

Keeping up with **Deepsea Dawn**

She's been around the globe in search of the ocean's secrets and says we know more about the surface of other planets than we do about our own ocean floor. She'd like to change that and when Dawn Wright gets her mind set on something, you better get ready.



Dawn and Lydia at the controls

As soon as you enter the office you know you are in the presence of an unconventional thinker. It's not just the plethora of computers—Macs, PC's, even a Unix—it's the feeling of being in the company of that rare individual who is both artist and scientist. The office door is covered with a bathymetric map of the sea floor near the Juan de Fuca Ridge off the coast of Oregon. Every corner has something to catch the eye—maps, books about oceans, geography and exploration, scientific posters and photographs. An M&M dispenser sits on the edge of a desk; Legos models of star ships and sea ships line shelves. While taking it all in, another one of the office's features greets you—a large, affectionate brown dog named Lydia, companion and office mate to the scientist who calls this space home. For this is the dry land address of noted marine geologist and undersea geographer Dawn Wright, known to friends and colleagues around the world as "Deepsea Dawn."

A professor in the Department of Geosciences at OSU, Wright's range of interests and expertise could easily earn her the title, "Renaissance Woman." Equally at home in a submarine on the ocean floor as she is hunched over her Mac G4 writing code for geographic information systems or GIS, Wright is a scientist whose star is on the rise. She is one of only 15 scientists featured in a recent book called *Portraits of Great American Scientists*, putting her in the company of such luminaries as naturalist E.O. Wilson and astronaut Sally Ride.

One would be forgiven for thinking that association with such rarefied company might go to a person's head and that such a person might not have time to give to nosy interviewers or anyone else for that matter. Not to worry with Dawn Wright. Far from the caricature of the distant and aloof academic, Wright is as warm as some of the tropical waters she's studied. She puts a very human face on the depth of knowledge she so obviously commands. Hers is a voice that speaks with passion and conviction for greater exploration of the world's oceans.

To spend a few hours watching Wright in action is to witness that rare combination of scientist/populist: a technical brilliance wrapped in a charismatic presence à la Carl Sagan, or, one of Wright's own personal heroes, oceanographer and advocate Sylvia Earle.

While gracious and articulate, Wright also doesn't shy from telling it like it is. For instance, she reminds anybody who will listen that national priorities for oceanographic research are not what they ought to be. In a recent Saturday Academy appearance in Portland, Wright relayed this favored theme to a group of ambitious middle-school girls exploring careers in science. She told the students that she'd like to see the same kind of enthusiasm for exploring the oceans, what she calls "inner space", that NASA directs toward outer space. "Whenever the space shuttle goes

Jacques Cousteau as he journeyed around the world's oceans in his famous boat, the Calypso. Wright beams as she recalls the thrill of those early days of discovery. "I would watch these Sunday night Jacques Cousteau specials and that really got me inspired," she said. An avid reader, Wright also became interested in science fiction and adventure novels set in the high seas. "I was really fascinated by sea novels like *Treasure Island* and *Mutiny on the Bounty*," she said. "Anything that had to do with the ocean and ocean adventure, I just loved it."

This passion for learning and the sea began



Dawn Wright shares the "shrunk wig head" with a student at Saturday Academy in Portland

up, it gets on CNN," said Wright. "We kind of wish it would be the same for us as oceanographers." Wright reminded the girls that only 5% of the ocean floor has been mapped. Since oceans cover about 71% of the Earth's surface, she said there is still a lot of work to do and an awful lot of room for future oceanographers—many of whom Wright hopes will be women.

Treasure Island meets the Calypso

Wright's interest in science came early. As a child growing up in Hawaii, she acquired a lifelong devotion to learning thanks to her mother, and, surprisingly, television. Wright's mother encouraged her daughter to watch quality programming, things like

to gel into what would become Wright's future career path. "It took me a little while to figure it out," she said. "I did a lot of research in high school about oceanography as a career, then decided that I really wanted the geology. I really liked to study rocks, sediments, faults and cracks." After earning an undergraduate degree in geology, Wright was accepted into a master's program in oceanography at Texas A&M University. While there, the university was awarded a contract to be the science operator for the International Ocean Drilling Program. It was a global initiative to gather samples of rock and sediment from the ocean floor and Wright was excited to join up. She and her colleagues would spend two-month intervals at sea on a 470-foot oil and gas exploration ship that had been converted

into a floating laboratory and matched anything in a university research lab. Perhaps its most amazing feature though, was its drill, capable of drilling several miles down into the ocean floor, the equivalent of about 6000 meters. With average ocean depths around 4000 meters, this ship and her crew could drill just about anywhere—and they did.

For three years Wright crisscrossed the globe with the drilling project. It was a time of learning and exploration, a chance to see the world and refine her own scientific focus. When her stint on the ship was up, Wright took her degrees in geology and oceanography into a Ph.D. program in geography at the University of California at Santa Barbara. At the time, she had no idea that this move

interpret their data better. Several years later Wright had a joint degree in geology and geography and was well versed with the emerging tools of GIS. It was time to grab the professor's lectern.

Watery ground

After receiving her Ph.D. from UCSB, Wright joined the faculty at OSU's College of Science where she cemented her reputation as a leading expert in ocean GIS. The timing was, again, perfect, as many of the tools and techniques of terrestrial geography were beginning to find their way into marine geography.

