

UIUC is recruiting multiple Postdocs and PhD students on water-agriculture nexus

The **Water, Agriculture, and Conservation Innovation Lab (WACI Lab)** led by [Dr. Bin Peng](#) at University of Illinois Urbana-Champaign (UIUC) is recruiting multiple postdoctoral researchers and graduate students on the **water-agriculture nexus from microscale to macroscale**. We are looking for highly motivated and enthusiastic members who are interested in (1) improving plant productivity and soil health by harnessing plant-soil-microbe interactions, and (2) unraveling the complexities of water, nutrient, and carbon cycles within diverse agricultural landscapes and their interconnectedness with agricultural productivity, downstream and the broad environmental system.



Position 1: Plant-soil-microbe interaction modeling

This position is to build multi-scale plant-soil-microbe interaction models and further integrate these models with multi-omics and meta-omics data to investigate the synergies and tradeoffs of multiple plant or/and microbial traits and their impacts on crop water use efficiency (WUE) and nitrogen use efficiency (NUE). The work is expected to be fully integrated with advanced breeding and bioengineering programs. Candidates with strong research interests, background, and potential in computational systems biology, quantitative genetics, crop growth modeling, plant functional-structural modeling, root growth and rhizosphere modeling, soil hydrology and reactive transport modeling, microbial ecology and biogeochemistry modeling, earth system modeling are encouraged to apply.

Position 2: Watershed hydrology and water quality modeling

This position is to build next-generation watershed hydrological and water quality models and use the systems modeling to advance our understanding of the complex scaling from field-scale conservation management to watershed-scale hydrological and water quality responses. Candidates with strong research interests, background, and potential in agroecosystem modeling, biogeochemical modeling, coupled surface-subsurface hydrological modeling, watershed

hydrological modeling, reactive transport modeling, river hydraulic modeling are particularly encouraged to apply.

Position 3: Watershed hydrology and water quality monitoring and sensing

This position is to discover fundamental knowledge about water and nutrient cycling with high-frequency hydrological and water quality monitoring data from IoT sensor networks and to reveal spatiotemporal patterns of hydrological and water quality variables through integrated sensing with unmanned aerial vehicles (UAVs) and satellites. Candidates with strong research interests, background, and potential in using high-frequency sensor data to investigate mechanisms and controls of nutrient export patterns and pathways from field to watershed scales or in water quality remote sensing (UAV and Satellite) are encouraged to apply for this position. Experiences in water quality sensor development, calibration, deployment, maintenance, data analytics and/or remote sensing are highly preferred.

Position 4: Environmental data science for watershed hydrology and water quality

This position is to develop high-resolution environmental (such as field-scale soil moisture, evapotranspiration, and inundation dynamics) and management (such as conservation practices) data layers with advanced remote sensing and geospatial big data analytics and to further build data-driven or hybrid models (such as knowledge-guided or physics-informed machine learning models, and differentiable hydrological models) linking environmental and management drivers with watershed-scale hydrological and water quality responses. Candidates with strong research interests, background, and potential in quantitative remote sensing (optical, thermal, and microwave), machine learning, deep learning, geospatial analytics are particularly encouraged to apply. Experiences in handling large-scale datasets are highly preferred.

Position 5: Modeling agriculture in the Earth system

This position is to improve the representation of agriculture and human management in the Earth System Models for assessing different climate change adaptation and mitigation strategies related to agriculture and quantifying water (blue, green, and gray) and carbon footprints of agricultural production at regional to global scales. Candidates with strong research interests, background and potential in earth system modeling, large-scale hydrological modeling, ecosystem modeling, crop growth modeling, and geospatial data science are encouraged to apply.

• **Qualifications for Postdoc positions:** (1) Applicants should have a Ph.D. in environmental science, earth system science, hydrology, hydrogeology, remote sensing, geography, meteorology, biology, plant and soil sciences, computer science and engineering, environmental engineering, electronic engineering, mathematics, or a closely related field. Candidates will be considered if graduation with a Ph.D. is expected by the targeted starting date. (2) Prior research experiences in process-based modeling (plant eco-physiological modeling, functional-structural modeling, hydrological modeling, groundwater modeling, reactive transport modeling, ecosystem modeling, or earth system modeling) and/or remote sensing of hydrology and water quality are highly preferred. (3) Strong programming skills (e.g., Python, R, C/C++, and/or Fortran in the Linux environment) and prior experience in supercomputing or big data analytical systems is required, as the applicant will be working routinely in the supercomputer environment. (4) Excellent writing skills, demonstrated by publication records. To ensure full consideration, qualified candidates must



send a cover letter, CV, unofficial transcripts for undergraduate and graduate programs, and contact information of three references via email with the subject of “**Prospective postdoc**” to **Dr. Bin Peng (binpeng@illinois.edu)**. All requested information must be submitted to the above email in order for your application to be considered. Incomplete applications will not be reviewed. Qualified applicants will be immediately reviewed upon receiving the application while the search may continue until the position is filled. We greatly appreciate all the interested applications but advise that only candidates shortlisted for interview will be notified of the application results. The appointment is renewed annually, contingent upon the performance. Salary is competitive and commensurate with experience in relevant research. **Starting Date is flexible and can be negotiated.**

● **Qualifications for PhD student positions:** Strong quantitative programming skills and domain science knowledge (such as hydrology, environmental biogeochemistry, plant physiology, biogeochemistry, remote sensing, and electronics) are required for successful PhD student candidates. Proficiency in spoken/written English is mandatory. All applicants should meet the minimum requirements of GPA by graduate admission (<http://www.grad.illinois.edu/admissions/apply/requirement>). International students should also meet the minimum requirements of TOEFL or IELTS (the same link above). Information for applying to the PhD program at Department of Crop Sciences can be found here: <https://cropsciences.illinois.edu/future-students/admissions/graduate-admissions>. Prospective graduate students are encouraged to contact Dr. **Bin Peng (binpeng@illinois.edu)** first via email with the subject of “**Prospective PhD student**” to share potential research projects and opportunities before applying. In emails, please include the following items: curriculum vitae, unofficial transcripts, TOEFL or IELTS score, GRE score (if you have one, but this is not required by the Department anymore), names and contact information of three references, and a brief personal statement. We greatly appreciate all the interested applications but advise that only candidates shortlisted for interview will be notified of the application results. **Starting Date:** We accept students at any time of the year, not confined to only the fall semester. Therefore, the enrollment time is **flexible**.

The newly joined members will have abundant opportunities to work with world-leading collaborators at the [Agroecosystem Sustainability Center](#), [College of Agricultural, Consumer and Environmental Sciences](#), [Department of Civil and Environmental Engineering](#), and [National Center for Supercomputing Applications](#) at University of Illinois Urbana-Champaign and other partner institutes.

UIUC is a world leader in research, teaching and public engagement, distinguished by the breadth of its programs, broad academic excellence, and internationally renowned faculty and alumni. Illinois serves the world by creating knowledge, preparing students for lives of impact, and finding solutions to critical societal needs. UIUC ranks top worldwide in Agricultural Science, Computer Science, and Environmental Science. The University of Illinois is an Affirmative Action/Equal Opportunity Employer. The administration, faculty, and staff embrace diversity and are committed to attracting qualified candidates who also embrace and value diversity and inclusivity. The Urbana-Champaign twin cities, which "sandwich" the University campus, are welcoming, diverse,



and vibrant. It is a 2–3-hour drive to three major metropolitan centers – Chicago, St. Louis, and Indianapolis. The University is conveniently located in proximity to affordable and beautiful neighborhoods with high-quality schools.

