



Czwalina, S., Boessenecker, B., "Identification, Anatomy, and Relationships of a New Basilosaurid Whale from Harleyville, SC."

Samantha Czwalina Research Statement:

This proposed project will be a continuation of my Bachelor's Essay identifying an archaeocete whale skull. So far, I have reconstructed and photographed the partial skull of an archaeocete whale *Dorudon* from Harleyville, South Carolina. This summer I will continue to describe and make anatomical comparisons to place this fossil within its geologic and evolutionary context, ultimately culminating in a published paper. The SSMB research grant will allow me to focus solely on my research project and publish my first scientific paper before I graduate from College of Charleston. Being able to work this summer will be vital for finishing up my research project because our goal is to have this paper ready for submission by August. This tight schedule can only be achieved through an intensive summer research period. Without the financial support of the SSMB grant, this work will be impossible to complete in a timely manner. My research is significant because it contributes to the scientific literature of marine paleontology. We believe that this skull represents a new species of archaeocete. Specifically, this partial skull is likely a new species of the genus *Dorudon*. This exciting discovery highlights the importance of communicating my findings to the broader scientific community. I will work with Dr. Boessenecker from May to August this summer to prepare my research for publication. In May, the primary goal is finalizing the skull comparison with other well known archaeocetes. Additionally, I will search through the matrix collected alongside the specimen to search for additional skull fragments. In June I will work to develop a cladistic matrix by examining primitive and derived character states of our skeleton to classify its relationship to other archaeocetes. Throughout July, I will work to create scientific illustrations of the skull and associated parts (such as the bulla and periotic), which will involve learning Adobe Illustrator and Photoshop. Finally, August will center around finalizing figures and tables along with their associated captions. This work will culminate with me submitting my research to an academic journal. The SSMB research grant will provide me the opportunity to fully immerse myself in important paleontological research. This project will teach me the art of specimen photography and figure construction, how to create a cladistic matrix, how to pull from published literature for relevant descriptions and images, and how to identify, prepare, and catalog fossils. All of these skills are relevant for my future in academia and publishing a paper will make me a competitive PhD candidate. After graduating from the College of Charleston, my current academic goal is to attend graduate school and obtain my PhD in an interdisciplinary geology field. Professionally, I hope to work at a museum after graduating with my PhD. Thus, this research will allow me to grow academically and professionally while teaching me valuable skills and will make me a competitive candidate for graduate school.

I have participated in research on campus for the past two years. I was the recipient of a SURF grant during the summer of 2019 where I studied sponge microbial symbionts at the Smithsonian Tropical Research Institute with Dr. Freeman. This work carried over into the academic year, where I worked on an independent research project at Hollings Marine Laboratory studying brittle stars and their associated sponges. Additionally, I participated in a research class with the BEAMS program at College of Charleston. This work involved using CARIS HIPS & SIPS 11.2 to analyze NOAA bathymetric data studying scarps off the coast of Georgia. This project has continued as an independent study and an abstract is currently under review for the SE GSA conference. Throughout the summer of 2020 I began working with Dr. Boessenecker to conduct preliminary research about archaeocete whales in preparation for my Bachelor's Essay. This project has been conducted in the fall and spring semesters and will hopefully continue through the summer with the support of an SSMB grant.