

**Assistant Professor**  
**Robotics, Sensors, and Manufacturing in Sustainable Agriculture**  
**and Environmental Management**  
**Department of Bioproducts and Biosystems Engineering**  
**College of Food, Agricultural and Natural Resource Sciences**  
**College of Science and Engineering**  
**University of Minnesota**

The Department of Bioproducts and Biosystems Engineering seeks candidates for a tenure-track academic position at the assistant professor level with 50% teaching and 50% research responsibilities to develop a collaborative, internationally recognized research program in the areas of sensing and robotics in sustainable agriculture and environmental management. This academic position is under the auspices of the University of Minnesota MnDRIVE initiative for Robotics, Sensing, and Advanced Manufacturing. MnDRIVE (Minnesota's Discovery, Research, and Innovation Economy) is a partnership between the University of Minnesota and the State of Minnesota that aligns areas of research strength with the state's key and emerging industries to address grand challenges of Robotics, Global Food, Environment, Brain Conditions, and Cancer Clinical Trials. The University of Minnesota's MnDRIVE initiative on Robotics, Sensors, and Manufacturing ([mndrive.umn.edu/robotics](http://mndrive.umn.edu/robotics)) envisions the University of Minnesota playing an integral part in helping the state emerge as a robotics and automation leader, and as a contributor to the renaissance of domestic manufacturing by providing critical innovations, education, and training in pertinent disciplines. To further enhance Minnesota's competitiveness at this critical time, the University of Minnesota is proposing to augment its existing strengths in teaching and research in areas relevant to robotics, sensors, and manufacturing.

The successful candidate is expected to develop a highly collaborative research program focusing on robotic and sensor/sensing systems with applications in environmental management and sustainable agriculture that align with the University of Minnesota Robotics Institute. Applicants must have an excellent record of accomplishment in an academic or industrial setting, and possess the potential to be an internationally-recognized leader in teaching and research.

Agriculture is an ideal industry for autonomous or semi-autonomous robotic systems because it involves many processes that are labor intensive, repetitious, and rely on information that computers can interpret and respond to. More efficient management of agricultural inputs with agricultural robotics will lead to increased crop production and improved quality as well as improved soil, water and air quality. Increases in agriculture production to meet the growing global demand for food and fiber will come at a price in the form of degraded soil, water and other natural resources unless innovative ways are developed for improving the efficient use of resources. Precision agriculture is a key technology in optimizing the use of water, nutrients and pesticides at the field scale. However, implementation of sustainable agricultural practices and optimal environmental management on a watershed scale requires consideration of the properties and response of streams, lakes, wetlands and other off-agricultural field features. Innovative methods based on improved sensors and robotics technology are needed to collect necessary data at relevant time and space scales, to understand the system, to reduce the chance of systematic errors in measurements, and to enable more effective control of agricultural inputs and improve the efficiency of production.

**Research:** The candidate is expected to develop an internationally recognized research program with a focus on sensing and robotics in sustainable agriculture and environmental management. Emphasis areas in research might include: the design of systems for dynamic or spatial measurement of water quality variables in agricultural run-off, streams and lakes, UAVs for inspection of damage after significant flooding events, design and management of water release systems in agricultural ditches and constructed wetlands, monitoring of soil moisture and water table depth, temperature and snow depth and frost depth, direct measurement of evapotranspiration, measurement of plant characteristics including location, species, canopy cover, and height, identification of areas with invasive species and noxious weeds, habitat assessment and distribution of woody debris in stream channels, and measurement of greenhouse gas emissions. The successful candidate will be

expected to develop research in areas that supports Minnesota agriculture and natural resources. Collaborative research with various colleges, departments, and centers across the University including College of Food, Agricultural and Natural Resource Sciences (i.e. Soil, Water, and Climate, Agronomy, Plant Pathology, and Animal Science) College of Biological Sciences (i.e. Ecology), the College of Science and Engineering (CSE), and the University of Minnesota Robotics Institute is highly encouraged.

**Teaching:** The teaching component of this position will include teaching and developing basic and applied engineering courses within the department (UG and GRAD) and their applications. Teaching may include lecture/lab, e-based learning, or other modes of instruction and interaction with students. Involvement in University Robotics team activities is encouraged. A demonstrated commitment to excellence in undergraduate and/or graduate teaching and advising is essential. This position is also expected to strive for excellence in academic advising for undergraduate and graduate students as a vital component of student development.

### **Qualifications**

#### Required:

- Ph.D. in an engineering or science discipline, with applications to environmental, agricultural, or biological systems
- Evidence of potential to develop a successful independent research program
- Demonstrated commitment to teaching
- Demonstrated effective written communication skills

#### Preferred:

- Research or industrial experience in aerial or terrestrial sensing or robotics with an interest in agricultural and/or environmental applications
- Demonstrated and relevant publication record or industrial experience
- Experience in effective teaching including active learning and course development
- Evidence of collaborative research
- Strong communication skills
- Demonstrated commitment to diversity and inclusivity in an academic or professional setting and commitment to supporting the University's goal of creating a positive and inclusive campus climate by advancing diversity, equity, and inclusivity

### **About the Department of Bioproducts and Biosystems Engineering**

The Department of Bioproducts and Biosystems Engineering ([bbe.umn.edu](http://bbe.umn.edu)) is an internationally renowned academic unit with the core mission of sustainable use of renewable agricultural and natural resources, and protection and enhancement of the environment.

### **How to Apply**

Applications must be submitted online at [humanresources.umn.edu/content/find-job](http://humanresources.umn.edu/content/find-job). Search for **Job ID 334321**. To be considered for this position, please click the Apply button and follow the instructions. You will have the opportunity to complete an online application for the position and attach a cover letter and resume. Additional documents may be attached after the application by accessing your "My Job Applications" page and uploading documents in the "My Cover Letters and Attachments" section.

Applications should include a cover letter referencing the BBE Robotics, Sensors and Manufacturing faculty position, detailed curriculum vitae, statements on teaching and research interests, and a list of three references with contact information (including email addresses). Review of applications will begin January 15, 2020 and continue until the position is filled. A successful candidate may be appointed as early as August 30, 2020.

During the interview process, applicants will be asked to describe their commitment, experience, and approach to teaching and working with students, colleagues and constituents from diverse populations.

This position will remain open until filled. To request an accommodation during the application process, please e-mail [employ@umn.edu](mailto:employ@umn.edu) or call (612) 624-UOHR (8647).

## **Diversity**

The University recognizes and values the importance of diversity and inclusion in enriching the employment experience of its employees and in supporting the academic mission. The University is committed to attracting and retaining employees with varying identities and backgrounds.

The University of Minnesota provides equal access to and opportunity in its programs, facilities, and employment without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression. To learn more about diversity at the U: <http://diversity.umn.edu>.

## **Background Check Information**

Any offer of employment is contingent upon the successful completion of a background check. Our presumption is that prospective employees are eligible to work here. Criminal convictions do not automatically disqualify finalists from employment.

## **About the University of Minnesota**

The University of Minnesota, Twin Cities (UMTC), is among the largest public research universities in the country, offering undergraduate, graduate, and professional students a multitude of opportunities for study and research. Located at the heart of one of the nation's most vibrant, diverse metropolitan communities, students on the campuses in Minneapolis and St. Paul benefit from extensive partnerships with world-renowned health centers, international corporations, government agencies, and arts, nonprofit, and public service organizations.