Wright describes her current work in GIS

Such potential for discovery fires Wright's imagination and keeps her working in locations that are right out of one of her high seas adventure novels. For instance, she recently returned from a sabbatical that took her to American Samoa in the South Pacific to map a marine sanctuary for the government. It was work that had special meaning for Wright as the coral reefs there had suffered much damage over the years. "They've been trying to bring their coral reefs back to health," she said. "They've had a couple of bad hurricanes and an invasion by the Crown-of-Thorns starfish which is probably tied to El Nino." Wright says that since the area now has marine sanctuary designation, the coral growth will continue to be monitored through GIS. "We can map the sea floor on a yearly basis now to try and track that," she said.

Deep water and deep pockets

As any scientist can attest, research is expensive. Funding for deepwater research comes with an especially high price tag says Wright. You have to send ships and crews out to remote parts of the world for months at a time and this requires some unusually deep pockets. For instance, the drill ship she worked on at Texas A&M cost around \$50,000 a day to operate. A month's worth of research at sea on this vessel comes with a price tag of a \$1.5 million. Contrast that with Wright's work in American Samoa where two whole weeks of research cost a mere \$50,000 and the economics become pretty clear.

Such high costs coupled with shifting priorities have hit deepwater ocean research hard. For instance, demographic changes have shifted research priorities toward coastal areas. With more people living in coastal areas than ever before, coastal research has grabbed the lion's share of research dollars. The end of the Cold War has also had an effect says Wright. For instance, the Office of Naval Research used to fund a great deal of deepwater research but, with the fall of the Soviet Union, there's been a lot less interest. "The Navy really hasn't needed research to help them find Russian submarines anymore," she said with a smile.

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would bring her into a new and emerging area that would define much of her future professional life for years to come: geographic information systems, or GIS.

It turned out that UCSB had just received funding from the National Science Foundation to bring research data into geographic information systems. Wright's timing was perfect as the new program was looking for graduate students. Wright knew very little about GIS at the time and thought it would be worth learning about. "Talk about not knowing how your future is going to be changed," she said.

Wright soon found herself working with a couple of researchers who had collected a great deal of data with GIS, but hadn't done anything with it yet. It was a great opportunity and with it, Wright found her dissertation topic—looking at issues where geographic tools could help oceanographers

as taking data from sonar surveys of the sea floor and plugging those data into computer programs to produce maps of underwater terrain. Mapping the ocean floor is more challenging than mapping another planet she says, because water is harder to "see" through. "The electromagnetic energy that's used with satellites to map the terrestrial surface of a planet doesn't see through water," she said. "We have great topographic maps of Mars and the Moon and Venus, but we can't do that with the sea." Instead, Wright says, marine geographers use acoustic energy—sound waves.

Considering the extent of the ocean floor still unmapped, turning those soundings into working maps could keep scientists involved in GIS busy for years to come. "Those of us who are ocean mappers, we're still pioneers," said Wright.

Squished heads and Spongebob Squarepants

Standing on the podium with three huge screens of PowerPoint images, Wright wowed the students and their parents at the Saturday Academy presentation in Portland. Gigantic maps and graphics of the world's oceans filled the screens along with photos of Wright and other oceanographers at work in various locations around the world.

Ever the skilled raconteur, Wright next put on a bit of show and tell. She produced several items that had been taken to extreme depths in the ocean to show what pressure

carefully to illustrate a very specific point she wanted to make about being a woman in science. In the cartoon, Spongebob tries to get a job at a diner but the diner's owner and manager don't really want him. In an attempt to discourage him, they set up an almost impossible set of conditions upon which they'll hire him. Undeterred, Spongebob's deep belief in his own abilities enable him to perform beyond everyone's wildest expectations, and when the diner is suddenly swamped by a tour bus full of hungry sardines, Spongebob wins the day and the job.

When the cartoon finished, Wright asked the

And like Spongebob, she said, you'll have to believe in yourself and be ready to prove yourself to those who would raise the bar so high as to seem unreachable.

In what may have been a slightly autobiographical moment, she reminded the girls that women in science might have to be a bit more like Spongebob, since they can often have a more uphill battle than men. "In my case I felt like I had to prove myself when I came to OSU," said Wright. "I had to prove that I could do the research and the teaching and establish myself as a scientist," she continued. "I just felt it better that I went 150%."



With future scientists at the Saturday Academy in Portland

at such depths can do. One of these was a Styrofoam wig head that had been down to a depth of 2.5 miles. Looking like some kind of shrunken pop culture talisman, the head was one-fourth its original size and felt disproportionately heavy, like some kind of leaded Styrofoam.

Wright then shifted gears and asked the students if they knew who lived in a pineapple under the ocean. While adults in the audience scratched their heads and looked to each other for clues, the assembled schoolgirls yelled almost in unison, "*Spongebob Squarepants!*" Once again proving her remarkable ability to connect with an audience, Wright nodded in affirmation and proceeded to play a video of a Nickelodeon cartoon featuring the character Spongebob Squarepants who lives in a pineapple under the sea. Entertaining as it was, this was hardly an exercise in mere fluff. On the contrary, Wright chose the episode

girls what they got out of it. The girls were unanimous—you have to believe in yourself no matter what anybody tells you. Wright smiled and nodded agreement. "There will be those who put up impossible circumstances for you," she told the audience. "Just like the owners of the diner did for Spongebob."

The road ahead

It is a joy to watch a scientist like Dawn Wright slip into her many different roles. She is just as at home in front of such an audience of school girls and parents as she is programming GIS on her computer or working on a research boat in the Indian Ocean. She operates at a pace that might weary most of us, but for Dawn Wright it's simply the life she loves. She recently finished editing her second book, *Undersea with GIS*, published by ESRI Press. She also plans to continue her follow-up mapping of the marine sanctuary in American Samoa. And she'll continue to be involved as a mentor and role model for future women scientists in any way she can. After all, she's the pace setter and the rest of the world will just have to keep up.

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