

Caribbean Adventures and Experiential Education during Herpetological Surveys

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My fieldwork brings me to the Caribbean to study lizards. Mentioning ‘Caribbean fieldwork’ to most people will bring to mind colorful coral reefs, breaching sharks, and vast stretches of uninhabited beach. The reality is better reflected by imaging sunburns, dehydration, and skin rashes. Explaining this reality is difficult when your audience is predisposed to the Travel Channel or a cruise port of call. Local people at my field sites in the U.S. Virgin Islands and Puerto Rico spend their leisure time hiking on developed trails, cultivating fruit orchards, and swimming at sandy beaches. Lizards, on the other hand, seem to have no sense of trails, sandy beaches or manicured yards,

but they are abundant. As I write from my office in Puerto Rico, I see three species of lizards indoors. At my field sites, I may see five or six different species of lizards at one time. It is overwhelmingly delicious for a herpetologist, and this diversity has brought North American scientists to these islands for hundreds of years.

What these scientists have found is that amphibians and reptiles comprise more than 70% of vertebrate species on Caribbean islands. Recently, the effects of agriculture, exotic predators, and increased storm events on species are studied in-

the context of biodiversity conservation. For example, natural hurricane systems mediate lizard distribution and abundance on the small islands peppering these seas as much as agricultural land conversion. Human-linked climate change is a worry, too; we may start to see the real extinction of species in the hotter years to come. To persist worldwide, lizards will have to adapt or move to more suitable places. On islands, lizards cannot disperse like continental species, and the ability of some taxa to adapt to new environments is widely unknown. My research integrates spatial modeling of regional environmental characteristics and mapping biotic variables like predation and adaptive physiology to understand species’ responses to changing environmental conditions.

I am passionate in my endeavor to understand the capacity of animals to adapt to changing conditions in the Caribbean. My passion for the science is often eclipsed by logistical constraints of fieldwork. The biggest need of graduate students in displaced and remote locations is field assistance. Over two, 6-month field seasons I have had the opportunity to host 6 students, 3 interns, 5 friends, and 2 family members in durations spanning 4 days to 11-weeks. The support, assistance, reflection, and perspective from this influx of visitors is the single factor that

I attribute to the success of both field seasons. I forget about skin rashes and remember I am making meaningful contributions to conservation biology in the company and support of volunteers and friends.

I was motivated by them, but I wondered what Caribbean fieldwork was like for my visitors. I asked a subset of volunteers for whom it was their first time in the Caribbean to reflect. I asked them: “Please provide no more than 200 words on your experience in Puerto Rico or the Virgin Islands. What did you do, what was your impression of the research program, etc. This will be included in my grant reporting, and circulated in my report to Texas A&M faculty and students.” Perhaps I biased their reflections by letting them know that faculty and students would be seeing their thoughts. But what the volunteers and students remembered was surprising. For example, it came out that one student had thought the field work so difficult that he might quit! After reading the reflections, I found two major themes in what they wrote— experiential education and adventure. I present to you here their reflections in their own words. I conclude with a short reflection of my own.

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Experiential Education

KRISTINA

As an incoming Ph.D. student without prior graduate school experience, I was unsure of my ability to accomplish a doctoral dissertation. There was a lot of unknown graduate school territory, which I allowed to become inflated in my mind. A few weeks before I accepted the position at Texas A&M University as a graduate student under Dr. Lee Fitzgerald, Lee advised me to talk to another of his students, Nicole Angeli, to gain a better perspective of what was to come and to be expected.

In one Skype conversation, many of my fears of the unknown were quelled, as she explained the timeline of events in graduate school, the graduate culture at TAMU, and that the pressures were not as insurmountable as I had thought. She then offered me a position as a field assistant for her dissertation project in Puerto Rico 2014 to gain experience and better understanding of a graduate thesis.

Since I needed more experience in the field, I was grateful and excited to accept her offer to join the project. While there, I had not only learned techniques for herpetology research, but have had incredibly rewarding experiences as a conservation biologist. Nicole has introduced me to many scientists in the region, and shown me what collaboration with other scientists accomplishes.

Meeting, working with, and getting to know Nicole has given me a much more confident outlook on graduate school, and has reinforced my path into field research and conservation biology.

