

Intellectual Merit Criterion

Overall Assessment of Intellectual Merit

Excellent

Explanation to Applicant

The applicant clearly has the experience necessary to develop independent research, based on several different research experiences. I am impressed by his proposed research developing a bacteria-phage system to answer basic eco-evo questions about metapopulation evolution. His references make clear the applicants' ability to succeed at independent research.

Broader Impacts Criterion

Overall Assessment of Broader Impacts

Fair

Explanation to Applicant

The broader impacts of this proposal would greatly benefit from more specificity. I see potential for the applicant to discuss how to use his extensive Spanish language and tropical ecology backgrounds to reach a wide audience (public or mentees). Public communication regarding evolution and conservation is critical, but it is not clear how the applicant proposes to do this. It is also unclear how the proposed research will benefit species conservation. Species interactions will change over time (presumably as climate changes?), but any direct links between the bacteria-phage system and conservation targets need more explaining.

Summary Comments

This is a very strong application in terms of the Intellectual Merit, and the applicant has an impressive background that points to success as a scientist. However, the broader impacts of both past and future work need to be more explicitly detailed.

Intellectual Merit Criterion

Overall Assessment of Intellectual Merit

Excellent

Explanation to Applicant

This applicant has an exceptional academic record and has amassed a wealth of research experience from the lab to international fieldwork. These experiences were actively sought after by the applicant demonstrating a clear commitment to pursue science as a profession, achieve goals, and take every advantage of the opportunities available to the applicant. There was deep thought given to career choices, testing different flavors of research, and thinking about biological science from a variety of angles. This demonstrates maturity in the applicant and this matches the well-written research plan and personal statement. The proposed project will help understand the impact of environment on coevolution between pathogen and host using an experimental evolution system. The plan is well crafted and sound. These results should provide new perspective on genetic mechanisms of adaptation and open new doors for a wealth of research by the applicant. The research topic is exciting and will impact the fields of coevolution, experimental evolution, and community ecology.

Broader Impacts Criterion

Overall Assessment of Broader Impacts

Fair

Explanation to Applicant

The applicant served as a mentor to a high school student through an NSF REU. There is mention of engaging the public regarding scientific disputes but the plans for how this will be achieved are not well articulated. The potential for broader impacts could be strengthened by more details on how broader impacts will be achieved and assessed during the proposed research. The proposed research would likely provide many opportunities to involve high-school students, members from underrepresented groups, and create outreach programs that collectively would strength the potential for broader impacts by the applicant.

Summary Comments

This is an exceptional applicant that proposes an excellent study. More details on potential broader impacts from the research plan and the applicants experience would strength the application

Intellectual Merit Criterion

Overall Assessment of Intellectual Merit

Excellent

Explanation to Applicant

The applicant is finishing his undergraduate degree at the University of Minnesota- Twin Cities, where he has outstanding grades. He participated in a study abroad program in Venezuela where he improved his Spanish language skills and solidified his preference for laboratory work. He has participated in undergraduate research in three labs, two at Minnesota and a third at KU during an NSF REU; all of his research has focused on microbiology, generally on experimental evolution. In his very honest personal statement, the applicant discusses both his failures and successes at acquiring grant money, and the lesson he learned in the process. He has independently designed the research into bacteria-phage co-evolution that he is currently undertaking and that he expands upon in his cogent research proposal. In both statements, the applicant's thoughtful, reflective nature is apparent. In his personal statement, he documents challenges he has faces in biology, but shows us how they lead him to expand his skillset, especially into bioinformatics and computation, and ultimately he was draw towards microbial evolutionary ecology. The research proposal is well-written and well-designed, and the results will provide important insights into the co-evolution of host and parasite in a manipulable system with a short generation time. The application is bolstered by three very strong letters of recommendation.

Broader Impacts Criterion

Overall Assessment of Broader Impacts

Good

Explanation to Applicant

The applicant is clear about the broader impacts of his proposed research: the potential development of a new eco-evo model system and potential to inform conservation (though this seems like a bit of a stretch) and infectious disease. It is also clear that he wants to communicate his research, the non-static nature of evolution, and the uncontroversial status of publically-percieved-as-controversial themes (e.g., GMOs, climate change) to the general public. He also understands the importance of mentoring and different mentoring styles as a result of his time in various labs. While both of these are laudable, the application does not detail exactly how the applicant will meet either of these broader impact goals.

Summary Comments

The applicant seems very well prepared for graduate school, and I expect that he will thrive, as his letter writers attest to. His well-written application highlights his mature thought process, his grasp on his chosen subfield of evolution, and his ability to learn and adapt to new situations. While the intellectual merit of this application is exemplary, the broader impacts portion has room for improvement.

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