

Opportunity Title: ORNL Laboratory Technology Program-Biosciences

Opportunity Reference Code: ORNL17-LabTech-BSD

Organization Oak Ridge National Laboratory (ORNL)

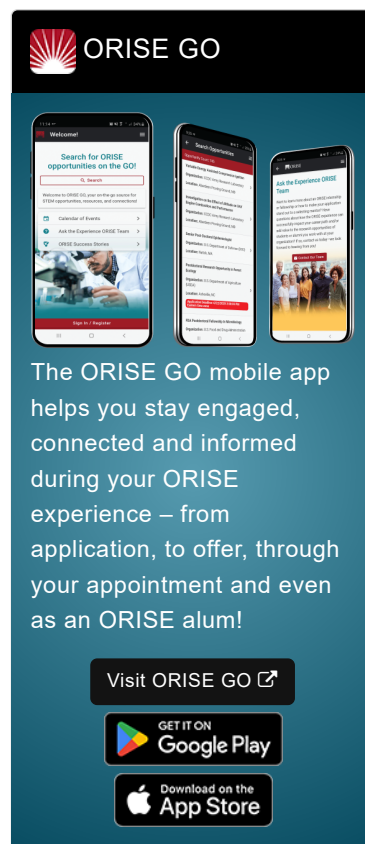
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Description This task is designed to test the hypothesis that differences in rhizosphere and endosphere microbial communities are driven by host species. Cuttings from each of the 18 target species will be cleared of their endophyte community using antibiotics and maintained in sterile culture. Endophyte-cleared shoots will be rooted and used in replicated greenhouse baiting experiments using potting media supplemented with native soils from the Cornell, UAF and NGEE arctic field sites. Four replicates of each species will be planted for each native soil. This experimental plan will enable us to test host species-dependent microbial recruitment without the confounding factors of geographical heterogeneity. Past experience with the perennial *Populus* suggest that a minimum of three months is required for stable endophytic colonization. As additional comparators, the same experiment will be performed side-by-side using sterile media to facilitate identification of PRRs specifically induced under microbial presence. Using 4-liter planting pots, we have shown that we can easily sample and replant trees without causing damage under greenhouse conditions. The project will involve sampling 20 pooled root-tips for each replicate at 3, 6, 12, 18 and 24 months' time points to characterize rhizosphere and endosphere communities as well as evaluate PRR expression over the same timeframe. Phylotyping to characterize the rhizosphere and endosphere communities of each sample will be performed as described in task 1 above.

Participation in this project and other greenhouse and lab activities will provide opportunities for enhanced learning by those students with a background in many science disciplines (Biology, Chemistry, Agriculture, Horticulture, Plant Science, etc.).

Learning opportunities and focus areas include, but are not limited to:

1. Assisting mentor in project set-up, maintenance, sample collection, and data recording.
2. Gaining an understanding of the mission of ORNL and how our projects relate to that mission.
3. Learning to propagate plant material for greenhouse use in multiple projects.
4. Training under the direction of the greenhouse manager in plant care and maintenance, such as: trimming, weeding, transplanting, fertilizing, watering, monitoring for pests and diseases etc.
5. Assisting in greenhouse maintenance: irrigation set-up and monitoring, sweeping, vacuuming, etc.
6. Acquiring a Tennessee Pesticide Applicator's License.
7. Participating in weekend watering.
8. Assisting team in harvests of plant material, sample collections, and sample preparation for lab analyses.
9. Aiding others with lab tasks when appropriate.
10. Completing all required trainings and maintaining safe work practices.
11. Learning to communicate in a timely and effective manner with people



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- of different cultural, educational, and professional backgrounds.
12. Utilizing critical thinking skills and problem solving abilities to provide ideas for projects when asked.

Qualifications -Science related background, preferably in biological science, plant science, horticultural science, agricultural science, or related courses

-Completing tasks individually or with a team

-Attention to detail

-Problem solving skills

- Eligibility Requirements**
- **Citizenship:** U.S. Citizen Only
 - **Degree:** High School Diploma/GED, Associate's Degree, or Bachelor's Degree.
 - **Discipline(s):**
 - **Chemistry and Materials Sciences** ([2](#))
 - **Earth and Geosciences** ([21](#))
 - **Engineering** ([1](#))
 - **Environmental and Marine Sciences** ([14](#))
 - **Life Health and Medical Sciences** ([18](#))

Affirmation I certify that I am at least 18 years of age and am either a student at an accredited community college or four-year institution, a recent graduate with either an associate's or bachelor's degree (within one semester of graduation; excludes summer semester), or I possess a skill set as evidenced by a technical certification.

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