# Student Invited Speaker

**Tuesday, February 6th • 4:00 – 5:00 PM • CH033**

## From Trash to Treasure:
## Harnessing Microbial Communities to Convert Waste to Food


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Microbial communities are complex interacting systems that can be leveraged for bioprocessing. However, their complexity and diversity complicate efforts to engineer communities for a particular outcome. Here we describe efforts to develop a system for circular food production from waste streams. Plastic waste is a major environmental issue with most end-of-life plastics being sent to landfills, incinerated, or being inadvertently released into the environment. There is a need for improved methods for plastic upcycling. Furthermore, there is a need for improved methods for food production from alternative feedstocks. We have developed a low-power system for distributed production of valuable products from plastic waste streams using microbial communities. Here we describe efforts to engineer a microbial community to convert deconstructed mixed plastic waste into microbial biomass that could be used as an alternative protein source. We have used both top-down and bottom-up approaches to construct synthetic communities for efficient waste conversion and stability. These enriched microbial communities can rapidly convert deconstructed plastics into microbial biomass. Analysis of these microbial communities has indicated that specialists and generalists coexist in these communities and can contribute to flexible metabolism of mixed plastic inputs. A deeper understanding of mechanisms governing microbial community function will enable more efficient engineering of synthetic microbial communities for improved bioprocessing.