BioOne AMBASSADOR AWARD

MEET THE WINNERS:

Rhett M. Rautsaw, Ph.D. Student

Nominated by the American Society of Ichthyologists and Herpetologists

The BioOne Ambassador Award recognizes early-career researchers who excel at communicating the importance and impact of their specialized research to the public. Nominees were asked to provide a 250-word plain-language summary of their research which responded to the question:

"What are the broader implications of your work, and how does your work impact the public at large?"

Responses were judged for their relevance and clarity. Read below to read Rhett's winning summary, and learn more about his research.

Stopped Dead in Their Tracks

Photo by Rhett M. Rautsaw

How did the tortoise cross the railway? An odd take on a classic joke, but this is no joke. The sad truth is that tortoises cannot cross railways. Railways are ubiquitous in our society, stretching for over 1,000,000 kilometers globally. Much like roads, railways cause many issues for wildlife. Animals lose their lives to trains, are trapped between rails, and their habitats fragmented by railways. Cumulatively, this causes smaller populations, inbreeding, and loss of adaptive potential which escalates species toward extinction.

Gopher Tortoises are cherished in the southeastern United States because of their lumbering, laidback attitude and because these keystone species dig burrows which provide shelter for over 360 species. Unfortunately, Gopher Tortoises are threatened with extinction due to habitat loss and fragmentation. Their loss could mean the demise of many other species depending on their burrows.

To reduce the impact of railways, we must first understand how tortoises are impacted by studying their movement and behavior around railways. Sadly, I found that railways are a near inescapable trap, causing tortoises to move less than expected by tortoises in unobstructed habitats.

How do we solve this problem? Digging trenches beneath the rails increased movement across railways and provided an escape route from entrapment. Although tortoises still face many threats, we believe that our study has helped raise awareness and critical thought about the impact of railways on wildlife. Even Florida's SunRail™ has contacted me and is committed to making improvements to increase the survival of Gopher Tortoises and other wildlife.

This summary is in reference to:

Stopped Dead in Their Tracks: The Impact of Railways on Gopher Tortoise (*Gopherus polyphemus*) Movement and Behavior

***Copeia*, 106(1):135-143. 2018.**

Rhett M. Rautsaw, Scott A. Martin, Bridget A. Vincent, Katelyn Lanctot, M. Rebecca Bolt, Richard A. Seigel, and Christopher L. Parkinson.

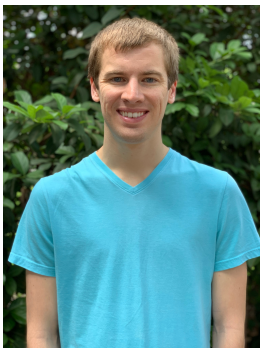
Funding for this research was proivded by the Florida Fish and Wildlife Conservation Commission (FWC).

View a video summary of Rhett's work:

Rhett M. Rautsaw, Ph.D. Student

Nominated by the American Society of Ichthyologists and Herpetologists

Rhett Rautsaw grew up in small-town Laura, Ohio with a fascination in science – especially biology and herpetology (the study of reptiles and amphibians). Following this passion, Rhett finished his B.S. degree at Wright State University and continued onto graduate school at the University of Central Florida (UCF). His M.S. thesis research at UCF focused on testing and understanding how roads and railways impact the



movement and behavior of Gopher Tortoises. While at UCF, Rhett also published work on new methods for estimating Gopher Tortoise abundance and on surveying reptile and small mammal communities using game cameras.

Currently, Rhett is a Ph.D. student in Dr. Christopher L. Parkinson's lab at Clemson University in the Department of Biological Sciences. His research at Clemson combines his expertise in ecology with evolution and genetics. Specifically, he is testing if competition influences the evolution and diversity of venom in pitvipers. Rhett's goal is to eventually become a professor at a top-tier university researching and integrating ecology, evolution, genetics, and conservation biology.

What drew you to your current research field?

I have had an innate fascination in biology, ecology, and conservation since a very young age. Growing up in a rural area meant that there wasn't much to do other than go enjoy nature. Additionally, there was always a lot of Steve Irwin on our family's TV. I was constantly outside catching snakes, lizards, and frogs and would bring them back into the house. Luckily for my parents, there are no venomous snakes in Laura, Ohio, so I was never tempted to try any of the risky snake-handling techniques I watched so attentively on TV.

I have been particularly drawn to science and biology because there are so many unknowns and unanswered questions. New species are constantly being discovered and described and there is so much we still don't know about our natural world. This being said, I am also drawn to conservation because our environment is in serious trouble due to habitat destruction, pollution, and climate change. This was obvious in the fragmented forests of the Midwest, but it is even more devastating to think about the vast unknowns of the tropical rainforests being destroyed. These rainforests might hold new medicines and the answers to so many questions, but we might never know what those questions even are without conservation and science. Therefore, I am drawn to making sure that our natural environment is preserved for myself and future generations to enjoy.

