

A day in the life...

Name: Craig Patrick O'Connell

Job Title: Magnetoreception Researcher for SharkDefense

Responsibilities

My responsibilities vary with this position. To begin, my focus is both developing and conducting magnetoreception experiments on a variety of elasmobranchs. Prior to conducting the experiments, I must write a proposal which clearly defines all aspects of the experiment: experimental layout, how data will be recorded, what subjects will be used, etc. Once the proposal is accepted, the experimental subjects must be caught. I am then responsible for conducting the experiment and accurately recording the data as stated in the proposal. To conclude the experiment, I also take part in writing a scientific paper to help publish our data.

Along with being responsible for experimental procedures, I am also lucky enough to be part of a company that relies heavily on making new inventions that could potentially minimize marine bycatch worldwide. This requires me to constantly use my brain and search for new and innovative ideas. When we develop a new idea, it is then important to test it. If we obtain positive results, it is another responsibility of mine to contact organizations that could potentially be interested. Although this is not my main responsibility, it is something that I help with. Once a contact is made, the SharkDefense team holds teleconferences with these organizations to talk about future plans.



Me holding a 173cm tiger shark (*Galeocerdo cuvier*) in Bimini, Bahamas

Daily routine

A day out in the field:

Being out in the field can be a rather tiring experience. It usually requires a lot of work, but no matter the outcome, if you are a marine biologist, your reward is quickly obtained by being out on the water.

Prior to a trip out on the field, a lot of planning must be done. Once a plan is made, a detailed schedule must be made and sent out to each member of the SharkDefense team. Now, arriving in the field, we start the days very early. Plans are discussed over breakfast, whether it is gourmet like McDonalds, or just a quick snack from a store. As soon as the plans are finalized, we then pack the car intensively and get ready for a days work out on the boat. Being shark biologists, we navigate on the boat using a Global Positioning System (GPS) to locate our shark test sites. Upon arrival, we anchor and quickly begin stringing fish to the boat and cutting chum. Chumming the water will continue all day to attract the sharks and keep them in close proximity to the boat. Once a shark arrives, all camera equipment is prepared and put into position. Simultaneously, all repellent gear and experimental apparatuses are placed into the water. After we conduct a trial, we continue to sit out on the water in hopes to attract more sharks.

Following this boat trip, all gear is removed from the boat and we prepare to talk about all the data we obtained. This preparation always includes a long shower to remove the terrible fishy smell off of our bodies. Finally after getting ourselves to be somewhat presentable in public, we go out for a nice dinner and talk about our data. The day usually ends with making plans for the next day and falling asleep in a nice comfortable bed with air conditioning.

How I got here

Getting here was quite a task. I completed my undergraduate at Boston University. While at Boston University, I participated in several projects. My freshman and sophomore year, I took part in a project that focused on the brood adoption behaviour of Convict Cichlids (*Cichlosoma nigrofasciatum*). While participating in this project, I also volunteered to assist in another project. This project focused on microinvertebrate analysis and their composition gradients within damselfish nests. These projects served as an excellent introduction into marine biology, while also teaching me all the intricacies of conducting research.

My junior year, I was lucky enough to be accepted into the Boston University Marine Program (BUMP) in Woods Hole, MA. This was an accelerated program which quickly introduced me into the development of experimental design, public presentations, and conducting research out in the field. This was my first experience conducting research in a foreign place. During this semester, I travelled to Wee Wee Caye, Belize where I conducted studies which examined marine bioluminescence and whether or not bioluminescence is used as a means of communication among marine invertebrates. In addition to this, I conducted studies on damselfish pattern recognition along with a study that incorporated triangulation techniques to locate elasmobranchs. At the end of this semester, I was awarded a unique research award called the Lara Vincent Award for Original Scientific Research for my bioluminescent studies on the Leidy's Comb Jelly, (*Mnemiopsis leidy*).

