

Department of Mathematics

Math professor Jodi Mead has stayed true to her family roots.

Her mother, Lorraine Duvall, was a math major. Duvall's first job was as a computer programmer when the field was so new only a few colleges had computer science programs. Duvall got her master's degree in operations research in the 1970s.

"My mom said, 'Jodi, you have to do this. It's the future.' I said I didn't want any part of it," recalled Mead.

But after graduating from college with a degree in theoretical math, Mead worked for an insurance company where she started using computer spreadsheets.

"I said, what? I don't have to use a calculator? I can cut and paste numbers into a bunch of cells? Computers didn't interest me then, but the idea that I could use computers as a tool for math. That was exciting," Mead said.

Now, she co-directs Boise State's PhD in computing program.

Even though Mead loved math, it didn't come easy for her. As a Chicago 7th grader, she took placement tests at school. She landed in accelerated English.

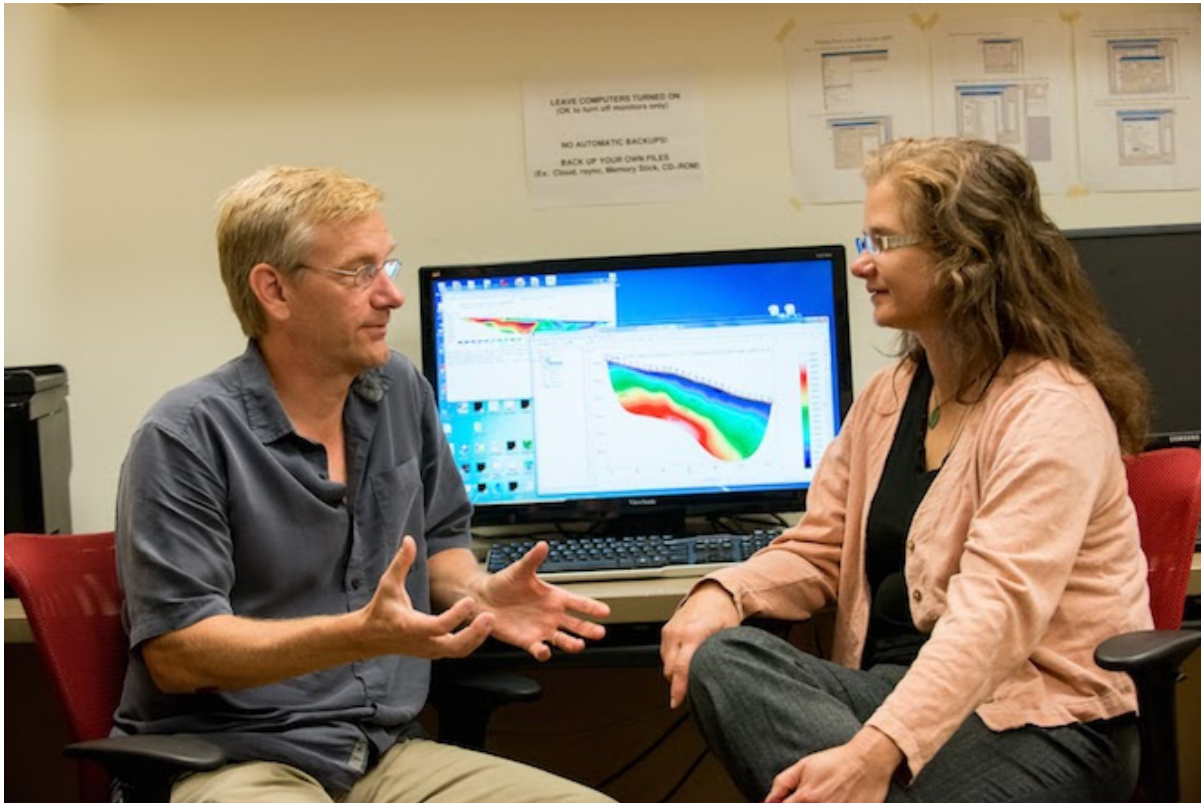
"But not in accelerated math," said Mead. "I started out behind, on the slow track."

That she persevered reveals a central fact about Mead: she likes doing things that are hard.

"I was born on a Saturday," Mead said, referencing the Victorian-era nursery rhyme "Monday's Child" that ascribes character traits to each day of the week. "Saturday's child works hard for a living."

