

## Intellectual Merit Criterion

### Overall Assessment of Intellectual Merit

Good

### Explanation to Applicant

The candidate comes with a wealth of specialized skills and conservation/natural history knowledge. While I was impressed by this experience, IU found the personal statement to lack any details of the scientific merit and theoretical framework for the candidate's past research. I was also surprised by the inclusion of a profile photo within the application, which I found inappropriate. The project itself lacked a theoretical framework or hypotheses. Although the proposed work could pose scientific methodological advancement, it is not clear how innovative the effect actually is to past efforts within the applicant's lab or that conducted among other groups examining SDM.

## Broader Impacts Criterion

### Overall Assessment of Broader Impacts

Excellent

### Explanation to Applicant

This is a very strong broader impacts plan that is both innovative and detailed. This candidate has outreach expertise that they leverage into building a scientific infrastructure and increasing science education. This is one of the best broader impacts plans I've seen.

## Summary Comments

I gave this applicant the highest possible score on their innovative and well-motivated broader impacts plan. I found the intellectual merit portion of the application lacking. A candidate of this level should be able to present the scientific context for their past and future work.

## Intellectual Merit Criterion

### Overall Assessment of Intellectual Merit

Excellent

### Explanation to Applicant

The applicant has a strong academic record, with some teaching and research experience. The applicant proposes to develop biologically-informed prediction of species-level responses to climate change. Given his strong computational skills and biological knowledge the proposed project has the potential to have high intellectual merit and provide great advancements in predictive models of species distribution.

## Broader Impacts Criterion

### Overall Assessment of Broader Impacts

Excellent

### Explanation to Applicant

The applicant is well placed to have broad impacts with the proposed project as he has a commitment to translating research into conservation and to share his quantitative expertise

## Summary Comments

The applicant has the skills needed and is well placed to be a successful graduate student

## Intellectual Merit Criterion

### Overall Assessment of Intellectual Merit

Very Good

### Explanation to Applicant

The applicant's academic background in both computer science and biology, along with his prior work in applying computational techniques to biological questions have thoroughly prepared him to carry out the proposed research. His recommendation letters indicate that the applicant is capable of using relevant biological data to build the type of model described. The work itself involves predicting species' range expansions by incorporating physiological data, species traits, and environmental conditions into a hybrid model, which is a very timely undertaking with the potential to transform ecological research into species ranges. I am intrigued by the use of machine learning techniques to build range expansion models, although I do not have the background necessary to judge the feasibility of that aspect of the work. The research plan, although understandably lacking in some detail, seems reasonable since it uses readily available data from hundreds of species to build the model. The applicant did present a plan to validate the model, but the number and types of taxa that will be used to validate the model predictions via experimentation were not discussed, nor were details of the validation process given.

## Broader Impacts Criterion

### Overall Assessment of Broader Impacts

Excellent

### Explanation to Applicant

This application shows excellent potential to realize the broader impacts of the applicant's research throughout his career. In the past, he has worked to educate the public via work at an environmental studies center, and he has used several forums to disseminate his techniques to other scientists. Moreover, he has received formal training in connecting science and policy and outlined a concrete pathway toward making the model resulting from this work widely available on several platforms. The applicant's graduate institution has programs in place to support the broader impacts of the work.

## Summary Comments

The applicant has outlined an ambitious plan to integrate physiological, phenotypic, and environmental data into a hybrid model capable of predicting range expansions across a variety of taxa. His formal coursework in both computer science and biology, in conjunction with his experience in modeling biological systems and working as a naturalist, has uniquely suited him to succeed in carrying out this project. The work itself is both timely and of critical importance to basic science, conservationists, managers, and policymakers. The applicant detailed a plan to use existing infrastructure at his institution to make his model and expertise available to interested parties from diverse backgrounds, including scientists and non-scientists. His history of communicating science to the public and sharing his techniques with other researchers strongly suggests that he will be able to follow through on his plans to realize the broader impacts of his work.