



Global Partnership Awards – Sample Student Application

Student Applicant Information

- **Name:** Bryan Reatini
- **Student Status:** Graduate/Professional
- **Anticipated Graduation Date:** 2021
- **Major(s)/Area of Study:** Ecology, Evolution and Organismal Biology

Sponsoring Faculty/Staff Information

- **Name:** Todd Vision
- **Title:** Associate Professor
- **School/Department:** Biology

Partner Information

- **Partner Institution(s) and Location:** Universidad San Francisco de Quito (Quito, Ecuador)
- **Partner School/Department:** Colegio Ciencias Biológicas y Ambientales
- **Participating UNC Schools/Departments:** Department of Biology & Galapagos Science Center

Project Information

Please describe the initiative to be conducted and the student's involvement:

We are interested in the ecological and genetic interactions (including potentially hybridization) between native and non-native, invasive plant species in the Galápagos Islands. In collaboration with Dr. Maria de Lourdes Torres and Dr. Hugo Valdebenito of the Universidad San Francisco de Quito (USFQ) in Ecuador, my student Bryan Reatini is studying the genus *Psidium*, which contains a rare species found only in the Galápagos (guayabillo) and an invasive cultivated species (guava). Bryan is taking a multifaceted approach to identify how hybridization may be facilitating the invasion of guava and/or threatening the endemic guayabillo populations, including the analysis of morphological, phenological, and genetic markers. This summer, Bryan will be focusing his work on a handful of sites of putative hybridization identified during last year's field season, and collecting data from isolated populations of the native guava found on two of the more remote islands of the Galapagos. The work will be based at the Galápagos Science Center (GSC), a joint UNC-USFQ research facility on Isla San Cristóbal. Additionally, Bryan proposes to teach a month-long evolution course at the Galapagos Institute for Arts and Science (GAIAS), a department of USFQ adjacent to the GSC on San Cristóbal.

Proposed Dates/Timeline:

The proposed work will occur between April and July of 2018. In April, I will visit the GSC to study overlap in flowering and pollination in a putative hybrid zone between the two species on San Cristóbal. In May, Bryan will visit San Cristóbal and Isabella to take detailed morphological measurements of both species and their putative hybrids and to sample DNA for sequencing back at UNC. At the end of May, he will visit and sample an isolated population of guayabillo on the island of Fernandina. In June, Bryan will extract DNA from material collected from the field while based at the GSC, ship the DNA samples back to UNC for sequencing, and teach a course at the Galápagos Academic Institute for the Arts and Sciences (GAIAS, see below).

Please state the requested funding amount and how the award would be spent:

I am requesting \$2,000 for Bryan's travel costs. Of this, \$1,000 will go toward round trip airfare to Ecuador and the Galapagos, \$500 for boat transport among the islands, and \$500 for room and board.

Please list other funding sources identified or received:

Bryan has applied to the most recent round of the Fulbright Student Program, but it would not cover fieldwork during the proposed time period (summer 2018). Bryan would receive a stipend for teaching at GAIAS, which will help supplement the partial travel budget from this award. I will be separately paying my own travel costs out of discretionary funds.

Please describe the expected outcomes and benefits to the student:

The data to be gathered will form the core of two of Bryan's planned thesis chapters. One will detail the biogeographic and ecological interactions between the two species, and the morphological evidence for hybridization between them. A second chapter will detail the population genetic aspects of this interaction, including potentially the role of hybridization in furthering invasiveness of guava or genetic extinction risk in guayabillo. This opportunity will help Bryan build a skillset which he will carry into his future work, including planning and executing fieldwork abroad and working with international collaborators. In addition, GAIAS will provide Bryan with a unique instructional training experience that will be valuable to his future academic career.

Please describe how the initiative will advance the institutional partnership:

The Galápagos Science Center was launched by UNC and USFQ in 2013 to promote science and education in support sustainable management of the Galápagos (a UNESCO World Heritage site) and the well-being of its growing human population. This particular project is helping to identify gaps, build capacity, and refine procedures at the GSC; we have been serving as "guinea pigs" for testing the facilities and procedures for storing plant material, extracting DNA, handing off samples to the UNC High Throughput Sequencing Core Facility, and getting sequencing data back to the GSC for local bioinformatic analyses. We are carrying this work out in close collaboration with researchers at USFQ (Dr. Maria de Lourdes Torres and Dr. Hugo Valdebenito) and anticipate a number of joint publications. Having a UNC graduate student teaching at GAIAS, which is primarily staffed by instructors from USFQ, will further strengthen the relationship between the two institutions.

Please describe any previous engagement with the partner institution by you or the student:

The project had its early origins in a 2011 trip to Ecuador and the Galápagos in which I co-taught a short course on conservation genetics at USFQ and gave a public lecture in honor of Charles Darwin's birthday at GAIAS. At that time, Dr. Valdebenito identified hybridization and invasion of plants on the islands as a potential focus for work at the GSC, which was then under construction. As an undergraduate, Bryan came into contact with Dr. Torres and Dr. Hugo Valdebenito through a study abroad program at USFQ and GAIAS. The collaboration was launched when Bryan enrolled in the UNC Biology graduate program with the specific intention of studying plant evolution on the Galápagos. Last summer, Bryan spent three months in the Galápagos for his first season of field work, designing the project together with Dr. Torres, Dr. Valdebenito, and the staff at the GSC. As one of the foremost experts on the plants of the Galápagos, Dr. Valdebenito now serves an external member on Bryan's thesis committee.