UNIVERSITY OF MINNESOTA
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Twin Cities Campus

GEMS Informatics Center

College of Food, Agricultural and Natural
Resource Sciences

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Web: agroinformatics.org

February 2, 2022

Topic: PhD Graduate Research Assistantship in Digital Agriculture and Irrigation

Dear Colleagues,

Applications are solicited for a Graduate Research Assistant (GRA) position at the University of Minnesota shared between the GEMS Informatics Center (https://agroinformatics.org) and the Department of Soil, Water and Climate (https://swac.umn.edu). The selected candidate will pursue a Ph.D. degree with a focus on digital agriculture applied to irrigation systems. The candidate must pursue a Ph.D. in Land and Atmospheric Sciences (https://laas.umn.edu) or Water Resources Science (https://wrs.umn.edu/prospective-students) and must also minor in Computer Science (https://cse.umn.edu/cs/phd-minor) and/or Geographic Information Science (https://cla.umn.edu/mgis/mgis-program/graduate-minor-geographic-information-science).

The candidate will be advised by Dr. Vasudha Sharma (https://extension.umn.edu/soil-and-water/irrigation) and Dr. Bryan Runck (http://bryanrunck.com), and will start the position in summer 2022. The assistantship will consist of an annual stipend, tuition, and health insurance.

Research Description

Irrigated crop production has grown over 30% in the past 20 years in Minnesota. To support sustainable irrigation management in the state, the Legislative-Citizen Commission on Minnesota Resources (link) funded the Irrigation Management Assistant tool led by the Benton County Soil and Water Conservation District in 2016 (link). The tool has subsequently been expanded to along the Central Sands Region of Minnesota and has been adopted by over 100 irrigators, leading to additional funding led by the University of Minnesota.

The next phase of the tool is to expand it into a statewide application and improve the underlying data inputs and models that support irrigator decision-making. The successful candidate will develop a research project at the interface of machine learning, human-computer interaction, and irrigation science to leverage new data collected by the project to improve the performance of evapotranspiration and soil moisture prediction underlying the tool. These models will be incorporated into the IMA tool and drive recommendations to farmers on irrigation management.

While the candidate's dissertation will focus on digital agriculture and irrigation management, opportunities will be provided for the student to engage with non-profit and for-profit partners on a number of other natural resources and agriculture projects as desired by the candidate.

Qualifications

The applicant must have B.S. degree, but preferably an M.S. degree, in agricultural engineering, agronomy, soil science, crop science, environmental science, water resources, computer science, electrical engineer, geographic information science, or a similar field. Prior experience related to irrigation is preferred, but not essential.

Funding after the first year is subject to satisfactory progress. Strong technical and analytical skills are desired, along with the ability to carry out field research using advanced instrumentation, coding in bash and python, and working with the standard python data science stack. The field research will require the candidate to make frequent trips to field sites. Preference will be given to candidates with an excellent academic performance record and oral and written communication skills.

The student will publish findings in peer-reviewed scientific journals and extension bulletins. Opportunities exist for presenting results in professional meetings and participating in scholarly activities relevant to the training needs and career goals of the candidate. The successful candidate will be located at University of Minnesota, Twin cities campus.
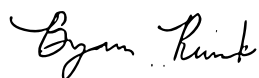
How to Apply

Interested candidates should send Drs. Runck (runck014@umn.edu) and Sharma (vasudha@umn.edu) the following information:

- Curriculum Vitae
- Names and email address of three potential references
- Link to GitHub or Code Samples
- First author scientific or technical writing sample

We look forward to hearing from you or those you might consider recommending apply for the position.

Sincerely,

Bryan Runck, PhD
runck014@umn.edu
GEMS Informatics Center
University of Minnesota

Vasudha Sharma, PhD
vasudha@umn.edu
Department of Soil, Water, and Climate
University of Minnesota