Intellectual Merit Criterion

Overall Assessment of Intellectual Merit

Excellent

Explanation to Applicant

Strengths The applicant received the undergraduate degree at Montana State University (MSU) where they continue as a master student. The applicant gave presentations at national conferences and was awarded the MSU scholarship. Since joining MSU, the applicant has performed research in computational mathematics, computer systems, as well as in experimental physics. The applicant is self-motivated, mature. They possess excellent skills in image analysis, spatial statistics, scientific computing, machine learning and, equally important, in interdisciplinary research in biomedical fields. If given the opportunity, the applicant has the potential to grow and excel in research. The applicant took advantage of the available resources at their institution and thrived in the research environment in which they participated. They have excellent skills for software development for scientific purposes and is independent thinker and problem-solver for both wet-lab experiments and for theoretical questions. The applicant has grantsmanship experience as they wrote themselves a proposal for undergraduate research (URA) project that was then approved and supported by the NIH. Weaknesses The academic record (grades as appearing on the transcript) could have been stronger. However, the profile of the applicant suggests them being a rather practical (than theoretical) researcher. Overall, this weakness does not seem to be critical as the applicant appears to be able to overcome it by hard work and talent for interdisciplinary research.

Broader Impacts Criterion

Overall Assessment of Broader Impacts

Excellent

Explanation to Applicant

By being a volunteer firefighter and working in lawn care, as well as a teaching assistant and research assistant in math and physics, the applicant contributed greatly to local community while advancing their studies. This is to be commended. The applicant's project is interdisciplinary and has applications to biology and physics. Solving high-dimensional partial differential equations with less computational time and error has wide applicability to numerous real-world problems.

Summary Comments

The applicant has maximized learning and research opportunities at their academic institution. The applicant shows talent and excellent skills for research project with practical applications. Their contributions to society through work and volunteering are inspiring and show strength of character.

Intellectual Merit Criterion

Overall Assessment of Intellectual Merit

Very Good

Explanation to Applicant

The applicant has significant undergraduate research experience. The applicant has experience giving research presentations at different conferences. Has received awards that attest to the applicant's ability to excel in mathematics including the National Honorary Mathematics Society award for superior achievement in the field of mathematics. The research plan is clearly stated. References attest to the applicant's ability excel in research.

Broader Impacts Criterion

Overall Assessment of Broader Impacts
Very Good

Explanation to Applicant
The applicant aims to use neural networks to solve PDEs and enhance practical applications of PDEs in areas where they are currently impractical due to computational cost. The applicant's research has the potential to benefit the deep learning community.

Summary Comments
The research plan is clearly stated. The applicant's research has the potential to benefit the deep learning community.

Intellectual Merit Criterion

Overall Assessment of Intellectual Merit
Good

Explanation to Applicant
The applicant received BS in Math from Montana State and is currently working towards a MS degree as a graduate Teaching assistant there. The applicant has a fair GPA record and received one scholarship and one award. The applicant had undergraduate research experiences on various projects and presented results in three different conferences (locally and regionally). However, those projects did not lead to publications. The applicant changed from being a physics major to math, with clear interests and strong backgrounds in science. All reference letters demonstrated the applicant has a good potential in doing interdisciplinary work. The project proposed could lead to interesting results and is definitely a "hot" area. It would be helpful if the applicant has taken more programing courses or demonstrated the proficiency of programing in software other than MATLAB.

Broader Impacts Criterion

Overall Assessment of Broader Impacts
Very Good

Explanation to Applicant
The applicant clearly cares for the society in general and is a volunteer firefighter. The applicant has presented in three different conferences to disseminate research results. The proposed project would be truly of great impact considering the wide applications and importance of Partial differential equations.

Summary Comments
Summary The applicant has a good academic record with great potential in succeed in a Ph.D. program. The proposed project has a great potential in broad impacts. The application would be more competitive if the applicant can demonstrate more involvement of outreach program. What confuses the reviewer a little is the application files seems to be scanned pictures from some other files pasted to a word file. Hence the texts were blur, and some of the important figures were not illegible.