**Post-doctoral Researcher in Tropical Microbial Ecology**

The Broders lab at the Smithsonian Tropical Research Institute in Panama is looking for a highly-motivated individual to pursue hypothesis-driven research in the area of ecology and evolution of plant associated microbes (fungi, bacteria, nematodes and viruses) in tropical ecosystems. This position is funded for 3-years from a grant provided by the Simons Foundation, and will provide the applicant with a broad latitude to pursue research of their own design as it relates to one of the following areas.

1. It is not uncommon that endophytic, saprophytic and pathogenic microorganisms are close relatives and frequently congeners. What are the genetic or epigenetic mechanisms (in both microbes and hosts) that differentiate a microbial “pathogen” from a “beneficial mutualist”? Can one organism occupy both niches, and if so does an environmental response trigger this change in the pathogen, plant or both? For this project we are currently studying the interactions between Cacao, the cacao endophyte *Colletotrichum tropicale*, and the cacao pathognes *Colletotrichum theobromicola* and *Phytopthora palmivora.* Other systems may also be explored.
2. At least in some cases we know that soil microbial communities interact with host plants to produce the processes of negative feedback at spatial scales of tens of meters that appear to generate deterministic patterns of relative abundances of host plant species at a spatial scale of 50 hectares. How does this work, and is it mediated by the relative success of microbial pathogens and mutualists? And what role does host defense play? We will be identifying soilborne fungi and oomycetes responsible for causing seed and seedling disease in several forests in Panama. The focus will be to determine whether each host has a host-specific pathogen that drives negative density dependence, or if the pathogens have a broader host-range that allows them to infect multiple hosts, and other factors, such as precipitation or soil chemistry, are driving infection rates.
3. How are microbial communities distributed across physical habitats, or among different host plants, both spatially within and among sites (or individuals), as well as temporally among seasons (wet *versus* dry) or with longer-term ecological succession? If communities are stable, can we empirically determine “rules” for microbial community stability? If they are not stable, are the changes predictable? We have multiple research sites throughout Panama as well as in the Amazon basin and Indonesia. There is also access to canopy cranes in Panama in order to look at microbial ecology from the forest floor to the tree tops.
4. In a biodiverse ecosystem, how do microbes move through the environment to find and colonize new plant hosts? Are their patterns to aerial, aquatic and insect movement of fungal and oomycete spores? Do these dispersal patterns vary between wet and dry seasons and between tropical and temperate forests? For this project we are currently baiting Phytophthora and Pythium zoospores from streams on Barro Colorado Island as well as collecting weekly aerial spore samples using a Burkhard sampler as part of the [Global Spore Sampling Network](https://www.helsinki.fi/en/researchgroups/spatial-food-web-ecology/research/gssp/about-gssp). Both projects have the potential to be expanded in size and scope
5. Novel research hypothesis related to tropical microbial ecology the individual is passionate about pursuing and can provide a sound rationale for why the work is novel and should be pursued.

Each of these projects is expected to have a significant computational component and will utilize comparative genomics, transcriptomics and/or metagenomics to gain a better functional understanding of plant-microbe interactions in the tropics. Therefore, experience with bioinformatics is preferred, but not required as long as the individual is willing to learn and invest significant time into these portions of the project.

**Qualifications**:

Candidates should have a Ph.D. degree in Genetics, Microbiology, Ecology and Evolutionary Biology, Plant Biology or other closely related field, a strong publication record (appropriate for career stage), and excellent communication skills. Willingness to involve students in research is also important. Knowledge of bioinformatics programming languages including: Python, Perl and/or R is preferred. The individual is also expected to be able to perform experiments independently, prepare scientific publications, communicate effectively in English, and is able and work independently and in a team environment.

Annual Stipend: The stipend for this appointment is $55,000/year but is negotiable depending on experience and research record. There are funds to cover relocation expenses. The appointment also comes with the support of a field technician to assist with sampling, setting up and monitoring field experiments. The project will also come with a research budget to cover the cost of international travel, sequencing, lab and field supplies and a new computer for the applicant. The molecular and sequencing lab is located at the [Naos](https://stri.si.edu/facility/naos) Laboratory on Naos Island, we have a microbiology lab and growth facilities at the [Gamboa](https://stri.si.edu/facility/gamboa) lab, and lab space and field equipment location on [Barro Colorado Island](https://stri.si.edu/facility/barro-colorado). STRI has several other [facilities](https://stri.si.edu/facilities) in Panama that would also be available for the applicant to utilize for research.

Interested individuals should provide a CV and brief (1-page) letter of interest to Dr. Kirk Broders at: [brodersk@stri.edu](mailto:brodersk@stri.edu)

The position is open until filled, but for full consideration send application materials by February 28, 2018