



Arnhold Environmental Undergraduate Fellowship
Causal Inference in Ecology: Current Practice in the Use of Before-After Control
Impact and Ways Forward
Summer 2025

Project Background

In 2021, the University of California Santa Barbara ([UCSB](#)) and Conservation International ([CI](#)) launched the Arnhold UC Santa Barbara-Conservation International Climate Solutions Collaborative to unify their demonstrated expertise and networks to conduct cutting-edge applied research to yield tangible, progressive solutions, and propel the careers of emerging environmental professionals. This partnership includes several applied collaborative research projects aimed at pushing the boundaries on resilient ocean and land conservation. The Collaborative has also created the Arnhold Environmental Fellows program—a powerful opportunity for undergraduate and graduate students to engage in collaborative research projects and receive mentorship from experts in the fields of environmental and ecological science.

This project addresses an important question in ecology and conservation science: what is the causal impact of conservation interventions? In the real world, outcomes of a conservation intervention, like protecting critical habitat for a particular species, are influenced by many other factors, such as climate change and population dynamics. To disentangle this, conservation scientists use Before-After Control-Impact (BACI), which is only valid when certain conditions are met. This project aims to evaluate if BACI is implemented correctly in ecology and conservation science, demonstrate how results can be misleading if conditions are not met, and provide constructive suggestions for how to ensure that BACI is used more rigorously. We will do so by conducting a systematic literature review and by replicating and extending existing studies using BACI.

We are currently seeking a highly motivated part-time undergraduate student fellow to support the above project. This student will work with UCSB faculty Kathy Baylis and Bren PhD student Linus Blomqvist to produce impactful research.

Responsibilities

During this opportunity, the Fellow will assist in conducting a systematic literature review, specifically:

- Helping deploy an AI-based software for systematic reviews
- Screening titles and abstracts to see if the studies meet criteria for inclusion in the review
- Carefully reviewing full papers that use BACI methods and document how far they discuss or test critical assumptions, as well as other indicators of the quality of the methodological approach

- Developing and maintaining a database containing the systematic review results

Qualifications

- Experience with databases and/or Microsoft Excel
- Attention to detail and strong organizational skills
- Desire to learn about statistical methods and underlying assumptions
- Additional qualifications that are desired but not required:
 - Experience with ecology and conservation science, causal inference, and/or systematic reviews

Fellow Selection Criteria

Students will be selected as Arnhold Environmental Fellows based on the following criteria:

- Excellence in environmental and ecological science and research
- Interest, skills, and experience related to the project responsibilities described above
- Registered UCSB undergraduate student in good academic standing

All Fellows are expected to participate in bi-weekly professional development events throughout the summer, a 5-minute flash talk presentation about your project, and other program-related events.

How to Apply

Apply for this position via Handshake with either the: a) job number – 9840394; b) job title – Arnhold Environmental Fellowship: Causal Inference in Ecology: Current Use of BACI and Ways Forward; or c) employer – Marine Science Institute. In your application package, please include the following:

1. Your resume including relevant coursework
2. A short cover letter (no longer than one page) that includes information on (a) any relevant work or volunteer experience that relates to the desired skills and experience outlined above, and (b) availability for either a part-time summer fellowship.

For questions, please contact: Jennifer Bone (jebone@ucsb.edu). The Arnhold Environmental Undergraduate Fellow will be paid \$18/hour and will work for 12 weeks from their start date.

Application Deadline: April 23rd, 2025