

BURST Project Description and Mentoring Statement  
for ██████████

I am excited to mentor ██████████, a sophomore EOSC major, on a project using high speed imaging to observe zooplankton behavior while foraging on marine snow. Marine snow, aggregates that form in the surface ocean from phytoplankton and other organic matter, play an important role in the carbon cycle by transporting carbon to the deep ocean as they sink<sup>1</sup>, and serve as a food source for many types of zooplankton. Research in the ██████████ Lab by former undergraduate students investigated the behavior of copepods, a common type of zooplankton, while consuming marine snow<sup>2</sup>, however these experiments only used copepods that were tethered, preventing their full range of behavior. ██████████'s project will build on this prior research with the outcomes:

1. Compare untethered and tethered copepod behavior foraging on marine snow
2. Compare behavior of copepods and gelatinous zooplankton foraging on marine snow

This project is ideal for ██████████, as a student new to research, because it involves methodology that is readily learned by students with no prior experience, and working with and observing live zooplankton often inspires enthusiasm in students with an interest in marine ecology like ██████████. I have a strong record of mentoring undergraduate research students at USD (from first-year students to rising seniors), and many of their projects involved the types of skills that ██████████ will use in her project, including working with live zooplankton and using scientific camera equipment. These students, all without prior research experience, were able to learn these skills and complete their projects successfully.

I take my role as a mentor very seriously, and it is important to me that students not only gain research experience but also feel a sense of belonging and gain confidence in their abilities. A key component of my mentoring philosophy is to expose students to all parts of the research process. Although I developed this project for ██████████, I chose it after multiple meetings with her to ensure it matches her interests, which involve marine organisms. Throughout the summer ██████████ and I will discuss her project so she is actively involved in experimental design and troubleshooting. To facilitate a positive research environment and promote success among my students, I find it important to adapt my mentoring style to cater to each student's personality, strengths, and background. ██████████ is a strong academic student (she has been in two of my classes), but is on the shy side and learns best one-on-one or in small groups. By having individual meetings with just ██████████ I hope to build her confidence so she gains a strong understanding and ownership of her project. However, ██████████ will also get the opportunity to work collaboratively with my other BURST student and the more senior students in my lab so that she feels part of a community. ██████████ is unsure of what she wants to do in the future but is potentially interested in graduate school. My hope is that this research experience will provide her some insight into graduate school and other possible career options. Her visit to Scripps Institution of Oceanography (SIO) in the first week of summer (see below) will expose her to what a world-class research institution is like, and through conversations with graduate students there she can learn about the graduate school experience. In addition, I will encourage ██████████ to attend summer OUR events that will be particularly helpful for her or aligned with her interests,

such as research talks or workshops on applying to graduate school. Finally, I encourage all my research students to present their research at national conferences, and although that won't happen this summer, this will be a future opportunity that can aid in [REDACTED]'s professional development.

[REDACTED]'s project will be achieved with the following training. While I am away at a conference in the first week of summer, [REDACTED] (along with my other BURST scholar, [REDACTED]) will visit my collaborator at [REDACTED], who is an expert in zooplankton ecology. During these visits, [REDACTED] and her graduate students will teach [REDACTED] about zooplankton taxonomy. The next week I will begin training [REDACTED] in methods needed for her experiments including culturing phytoplankton, collecting and sorting live zooplankton, forming marine snow, and operating a high-speed scientific camera. For each experiment we will film at least two types of zooplankton (both with multiple replicates): a local copepod species that was used in prior experiments and at least one species of gelatinous zooplankton. We will place one individual at a time in a small tank and record behavior both with and without marine snow. I will then train [REDACTED] to use MATLAB to analyze images so she can compare behavior of copepods she observed to that of tethered copepods from previous years (Outcome #1), and so she can compare behavior of copepods to gelatinous zooplankton (Outcome #2).

## References

<sup>1</sup> J. Turner. (2015) Zooplankton fecal pellets, marine snow, phytodetritus and the ocean's biological pump. *Progress in Oceanography* 130: 205-248.

<sup>2</sup> C. Briseño-Avena, J. Yen, and J. C. Prairie. (in prep) The effects of interactions of copepods with marine snow.