CAMERON

My love for field research has blossomed since I was able to participate in a real field study. In the spring of 2013, I received a \$2400 grant from Lebanon Valley College to accompany Nicole Frances Angeli to Puerto Rico. Throughout the summer of 2013, we studied lizards of the *Ameiva* genus in Puerto Rico focusing on predation,

phenotypic variation of populations, and physiology.

This research project with Nicole helped me make pivotal decisions in my life. The work was hard, it was hot, and thorns were everywhere. It was not a cakewalk by far, and I debating quitting several times. The other assistant actually did quit, but quitting wasn't an option for me. I had to ask myself, "If I can't do this for 2 months, who am I gonna be? If I can't push myself to do this, how can I expect to succeed in life?" So, I didn't quit and I continued to push myself and continued to learn. After this wonderful experience I realized I can do this and further my education. Now, I am attending Penn State for a PhD program in Ecology this fall. I also made connections, well mainly with Nicole. Without her, I don't think I would have even thought about grad school. I still consider her a role model, friend, and hopefully life-long mentor, too.

KATHRYN

In the spring of 2013, I spent 12 weeks interning with the National Park Service on St. Croix in the US Virgin Islands, working on a project to evaluate the current distribution of *Ameiva polops* on Buck Island. Working with Nicole, I had the opportunity to learn how to evaluate habitat preferences using temperature models and micro-habitat assessments. Through this opportunity I gained valuable field experience and was able to experience the concepts I had learned in the classroom as an undergraduate being applied in real life. In addition to learning new field techniques, I was also able to see the importance of meticulous planning and time management in the implementation of a study and have been able to use these skills to improve my own work in wildlife biology today. The hands-on experience and practical application that this program provides are extremely beneficial, not only to the people who work on it, but also to the little known and endangered *Ameiva polops*.

NATHAN

In March 2013, I embarked upon a three month internship working on an endangered species

population assessment in St. Croix, U. S. Virgin Islands. As a prospective wildlife biologist, I was excited for this internship and the new experiences. My position required me to perform population surveys for an endangered ground lizard and manage for invasive plant species on Buck Island Reef National Monument for the U.S. National Park Service. This project involved working with various organizations such as Texas A&M and U.S. Fish and Wildlife Service to accomplish a comprehensive analysis pertaining to the endangered species. Team work and communication were always important between the six project team members. One of the team members was a Texas A&M graduate student whom worked in a very determined way to develop a great behavioral ecology study for the St. Croix ground lizard and its genus. Through this internship, I was able to learn new skills such as capturing lizards by noosing and proper herbicide treatment.

KAYCEE

My name is Kaycee Faunce and I spent part of my 2014 summer assisting Nicole Angeli with her research on Puerto Rican ground lizards (*Ameiva exsul*) in Puerto Rico and St. Croix. Most of the field days were long and hot and some were through rough terrain, but the opportunity to work alongside a biologist as she conducts and refines her research has been amazing. I've recently finished my undergrad with a B.S in Biology, so the field experience will be invaluable as I begin to look for jobs. Additionally, the opportunity to meet other biologists, Fish and Wildlife Service employees, and students during my trip has inspired me to begin pursuing M.S. programs related to conservation and wildlife biology.

Nicole has been an excellent teacher and mentor, and through her I have learned so much more than anticipated. She has never hesitated to teach me as much as possible; we explored many of the ecological life zones present on Puerto Rico, and I learned much about island invasive species and how to identify many of the native flora and fauna both on Puerto Rico and on St. Croix.

MOM

When Nicole proposed that I go to Puerto Rico with her, I was surprised and honored. Granted, I understood that she was asking me merely because she didn't want to "pay" an intern to accompany her and that I would actually have to "do" things for her and let her "take the reins". OK, I was up for that!! Nicole made all the plans for the trip; of course, I paid my own way... OK, and some of hers, at least for food, etc. She told me what to pack, and especially to be sure to bring boots.

I felt I learned so much about lizards, their biology, and the island itself. Nicole showed me tracking and holding techniques. A week in Puerto Rico wasn't enough to see everything and to do the type of "scouting" she needed to do. Basically, she was able to meet the right people that could assist her with permits and introduce her to others who are doing similar work. For myself, I learned so much, and I was amazed and proud that my own daughter could be such an intellectual and be able to teach the information in a way that anyone could understand.

