

# Optimizing Crop Biodiversity for Sustainable Agriculture

## Bren Environmental Leadership Program Summer Fellowship



Crop diversification - increasing the number of crop types in an agricultural field - can increase food production on available land, decrease herbicide and pesticide use, and decrease nutrient pollution to the environment. Growing more than one crop type within a field, a practice known as intercropping, is common in many non-industrial agricultural systems. Yet traditional crop diversification practices are threatened as governments and extension agencies encourage smallholder farmers to adopt monocultures, and as agricultural systems mechanize. Increasing crop biodiversity in industrial agriculture, and increasing the productivity of traditional intercropping systems, requires an improved understanding of the format and scale of diversification which maximizes benefits for farmers and the environment.

This project will synthesize peer-reviewed literature to analyze how the impacts of crop biodiversity attenuate through space due to light, water, and nutrient limitation. Through a meta-analysis which aggregates the data from published intercropping experiments, the project will assess how farm systems can use crop diversity to maximize light, water, and nutrient-use efficiency. The project may also include an opportunity to join a field research trip to Kenya to collect primary data from smallholder farms practicing intercropping. *(Travel costs and field expenses will be covered by the project.)*

### Undergraduate Intern Role

The chosen undergraduate candidate will:

- Conduct a meta-analysis of peer-reviewed scientific literature on intercropping experiments, extracting data on experimental conditions and findings to generate a uniform, synthesized dataset.
- Assist in fieldwork, including surveys of smallholder intercropping practices, and other data collection in rural Kenya.
- Conduct preliminary analyses of meta-analysis and/or field data.
- Interpret the project results and submit an abstract and poster to be presented at the American Geophysical Union (AGU) fall meeting, which the student will have an opportunity to attend (happening in New Orleans, LA this year).

### Qualifications

- Interest and enthusiasm about the project and sustainable agriculture!
- Interest and enthusiasm to conduct field research in a rural, international context. Fieldwork can be hot, dirty, and tiring - a positive mindset towards challenges is essential! Appreciates learning from challenges and problem-solving in novel settings.
- Strong reading comprehension of primary scientific literature; ability to find and interpret scientific data.
- A grasp of basic statistics (p-values, linear regression) and the scientific method.
- Excellent attention to detail and organizational skills.
- Experience conducting data analysis in R is helpful but not required (training will be provided).
- International or other cross-cultural experiences are helpful, but not required.

### Details

The position is 10 weeks, 35 hours per week, with exact dates flexible between mid-June to mid-September. The work can be conducted remotely or in-person; in-person availability is preferred.

The student will receive a \$6500 stipend. This position is part of the Bren Environmental Leadership Program – the student will participate in professional development training during the summer and a poster session at the Mantell Symposium on Environmental Justice and Conservation Innovation in Fall 2024. Applicants must be full-time UCSB continuing undergraduate students (not graduating within the 2024 calendar year).

### How to Apply

Please submit applications [here](#) by April 2. Applications should include:

- A brief statement (2-3 paragraphs) or cover letter describing why you are interested in this project, and how your experience and qualifications make you a good fit for the position.
  - Please mention any experiences informing your interest in agriculture.
  - Describe prior projects, work, coursework, or other lived experiences in which you were organized and detail-oriented.
  - Describe prior experiences which required problem-solving and overcoming challenges, and how you were able to adapt. Please note any prior experience in the field, or problem-solving in any international or other cross-cultural contexts.
  - We are committed to fostering an inclusive environment and supporting diverse students in Environmental Science, including those from underrepresented, low-income, and first-generation college backgrounds, and those active in DEI, environmental justice, or social justice. We welcome insights into how your experiences or perspective might shape your contribution to the BEL community.
- Unofficial transcript
- A resume or CV, including any relevant coursework and experience

*Interview and Selection Process: Approximately two weeks after the submission deadline, applicants selected for interviews will be notified by email. Though only some students will be selected for interviews, all applicants will be notified of the status of their application when the interview/selection process is complete (approximately 3-4 weeks after application deadline).*