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I submitted two abstract that were both accepted for presentation. However, I would like this abstract to be considered as I am very excited about the potential of this lab in the hands of ABO members.

Using Algae in Undergraduate STEM Education: A Flexible Inquiry-Based Investigation at Scale

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Presentation type: Poster
Topic area: Education

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Algae are a diverse group of organisms that influence global biogeochemical cycles, feed millions of people, and inspire myriad entrepreneurial ventures. Any student with a smart phone has likely heard of algae in one or more contexts. Despite all the flash, algal biology is truly an incredible teaching tool that opens inroads towards learning in diverse inter-related topics central to any biology curriculum.

We have developed a laboratory investigation intended for high school and introductory undergraduate education using consumer water bottles, basic equipment and relatively affordable supplies. In this lab, students integrate various biological concepts and applications through inquiry-based, student-driven research. Teams will recognize and apply the basics of photosynthesis and the interplay between fundamental metabolic modes, i.e., cellular respiration and photosynthesis. A number of independent variables such as salinity, nutrients, light quantity and quality, novel additives, and species are alterable for a myriad of multivariate experimental designs, allowing for higher level interpretation and analysis. Students who complete this lab will gain experience in basic microbiology and plant science skills such as sterile technique, cell counting, and pigment extraction. Successful teams will learn to communicate the implications of their findings and provide predictions regarding the effects of climate change on aquatic primary production or the benefits to bio-based industries such as algal biofuels.

While this lab is designed with biofuels in mind, the material herein is flexible and is pertinent in many contexts. Any application focused on generating biomass is within the scope of this framework. However, it would be simple to adapt this investigation to address a number of different applications like bioprospecting, community composition, and the fundamentals of water quality.

Note: This lab was developed by the Boyce Thompson Institute for Plant Research, then adapted and improved for use in large-scale undergraduate labs at Oklahoma State University.

Second abstract title:

Maintaining nitrogen-limited balanced-growth states in a cyclo-turbidostat: How do cells cope with limiting nitrate supply?