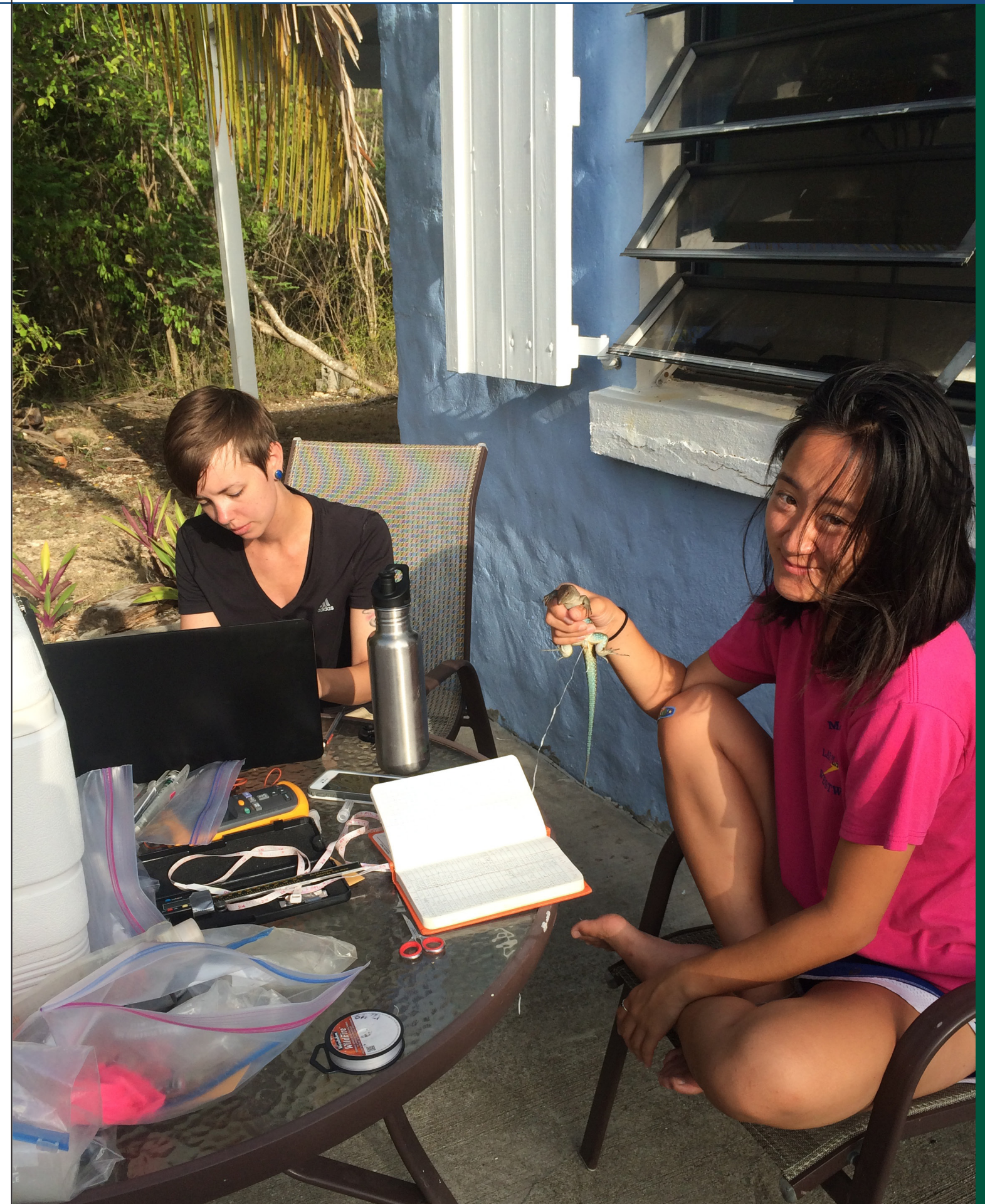
ARTHIKA

As I reflect on my experiences, I realize two things: one—that I knew absolutely nothing about the methods of this research until visiting and I can now speak on at least a cursory level about the endeavor, and two—that I could never have imagined how rewarding time spent problem-solving to trap lizards could be. The supportive, educational, and "team"-oriented environment that Nicole embraced while conducting these studies (as an honorary team member), made for an invigorating week in Puerto Rico, and a vacation I will never forget.

