

## **Programmable Plant Systems (NSF REU with CROPPS Science and Technology Center)**

The Center for Research on Programmable Plant Systems unites plant scientists, engineers, computer scientists, and social scientists to develop technologies that will enable seamless, bidirectional communication between humans and plants. The relevant technologies fuse synthetic biology, nanotechnology, optics, and computing to gain access to the internal biological processes of plants and their associated organisms such as, for example, soil microbes. The Center aims for these technologies to give new access to the biological processes that connect genes to traits, to guide the process of plant selection, engineering, and editing for improved crops, and to enable sophisticated management of crops in the field for improved sustainability and productivity. Interns in this program will be hosted and mentored by interdisciplinary teams that include expertise in both plant science and technology development. Undergraduate applicants with backgrounds in biology, engineering, or computing are encouraged to apply.

### **Taryn Bauerle (Horticulture) and Rob Shepherd (Mechanical and Aerospace Engineering)**

*Real-time soil health and rhizosphere root phenotyping using 3D Printed Soil Swimming Robot (ROSESCOPE)*

### **Margaret Frank (Plant Biology) and Sijin Li (Chemical Engineering)**

*Illuminating belowground environments by harnessing plant metabolites for programmable plant phenotyping*

### **Jenny Kao-Kniffin (Horticulture) and Amit Lal (Electrical and Computer Engineering)**

*Real-time soil health and rhizosphere biofilm imaging using GHz Ultrasonic lab-on-a-chip imagers*

### **Kirstin Petersen (Electrical and Computer Engineering) and Justine Vanden Heuvel (Horticulture)**

*Smart-phone app development for improved vineyard management*

### **Abe Stroock (Chemical and Biomolecular Engineering) and Georg Jander (Boyce Thompson Institute)**

*Investigation of plant-aphid interactions using AquaDust nanoparticles to detect water stress.*