Intellectual Merit Criterion

Overall Assessment of Intellectual Merit

Very Good

Explanation to Applicant

This application is from a student who has undergraduate experience analyzing video samples of behavior in anole lizards to construct models of their cognitive abilities, graduate rotations in mouse olfaction and development of visual function in zebrafish, and eventually a graduate research project in analysis of neural pathways that analyze light polarization in cephalopods. Accordingly, she has experience with multiple animal models, and has developed a strong foundation in experiments on visual processing. The applicant completed a rigorous undergraduate education in Biological Sciences with a record that was mostly strong - with some challenges in science courses. She also plans to attend Neuromatch Academy to develop skills in computational neuroscience, and the highly competitive Marine Biological Laboratory Neural Systems and Behavior course. Letters of support describe the applicant's troubleshooting abilities and contributions to improving methodologies. The letters also attest to the applicant's involvement in open science and data sharing, which are (of course) very important concerns in neuroscience today. The statement of educational and career goals describes that the applicant will pursue post-doctoral education working on cephalopod neural systems and behavior, and will eventually seek an academic career at a R1 institution.

Broader Impacts Criterion

Overall Assessment of Broader Impacts

Good

Explanation to Applicant

The applicant started her academic career as a McNair Scholar at the University of Missouri. She mentored under-represented undergraduates through their Center for Academic Success and Excellence, and she has conducted multiple "octopus demonstrations" to promote interest in scientific research. These activities are also recognized in the letters of support. The applicant also indicates that she plans meaningful engagement with students through the SPICE program, the Women in STEM seminar series at University of Oregon, and the Institute of Neuroscience DEI initiative, but these plans have not been realized at the time of the application. The plan for research is to study visual processing of light polarization in octopus. Analysis of light polarization is a rare ability that is not shared by many other organisms, and it will be studied in a creature that has a different evolutionary visual heritage from most commonly studied organisms. This limits the broader impact of the research.

Summary Comments

This application is from a student in an under-represented group - a McNair Scholar, who is invested in mentoring diverse students. She has a reasonably strong academic track record, and a reasonably well-developed graduate research plan. She also describes some outreach activities with under-represented students, and plans for further engagement.

Intellectual Merit Criterion

Overall Assessment of Intellectual Merit

Excellent

Explanation to Applicant

The applicant was a McNair scholar at the University of Missouri. She has co-authored several papers and is first-author on one.

Broader Impacts Criterion

Overall Assessment of Broader Impacts
Excellent

Explanation to Applicant
The applicant's project will greatly enhance vision research. In addition, her outreach activities especially for communities that are underrepresented in STEM is commendable

Summary Comments
The applicant has a project that is far reaching beyond vision research. Her enthusiasm for basic science research and outreach activities makes her an excellent recipient for the GRFP grant. I NEVER give a perfect score but this applicant impressed me so much that I had no choice but to give a perfect score.

Intellectual Merit Criterion

Overall Assessment of Intellectual Merit
Excellent

Explanation to Applicant
This applicant graduated from the University of Missouri - Columbia with a degree in ecology. As an undergraduate, the applicant performed a considerable amount of research as a McNair scholar, which lead to one presentation. They have one paper in progress. The applicant plans to study 2-photon calcium imaging of neural responses to polarized light stimuli in octopi. As these cephalopods have a visual system similar to humans, which could provide an evolutionary perspective of the neurological programming of perception and cognition.

Broader Impacts Criterion

Overall Assessment of Broader Impacts
Very Good

Explanation to Applicant
The applicant is involved in outreach activities at their home institution including science demonstrations in undergraduate courses, high schools, and middle school camps. The applicant speaks about mentoring the next generation of scientists but does not speak deeply about their previous experiences mentoring others. They plan to continue working with the DucksRise program, which provides formal mentoring to graduate students who will then mentor undergraduate students.

Summary Comments
The applicant plans to study how neurons in the optic lobe encode polarization information using 2-photon calcium imaging of neural activity in response to visual stimuli that vary in either luminance or polarization angle. Humans cannot perceive polarization, therefore findings from this work may highlight the evolutional divergence of the visual system. This project aims to produce the first measurement of visual encoding of polarization in a cephalopod, making it very innovative. The broader impacts are very good. The applicant is described as enthusiastic, creative, talented, scientifically curious, engaged, and hardworking among other accolades. They show great promise as a future leader, researcher and mentor.