"Math was always a challenge. I always had to work on it to get it right. But

that probably served me well," said Mead. "And now it helps me relate to students, to be able to say to them, 'Look, I wasn't always good at this.'"



Mead with her former colleague John Bradford.

Mead and Bradford co-advised a graduate student working with electromagnetic waves to explore the Earth's subsurface.

Her work as a mathematician has been about assimilating observational data – observation of the natural world for example – into mathematical models to make those models more accurate. The models have real world applications. Mead has proposals in the works for two projects, one that would predict the path of wildfire smoke and one that would determine the likelihood of earthquakes occurring in certain areas.

Recently, Mead co-advised (with former colleague John Bradford) a geophysics graduate student whose dissertation project involved sending electromagnetic waves into the Earth to obtain images of the subsurface.

"If we know what it looks like underground – where there's rock, or sand, or groundwater – math equations can tell us how the waves will travel," said Mead.

"But when it comes to the Earth, we don't know what it looks like underground, and we can't dig holes everywhere to find out," said Mead. "So we send the electromagnetic waves in, record the path of the wave and try to determine what made the wave behave the way it did."

"We literally back out how we got the observations, solving a math equation backwards to figure out what's down there," Mead said.

This, too, has practical applications for anyone building structures, or highways, or something else.

"If there's buried pollution, or debris, or anything else, we can identify it," Mead said.

She noted the current interest in data science – everything from artificial intelligence to political polling – is a matter of building mathematical models to make predictions.

"It's what I've been doing all my life," Mead said.

She received her undergraduate degree in math from Syracuse University, the fourth generation in her family to attend that institution. Her great grandfather, a Methodist minister, set the precedent. Mead shared her final semester with her mother who returned to Syracuse to pursue a PhD in information technology.



Syracuse graduation, 1989. Mead (left) with her mom, Lorraine Duvall.

Today, Mead lives with her husband, Tom Kilroy. Their children attend college in Salt Lake City. Daughter Melanie studies art at Westminster College. Son Barrett studies mechanical engineering at the University of Utah.



Melanie and Barrett

Mead told us more about her work and life:

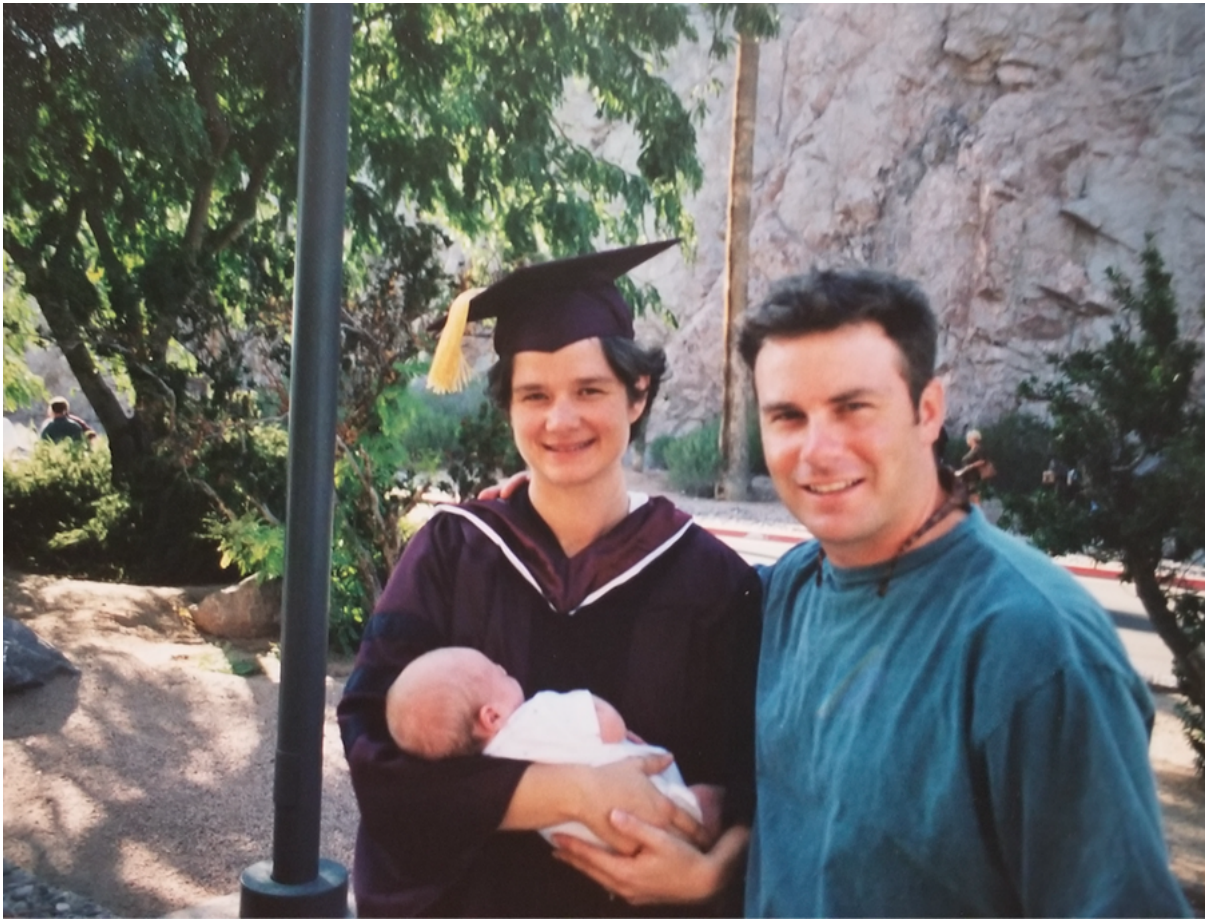
Q. Did you have an influential mentor or teacher?

