POST-DOCTORAL & PHD STUDENT POSITIONS

Direction 1: Multi-Scale Hyperspectral Sensing for Sustainable Agriculture

BACKGROUND: Accurate characterization of the spatial and temporal variability of agroecosystem variables, such as crop traits, soil properties and management practices, are essential for agroecosystem monitoring to advance sustainable agriculture. However, the high-resolution observation of these agroecosystem variables are largely missing in the existing research. Hyperspectral data from proximal and airborne sensing have been demonstrated with a high capability of accurately quantifying the agroecosystem variables in space and time. The new and forthcoming spaceborne hyperspectral missions, such as DESIS, PRISMA and SBG, provide a great opportunity to quantify large-scale agroecosystem variables. A new post-doctoral position and a new PhD student will focus on integrating multi-scale hyperspectral data from spaceborne, airborne and proximal sensing along with collecting field data to quantify large-scale high-resolution crop traits, soil properties and management practices in the U.S. Midwest agroecosystems. The post-doctoral fellow / PhD student will work with **Prof. Sheng Wang**, Research Assistant Professor at UIUC Department of Natural Resources and Environmental Sciences (https://shengwang12.github.io/), and **Prof. Kaiyu Guan**, Blue Waters Associate Professor at UIUC Department of Natural Resources and Environmental Sciences (http://faculty.nres.illinois.edu/~kaiyuguan/), and other scientists at UIUC or other institutes.

RESPONSIBILITIES: (1) Design and implement automated computing methods for spaceborne/airborne hyperspectral data processing. (2) Utilize radiative transfer models and machine learning with hyperspectral data to quantify high-resolution crop traits, soil properties and management practices in space and time. 3) Analyze changes of agroecosystem variables and provide stakeholders adaptive strategies for sustainable agriculture. Other responsibilities include publishing findings on peer-reviewed journals, presenting progress at professional meetings, preparing project reports and deliverables, collaborating with other research teams.

Direction 2: Remote Sensing of Grassland Productivity

BACKGROUND: Pasture and Rangeland are extensive areas of land that are occupied by native and seeded grass, respectively, to provide forage for different types of domestic livestock. Pasture and Rangeland are located in all the contiguous 48 states in the U.S., making up over 27% of the total area, larger than forests and cropland. Cover crops are grasses planted in farmland during non-growing season to mitigate the negative impacts of intensive farming practices on the environment. Because of its ability to increase soil organic carbon and reduce nitrogen leaching, the adoption of cover crop is rapidly increasing in the U.S. Biofuel crops are perennial C4 grasses planted in marginal land to provide feedstocks for bioenergy production with higher profitability than planting row crops. Planting next-generation biofuel crops is also appealing for its low carbon intensity. Quantifying field-level productivity of pasture, rangeland, cover crops and biofuel crops is therefore critical to achieve the goal of sustainable agriculture. A new postdoctoral position and a new PhD position will work to capture and understand the spatial, seasonal and interannual variations of the growth conditions of those grasslands. The post-doctoral fellow/PhD student will work with **Prof. Chongya Jiang**, Research Assistant Professor at UIUC Department of Natural Resources and Environmental Sciences

(https://sites.google.com/illinois.edu/chongya-jiang/home) and **Prof. Kaiyu Guan**, Blue Waters Associate Professor at UIUC Department of Natural Resources and Environmental Science (http://faculty.nres.illinois.edu/~kaiyuguan/), and other scientists at UIUC or other institutes.

RESPONSIBILITIES: (1) Design and implement automatic computing methods using ground IoT/airborne/satellite remote sensing for monitoring grassland productivity in real time at field level over large areas. (2) Analyze sensitivity of pasture and rangeland to climate change and assess the economic loss due to extreme climate events. (3) Quantify biomass for individual farms that have adopted cover crops or biofuel crops and provide guidance on best management practices. Other responsibilities include publishing findings on peer-reviewed journals, presenting progress at professional meetings, preparing project reports and deliverables, and collaborating with other research teams.

● **Qualifications for Postdoc positions:** (1) Strong knowledge and experience in satellite remote sensing and machine learning. (2) High-level Big Data processing and programming skills (in Python). (3) Strong willingness to participate in field data collection. (4) Excellent writing skills, demonstrated by publication records. To ensure full consideration, qualified candidates must send a cover letter, CV, and contact information of three references via email with the subject "**Grassland Postdoc**" or "**Hyperspectral Postdoc**" to **Ms. Xin Lin (linxin@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 will only give feedback to those candidates that we plan to interview.

● **Qualifications for PhD student positions**: Strong quantitative programming skills and remote sensing knowledge are required for successful PhD student candidates. Proficiency in spoken/written English is mandatory. All applicants should meet the minimum requirements of GPA and GRE 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). Prospective graduate students are encouraged to contact **Ms. Xin Lin (linxin@illinois.edu)** first via email with the subject "**Grassland PhD student**" or "**Hyperspectral PhD student**" to share potential research projects and opportunities before applying. In emails, please include the following items: unofficial transcripts, curriculum vitae, GRE score, names and contact information of three references, and a brief personal statement.

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