



Red-eyed tree frogs spotted on Gamboa night hike.

ASU-Faculty Led Study Abroad Opportunity Smithsonian Tropical Research Institute in Panama

Earn academic credit while experiencing the wonder of the tropical rainforest and the challenge and satisfaction of designing and conducting your own research project. Tropical Research in Panama is a four-credit Bio 494 course set at the Smithsonian Tropical Research Institute (STRI) in Gamboa, Panama. This course, taught by SOLS professors Jon Harrison and Juergen Liebig, fully immerses students in a field environment. The course combines standard lectures, day and night hikes through jungle forests and streams, and excursions to natural history and cultural highlights including the Soberanía National Park, Barro Colorado STRI research station, an indigenous Embera village via dugout canoe, Panama Canal's Miraflores locks, and the colonial Old Quarter of Panama City. There are no tests. Grades are based on active engagement, and your effort and skill in developing your own research project in tropical biology. Based on your observations during initial explorations, with iterative help from your instructors, you will design a study to test a hypothesis. Then, you'll collect the data, analyze it statistically (with help from the instructors if necessary) and present your results in oral and written form. This is a unique opportunity to combine learning of experimental design and field techniques as well as theoretical and practical aspects of ecology, physiology, biodiversity and behavior.

We stay in bunkhouse dormitories in the STRI-managed schoolhouse. From the schoolhouse porch you will likely see toucans, flocks of parrots, agoutis, and ships passing along the Panama canal. On our hikes, we regularly encounter howler monkeys, Geoffrey's tamarins, sloths, coatimundis, many species of hummingbirds, tungara frogs, poison arrow frogs, crocodiles, basilisk lizards, marching leaf-cutter and army ants, termite mounds in trees, heliconid butterflies, millipedes that secrete cyanide, 200 foot *Ceiba* trees, giant ficus trees with buttress roots taller than you, and *Cecropia* trees that serve as apartments for stinging *Azteca* ants. We come home to hearty Panamanian-style meals prepared by our local cook. Student projects are diverse, asking questions ranging from patterns of biodiversity to mechanisms of behavior. Students have authored scientific publications based on their research in this course.

Here are some quotes from ASU students who took this course in 2018.

Thomas Cassano: *It is amazing how nightfall can simply trigger an entirely new world to arise. It is a stage for a symphony of frogs calling out to each other—each one a unique call.*

Daniel Karstetter: *I would recommend this program to anybody that actually wants to gain transferable skills that they can use in all walks of life.*

Ruben Gameros: *If one finds time to look up one just might see members of the most diverse group of mammals: bats. Darting over trails and between trees, their flight patterns may seem random but over several sightings two main styles of flight can be viewed. The first makes frequent, rapid turns and flaps even faster. The second has markedly slower flapping, and will make fewer turns.*

Tess Prendergast: *The most important lesson this course has taught me is that research is never finished. From all the talks given to us by scientists at the Smithsonian Tropical Research Institute, and from my own research, I've realized that the hypothesis you start with is rarely the one you'll end with.*

Melissa Hayhurst: *I've been imagining the rainforest my whole life, and it's just crazy to actually be here among the monkeys, tropical birds and freaky-looking spiders, wading through the rivers and ducking around the walls of vines descending from the forest canopy.*

Zach Roland: *All in all, I couldn't be happier that I took the risk to come to Panama.*

Nhu Nguyen:

Beauty of Nature

Gamboa, a small town with hidden treasures

So diverse, seems impossible to measure.

Surrounded by the forest and wetlands,

It is a sight that must be seen firsthand.

Spiders, fishes, bats and ants,

Then there's bees, trees, and more plants.

Plus, the deer, agouties and sloths

Can't forget the monkeys, squirrels and moths.

There's so many unbelievable sights,

But there's definitely more bug bites.

However, the education and the friendships made

Is an experience that I would not trade.

Scientific hypotheses and predictions,

Curiosity becomes an addiction.

Humidity is always in the air

Makes for frizzy and puffy hair,

But one should not care for how they look,

*Because every activity is one for books.
Do not wait to encounter this later,
It is simply the Beauty of Nature.*

The course runs June 4-21, 2019. The course fee of \$4,385 covers tuition, room and board, health insurance, and all excursions (the main additional cost is airfare). You can sign up with a \$50 application fee at studyabroad.asu.edu/?go=TropicalBiology. Sign up and apply for scholarship aid by Feb 1 at studyabroad.asu.edu/?go=finance. Contact Jon Harrison (j.harrison@asu.edu) or Juergen Liebig (Juergen.Liebig@asu.edu) for further details.



Aerial view of Panama canal. Town of Gamboa and Soberania National Park on right.