



USDA NIFA IBE Workshop on Convergence in Bioengineering



Eligibility: Undergraduate and graduate students enrolled in any major

Topic: *Cyberphysical tools for sustainable intensification of agriculture*

Submission Deadline: Friday, Feb 7, 2020 to BE@usu.edu

Submission length: Minimum 3,000 words + 3 figures | Maximum 4,500 works + 4 figures

Travel Grant: \$400 per finalist

Motivation: Sustainable use of land, water, and energy resources is imperative as evolving environmental stresses and expanding nutritional needs put increasing demands on agricultural productivity. Stress-resilient cultivars and real-time decision support systems to manage irrigation, fertilization, and pest control could ameliorate such factors. But cost, usability, and performance constraints of today's tools for precision agriculture and high throughput plant phenotyping (HTPP) limit their resolution and scalability, preventing real-time, high-resolution, data-driven decision support systems. ***What innovative systems that converge advances in data science and engineering with agricultural knowhow could sustainably increase crop yield and profitability while decreasing collateral impacts?***

Eligibility: Undergraduate and graduate students enrolled in any discipline, are invited to compete in the 2020 USDA NIFA IBE Student Design Contest. Innovative solutions are sought to tackle complex climate and ecological variability, extreme weather events, and abiotic and biotic stresses that constrain agricultural productivity and profitability.

Abstract Submission Deadline: February 7th, 2020

Participants: Students should identify two faculty mentors from the natural, agricultural, data and social sciences, engineering, management, or humanities disciplines to provide guidance and feedback. Faculty mentors are to assist students to clarify their proposed design, identify its novelty, advantages, and risks relative to state of the art, and describe work needed to advance the design. Students should consider

- What are the theory, material, system, and performance aspects of the design?
- By what metrics should the design be validated?
- What software, equipment, or methods would be required to validate the design?
- Why is the design better than alternatives?
- What attribute(s) make the design likely to disrupt or penetrate the market and be selected by profit and sustainability-conscious growers to manage crop yields?

Evaluation Criteria: The submission evaluation will consider novelty, functionality, workability, and desirability of the proposed design. This evaluation includes:

- What features of the design are compatible with the environment and marketing factors?
- What could affect implementation, outcomes and impact of proposed design elements?
- What is the landscape of relevant existing intellectual property?
- To what extent are relevant scientific and engineering aspects addressed?

Submission: To submit a design, students must submit their final design (between 3000 to 4500 words and 3 to 4 figures) to BE.usu.edu by Feb. 7, 2020, including a title and name, email, street address, department, and institutional affiliation of student author(s) and mentors. The final proposed design must be received by BE@usu.edu by February 7th, 2020. Finalists eligible to participate at USDA NIFA IBE Workshop will be notified by February 20th, 2020.

Contest Rules: Entries will be submitted to a plagiarism-checking service. USDA NIFA IBE Workshop is not responsible for any difficulties during submission. Only finalists will be notified of the results. Written feedback will be provided to finalists by competition judges. Finalists will be invited to participate in hands on workshops to refine their capabilities developing sustainable intensification of Cyberphysical agricultural systems. Finalists will be given complimentary registration to the USDA NIFA IBE Workshop and a travel grant (maximum of \$400), with support from USDA NIFA IBE Workshop Grant. By submitting an entry, students agree that copyright of winning entries is assigned to USDA NIFA IBE Workshop and that they will attend and participate at the USDA NIFA IBE Workshop if selected as a finalist.



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USDA NIFA IBE Workshop is an event aimed to equip future leaders in precision agriculture with hands-on introductions to emerging capabilities in data science and artificial intelligence, cyberphysical tools, process modeling, and socioeconomics to sustainably intensify agriculture and food systems

<https://engineering.usu.edu/be/events/wcb/>