

Oct 24, 2013

## New Vice Chancellor for Marine Sciences Creates Vision for Scripps Institution of Oceanography



*Photo by Erik Jepsen/UC San Diego Publications*

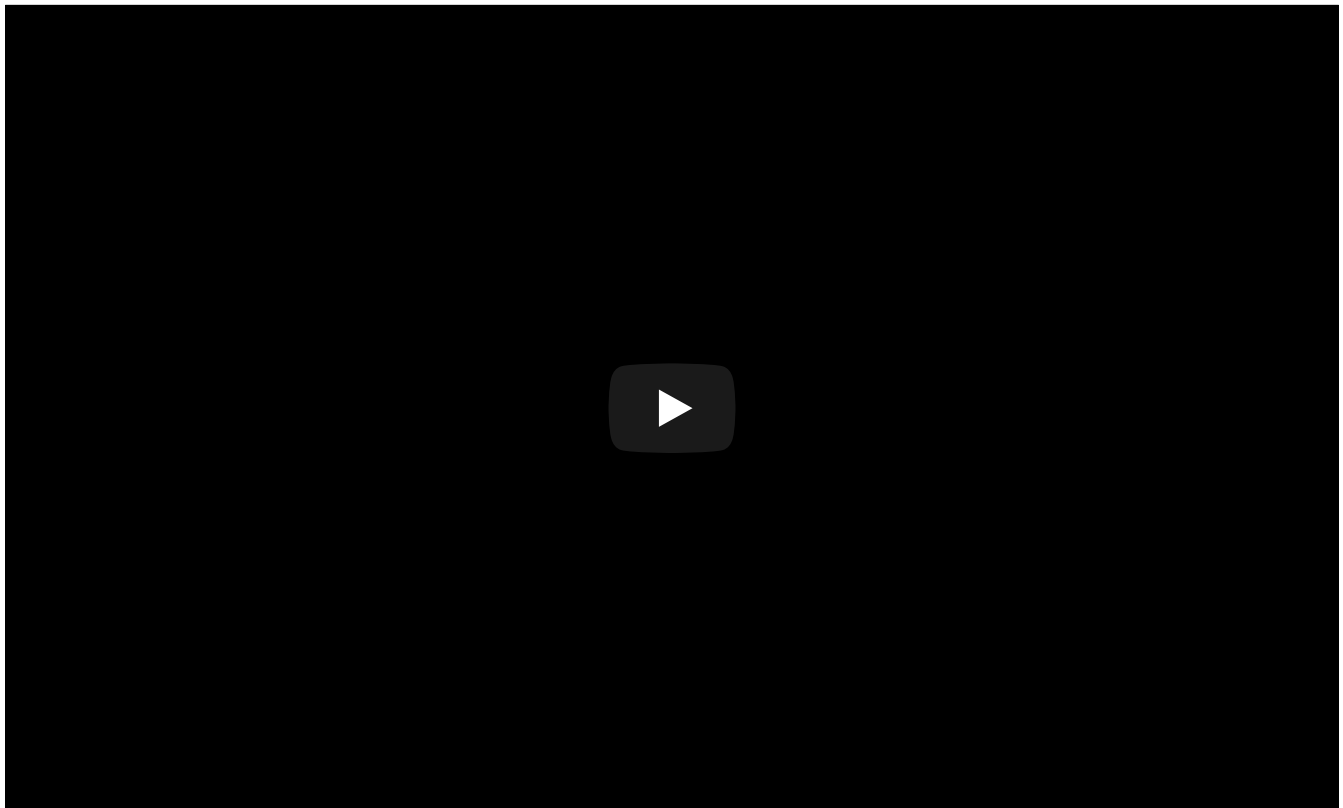
*Scripps Institution of Oceanography at UC San Diego is one of the oldest, largest, and most important centers for global science research and education in the world. Now in its second century of discovery, the scientific scope of the institution has grown to include biological, physical, chemical, geological, geophysical, and atmospheric studies of the earth as a system. Hundreds of research programs covering a wide range of scientific areas are under way today on every continent and in every ocean. Scripps operates robotic networks and one of the largest U.S. academic fleets with four oceanographic research ships and one research platform for worldwide exploration.*

*On Oct. 1, UC San Diego welcomed Margaret Leinen as vice chancellor for Marine Sciences, director of Scripps Institution of Oceanography, and dean of the School of Marine Sciences. Leinen is a highly distinguished, award-winning oceanographer and an accomplished executive with extensive national*

*and international experience in ocean science, global climate and environmental issues, federal research administration, and non-profit startups.*

### **What makes Scripps Institution of Oceanography so special to you?**

Scripps Institution of Oceanography is the oldest oceanographic institution in the country. It's probably the oldest in the world. This was the first oceanographic institution to recognize the value in an organized and complete study of the oceans, including their circulation, chemistry, biology, and geology. One of the real signatures of Scripps Oceanography is its investment across the board in virtually every aspect of ocean science and in the relationship between the oceans, atmosphere, land and solid earth, as well as between the oceans and human health. Our oceanographic challenges today are very complex and multifaceted. It is really important that Scripps Oceanography is part of one of the foremost universities in the world, UC San Diego. That means that all of us at Scripps Oceanography have as partners phenomenal faculty—in engineering, business, the arts, social sciences, information technology, biology, and every other form of science—to call on to assist us in addressing those big challenges.



### **How will the major environmental challenges facing the planet be met?**

Being able to engineer new equipment, new technology, new concepts, and new ways of processing information, and being able to apply the tools of the revolution that's going on in biology to our study of the oceans and the organisms that live in the oceans is absolutely essential. Whether they are

physical tools or whether they're conceptual tools, they are important to our challenge. We also need to be able to understand that sense of place that includes our relationship to each other, to our community, to our location, to the oceans, to the planet. You can't get at it by looking at a single perspective. UC San Diego and Scripps Oceanography are an incredibly powerful alliance to do that. I think it's enormously exciting and it's a real privilege to be able to be part of that effort.

