



Microbiology Department

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Dear CSH Student Research Travel and Supplies Grants Selection Committee,

February 15, 2024

I am writing to recommend Lindsey Zimmerman to receive a CSH Student Research Supplies Grant. Lindsey started working in my lab part way through the Fall 2023 semester. She started working on a project involving the production of bacterial cellulose by acetic acid bacteria. This work fits into the lab's overarching work on understanding the metabolism and physiology of acetic acid bacteria. My lab is also interested in using this information to engineer these bacteria for industrial / commercial purposes.

Lindsey has helped with most of the research planning. For example, she has examined the genome of a model cellulose producing acetic acid bacterium and identified a predicted *bolA* gene that is known to control the production of a regulatory molecule called c-di-GMP in *E. coli*. This molecule binds the cellulose assembly machinery in acetic acid bacteria and stimulates cellulose production. Lindsey wants to examine if modulating *bolA* gene expression using a CRISPR interference (CRISPRi) system influences cellulose production. Last semester, she planned out all of the molecular work that is needed to test her hypothesis. This included planning plasmid assemblies, picking *bolA* molecular CRISPRi targets, and designing molecular guides for the system. Lindsey has enjoyed her time in the lab and has chose to continue with the project and is now enrolled in Independent Research (MIC 499) this semester. I am happy to have her in the lab and support her undergraduate research. She is a dedicated student researcher who is more than capable of taking on this complex molecular and physiological project.

Lindsey will conduct her work in my laboratory that contains all other equipment and routine supplies necessary for the proposed work (e.g. incubators, spectrophotometers, refrigerators, freezers, centrifuges, plastic consumables, growth media). However, Lindsey does require a site-directed mutagenesis kit and highly pure DNA parts required for the molecular work of the project. These are not available in the lab and must be purchased. The DNA parts also need to be synthesized form a commercial vendor. We currently do not have project funding to purchase these items. These funds will ensure that this currently unfunded project can move forward in a meaningful way.

Continuing this project will benefit Lindsey both academically and professionally. It is well documented that undergraduate research is a high impact learning practice. Lindsey will continue to grow independent in the lab as she applies concepts from the classroom to a real-world question. The lab skills will help improve her employability and complement the work she already is doing at Gundersen.

Lindsey's proposed research is well planned with defined aims and the results will directly answer the research question. I will continue to mentor her, and continue our regular meetings to discuss progress, goals, and troubleshoot any issues. Lindsey plans on presenting at the Research & Creativity Symposium and the next American Society for Microbiology North Central Branch meeting. If successful, we will also be able to publish the results in a peer review journal.



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Lindey has my full support and I recommend funding her request. The CSH Supplies Grant will help support a dedicated undergraduate researcher. I would happily be contacted for more information.

Sincerely,

Dr. Paul Schweiger
Associate Professor – Microbiology
Microbiology Graduate Programs Director
University of Wisconsin-La Crosse