

Request for Proposals – Multimodal Sensors in Agriculture

The **N.C. Plant Sciences Initiative (N.C. PSI)** and the **Institute for Connected Sensor-Systems (IConS)** are inviting proposals from qualified and experienced faculty to provide multimodal sensor solutions for monitoring agricultural systems across one or more scales (e.g., molecular, physiological, or environmental). We seek innovative and cutting-edge sensor technologies that can contribute to advancing sustainable agriculture practices, improving yield, and reducing the negative impact of extreme environmental conditions.

BACKGROUND

The N.C. PSI and IConS are committed to promoting the development and building of interdisciplinary teams that are able to advance technological innovations in agriculture. We recognize the potential of multimodal sensor systems to revolutionize the way farmers and producers manage their crops and resources. This Request for Proposals (RFP) aims to identify partners who can offer translatable state-of-the-art sensor solutions for agricultural applications.

PROJECT SCOPE

The proposal should describe how the project will advance sustainable agriculture through one or more of the themes listed below. The successful proposal will also detail how the research will expand beyond this RFP, identifying potential, external funding to sustain and amplify the work. The selected team will be responsible for one or more of the following:

- a.** Designing and developing a multimodal sensor system capable of monitoring various aspects of agricultural operations, including but not limited to soil conditions, weather patterns, and crop health.
- b.** Integrating the sensor system with existing research and data collection initiatives.
- c.** Working with existing research stations to conduct field trials to demonstrate successful implementation and efficacy of the proposed sensor technology.
- d.** Data analysis and reporting capabilities to transform sensor data into actionable insights for researchers and/or farmers.
- e.** Training and capacity-building efforts to enhance the skill set of the next generation of interdisciplinary agricultural researchers.
- f.** Understanding cultural and societal impacts of technology and technology adoption in agricultural systems (e.g., crops, land use, water management, farm management practices, sustainability).

AWARD

Student Support: The awarded proposal will fund 12 months of at least one graduate research assistantship, including stipend, fringe, and tuition costs. Following an annual review, an additional 12 months of support may be requested based on availability of funds.

Material and Supplies: The selected project will receive \$6,000 for materials and supplies.

PSI Resources: The selected project will be able to request support from the N.C. PSI resources for the development of future proposals, including support for makerspace activities, research computing and data, education & extension, proposal development, and project launch. The selected team will also have priority access to Plant Sciences Building (PSB) facilities, including the greenhouse, growth chambers, and makerspace equipment.

IConS Resources: The selected project will be able to request support from the dedicated proposal writing services for IConS, use of the ASSIST Center Prototyping Lab, and consult with Industrial Liaison for those pursuing translational technology development or interest in industry partnerships. The selected project can also request undergraduate research support.

PROPOSAL SUBMISSION

Interested teams are invited to submit their proposals by April 15, 2024, no later than 5 p.m. Eastern Daylight Time (EDT). Submission link: <https://forms.gle/1Yt46Tt39CSbgS6b8>

Proposal Format: Proposals should be submitted electronically in PDF format and should be no more than 5 pages, with minimum 11pt font, Times New Roman. Information pertaining to the project narrative that is submitted in excess of the five-page limit *will not be reviewed*.

Mandatory things that proposals should identify:

- i. Theme(s) the project will address (see a–f in Project Scope, above)
- ii. Summary of the work plan and how the project will advance sustainable agriculture through the chosen theme(s), including expected deliverables.
- iii. Project's technical specifications, if applicable, along with a detailed description of how the proposed technology will work and how users will interact with it.
- iv. Proposals that include training and capacity-building efforts should describe the effort, identify the disciplines and how they will contribute to the effort, identify the intended audience(s), and describe how the success of the training effort will be evaluated.
- v. The expertise, experience, and vision for the intended collaboration should be described in detail.
- vi. How the student(s) on the project will be mentored on the multidisciplinary project should be addressed.
- vii. A clear strategy for seeking external funding to support and expand the proposed research, including potential funding sources.

NUMBER OF AWARDS

We expect to issue one award for this internal funding program.

EVALUATION CRITERIA

Proposals will be evaluated based on the following criteria:

1. Technical expertise and experience of the submitting team to complete the proposed work.
2. Innovation and adaptability of the proposed sensor technology to address the unique challenges in agriculture.
3. Effective training and mentoring plan for student, including co-mentoring for how the student will be jointly mentored across research groups
4. Clearly demonstrate use of N.C. PSI and IConS resources and facilities (see above for details).
5. A clear and viable strategy for seeking external funding to support and expand the proposed research, including potential funding sources.

TIMELINE

The anticipated timeline for this project is as follows:

- Proposal Submission Deadline: April 15, 2024
- Proposal Evaluation and Organization Selection: May 31, 2024
- Initial Award: July 1, 2024–June 30, 2025

INQUIRIES

Any questions or requests for clarification regarding this Request for Proposals should be submitted to Lauren Maynard, Interdisciplinary Project Launch Director (ldmaynar@ncsu.edu). Dr. Maynard will direct all relevant questions to N.C. PSI and IConS leadership, including Cranos Williams and Michael Daniele.

We look forward to receiving your proposal and working together to advance agricultural research and innovation through the implementation of multimodal sensor technology.