Sarah Daly is originally from Ohio. She attended Cornell University where she earned a B.S. and M.S. in Biological Engineering. In August 2016, she joined Dr. Ni's research group at Purdue University to pursue a Ph.D. in Agricultural and Biological Engineering. Sarah's research interests include fermentation, anaerobic digestion, and sustainability. During her time at Purdue, she served as President and Professional Development Chair of the Agricultural and Biological Engineering Graduate Student Association. She was also a recipient of the Ross and Henry Ford II fellowships. In 2020, she was named as one of the new faces of ASABE-Professionals. After graduation, she plans to continue in an academic career.

Agricultural & Biological ENGINEERING

Dissertation Defense

Speaker: Sarah Daly

Title: Biochemical Methane Potential Testing and Modelling for Insight into Anaerobic Digester Performance

Major Professor(s): Dr. Jiqin Ni

Date: Thursday, July 09, 2020

Time: 1:00PM

Link to join: Zoom

Abstract:

This work examines how differences in waste composition can affect anaerobic digestion (AD). To accomplish this, materials from four different field digesters were collected and characterized. These waste materials were then fed to lab-scale batch digesters and biochemical methane potential (BMP) tests were conducted. Using the data collected from the field digester characterizations and BMP tests, the relationships between the physical and chemical properties of the digester material and digester function were examined. Using multivariate statistics, modelling, and machine learning, this project developed models and simulated the prediction of digester outcomes based on the initial characteristics of the waste type. The characteristics of each waste type varied significantly based on substrate and inoculum type, and foaming status. The influent chemical characteristics of the wastes significantly impacted all aspects of digester function.

Application:

Anaerobic digestion is a technology which generates energy from organic wastes using a mixed microbial community. By doing so, it mitigates greenhouse gas emissions and provides several economic benefits for digester owners. The results of this work provide new knowledge and insight into anaerobic digester function.