Prior to my fascination with reptiles, my mom was absolutely terrified of snakes. Now, she is one of the most comfortable people I know around them. I think this shift in my mom's understanding and behavior toward snakes is another reason why I am so drawn to this field. I thoroughly enjoy teaching people about animals, nature, and science in general. Once people understand the science or animal, it becomes much less scary. This is a tangible experience I have had many times in my life with snakes. People are generally terrified of

snakes, but I have done many educational outreach events and people eventually realize tha snakes aren't as scary as they first seem.

Who most inspired and/or influenced your career?

It is hard to say who most inspired or influenced my career. There have been so many supportive people in my life! For starters, my parents (Darci and Brett Rautsaw) and family have always been incredibly supportive and always pushed me to make my career something that I truly enjoy. I cannot thank them enough for everything they did to make me who I am today. I also had a particularly influential elementary school teacher, Samantha Porter, whom always encouraged me to pursue science. Of course, I'm sure Steve Irwin had a lot of influence on me as well – especially in terms of my interest in reptiles.

During my college years, there have also been many people who have truly influenced and helped me shape my career. Dr. Thomas Rooney at Wright State University was one of my first college professors whom turned into an incredible advisor. He helped me gain my first research experiences and a research position in Dr. Jeffrey Peters' lab. Dr. Peters was also was a tremendous mentor and taught me so much to prepare me for graduate school.

In graduate school, my collaborators Dr. Richard Seigel, Becky Bolt, and Scott Martin helped to develop my projects and influenced my ability to think scientifically. Michelle Gaynor continues to challenge me to be better every day and the countless discussions I have with her increase my scientific knowledge and motivation. I received and continue to receive significant guidance and help from lab-mates Jason Strickland and Andrew Mason. They really took me under their wing when I arrived at UCF and started graduate school. Lastly, my advisor, Dr. Christopher Parkinson helped shape me into the well-rounded scientist and academic that I am today, and he continues to do this throughout my Ph.D.

I cannot say which of these people most inspired or influenced my career, but I can confidently say that I could not have gotten to where I am today without each and every one of them.

What one thing would you like the public to remember or understand about your research?

Primarily, I want the public to remember that we – as humans – have an enormous impact on our natural world. We go about our day-to-day lives and don't think about how simple actions can have large consequences on the environment. For example, a large number of the plastic bags – which we use for only a few minutes from grocery to home – end up in the ocean and look like a jellyfish to hungry sea turtles. Reducing our use of plastic bags can have tremendous positive effects on sea turtle populations thousands of miles away.

The same is true for roads and railways, the focus of my research. We generally don't think much about roads or railways other than being annoyed at the occasional pothole or passing

train. However, there are entire fields of biology dedicated to understanding their impacts on wildlife. Roads and railways cause a lot of mortality and fragment populations of animals. This may not seem like a big deal, but it has huge downstream effects on wildlife populations. Splitting populations with roads and railways can lead to smaller, isolated populations subject to inbreeding, loss in adaptive ability, and further declines in population abundance.

With our research, we have shown that tortoises are particularly vulnerable to railways by both restricting their movement and entrapping them in the rails. However, we found that these issues can be easily resolved by adding some trenches to facilitate movement. So, the next time you see a turtle or any other native animal trying to cross a road or railway, maybe give it a helping hand and think about what else you can do to help **our** environment.

If you had one piece of advice for someone who wants to pursue research in your field, what would it be?

Get involved! Regardless of where you are in life – high school, college, working, etc. – getting involved is the first step to pursuing research in this or any field. This means:

1. Start reading academic papers that you find interesting. If it is road/railway ecology, then read those papers. Academic papers can be really tough to read as they are often filled with jargon. But that is okay! Take your time. Look up things you don't understand. Learn. This will better prepare you for a career or research in this or any field. Additionally, reading papers points you in the direction of authors whom are active in the field.

2. Reach out to the authors that you find most interesting, especially if you are interested in pursuing a graduate degree. You might be surprised to hear this, but scientists are just people. Most will be more than willing to help guide you and answer questions about what your next step should be, regardless of whether you are pursuing further education or just have an idea for a research project. You may even be able to help with their research and it certainly doesn't hurt to ask.

3. Build a toolbox. Regardless of what discipline you are planning on focusing, there will be a standard set of skills you should build to make yourself competitive and able to actually do the research. Computer coding and statistics are two of the most important skillsets you can have for nearly any biology sub-discipline. The program called R is a great place to start. You can begin to learn R coding with a package called swirl (https://swirlstats.com/). Another important skillset for ecologists is geographic information systems (GIS).

CONTACT INFORMATION

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For information about the American Society of Ichthyologists and Herpetologists, please visit their website:

The American Society of Ichthyologists and Herpetologists (ASIH)

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