Following this semester, I was accepted into the Boston University Tropical Ecology Program in Ecuador. This was the best semester of my life because I developed skills in plant and animal identification, experimental design, data recording and analysis, and I learned to adapt to a variety of environments. Being a part of this trip, I ventured to the tip of volcanoes, through the waters of the Galapagos, and through the dense vegetative habitat of the Tiputini Biodiversity Station in the rainforest. This trip was not only beneficial in the scientific sense, but it was beneficial in helping me to develop interpersonal relationships between the people of Ecuador. I not only learned and adapted to a new culture, but I learned the Spanish language and I made many new Ecuadorian friends.

My senior year was comprised once again of conducting scientific experiments. I conducted studies in a lab that focused on pattern recognition in a variety of swordtails. While conducting these studies, I also set up a computer-animated video playback system and performed digital image analysis which helped us examine the details of the experiment.

After completing my undergraduate education, I became a volunteer at the Bimini Biological Field Station (a.k.a. the SharkLab). Not only was this the most beneficial experience I could have had, but it was also the most educational. Here, I was surrounded by beautiful waters, fish, and a variety of other island commodities. It was difficult not to learn because I was constantly immersed observing the marine-life of these waters. Prior to my arrival to Bimini, I worked on a proposal which related elasmobranch magnetoreception and shark conservation. This was an idea I had developed as a college student and once I had arrived, I met with SharkDefense (my future employer) and they helped fine tune my ideas and helped me clearly understand magnetoreception. Once meeting with them, I teamed up with them on a variety of experiments. I got to catch wild nurse (*Ginglymostoma cirratum*), tiger (*Galeocerdo cuvier*), and lemon sharks (*Negaprion brevirostris*), while also catching southern stingrays (*Dasyatis americana*). That alone was a thrilling experience. After catching these subjects, I had to conduct magnetic experiments that I had designed. After participating in numerous studies, I became a happy member of SharkDefense and have been conducting fascinating research ever since.

Best bits

There are not many unrewarding parts of my job. I mean, no matter where you go with marine biology, you will meet outstanding and passionate personalities. I think the best part of this type of work is that the people you are with always seem to be happy. But, if you are not concerned with how the people are, then you will be greatly satisfied by the amount of time you spend on the water. When being in the field in my job, you are either on a boat or waist deep in water with sharks all around you. The rewarding part of this is that you realize how passive sharks really are and the more time you spend in the water with them, the greater your respect grows for them.



Control apparatus being presented to a Caribbean Reef Shark (*Carcharhinus perezii*) in Bimini, Bahamas.

Lastly, the most rewarding part of my job is that I hold the ability to greatly help the marine environment. Since my job focuses on new innovative bycatch technology, we are constantly coming up with new ideas that could potentially alleviate bycatch. After developing many ideas, it is the best feeling in the world when an innovative idea of your own finally works and you begin to see your potential in positively effecting the marine environment.

Worst bits

In my line of work, it is very hard to find bad parts about it. The only problems I ever have with this job is the difficulty of writing scientific papers. I mean, writing is not requested of me all that often, but when it is, it is difficult to sum up all aspects of the project into one paper. But this is one of those things that will come with any scientific job and you will begin to learn that not only does the fun outweigh this writing, but you will have many amazing experiences on this job that you will forever cherish. So although writing might be the most difficult part of this job, there are multiple aspects of this job that immediately make the task of writing much easier.

More information

Being a student in college, I was always tentative about becoming a marine biologist. All I can say is that if this is what you want to do, then go for it. There might be deterrents such as low pay, but I promise that if you put your heart into your work, that will never be a problem. Not only will you be fine financially, but you will witness some of the most beautiful things.

Lastly, like any job, you will have your ups and your downs. But, do not let the downs get to you. Stay passionate and enthusiastic and do what you love. Take what you learn and teach others. If you really put your all into what you do, I promise you that this career will be filled with rewards and a lifetime of happiness.