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faculty interview: biology

The Importance of Echinoderms: An Interview with Dr. Stephen Watts

Marine Biology, Kim Trawick

Recently, I had the chance to interview Dr. Stephen Watts about his position at UAB, his passion for research, and his current research. Dr. Watts is a world-renowned echinoderm biologist, who has specialized in marine ecology, biochemistry, and nutrition. He has been a professor and a research scientist at UAB since 1987. In 2000 he was also made the Chair of the Biology Graduate department, and has since assisted in making the Biology graduate department one of the largest on campus. From the beginning of his career at UAB, he has been responsible for teaching Undergraduate Cell Biology. During this interview, Dr. Watts talked about how he got into research, how he came to UAB, and also gave some advice to undergraduate students interested in working in research facilities at UAB.

Q) How did you get started in research?

A) I got into research my last year at Auburn. I heard about other students that were involved in research, and I also had TAs who were in research and they enjoyed it. So, it sounded like something that might be fun to try.

Q) What did you want to do before you started research?

A) I did not know. My parents wanted me to go into medical school, but I don't like sick people.

Q) So did you know that you wanted to do marine science?

A) I loved marine science. I grew up on marine science. We were scuba divers in high school. We used to dive and see all the neat animals. That was a period of time when there were lots of TV shows that promoted marine science, like Jacques Cousteau. There were lots of specials coming on at that time. There was a media love affair with the ocean at that point. So marine science sounded like something good to do, though we didn't have a clue of what a job in marine science would be.

Q) What was your first research experience like?

A) I was working with William Mason. He was a well-known biologist at Auburn. He was well known for being hardcore. I had taken invertebrate zoology from him, and had done well in that class. So, I went to work with him and one of his Ph.D. students. We worked with the Tartigrades, water bears. It was systematic work, where I had to identify them based on their structures. It was the most wonderful thing I had ever done because I got to engage in science and think. We were doing new things, innovative things, we were using our minds, using the classes that we had taken, and I thought it was just phenomenal. It was very exciting to me to participate in research.

Q) Where did you go after Auburn?

A) At that point in time, I didn't think I had the ability to participate in research. I looked at Master's students

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that TA'd my class, and I thought these guys must be brilliant. I put them on a huge pedestal, and I didn't even think I could get to that point, but I was willing to make an attempt. So, I looked into Marine Science programs, and found the University of South Florida.

I found one of the faculty, Dr. John Lawrence, who worked with echinoderms. I like echinoderms, particularly sand dollars because we used to collect a lot of sand dollars on our scuba diving trips. I thought it was a neat animal.

Q) What did you do at USF?

A) I went to visit Dr. Lawrence. He indicated that he would be willing to accept me, and I was to start off as a behavioral ecologist. In my first term there, I took a course from him called physiological ecology, which had a laboratory with it. That laboratory was designed so that the students would participate in a project that they could publish. That course was so exciting to me, learning about how the physical environment affects the physiology and biochemistry of the animals that live in those environments. You could understand how the animals were affected by understanding how they effected in their cells and biochemistry, and it all

came together. You could explain ecological concepts based on biochemical concepts. I really enjoyed that type of cross-disciplinarian approach.

Q) Did you stay at USF to get your Ph.D.?

A) Only after I got my Masters did I feel that I had the ability to go on to get a Ph.D. I still did not know what I wanted to do for a job, but I enjoyed the science. I stayed and worked with sea stars and how their reproductive cycles changed seasonally, and I also worked with sea urchins as side projects.

Q) When did you decide what your career goals were?

A) About one year before I finished my Ph.D. I finally recognized that I could work at that particular level because I had good training and a very good committee. It was a very rigorous Ph.D. program, but it helped prepare me for the future. I graduated with 9 publications, which was pretty good for a Masters and Ph.D. After that I went straight on to a post-doctoral position.

Q) Where did you do your post-doc?

A) I was split between the University of New Hampshire and the State University of Utrecht in the Netherlands. I went to New Hampshire, and we worked on spermatogenesis in sea stars. I was looking at the hormonal systems, steroids in particular, involved in spermatogenesis.

Q) What did you gain from your time in New Hampshire?

A) I learned how to write grants. I was funded by the two people that hired me, and some of the money came from the Netherlands.

