UNIVERSITY OF ILLINOIS URBANA - CHAMPAIGN
Agroecosystem Sustainability Center

Call for applicants on ecosystem modeling, remote sensing, and AI: Scientific Programmer, Postdocs, & PhD Students

Agroecosystem Sustainability Center (ASC) at University of Illinois Urbana-Champaign (UIUC) is recruiting a scientific programmer/engineer, postdoctoral scholars, and PhD students on ecosystem modeling, remote sensing, and Artificial Intelligence (AI). **ASC** is a leading global research center and innovation powerhouse in advancing the monitoring and modeling of agroecosystems for improving sustainability under climate change. ASC leverages the UIUC's world-leading strengths in Agricultural Science, Computer Science, and Environmental Science. ASC scientists and students are working towards advancing science goals and technological innovations to generate real-world solutions and impacts. ASC works closely with farmers, industry and policymakers, and brings truly transdisciplinary educational and research experiences to talented students and scholars at UIUC.

ASC was founded by Dr. Kaiyu Guan and other leading scientists at UIUC in the area of agroecosystem sustainability. Successful candidates will work with a transdisciplinary team composed by leading experts in earth system modeling, plant physiology, biogeochemistry, hydrology, soil science, agronomy, remote sensing, and AI, including scientists listed at https://asc.illinois.edu/people/faculty/ (e.g., Lisa Ainsworth, Bin Peng, Shenlong Wang, Andrew Margenot, Evan DeLucia, Wendy Yang, Murugesu Sivapalan, and Sheng Wang). We have extensive and deep collaborations with leading institutes in this space, including NASA/DOE National Labs, leading NGOs, and others.

Our recent research highlights can be found as follows: (i) **"System-of-systems" solution to quantify field-level agricultural carbon outcomes** (a review); (ii) **AI-based Knowledge-Guided Machine Learning for ecosystem modeling** (KGML-Ag); (iii) **Process modeling to quantify agroecosystem dynamics** (carbon budget, cover crop, nitrogen); (iii) **Cross-scale sensing for agroecosystem variables** (cover crop, crop nitrogen, tillage practices); (iv) **Large-scale satellite algorithms and products** (photosynthesis, evapotranspiration, marginal land, crop yield, cover crop); (v) **Water sustainability** (irrigation, excessive moisture, tile drainage).

<u>Research Topics</u>: Increased environmental variability and human activities are continuously affecting the agricultural ecosystem functions and services across multiple scales. To better manage agricultural ecosystems in the Anthropocene, we need to improve mechanistic understanding and prediction of ecosystem dynamics and provide a better monitoring capability to track the agroecosystem changes. Research topics for these positions at ASC include:

1) Advancing ecosystem modeling (using the *ecosys* model) for coupled carbon, water and nutrient cycles in agricultural ecosystems. The candidates will work on improving existing ecosystem models or developing new modules with new theories and observational evidence.

2) Advancing Artificial Intelligence and Model-Data Fusion, by integrating advanced process-based modeling with data to quantify agricultural ecosystem services, e.g. GHG (N_2O, CH_4), soil health, and water quality. The candidates will work on building or improving effective, scalable and efficient model-data fusion methods, using supercomputers and AI.

3) Advancing ecosystem remote sensing, including ground/airborne/satellite hyperspectral sensing, and big-data analytics of satellite algorithms. The candidates will work on generating new insights and data products from geospatial big data with radiative transfer modeling, computer vision, and AI.

Scientific Programmer/Software Engineer:

- **Salary: <u>$70-100K/year with full benefits</u>, depending on experience.**
- **Qualifications:** (1) Applicants should have an extensive experience in scientific programming, software engineering, and data science, ideally in the general area of earth science and environmental science. (2) **Professional-level programming skills** (e.g., Python, C/C++, and/or Fortran in the Linux environment) and prior experience in supercomputing or big data analytical systems are required, as the applicant will be working routinely in the supercomputer environment. (4) Excellent communication skills in both speaking and writing.
- To ensure full consideration, qualified candidates must send a cover letter, CV, academic evidence (i.e. transcripts of college and PhD, or others), and contact information of three references via email with the subject **"Prospective Programmer"** to **asc-application@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 positions are 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**: We accept applicants year around, and the starting time is generally as soon as possible, but remain **flexible.**

Postdoc: Compensation and Qualifications

- **Salary: <u>$60-$75K/year with full benefits</u>, depending on experience.**
- **Qualifications:** (1) Applicants should have a Ph.D. in earth system and environmental science, hydrology, remote sensing, environmental engineering, atmospheric sciences, geography, 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 and/or remote sensing and/or AI** are highly preferred. (3) Strong programming skills (e.g., Python, C/C++, and/or Fortran in the Linux environment) and prior experience in supercomputing or big data analytical systems are 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, academic evidence (i.e. transcripts of college and PhD, or others), and contact information of three references via email with the subject **"Prospective Postdoc"** to **asc-application@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 positions are 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**: We accept applicants year around, and the starting time is generally as soon as possible, but remain **flexible.**

PhD student: Compensation and Qualifications

- **Stipend: $34K/year with benefits, plus full tuition waiver (~$30K/year).**
- **Qualifications:** Strong quantitative programming skills and domain science (such as hydrology, plant physiology, atmospheric science, biogeochemistry, remote sensing, ecology and geography) knowledge 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). Information for applying to NRES can be found here: https://nres.illinois.edu/graduate/apply.

International students should also meet the minimum requirements of TOEFL (the same link above). GRE is not required.

- Prospective students are strongly encouraged to contact **asc-application@illinois.edu** first with the subject "**Prospective PhD student**" to share credentials and research statement before applying. In emails, please include the following items: unofficial transcripts, curriculum vitae, GRE score (optional), 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**.

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. UIUC ranks top worldwide in Agricultural Science, Computer Science, and Environmental Science. Illinois serves the world by creating knowledge, preparing students for lives of impact, and finding solutions to critical societal needs. 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.