PhD Graduate Assistantship (Fall 2023): Develop and implement an Earth Observation driven framework for soil health monitoring and mapping - Nikolaos Tziolas

The Southwest Florida Research and Education Center (SWFREC) in Immokalee is dedicated to interdisciplinary fundamental research in the field of agricultural sciences with a recent focus on Artificial Intelligence (AI) to build a tech-driven agricultural domain. [https://swfrec.ifas.ufl.edu](https://swfrec.ifas.ufl.edu)

Applicants are invited for a fully funded PhD graduate assistantship at SWFREC, University of Florida Soil Science A.I. program, within the Institute of Food and Agricultural Sciences, Department of Soil, Water, and Ecosystems Sciences. The assistantship is available Fall 2023 semester and includes full tuition, stipend, and health insurance.

**Background information**

Earth Observation (EO) systems provide critical data sources for monitoring the soil ecosystem, having a great potential to further support the needs of providing robust and widely affordable information services (i.e. regular monitoring of large areas, global reach). Thus, a radically new EO-based soil health monitoring and service delivery framework promises to make it easier to identify potential critical areas, monitor trends, highlight policy successes or failures, and optimize gain from investments in various farming activities. Nowadays, EO is also being driven by emerging technologies, such as AI, as well as by the ever-increasing availability and accessibility of forthcoming enhanced EO data in terms of spectral and spatial resolution from all domains (UAVs to satellites). In this context, novel approaches and applicable EO indicators need to be developed to predict from EO data the health status of agricultural soils (e.g., chemical, biological) exploring also the causal links with environmental drivers and management practices. This information will allow us to enhance interventions in order to improve the soil’s health status.

**Position description**

The successful candidate is expected to identify EO-based soil health proxies that can describe the state and change in health of agricultural soils by integrating and analyzing massive data from operational spaceborne multispectral sources. Furthermore, synergies with radar, hyperspectral and very high resolution imagery data will be prioritised to assess the limitations whereby standalone multispectral imagery data is not sufficient to reach the desired spatio-spectral representativeness and reliability. Explainable AI algorithms will be used to further evolve observational methods and evaluate the interlinaces of the target variables and several other input features. The EO-based indicators will be validated in diverse bioclimatic regions, where sustainable agricultural practices will be compared with conventional high input-output practices. Lastly, the candidate is expected to disseminate the research findings at relevant scientific conferences and symposiums, as well as to peer-reviewed journal articles.

**Required Qualifications**

- Relevant Master’s degree (e.g., agricultural sciences, computer science, remote sensing, agricultural and biological engineering, electrical engineering, mathematics, or closely related fields);
Experience conducting remote sensing and geospatial analytics (e.g., R and/or Python and/or GIS softwares);

- Good English verbal and written skills are required, (non-native English speakers please check for TOEFL/IELTS requirements).

Preferred Qualifications

- Prior experience in AI (machine and/or deep learning) is highly desired, but candidates from other disciplines will be considered based on their merits and potential;
- Experience with fieldwork (e.g., collect and record scientific data relating to the biological sciences) can be considered as an important asset.
- Familiarity with cloud infrastructure is considered as a bonus.

Application process information
Interested candidates are required to contact Dr. Nikolaos Tziolas at ntziolas@ufl.edu and provide a cover letter with their research interests and experiences (1 page), curriculum vitae as well as contact information for two references (email title “Inquiry about PhD Soil Health RS”). The review of applications starts immediately and will continue until the position is filled. The shortlisted candidates will be interviewed. The selected candidate is required to submit a formal application to the Department of Soil, Water, and Ecosystem Sciences graduate program https://soils.ifas.ufl.edu/academics/graduate-studies/apply/ prior to April 16, 2023.

For facts about the University of Florida and its core values please see here.