colorado School of Mines  
Dylan Domaille, Colorado School of Mines  
Nichole Fitzgerald, EERE Bioenergy Technology Office (BETO)
- 17:20 Fundraising for Zero Waste Initiatives  
Emily Kelton, Colorado School of Mines Foundation
- 17:35 Key questions for break outs  
Nancy Haegel, National Renewable Energy Laboratory  
Stefanie Tompkins, Colorado School of Mines
- 18:00 Social hour and dinner

## Friday, September 14

- 8:00 Buffet breakfast
- 8:30 Metal waste and recycling  
Debashish Bhattacharjee, TATA Global
- 9:00 Metal waste and recycling: Status and challenges-opportunities for NREL/Mines, short presentations (<10 minutes) followed by interactive panel discussion, Q&A (20 minutes)
- Session Chair-Sridhar Seethramanan, Colorado School of Mines  
Alberta Carpenter- National Renewable Energy Laboratory  
John Speer- Colorado School of Mines  
Pat Taylor- Colorado School of Mines
- 10:00 Coffee
- 10:20 Limits to Recycling?—A View from the Recycling Industry  
David Waggoner, Institute of Scrap Recycling Industries (ISRI)
- 10:50 Circular Economy Opportunities in Photovoltaics and Lithium-ion Batteries  
Dustin Mulvaney, San Jose State University
- 11:10 E-waste: Status and challenges-opportunities for NREL/Mines, short presentations (<10 minutes) followed by interactive panel discussion, Q&A (20 minutes)
- Session Chair- Garvin Heath- National Renewable Energy Laboratory  
Shriram Santhanagopalan - National Renewable Energy Laboratory  
Corby Anderson, Colorado School of Mines  
Carol Handwerker, Purdue
- 12:10 Lunch
- 13:00 Informing Design of Resource-Effective Materials, Processes and Systems  
Elsa Olivetti, Massachusetts Institute of Technology
- 13:30 Renewed charge for breakouts followed by breaking into smaller groups to discuss grand challenges that Mines/NREL can uniquely address, collaborative solutions, potential action items
- 14:40 Out brief from each group (10 minutes each) and discuss actionable items and next steps
- 16:00 Summarize and report out- What are we doing as a community? What do we change? What issues would benefit most from Mines/NREL collaboration? What is the most important contribution(s) we should publish from the workshop?
- 16:30 Closing remarks and adjourn Nancy Haegel and Ryan Richards
- 17:00 Optional cash bar reception