

Intellectual Merit Criterion

Overall Assessment of Intellectual Merit

Very Good

Explanation to Applicant

The applicant has several academic honors. He has presented his research orally and on posters at local venues and national conferences. Some work is in the process of going to publication. He vividly recounts his four diverse undergraduate research experiences, which have yielded marketable products. He has experience working independently and as a team member.

Broader Impacts Criterion

Overall Assessment of Broader Impacts

Very Good

Explanation to Applicant

He recognized early the importance of sharing scientific results with the public and has employed this tenet in his own past research. He has mentored high school students and participated in open community interfaces with academic scientists. He plans to present his results at events directed towards children and the public.

Summary Comments

His proposed project at first seemed rather simplistic although it clearly indicated the hypothesis and expected outcome. In fact, it combines many current algorithms to carefully analyze large genomic datasets rigorously. The applicant has a commitment to share his scientific results with the broader public.

Intellectual Merit Criterion

Overall Assessment of Intellectual Merit

Good

Explanation to Applicant

The applicant gained a lot of diverse research experience spanning both biology and quantitative sciences, which set a solid foundation for him to pursue in-depth graduate research. The project aims to study how mutation rate varies in different tissues and different genes. The question is interesting and straightforward, but its linkage to cancers or other diseases is not well explored as expected. The applicant's research skills and determination are strongly recommended by the referees. His academic record is very good.

Broader Impacts Criterion

Overall Assessment of Broader Impacts

Excellent

Explanation to Applicant

The applicant has a good record of mentoring the people in the local community, particularly children, through a number of outreach activities. He also has the good experience of disseminating open-source scientific software tools. The plan of reaching out K12 students and general public is great. The plan of disseminating data and tools is very welcome.

Summary Comments

The applicant has gained a lot of experience of conducting interdisciplinary research involving biology, mathematics and computer science. The research on mutation rate in mouse tissue is relevant and valuable, although its relevance to cancers is not well explored. The broader impact of the project is strong.

Intellectual Merit Criterion

Overall Assessment of Intellectual Merit

Very Good

Explanation to Applicant

The applicant has a very strong foundation in molecular biology and mathematics through his coursework. He also has had many hands-on experiences in different laboratories that would be highly relevant for his graduate studies and proposed research. Rather than simply listing his work experiences, he very clearly and succinctly clarifies his contributions and what he gained from each mentorship. Additionally, the applicant clearly states in his proposal the hypotheses that he plans to test, appropriate approaches for doing so, and the results he anticipates, including their interpretation. This application could be strengthened by discussing possible alternatives in his approach, in case his experiment fails. Overall, both of his statements are well-written and demonstrate that he is thoughtful and logical in his work.

Broader Impacts Criterion

Overall Assessment of Broader Impacts

Excellent

Explanation to Applicant

As a part of his scientific discoveries, the applicant has demonstrated that he is highly motivated to improve public dissemination of research results, has participated in various scientific meetings, and aims to push mobile apps and other user-friendly tools for public use. He seems to have sufficient training for developing these applications and online tools, and is interested in keeping his source codes and other materials open-source for anyone to use. Additionally, the proposed research is not only relevant for basic science, but it will have many applications, such as advancing genomic research and perhaps the development of clinical tools for medical practitioners.

Summary Comments

Based on his completed coursework, research experiences and carefully written statements, the applicant shows a lot of scientific maturity and is well-prepared to pursue the proposed research. He is enthusiastic about interdisciplinary approaches, and would want to improve the accessibility of his research results. His goals that he has planned for his graduate studies are appropriate, given his educational background and the resources that are available to him at his university.