

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

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE students

FOR APPLICATION YEAR: 2025

PROJECT TITLE: Recycling of Biobased Plastic Packaging

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Project Description

Chemical recycling is a "closed loop" process where plastic waste is collected, broken down, and reintroduced as a new feedstock. 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. We address this challenge by utilizing an 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. The research will be conducted in the RheOhio Lab (Department of Chemical and Environmental Engineering). The summer student will work as a team member alongside the faculty mentor (Prof. Yavitt), graduate, and undergraduate researchers in the group. 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 and applications of Python (for data organization/analysis) will also be learned during the research experience.