Undergraduate Student Research and Education Positions in Soil and Water Sciences

Project title: Harnessing Microbes for Sustainable Food Production

Project summary: Multiple aspects of farming practices and operations need to be optimized simultaneously and coherently to make food production sustainable. Productivity needs to be maintained while soil nutrients, water quality and farm waste need to be managed properly to mitigate negative impacts of farming on the surrounding ecosystems, so people in the next generations continue to receive ecosystem services. Though often ignored due to their intangible nature, microorganisms play important roles in agriculture by facilitating growth of plants via symbiotic interactions, maintaining the water quality of receiving water bodies, and converting farm waste into renewable energy and nutrient-rich biofertilizer. The microbial processes are natural rather than synthetic, mediating long-lasting interactions between nutrients, plants, and soils. In this project, a team of UF faculty members (Dr. Fujimoto and Dr. Wilkie) and students will conduct an education program on the vital roles of microbes in sustainable agriculture. Topics covered will include microbes involved in the nitrogen cycle, the phosphorus cycle, mycorrhizal fungi, and microbes that are involved in anaerobic digestion and composting of farm waste. The targeted audience will be local and regional small-scale farmers, who are likely to adopt sustainable farming practices. This education program will allow farmers to learn the role of microbes in sustainable agriculture, methods to sustainably fertilize and improve soils using naturally occurring materials and processes, the concept that over fertilization or irrigation may pollute groundwater or reservoirs, and skills about waste conversion into renewable energy and biofertilizer, which make farming operations more sustainable. The education program will be hosted at the BioEnergy and Sustainable Technology (BEST) Laboratory in the Energy Research and Education Park in Gainesville, FL.

Job description: Two positions are open related to this education project; a) undergraduate research assistant, and b) undergraduate education/science communication assistant. For the a) undergraduate research assistant position, we are seeking two undergraduate students who are passionate about studying microbial roles in sustainable agriculture. The students will participate in both field and lab work during the project. The field work includes growing crops under different soil treatments and collecting soil samples, while lab work includes observing soil and plant-associated microbes using microscopes, extraction of DNA, DNA sequencing, and analysis of DNA sequence data. The students will also help create posters and other education materials that will be used during education sessions at the BioEnergy and Sustainable Technology Laboratory. Through these activities, students will learn sustainable agricultural practices and the role of microbes in sustainable food production, as well as fundamental skills and knowledge in molecular biology through both hands-on activities and literature reviews. For the b) undergraduate education/science communication assistant position, we are seeking one undergraduate student who is interested in science communication and agricultural extension activities. The student will record videos and take photographs during the education sessions, create testimonials from participants, and create website content and brochures using digital materials. This website will be maintained and updated periodically and used to recruit farmers who directly participate in subsequent educational programs at the BioEnergy and Sustainable Technology Laboratory. If you are interested in these student assistant positions, please send a brief statement of interest (250 words) and a short CV (1 page) to Dr. Masa Fujimoto (mfujimoto@ufl.edu) and Dr. Ann Wilkie (acwilkie@ufl.edu) via email (please copy both) by September 30th. Previous research or outreach experience is not required. We are keen to have students who are passionate about sustainable agriculture, sustainable resource uses, microbiology, and science communication on our team, and are excited to help you achieve your career goals.