

Summary

The goal of this developmental funding request is to finance the first vertebrate research program at Lincoln University. The funding will support the objective of:

1. Establishing a functional and sustainable Institutional Animal Care and Use Committee (IACUC)
2. Applying for the Charles E Kaufman Foundation New Investigator Research Award

This project will be completed between May and August of 2026.

Background

As an HBCU, Lincoln University serves to educate and provide opportunities for its minority serving population. My goal as a biologist and biology professor is to educate my students in the sciences but also develop their confidence and curiosity in the field. Science education research emphasizes importance of undergraduate research as it increases student confidence, sense of belonging in the field of science and increases the likelihood of graduate school (Seymour et al. 2004; Russell et al. 2007). The benefits of undergraduate research also extend to students engaging with model organisms and vertebrate research (Sarmah et al. 2016; Forecki et al. 2023). The use of animals in research helps students gain practice in experimental design and animal husbandry. What is surprising is many undergraduate biology students at Lincoln University travel to larger and predominately white universities to gain research experience. Historically, faculty have used the space, equipment and OLAW assurances of other nearby institutions to conduct research. These methods have been time consuming and costly. When initially joining Lincoln University I was told that the necessary committee to conduct vertebrate research was in development. However, there were unexpected roadblocks, and the committee was not formed for these endeavors. Therefore, the goals of this project are to (1) *establish an Institutional Animal Care and Use Committee (IACUC), which is a requirement to conduct animal research, and (2) apply for the Charles E Kaufman Foundation Award to gain funding to establish a research program that address the effects of pleiotropy of the melanocortin system using *Gambusia Holbrooki*, the eastern mosquitofish.*

Specific Aims

Aim One: Establish Lincoln University's IACUC

To complete my research, and any vertebrate research at the institution, the university must acquire an Animal Welfare Assurance. I have initiated the process of assurance acquisition with Dr. Karen Baskerville (IACUC co-chair) and Dr. Michael Ayewoh (Chief Research & Sponsored Programs Officer). With support from the development grant, as well as a full summer to focus on the project, I will have the opportunity to work with administration and finalize all documentation, health and safety requirements, and finances associated with the IACUC requirements. Dr. Emily Miedel, Associate Professor of Laboratory Animal Medicine at the University of Pennsylvania has agreed to meet with me monthly in May-August 2026 to assist in finalizing the Animal Welfare Assurance. The IACUC committee will assess and support all vertebrate research, and two faculty members (Dr. Booker, Dr. Baskerville) are interested in submitting vertebrate research agendas once the committee is established.

Aim 2: Application for the Charles E Kaufman Award:

The Charles E. Kaufman Foundation provides funding to Pennsylvania universities to carry out research in the areas of biology, chemistry and physics. I am eligible to apply for the New Investigator Research Grant which provides up to \$150,000 over two years as I am an investigator (tenure and tenure-track) at a Pennsylvania University. The foundation's award would provide funding for my work to assess the potential pleiotropic benefits of eumelanic coloration. This work assesses the maintenance of rare eumelanic polymorphisms and provides a mechanism for their persistence. I plan to submit two overall objectives for the two-year grant (1) assess behavioral differences between melanic and silver males in response to predators in varying social environments, (2) identify differences in hormonal response (testosterone and cortisol) given different predator and social treatments. The submitted proposal will be titled: "Understanding the maintenance of a melanic polymorphism by assessing behavior and physiology in Eastern mosquitofish populations." Funding from this grant would establish my ultimate research agenda and provide on campus animal research opportunities for students.

Timeline

Since IACUC documentation has already been started I will finalize the applications and will also schedule monthly meetings with Dr. Michael Ayewoh (Institutional Officer) and Dr. Miedel. I plan to readdress issues in the current documents in May and have the IACUC application completed with established committee members by August 2026, or the start of the academic school year. For the Charles E. Kaufman award, the LOI (Letter of Intent) is due March 27, 2026, at 5PM ET and the full proposal is due July 24, 2025, at 5PM ET. I plan to work on the proposal from May -July 2026. The faculty development grant would provide financial support for me to complete both aims during the summer of 2026.

Developmental Impact/ Dissemination

I would like to announce the establishment of the IACUC committee during a Fall faculty meeting. The presence of the committee will allow for the use of vertebrate animals in research which would increase Lincoln's appeal to new biology and chemistry hires. The Kaufman grant would significantly impact students access to basic biology research and expand their understanding of opportunities in the field of ecology and evolution. Work from the Kaufman grant will be presented at Lincoln's Science Fair and Annual Research Symposium and the International Evolution Conference. An analysis of aims one and two and project report will be submitted to the FDRC Committee and Faculty Affairs.

References

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- Russell, S. H., Hancock, M. P., & McCullough, J. (2007). Benefits of undergraduate research experiences. *Science*, 316(5824), 548-549.
- Sarmah, S., Chism III, G. W., Vaughan, M. A., Muralidharan, P., Marrs, J. A., & Marrs, K. A. (2016). Using zebrafish to implement a course-based undergraduate research experience to study teratogenesis in two biology laboratory courses. *Zebrafish*, 13(4), 293-304.
- Seymour, E., Hunter, A. B., Laursen, S. L., & DeAntoni, T. (2004). Establishing the benefits of research experiences for undergraduates in the sciences: First findings from a three-year study. *Science education*, 88(4), 493-534.