

STATEMENT OF PURPOSE

Cesar Estien, University of Montana – Organismal Biology, Ecology, and Evolution

As a first-generation student, I entered my university with no clear path. The only desire I had was to make my family proud. When I sat with this thought and my interests, it made sense to major in environmental engineering. This initial path allowed me to unearth the passion I had for the environment from high school. When I began to cultivate this passion in ecology, I recognized that no one that looked like me was pursuing this profession or teaching my classes. It was difficult to see myself fitting in this field due to this lack of representation but I decided to register for an introductory course in Biology and take a leap. This leap landed me into the arms of an incredibly supportive group of graduate students and faculty who encouraged and told me that there is a place for me in this field.

I am writing in application to the University of Montana's Master of Science degree program in Organismal Biology, Ecology, and Evolution with the intention of working for Dr. [REDACTED]. I want to pursue a Master's to open doors and provide me with the proper experience to transition into my long-term goal of pursuing a Ph.D. and a career in academia focused on examining anthropogenic effects on birds and mammals. I will utilize genomic and physiological techniques to reveal how individuals are exhibiting phenotypic plasticity in response to their local environment. Throughout the time I conduct research and build my career, I aim to work towards bridging the racial gap between education in ecological and environmental sciences, and the Hispanic/African-American community by showing that a career in this field is possible for anyone with passion and a commitment to education.

My undergraduate course work and research experiences have well prepared me to succeed in this program. I began to pursue my interests in research during my second year at Florida State University. I volunteered under a Ph.D. candidate, Jessica Cusick, who investigated the proximate mechanisms that influence individual variation in cooperative behavior in brown-headed nuthatch birds (*Sitta pusilla*). To assist her, I analyzed videos on parental care and fledging behavior obtained from the field. In addition to behavioral observations, the now Dr. Cusick, used physiological work to answer her questions. After learning more about how physiological information can answer behavioral questions, I decided to explore other aspects of research that could be used to answer the questions I was beginning to develop about how animals adapt to their dynamic environment. The following fall, I explored a whole new side of ecology research by joining the Levitan lab under Ph.D. candidate Kevin Olsen who incorporates components of population genetics with laboratory experiments to understand more about the forces influencing mating systems. Under Olsen, I assist in the use of microsatellites to determine the degree of relatedness between sea squirt colonies and prepare solutions to assist in breaking down cellular material. Here, I further developed my interest in investigating how animals integrate environmental information to change their behavior and physiology.

During the summer of 2019, I pursued my interests in ecology and worked as a field technician for the Kluane Red Squirrel Project in the Yukon Territory of Canada. As a core team member for this project, I worked in harsh conditions and handled red squirrels, independently managed a research grid, recognized uniquely marked individuals, extensively tracked them using radio telemetry, and conducted detailed behavioral observations. During my time there, I worked alongside Ph.D. students and PIs where I solidified my desire to pursue a Master's. Working alongside this group of researchers showed me that my goals are feasible and that I could succeed at not only advancing my knowledge, but in promoting diversity and inclusion in the field of ecology.

To further prepare for attaining my Master's, I decided to become a DIS (directed individual study) student in the Levitan laboratory. This lab has given me the opportunity to

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analyze the effect salinity and turbidity has on fertilization success in sea urchins (*Lytechinus variegatus*). This project will further my interest in how animals perform under environmental stress. Through this experience, I will improve my ability to communicate science effectively to those around me by creating a poster for my research and participating in lab meetings. After completing this DIS, I will have built a foundation in scientific writing and furthered my skills in developing, testing, and analyzing a hypothesis.

Education is the key to bridging the gap that exists in the representation of the STEM community. For this reason, I am passionate about excelling as a Teaching Assistant during my time at the University of Montana. Through my teaching assistantship, I hope to create a safe space that values human diversity and promotes mutual respect between students and teachers of all backgrounds. I want to create a learning space that stimulates curiosity, encourages feedback, and pushes a strong work ethic. I look forward to investing in undergraduates and ensuring each student sees a place for themselves in ecology. While teaching, I hope to gain further insights into my strengths and enhance my communication skills, flexibility, and compassion. STEM education, specifically environmental science, is being reduced in some areas of our country. Working as a TA will prepare me for one of my career goals to create educational materials based on my biological research that helps teachers to best serve their classrooms by integrating new information about ecology into their curriculum. Communicating science effectively is an important component of any career in science. Working as a teaching assistant and thinking about how my research can be used to guide science education will strengthen my oral communication skills and allow my research to have broad impacts.

Working with [REDACTED] lab will best equip me to study the mechanisms animals use to adapt to continual changes in their environment. It is refreshing to see that the [REDACTED] takes interdisciplinary collaboration to heart by sharing lab space with multiple labs, encouraging and supporting additional perspectives. [REDACTED] collaborative work with labs, such as the [REDACTED] who investigates the rapid evolutionary responses of individuals to climate change, make this lab and the OBEE department the ideal place to further my career. I plan to build on [REDACTED] exploring phenotypic plasticity in relation to a changing environment by integrating genomic and physiological approaches to investigate the traits that help individuals succeed at high elevations and how that differs along an elevation gradient.

I want to attend the University of Montana because of the incredible faculty and access to the Northern Rockies. The dynamic landscape of the Rocky Mountains can contribute to physiological adaptations, making this an ideal place to pursue my interests in how evolutionary mechanisms shape adaptations in varying environments. The smaller size of the Organismal Biology, Ecology, and Evolution program allows me to get more hands-on learning in understanding fundamental ecology and evolution principles. Participation in the OBEE Master of Science degree program will provide me with a rigorous education and the resources to create a thesis project that will contribute to the greater field of anthropogenic effects on phenotypic plasticity and ecology. At the University of Montana, I will be trained as a future colleague in ecology and evolution preparing me for my desired career in an academic position. Thank you for your consideration of my application.