### **What drew you to Scripps Oceanography?**

What appealed to me most about joining Scripps Oceanography is the ability to help people look at any part of the ocean, whether that's a geographic part of the ocean, whether it's a part of the interaction of the ocean with the rest of the planet, or whether it's a part of the interaction of the ocean with us in society. To be part of an organization that has the capability to look at these complete systems was enormously attractive.

### **What does the public need to know when it comes to research at UC San Diego?**

I think the public needs to know how research works, what research is about, what inquiry is about. We routinely encounter people who think that if there is controversy in science it means that one side is right and one side is wrong. As researchers, we know that constructive criticism—or taking a point of view to challenge another person's thinking—are really important parts of inquiry. This doesn't mean that the research is wrong. It means that we are testing the research and the point of view. It's hard to be constantly challenged. We need to let people understand that this dynamic is part of research. Also, uncertainty doesn't mean that something is wrong and you have to throw it out. It means that we have additional aspects that we need to study to ensure we are right. I like to say that all of my research was 'revisionist history' because I kept going back to the same problems to apply new techniques and insights to them to improve my understanding or reduce uncertainty. Our knowledge evolves with time. But we have to use what we have now, our best understanding, with the recognition that it may evolve with time. That's a really important concept for the public to understand.

I think another thing that's very important for the public to understand is how hard it is to do research, how hard it is to design a program of study in a way that allows you to answer questions as unequivocally as possible. It's a very organized activity.

A third part of research being hard is getting the support to be able to do research. By that I mean the laboratory facilities, the funding to do research—especially if it's research that involves field study, being able to get to places like the Arctic ice or the bottom of the Pacific Ocean. Organizing and getting the funds for science is a time-consuming activity, and it requires a lot of dedication.

### **What guided your transition from research scientist to administrator?**

I was busy doing research at the University of Rhode Island, but I had been very involved in developing new programs for students, so I had a lot of interest in the academic program. I was very concerned about my own students and their experiences. That translated into an interest in all of the students at the Graduate School of Oceanography. That resulted in my appointment as dean. I'd think administration is very similar to being a faculty member. I was doing the same things, thinking of research activities, promoting research, thinking about the students, but for the whole institution instead of just my research group.

**What changes do you foresee for undergraduate and graduate students at Scripps and UC San Diego?**

I think UC San Diego provides a unique environment for undergraduate education because of the college system. I think that students are learning in ways that are very different from the ways that the faculty learned. That has a lot to do with how they get information. For example, we know that undergraduate students are not using texts in the same way they did before. I think we are going through a revolution in the way that people learn... not only how they get the information, but who they get the information from. We're just beginning to sort out how we might use online education tools at all levels of education and how we might allow crowd sourcing of study and of research. There is a focus of intellectual inquiry on how learning is taking place. Our students are the next generation of leaders. We need to ensure that they're engaged. I think that's another thing that's very exciting about UC San Diego. This university has the ability to undertake these kinds of experiments and take them on while ensuring that the best minds in the world are available to the students.

**What advice would you have for early career women in science?**

Although early career women in science have come to science because they've been intrigued by it and they like it, they may be intimidated by what they think are the demands on them. I think that one of the things that is very difficult to deal with for *all* scientists, is the concern that they may not be 'good enough' in comparison with others, whether that is others in my classes or the other people that I work with. Can I juggle all of this and still have a life? We put extraordinary demands on students in terms of the time that we expect them to devote to learning, but all of our students want a life and are trying to balance that life with the demands of school and a career. I think that it's important for young women in science to know that *everyone* is intimidated by the demands—whether they are men or women, students, faculty, technical staff, or other professional scientists. We all worry about whether we will live up to our own expectations and those of others.

**Where do you think Scripps Oceanography will be five years from now?**

I think that Scripps Oceanography will be setting the example of how we use a new suite of tools that we are developing to study the oceans and their interaction with the atmosphere and the rest of the planet. I think that we will be setting the example for how we use social media, how we use social

networking—not just a Facebook page—but how we really engage the community of scientists to attack some of the foremost problems that face us. We really need multiple perspectives. We need diverse ways of thinking; we need a lot of brain power applied to these issues. I think Scripps has the ability to lead not only ocean science and interaction with the rest of the world, but it has the ability to lead the scientific community in new ways of thinking, new ways of approaching these problems. It is a great institution. If Scripps Oceanography takes on these issues others will be watching—and learning. We have the reputation and the capability to lay out those new paths for the rest of the world and to engage the rest of the world in being a part of these solution. We need to challenge people, to say ‘come and join us, this means something, this is important for the future of the planet. Come together with us, let’s go do it!’

**What is your greatest hope for the future of the planet?**

My greatest hope for the future of the planet is that we will understand that our stewardship of the planet is an overriding imperative. Our thinking about how we solve important problems like human disease or how we interact with the planet to provide energy are important, but they depend on a planet that’s able to sustain us. If we are not stewards of that ability, we will have lost everything. It won’t matter whether we can cure disease or whether we can find energy because we won’t be able to live here in a sustainable fashion. So, my hope is that we will be struck by the magnitude of the awesome responsibility that comes with changing the composition of the atmosphere, the awesome responsibility that comes with changing whether estuaries have the ability to filter water from the continent into the ocean and whether oceans have the ability to provide the services that they do now, the responsibility that comes with changing the ecosystem of the planet with our crops and our structures and our activities. That’s an awesome responsibility. We are tinkering with the planet, so we must come to it with a sense of great stewardship.

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