Q) What did you do in the Netherlands?

A) I worked with Peter Voogt, who was a world-renowned steroid technologist. We learned how to do the work in steroids with sea stars.

A) I knew that I would have to go into professorship somewhere, and I started to apply for jobs. I applied to all Marine Science centers. UAB was the only school without a marine science center. When I came to UAB, I didn't come to get a job. I came for the interview because my family was nearby. Once I got here, I saw that UAB had changed. When I grew up, UAB was an equivalent of a junior college and most of the faculty only had Masters degree. When I came back for a job, it was a very different university that had a lot to offer. They were very generous, and they were trying to make the university more of a research-based school. I really enjoyed it here, and I decided to take the position in '87.

Q) What was your initial position?

A) I taught Cell Biology, Introductory Biology, and a graduate course, but primarily my job was research. We initially continued with sea star spermatogenesis, but overtime I worked with Dr. George Cline and he got us involved in aquaculture. We understood that funding is required, and it is much easier to get funding when you work with a species of economic value. Working with tilapia in aquaculture opened up new sources of funding.

Q) How did you get involved with sea urchin research?

A) We started with the sea urchins at USF during my Masters program. In the early '90s, we saw the importance of sea urchins on the world markets and went to NOAA to get funding to research this. In the mid-90s, NOAA came back to us and agreed to fund us because they started to see the problems with sea urchins on the world market. We started with some aspects of nutrition and basic culture husbandry. There were a lot of engineering components, as we continued to study the biology of husbandry. In the late '90s, we shifted more heavily to the nutrition component recognizing that you can't house urchins in-shore without knowing what to feed them.

Q) What is your current research on?

If you can help guide those students in a particular direction, you can affect their outcome. That's important. I saw that we could do things that would enhance the students' ability to go out and get jobs.

Q) After your post-doc, what did you want to do as your career?

A) The nutrition of aquatic organisms, particularly those who have economic value or those that have value as biomedical models, including sea urchins and zebrafish.

Talk to the faculty; get to know the faculty in the classes they are taking. Don't be strangers to the faculty. If I don't know a student's name by the end of the term then they didn't do their job. I can only do so much because there are so many, but if they come to me and they talk to me I will get to know them and I can help direct them to other areas.

Q) How do you foresee your research impacting the scientific community?

A) Animal models have come under increased scrutiny for use in testing. In the old days, there was no thought about what type of animal was used. Now there is a shift to move away from using complex vertebrates, and perhaps use other models that are easier to and are cheaper to use. We knew that it is far cheaper to fish and sea urchins as models rather than rats and mice, but we have to make sure that we are developing the model adequately so that they can be used.

Q) When did you become the director of the Biology Graduate Department?

A) That would be almost 9 years ago.

Q) Why did you want to do that?

A) From day one, I was interested in the graduate department. When I got here, we had 6 graduate students. When I took over, we had almost 30 graduate students, and today we have 58 registered graduate students. So, we have almost doubled the number of graduate students. My interest in graduate students comes from several things. Number one, my former mentor was a graduate program director, and I saw that he had a huge impact on the lives and futures of students. If you can help guide those students in a particular direction, you can affect their outcome. That's important. I saw that we could do things that would enhance the students' ability to go out and get jobs.

Q) What is your favorite part about being the graduate director?

A) Talking to lots of students, and seeing different areas of research. I like talking and interacting with the students.

Q) How do you feel about teaching the undergraduate students?

A) I very much enjoy teaching the undergrads, but it is not

as much fun as it used to be because of the class sizes. I don't get the opportunity to interact with the students with such large classes. I miss knowing and being able to help all of my students, but this is part of becoming a large department. But I really enjoy watching the undergraduates because you get to watch them step up. You can take someone with very little confidence, and make them realize that they are much smarter than they think they are.

Q) Do you have any advice for undergraduates that want to get into research?

A) Talk to their advisor first to make sure they have the grades to do it, and then determine what area of the coursework they like best. Talk to the faculty; get to know the faculty in the classes they are taking. Don't be strangers to the faculty. If I don't know a student's name by the end of the term then they didn't do their job. I can only do so much because there are so many, but if they come to me and they talk to me I will get to know them and I can help direct them to other areas.

