Data Science Seminar

Hosted by the Department of Mathematics and Statistics

- Date: Tuesday, November 12, 2024
- Time: 12:00pm – 1:00pm
- Room: Whitney Hall 100E
- Speaker: Gerald “Ben” Jones
- Title: An Integrated Experimental and Modeling Approach to Design Rotating Algae Biofilm Reactors (RABRs) via Optimizing Algae Biofilm Productivity, Nutrient Recovery, and Energy Efficiency.

Abstract

Microalgae biofilms can grow on a rotating algae biofilm reactor (RABR) as a way to clean wastewater and provide a source of biomass for creating valuable products. However, we need a quantitative way to understand how these algae biofilms grow to make the RABR more efficient and productive. In this study, we designed experiments in the lab to test different factors that might affect the growth of the biofilms, such as how fast the RABR spins and how much light it gets. We then used these results as guidance to create a mathematical model that helps us predict how microalgae biofilms will grow in different situations. Our new method allows us to test various conditions for growing these biofilms so they can clean wastewater more effectively and provide more biomass simultaneously. Additionally, we have investigated the energy efficiency of the process, which is closely tied to the speed of the RABR and how often it rotates. By understanding these factors, we can develop better ways to use microalgae biofilms for cleaning wastewater and producing valuable biomass.

Biography of the speaker: Gerald “Ben” Jones has received an education in interdisciplinary mathematics at Utah State University (USU). As an undergraduate, Ben majored in Mathematics, with a minor in Computer Science and Statistics. Towards the end of his undergraduate degree, Ben began research with USU's Mathematics & Statistics and USU's Biological Engineering department on mathematically modeling algae growth for wastewater treatment. By using numerical methods to solve the cell kinematics of algae growth, Ben helped predict the efficiency for novel designs of bioreactors used for wastewater treatment. In Spring 2023, Ben received his Master's in Industrial Mathematics at USU. Following graduation, Ben has worked as an applied mathematician. In his free time, Ben develops video games, cooks, and goes jogging.