Postdoctoral Position in Data Assimilation and Soil Moisture Forecasting

University of Alberta | Research group of Professor Jinfeng Liu
Location: Edmonton, Alberta, Canada, with collaboration with Lethbridge Polytechnic

The opportunity

Professor Jinfeng Liu's research group at the University of Alberta invites applications for a postdoctoral position in data assimilation, soil-moisture forecasting, and irrigation decision support. The successful candidate will develop methods that combine agricultural sensor observations with dynamic models to improve estimates and short-term forecasts of root-zone soil moisture.

This position offers an opportunity to connect research in systems engineering and uncertainty quantification with practical questions in agricultural water management. The postdoctoral researcher will work with Professor Liu, students, and project collaborators to develop methods, evaluate their performance, and integrate validated algorithms into the project's software platform.

Research responsibilities

- Develop and evaluate methods for state estimation and data assimilation, including extended and ensemble Kalman filtering and other suitable approaches for nonlinear soil-water models.
- Combine water-balance and soil-water dynamics models with heterogeneous observations to estimate root-zone conditions and produce short-term forecasts with quantified uncertainty.
- Establish reproducible data preparation and quality-control workflows for field observations, including missing data, irregular sampling, sensor bias, and calibration uncertainty.
- Design rigorous evaluation studies using synthetic experiments, chronological forecast validation, and comparisons with persistence, model-only, and existing assimilation approaches.
- Assess the value of different sensor combinations, measurement depths, and sampling strategies, including performance when observations are unavailable or unreliable.
- Develop efficient, documented scientific software and collaborate on integration with the Irrigation Scheduling Comparison Platform.
- Publish research findings, contribute to project reports and demonstrations, and help mentor graduate and undergraduate researchers.

How to apply

Please email **at jinfeng@ualberta.ca** with your CV to apply