Mead: My mom for sure, and my PhD advisor Rosemary Renaut at Arizona State University (Mead received both of her graduate degrees from Arizona State in the 1990s). Any woman in math has a story like this: My first semester, I was talking to my advisor, an old professor. He told me, 'We look at women graduate students differently, especially the married ones.' (Mead was newly married). I didn't know what that meant, but I didn't like it. So I sought out Rosemary, the only woman on the math faculty. I remember when she opened her door for the first time. I saw a picture of her two children. I thought, my god, you can be a professor and have kids. She was such a good role model – academically and as a mom.



Academic conference in Sweden when I first got to Boise State, 2001.
Rosemary on left, Mom on right, Melanie in baby carrier

I defended my dissertation when I was eight months pregnant. If not for Rosemary, I might not have felt comfortable. Now, thankfully, it's not as notable when women have families – and serious professional ambitions.



PhD graduation with husband Tom, Barrett 3 weeks old

Rosemary and I are still very close. I did my post-doc work in oceanography. That's when I started using data to inform mathematical models (Mead charted ocean currents by gathering data from satellites that tracked ocean buoys). I went back to Arizona to see Rosemary. We realized we were working on similar problems. She was doing the same kind of work I was doing – imaging – only with the human body instead of the Earth.

Q. What are your greatest challenges?

Mead: Not having enough time to do what I want to do. I like challenges, so that's always a good thing. But when it comes to teaching, everything in my field is developing so rapidly that I can never teach the same class twice.

I'm not a good lecturer. I'm more the 'guide on the side' than the on-stage teacher. I make mistakes. I want students to talk about the mistakes, but

most don't like that. I'm messy. They think I'm not clear.

When it comes to talking about data science and machine learning, a challenge is putting the mathematical aspects in a context and making them relatable. You do what you do, but then you have to explain it. You have to ask, do people understand it? Does it excite them?

Q. What are some of your pursuits outside of Boise State?

Mead: I like to do things outdoors. That's one of the best things about being at Boise State. My husband said he'd go anywhere, as long as there were mountains. I mountain bike and snowboard. And we have dogs, an Australian shepherd named Boomer and a new 'COVID puppy,' a black lab named Ruby. They take us for walks.



Bogus basin with friends and family

In these COVID times it's been hard to socialize. So I got a chimenea (a small outdoor fireplace). It's nice, a durable metal one. We can have

friends and neighbors come over and we all sit around the chimenea and talk.



Mead's canine companions: Boomer and Ruby

Q. What do you want non-mathematicians to know about math?

Mead: Math is a language and it's everywhere. It's something that we do in our heads automatically. For instance, even when we're driving, our brains are figuring things out, like when we'll get to a stop sign and when we should start applying the brakes. Mathematical symbols just let us write down something that's already there.

Opportunities to Get Involved

School of the Environment: Townhall #4

Friday, February 26th, 11am

School of the Environment Townhall: What suite of activities would allow you to co-learn, share expertise, and address environmental challenges?

Meeting ID: 990 5481 1921

Passcode: pd8zht

Department of English: Lecture Series Opportunities