

Intellectual Merit Criterion

Overall Assessment of Intellectual Merit

Excellent

Explanation to Applicant

The applicant has very strong intellectual merit. His academic performance is very strong with multiple honors including fellowships, scholarships, induction in to academic honor societies and receiving an NIH training grant. The applicant has also given multiple presentations on his work both posters and talks and is a co-author on a submitted manuscript in a high impact journal. The applicant sought out research experiences and has been performing research since the summer of his freshman year. In addition, the applicant already received a fellowship and scholarship for graduate school. The completely independently developed and proposed aims could benefit from clear concrete experiments to test hypothesis and include additional validation and alternate solutions in proposal. An additional method for evaluating transcription processes is needed besides just evaluating gene expression only after deletion of *ino80* or *snf* or inhibition of enzyme activity? I believe the research proposal could be more developed. However, I do not want to reiterate the very strong intellectual merit of the candidate and he has more than enough potential to improve this research proposal to test his hypothesis.

Broader Impacts Criterion

Overall Assessment of Broader Impacts

Very Good

Explanation to Applicant

Volunteered for 3 years to get elementary schoolers and middle schoolers interested in STEM fields in the First Lego League. The applicant plans to intervene early encouraging more underrepresented elementary and middle schoolers to be interested in science and provide ability to conduct scientific research by volunteering on a regular basis at FUSE, and will provide hands on lessons to students thru the Vanderbilt Student Volunteers for Science program. His commitment to this outreach is confirmed by his aim to start a volunteering initiative specifically geared towards children who are traditionally underrepresented in science! The scientific research presented will allow us to understand how chromatin regulation affects noise in gene expression and biological fitness. It would have been nice for references to strengthen this impact of the proposed work by giving opinion on this in letters.

Summary Comments

This applicant has proven to be a motivated individual that is determined to become an excellent scientist who will make a significant impact on future scientists beginning at such a young age. The applicant has an excellent intellectual merit. The values radiating from this proposal are completely in line and stand for everything the NSF fellowship program aims to accomplish.

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Explanation to Applicant

Strengths The intellectual merit is strengthened by an accomplished applicant, a clearly written proposal and an exciting research plan. The applicant is highly motivated, curious, and building an exciting skillset that will promote success in graduate school and beyond. The applicant describes an impactful series of research experiences, and in each case clearly draws out the central

scientific goals of the projects. The proposed research plans focus on understanding the basis of transcriptional heterogeneity, using a series of elegant experiments in budding yeast. These experiments are clearly described and likely to advance our understanding of a complex problem. Plus, this project nicely builds on the training of the applicant, and seems like an excellent next step in the career path. Weaknesses There are some weaknesses in the academic record, but these are viewed as minor

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Explanation to Applicant

Strengths The applicant is deeply committed to STEM outreach and education, particularly broadening the participation of members of underrepresented groups. The application demonstrates a track record of efforts toward these goals, and plans to develop new outreach programs during the fellowship period. These plans are viewed very positively and align nicely with the training and goals. The noted connection between the role of transcriptional heterogeneity and the role of diversity in STEM is poetic. Weaknesses None noted.

Summary Comments

This is an excellent application. The intellectual merit is strengthened by a cohesive articulation of exciting ideas and questions. The applicant is motivated and prepared for graduate studies, and the proposed project is viewed as an excellent opportunity to expand training. The research statement is very strong. The broader impacts are strengthened by the commitment of the applicant to increasing the participation of underrepresented groups in STEM, and the track record and future plans demonstrate that commitment.

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Explanation to Applicant

The applicant has a strong academic record and has completed a BS degree in chemical engineering from [REDACTED]. The applicant is currently enrolled in a PhD program in [REDACTED]. The applicant has received several honors has a publication and both oral and poster presentations of research. The proposed research aims to chromatin-remodeling during transcriptional regulation in single cells. The work has merit and is well described and well defined. This work has relevance for engineering yeast systems for bioremediations. The letters of support were enthusiastic about the candidate's potential in science.

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Explanation to Applicant

The applicant has an established track record of teaching and mentoring activities with an emphasis on biology and chemistry. The applicant demonstrates passion and drive combined with intellectual curiosity. The applicant does a good job of expressing how the proposed research can be disseminated to youth and undergraduates.

Summary Comments

The applicant aims to chromatin remodeling in regards to transcriptional regulation in single cell systems. The intellectual merit

of this proposal well described and the applicant has a good academic record and strong record of laboratory experience and research in several different laboratories. The applicant had strong recommendations and a track record of identifying and successfully completing research opportunities. The applicant has a strong history of outreach and science communication and strong plans to continue this impact.