

DEPARTMENT OF CHEMICAL AND ENVIRONMENTAL ENGINEERING
COLLEGE OF ENGINEERING AND APPLIED SCIENCE

RESEARCH OPPORTUNITIES FOR UNDERGRADUATE students

APPLICATION DEADLINE: April 29, 2024

PROJECT TITLE: Recycling of Biobased Plastics Packaging

Physical Requirement : Must be in lab to prepare samples and perform experiments

Project's Technical Skills Requirement : basic chemical lab skills, basic knowledge of Python

Project's Available Positions : 1

Benjamin Yavitt
Chemical Engineering
College of Engineering and Applied Science
858 Mantei Center
Cincinnati, OH 45221
yavittbn@ucmail.uc.edu
Phone: 513-556-9840

Project Description

Chemical recycling, where packaging is collected, broken down, and reintroduced as a feedstock, is a "closed loop" process that promises to reverse the stigma of plastic waste. Catalysts can be used to accelerate degradation of plastic molecules into smaller, useful chemicals. However, real plastic waste contains additives and contaminants which disrupt the degradation process. To address this significant challenge, we propose to utilize a rapid experimental technique capable of revealing changes in polymer size under simulated chemical recycling conditions. The objectives of the project are to determine the impact of commercial plastic additives on the degradation of poly(lactic acid), a bioplastic packaging material. Polymer blends will be prepared in the lab and placed under various accelerated degradation processes. The mechanical properties will be systematically tested at various stages of degradation and modeled to reveal the formation of molecular products throughout the recycling process.

This research will be conducted in the RheOhio Lab, Department of Chemical and Environmental Engineering. The co-op student will be working alongside the faculty mentor and a graduate student mentor in the lab. The co-op student is expected to drive this independent portion of a larger team objective within the group. Opportunities to collaborate with other research groups on and off campus are available. Day-to-day activities involve in-lab, hands-on, experimental work, including sample preparation, mechanical testing, and data analysis. Training in all three of these activities will be provided by lab members. Basic chemical lab skills (such as handling of solvents and glassware) and a basic understanding of Python (for data

organization and analysis) are preferred but not required as these skills will be utilized heavily during the co-op.