Meet Jeff Sale

As a computational data science research specialist and instructional design technologist, Jeff Sale has played a number of different roles at SDSC over the course of his 12 years with the Center. Currently, Sale is focusing on SDSC’s user training program, working to develop online tutorials and training material for users of SDSC’s supercomputers. He also provides advanced data visualization research and support for XSEDE (eXtreme Science and Engineering Discovery Environments), an organization funded by the National Science Foundation that coordinates advanced digital services with researchers nationally. Additionally, he has been involved with REHS since its inception in 2010.

Sale holds both Bachelor of Science degree in Condensed Matter and Materials Physics and a Master of Arts degree in Learning Design and Technology from San Diego State University.

Q: You provide data visualization support for several projects as part of XSEDE. Can you talk about one that you’re particularly excited about right now?

One I’m working on with about 25% of my time is with a researcher interested in ultradian rhythms and the sleep cycle. We’re trying to understand correlations between brain hemisphere dominance and sleep stages. Some of our observations include that the right hemisphere seems to be the dominant hemisphere in the deepest sleep stages, three and four, but the left hemisphere seems to be the dominant hemisphere.
for REM sleep, the shallow dream state sleep. This project has been particularly rewarding because it calls for a lot of visualization of the data that we’ve collected, which is my strength.

**Q: In addition to your scientific research, you’re heavily invested in education. When did you begin to develop an interest in the latter?**

I had been doing research into the brain at Loma Linda University School of Medicine and studying patients with diseases such as Parkinson’s disease, Huntington’s disease, and ALS. As I learned more about complex biological systems, I learned about the importance of a principle in chaos theory called sensitivity to initial conditions, and I realized that people are complex systems. When it comes to learning and education, the earlier in life we impact them, the more likely we are to have positive outcomes. That propelled me to move from scientific research into education, helping teachers use technology. It’s been a long challenge trying to find ways of bringing technology into the classroom effectively, through more than just PowerPoint.

**Q: How do you envision the next steps of integrating technology and education?**

A lot of the movement is going online. The Supercomputer Center has jumped into that by developing several courses on big data and data science on Coursera, which is a MOOC, or Massive Open Online Course. It’s been a challenge getting people to recognize the value of teaching online, and even those who understand the value don’t really know how to do it. But there’s all kinds of great tools out now that are available for making it easier to teach online.

**Q: What is something you wish you’d known entering into college?**

I think the most important thing is to know your limits, because I didn’t. I went off to school too young. I was really good in high school, and I even skipped a grade; but I didn’t understand that I lacked the maturity. I had a bad first-year experience in college because I was at a huge university of 60,000 students in Minnesota. Overwhelmed, I came back and went to community college. Students need to know whether they’re cut out for a university like UCSD — one that places demands on undergraduate students that they won’t have if they go to a state school or community college. If you’re self-motivated, self-driven, and self-assured, then University of California, or schools like Stanford, MIT, or Caltech would make sense for you. If you’re not sure of what you want to do or if you’re not up to the challenge of going to a four-year university, it’s important to be aware of that and make decisions accordingly. There’s nothing wrong with community college. It saved my academic career, and I still ended up here at the Supercomputer Center.
Q: This summer, you’re working on the Visualization of Ultradian Rhythms in Sleep EEG and MEG. Can you briefly describe this research and your interest in it?

We have a lot of EEG and MEG electrical data collected from patients during sleep. Our job now is to analyze it and decipher the sleep cycle because there’s no research that truly displays what the sleep cycle is and exactly what’s happening in the brain during sleep. It combines computer science and a practical application of biology. That really attracted me because while a lot of the other projects were pure computer science, this one also involved visualization, like making art, graphs, and diagrams.

Q: In your REHS application, you wrote about the surprising similarities between Indian classical dance and research. Can you elaborate on that?

With Indian classical dance, it seems like you would only learn how to dance, but I also gained discipline, focus, and a strong work ethic from it. That truly does apply to research, too. It’s not just technical. You’re learning how to do so many other things, such as, again, focusing yourself. I’m learning so much more this summer than I even thought I would.

Q: What field do you see yourself pursuing after high school graduation?

In the future, I want to do aerospace engineering because I really like physics and astrophysics. Coding for Mars missions and rockets is the kind of thing I want to work on later in my life.

Q: What has been the most challenging aspect of your last six weeks at SDSC?

It’s definitely not a high school level kind of job. It’s a real job. Picking up all of the software, learning how to code a huge variety of things, downloading items — it’s just a lot of stuff I’ve never done before. Getting past the learning curve can be kind of hard.

Q: And the most rewarding?

Definitely when the code works! Sometimes, it takes me three hours to troubleshoot and get it to work, so that’s the best feeling when it finally all comes together.
StudentTECH Goes International

As an international leader in advanced computation and data management, SDSC serves tens of thousands of users on its supercomputers across the globe. This summer, SDSC’s StudentTECH, a STEM-focused out-reach program of UC San Diego for students in grades 4–12, expanded internationally as well.

StudentTECH offers a vast array of science, technology, and programming summer workshops, with 2019’s classes featuring topics such as robotics, video creation, Sphero, everyday engineering, and more. Always popular with local middle and high schoolers, the program now boasts attendees hailing from out of the U.S. as well, with eight visiting students from China joining two StudentTECH workshops during the week of July 22nd to 26th.

Despite the added challenge of English as a second language, the students managed to fully involve themselves in their classes, collaborating with their fellow workshop participants either to design, build, and program a robotic LEGO® vehicle in “Dynamic LEGO® Robotics Challenge Lab”; or to create a Raspberry Pi-powered AI assistant in “Do-it-Yourself Intelligent Speaker: Experiment With Voice Recognition and the Google Smart AI Assistant.”

“The class is designed to fit various levels of skill,” said Lori Holland, the LEGO® Robotics workshop instructor. “Jerry, one of the visiting students, has lots of experience with the software. On the other hand, Bonnie [another visiting student] just joined our class yesterday, but she’s been a very active participant and is having lots of fun. Overall, I think it’s a good challenge and experience for all of them to collaborate, no matter how much expertise they possess.”

Bonnie herself expressed the same sentiment. When prompted about her favorite part of the workshop, she exclaimed, “The English can be hard, but everyone is so cute! I love everyone I’ve been with, and they’re so fun to talk to.”

With tentative plans to expand the immersion program in the coming years, SDSC hopes to welcome back another group of eager traveling STEM students next summer.

Image credit: Jon Chi Lou, SDSC