

Graduate Studies, University of California, Davis  
***Achievement Rewards for College Scientists (ARCS) 2023-24 Nomination***

**Student Name: Katherine Lauck**

**Graduate Program: PhD Ecology**

***ARCS prefer previous ARCS scholars if possible.***

**Previous/current ARCS Scholar?   ☐ Yes   ☒ No   Ranking (Ex: 1 of 2): \_\_\_\_\_**

**Does the nominee have any current fellowship awards? yes   If so, please list**

**Solano County Water Agency fellowship: two summers and two academic quarters of GSR support**

**BIOGRAPHY (1 paragraph)**

Katherine Lauck is non-binary and grew up in a rural area without representation. At age 29, after relocating to California for graduate school (current GPA 4.0), they finally recognized and begun to express their gender identity. They could have spent their life in an identity that felt suffocating, in a place that did not accept their full humanity, simply because they faced financial barriers. They would not have been able to attend university without the full scholarship they received from Cornell University. After university, they won a Fulbright to conduct an independent research project in Indonesia. They learned to speak Indonesian and spent hours in conservation with our local guides, and in the process, learned how privileged they were, despite the challenges their upbringing posed. Their experiences with financial insecurity and gender identity, coupled with their experiences abroad, have forged their determination to use their privilege for positive change. Katherine pursues this ambition in three main ways. Firstly, they seek to produce actionable science. they have co-developed research abroad with NGOs in service of their community-driven research programs, and their current research program is focused on conservation science applicable to farms across the US. Secondly, they mentor and collaborate with folks that have been historically excluded from academia, both abroad and in the US. One of their mentees was recently awarded a Chevening Scholarship and attended graduate school in the UK. Finally, they are involved as a leader in efforts to build a more just and inclusive community at UC Davis by leading and participating in committees working to improve the Ecology graduate program's recruitment and retention of diverse graduate students.

**RESEARCH: include explanation of how ARCS funding will assist in educational goals (2 paragraphs).**

Habitat loss to anthropogenic disturbance is the primary driver of species loss and endangerment. As climate change progresses, human-dominated landscapes may expose birds to new temperature extremes because converting land to agriculture removes trees that insulate the understory from ambient temperature. Katherine's previous work has found that, across species and geography, bird nests in agricultural areas are more likely to fail during high temperature anomalies than those in forest. We expect two main mechanisms to play a role in decreasing growth and survival of nestling birds: increased thermoregulatory energy demands and reduced food provisioning to nestlings. To test this hypothesis, they established a network of over 200 nest boxes distributed across row crop, grassland, orchard, and riparian forest in California's Central Valley and monitored Tree Swallow and Western Bluebird nestlings during April-August 2021-2023. We collected weekly blood samples and monitored internal and external nest box temperature, individual growth, parental food delivery rates, and survival over 232 nesting attempts. They will measure blood corticosterone using ELISA assays. Then, they will build a structural equation model to trace the direct and indirect effects of air temperature through land cover type, nest box temperature, corticosterone response, food delivery rates, growth, and ultimately nestling survival to fledging. Our findings will suggest concrete avenues through which working landscapes in the Central Valley could be modified to better accommodate birds as climate change continues to warm the landscape. If the direct effects of heat predominate, providing shade trees in agriculture or modifying nest boxes to reduce their internal temperature may increase nestling resilience. If food-mediated effects are more important, maintaining patches of non-crop habitats in working landscapes to support food resources and provide thermal refuges for parents may be effective. Katherine has supported themselves mainly through teaching assistantships so far. Though they have enjoyed teaching, they have already taught eight quarters of classes, which is more than adequate for their career goals. If awarded an ARCS fellowship, they would be able to ensure that they will be able to focus exclusively on completing their research program. With this extra time, they will be able to shepherd more of their research through the entire publication process.