Adventure

KRISTINA

Though unrelated to the project, one of the most meaningful experiences, based on Nicole's connection to the scientific community in St. Croix, was being invited to watch Leatherback



Sea Turtle hatchlings emerge in a protected beach. She has had many continuing conversations with me about life as a graduate student, and advised me of classes I should consider taking.

NATHAN

Personally, the culture and people of St. Croix were quite diverse which I found very interesting. For the most part, it was a laid back atmosphere filled with beautiful landscape and ocean views. However, because of the high cost of living, it seemed many locals had a hard economic life. I very much enjoyed the opportunity to work on St. Croix with so many passionate people.

KAYCEE

I have gained an appreciation of the history and culture of the two islands (St. Croix and Puerto Rico). Experiences that stand out to me are spelunking in a state forest cave to see hundreds of Antillean bats emerge from their roosts for the night, seeking out elusive or rare herpetofauna such as the crested toad (*Bufo lemur*) and the blue-tailed ground lizard (*Ameiva wetmorei*), and snorkeling over coral reefs and seeing all the beautiful

Caribbean reef life, including critically endangered staghorn coral (*Acropora cervicornis*) colonies.

ARTHIKA

My time in Puerto Rico was as much an educational and intellectual adventure as it was a cultural immersion. I was initially intrigued by the innovative, intricate, and demanding dispersion mapping techniques that Nicole was employing. Over the course of my first few days on the island, I quickly appreciated the incredible number of difficulties that Nicole had to confront and overcome in doing this form of research. First we struggled to get to the actual locations mapped out by what appeared to me to be an incredibly complex programmed algorithm. Next, we fought a losing battle against our elusive lizard subjects in our efforts to classify their optimal physiological thermal range

MOM

It was my adventure as much as it was hers. I never flew out of the U.S.A. before, or should I say, over the ocean. We flew into San Juan, Puerto Rico and then rented a car to go to Fajardo. We stopped along the road if Nicole was

already in their back yard looking at invasive species specifically the green iguana. The next day, we followed lizards into the brush near beaches and in the Agricultural Botanical Gardens. We drove around the island along the coast checking out spots like Luquillo, Maricao, Cabo Rojo, etc. Her love for her subject and research is palpable. She will be a credit to the scientific community.

Conclusion

My experience managing these doctoral dissertation projects has taught me both leadership and self-management skills. My first priority as a leader is safety in the field. There is always time to rest, drink water, and be safe. Safety was in my mind one of the first days of my first field season. A dehydrated volunteer wanted to continue their workday. It was 105° F at 10 a.m. in dense coastal forest, and the work involved using a machete to make a trail in the forest. Dehydration causes impaired judgment and motor skills; I saw no way for us to move forward with our original mission. Balancing their desire to work with their safety, I approached them in a collaborative spirit, asking whether the work could wait for the next day and if we could work on a different task that took us near a breezy, shaded coastal area. The final decision to change gears and pack up for the beach was both my own idea and their idea. The decision took just a few more minutes than ordering them to pack up, and we passed a pleasant day preparing tools for work in the weeks to come.

I find this sort of reflective period at the end of a field season is refreshing. I forget about small management choices I made until I reflect or hear the reflections of others. For example, I thought it might boost morale to spend one evening watching a bat emergence rather than processing lizard specimens. These decision-making skills are the tools that will bring me the most success in developing my future research programs. The big ideas and discoveries will come—I could realistically drive around the coast of Puerto Rico and catch lizards solo. But why? People appreciate inclusion and spending their time learning something new. Army crawling through thorny brush in 110° F heat to catch a lizard is the most fun that I

have ever had, but it is hard. I would have crawled back to Texas defeated without support. Instead, I've developed new and strong relationships that motivate me each day. I am pleased that my assistants have felt inspired and learned a lot. I support reflection periods for any type of project, and I am glad that this series supports opportunities for bringing all sorts of 'perspectives' to the Applied Biodiversity Sciences community at Texas A&M University. 🌿

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