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Davis: Texas Tech looks at ways to “save the frogs” and other amphibians.

Hello everyone, I’m John Davis and this is AcademiCast, brought to you by Texas Tech University.

In the past 30 years, about 200 amphibian species have vanished, which is a loss of about one species every two months. Scientists know it’s happening, but the question is why?

Frogs face threats internationally on several fronts, from pollution, disease, habitat loss, climate change and overharvesting by the pet and food industries, says Texas Tech Assistant Professor of Biological Sciences, Dr. Ximena Bernal.

One of the things Bernal is looking at is why Cane Toads are the exception. She says they are actually thriving in certain parts of the world.

Bernal: The Cane Toads are an amazing species. They’re native of South and Central America, but they have invaded a lot of new habitats. So they’re an invasive species in Hawaii, Florida, Puerto Rico, Australia, and are doing really well. It’s one of those species under study that are not declining. And we suspect some reasons to explain this, but I’m mostly interested in understanding how learning could help them. We haven’t really looked in the past at learning very much, and I think we have underestimated how smart they are. They are good at exploring, finding new food, and then they remember where it is.

Davis: About 700 Texas Tech students, faculty and staff set a world record during the April Arbor Day celebration on campus for the most people in one place wearing frog masks, according to the World Records Academy. The event, organized by Dr. Bernal’s lab, coincided with Save the Frogs Day.

Our next integrated scholar feature is Dr. Michael San Francisco, who has been a leading researcher in biological sciences and works with Dr. Bernal in amphibian research. Here’s Provost Bob Smith with more.

Smith: Dr. Michael San Francisco’s talents and roles at Texas Tech are seemingly limitless. He is currently serving as associate vice president for research and holds joint professorial positions in Texas Tech’s Department of Biological Sciences and the Texas Tech Health Sciences Center’s Department of Microbiology and Immunology. Dr. San Francisco also serves in leadership roles in the Center for the Integration of Science and Research and the TTU/Howard Hughes Medical Institute Science Education Program. Earlier on, he served as associate dean of the Texas Tech Honors College.
Dr. San Francisco tries to answer questions pertaining to plant and animal health. More specifically, San Francisco and his team of researchers are trying to find the pathogen or pathogens that have apparently been responsible for a massive decline in amphibians around the world. Once the pathogenic organism or organisms are identified, the goal is to determine how to control spreading and infectivity. Let’s listen as Dr. San Francisco explains how he became so interested in this area of scholarship.

**San Francisco:** I remember in ninth grade, having two major issues. One was having difficulty with physics. And I took it upon myself, I bought a physics problem set book, and I just worked on physics problems until I mastered them. So I loved physics. I was always good at geometry and trigonometry. But I did really well and naturally well in the biological sciences in school, so that came naturally to me. When I went to college, I was really not interested in attending class, and so that was not a priority issue for me. I took all my exams and stuff, and I didn’t find professors particularly intriguing or interesting. Fortunately I did attend one course taught by a professor in microbiology. And he was talking about those microbes that interact with the roots of plants and help convert atmospheric nitrogen, which is 76 percent of the air we breathe, into a usable form, which we need. That to me was something that triggered me. So I went to him and I asked him about it and he said come to the lab. So I still didn’t go to class. I was now at the lab doing research. And that’s how I got involved in research, in biological research.

**Smith:** It’s clear that Dr. San Francisco has a passion for research and helping others—including students from all levels and other faculty. Overall, he wants to spread his own passion for research among others. As a part of his efforts to promote research, Dr. San Francisco directs the Clark Scholars Program—a program that offers opportunities for high school juniors and seniors to conduct research with faculty mentors during the summer. He has been working with this program since its inception and has been pleased to watch it grow over the past 19 summers.

**San Francisco:** It’s grown now from 40 applicants annually from a national pool to about 180 also from an international pool. We typically get the top one percent students in the nation who apply, so they’re awesome and it’s a fabulous opportunity. We only pick twelve kids. These kids are amazing. You can ask our faculty. They say they are often better than our graduate students in their thought processes. They spend seven weeks, and they can produce incredible work.

**Smith:** Dr. San Francisco is also a devoted teacher. He has taught a variety of courses in the biological sciences and in the Honors College. He says he uses a unique approach to help students in his upper-level biology courses understand difficult topics.

**San Francisco:** The bottom line is trying to understand how or what makes a microbe tick, what turns them on. I’ve stopped teaching from a textbook by the way, I teach through a deconstructive process. So what I do is I give them a high-level publication at the front end of the class and then we basically take it apart. It’s like giving you a car and then saying let’s take it apart to understand internal combustion engine, to understand mechanics, to understand all of those kinds of things, ergonomics. That’s what we do
with the microbial cell. I give them a complex paper and they will deconstruct it over the course of the semester.

**Smith:** To master all three areas of an integrated scholar—research, teaching and outreach, Dr. San Francisco believes that finding your own passion, as a scholar, is the most important.

**San Francisco:** I’d say there’s no cookie cutter type answer to that. Everybody has to make themselves fit into the system. Nobody came to me and said ‘Hey Michael, do this, do this, do this and you’ll be an integrated scholar.’ You just do what’s important to you. You try to do it well. You try to make yourself available to the people. So in my own life, you know I coached the women’s soccer club team for ten years. I was faculty rep for about five different student organizations because it’s just important; it’s good stuff to do. So I just tell everybody find your own place, do it well.

**Smith:** Dr. Michael San Francisco has a record of achievement that places him high among Texas Tech’s integrated scholars. We would like to thank Dr. San Francisco for all of his scholarly work at our university. Thanks for listening! I’m Bob Smith.

**Davis:** Thanks, Dr. Smith. Texas Tech’s chapter of Sigma Xi, the international scientific research honor society based in the science and engineering disciplines, is increasing its efforts to promote growth and recruit new members. Current Texas Tech Sigma Xi president, Dr. Kishor Mehta says the renewed efforts are a way to increase interactions and dialogue among faculty to enhance quality, trans-disciplinary research.

**Mehta:** The key about Sigma Xi, is that it encompasses all disciplines. And, it is important for researchers in the years to come to be involved in more than one discipline. That is just the nature of it. So this organization will help us to bring people together every month and be able to understand what other disciplines are doing. As the time goes on, over the next two or three years, I can see some collaboration between the disciplines will occur on the campus.

**Davis:** All faculty researchers can join Sigma Xi, as well as graduate and undergraduate students currently pursuing research, or those who plan to pursue research. Until next time, I’m John Davis for AcademiCast.