3-8-2019

Supercomputing SWOSU

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Dr. Patsy Parker, Associate Dean, Everett Dobson School of Business and Technology

Patsy Parker is a tenured associate professor and Associate Dean of the Everett Dobson School of Business and Technology at Southwestern Oklahoma State University. Dr. Parker earned her doctor of philosophy degree in higher education administration from the University of Oklahoma.[7]

Q: **Do you think (super) computers are important? Why?**

Dr. Parker: "Absolutely important! Supercomputers will manage our data and connections in the future and probably already manage much of them at the present time. Everything we do is managed electronically – banking, finance, health information, business contact information. I am a teacher so all of my grading, student information, assignments, faculty information is handled electronically. In 1982 [when I began teaching] we had no computers available for record keeping. I appreciate greatly the positive effect computers have had on my life."

Q: **As a Professor of Business, Chair and Associate Dean, how has computing changed the course of how you get work done?**

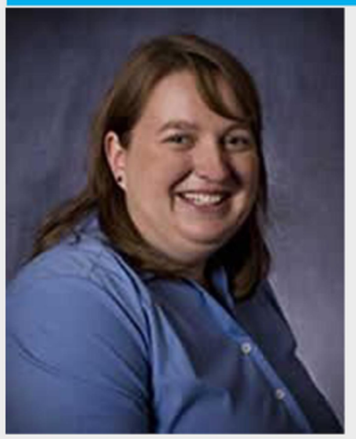
"In the "old days," even just ten years ago, the [accreditation] self studies for our eight business programs and the supporting documents would have been completed in hard copy. The document…would have to be either typed manually on a typewriter or printed out, bound, and mailed to the accrediting agency. The portal version of writing a self study substantially cuts down on the time taken to produce the final copy. In other areas, things like Google docs and Canvas make transferring information and writing documents much easier…Another example of how computers have changed the way we get work done is eliminating a lot of meeting through email. "

Q: **How do you see the future of NASA and how big of a part, do you think, will computing play in the future of NASA?**

"I had the opportunity to visit the Kennedy Space Center a couple of years ago and was amazed at the amount of research being conducted. NASA has brought the US and the world to where we are today in the use of computers and I have no doubt NASA will bring us to new heights in the near future.

I am so grateful for the presence of Madeline Baugher at SWOSU. So many of our students have benefitted and began their careers at NASA because of the connections Madeline Baugher has made. Even in her retirement, Madeline continues to serve in her role as Program Coordinator for NASA Oklahoma Space Grant Consortium and NASA EPSCoR. She continues to open doors of opportunities for SWOSU students and other students in Oklahoma." (P. Parker, personal communication, February 17, 2019)

Dr. Lori Gwyn, Director of Sponsored Programs



Dr. Gwyn has worked the past six years in the SWOSU Department of Chemistry and Physics as an assistant/associate professor of biochemistry. B.S. in chemistry from SWOSU in 1999 and an M.S. and Ph.D. in chemistry from the University of Missouri St. Louis in 2005. Gwyn was an NIH Postdoctoral Fellow at the University of Oklahoma Health Sciences Center from 2005-2009.[8]

Q: **Do you think supercomputers are important? Why?**

Dr. Gwyn: "I think they are very important. I think they are important in that they are helping us solve problems faster but they are also creating this intense amount of more data that we need to organize and analyze so it is a double-edged sword. It is important in that aspect that we are solving problems but it also creating that much information to go through."

Q:**Do you see a need for computers in your field of chemistry and in your position as the Director of Sponsored Programs?**

"Computers are everywhere, it is hard to do anything without them. In terms of what I do here in sponsored programs, we don't do too much heavy calculations but [we do] organizing the grants and opportunities that come in. We do linking faculty members to available opportunities. I am a biochemist so we collect a lot of data such as thermodynamics, kinetic data that we send to different models, so we use computers quite a bit for that. And then there are experiments that we can't physically do, so if you can't physically do it because you can't get enough protein or if you are working with an explosive reaction that you can't do here [at the labs in school], the next best thing is to try to calculate it, to hypothesize how it could be. We also use simulation apps for that purpose."

Q: **How important do you think supercomputing is for NASA?**

"Very important. They are sending large spacecrafts to space, and in a lot of cases without people, so the computers are running everything, although people have programmed them. Without the ability to do unmanned space explorations, we would not be as far as we are exploring the universe."

Q: Is there anything else you would like to add about NASA or computing?

"A few years ago, I had the opportunity to have one of the NASA travel grants to visit one of the sites. As a biochemist, I did not fully understand what biochemistry had to do with NASA. I am so glad I did [go]. It helped me understand the breath of research that NASA does. It is not just rockets, but there is also the social aspect, its origin of life research, and the biological aspect...sending living things into space, how to deal with sustaining life in space. One of the neatest things we saw at the Ames Center was a group that works with algae. They would need to travel to South America to get the different types of algae and return back to the center. There was a green house there that was powered solely with algae, so all of the energy was from the algae. The breath of NASA is far spanning." (L. Gwyn, personal communication, February 14, 2019)

Dr Jeremy Evert, Assistant Professor of Computer Science

Dr. Jeremy Evert is an Assistant Professor of computer science at SWOSU.

Current Projects:

* Ezgi Gursel: OK NASA EPSCoR Intern: Supercomputing and NASA
* Jacob Miller: OK NASA EPSCoR Intern: Machine learning for image segmentation.
* Hayden Webb: OK NASA EPSCoR Intern: Big data for weather forecasting and climate research
* Nicholas McDaniel: OK NASA EPSCoR Intern Artificial intelligence for data analysis
* Joshua McGuire: XSEDE EMPOWER Intern: Multi-core and multi-node programming
* Braden Box: XSEDE EMPOWER Intern: Cluster Computer Systems Administration
* Anthony Parchman: OK HPC Competition

Q: Do you think supercomputers are important? Why?

Dr. Evert: "For me, supercomputers are an expression of human curiosity and passion. We can answer many questions with the tools that we have used in the past. A supercomputer, such as Blue Waters, can help us reach those answers in our lifetime. So as a research tool, I find that supercomputers are an important reflection of the desire to learn as much as we can about the world around us as fast as possible."

Q: How do you see the future of supercomputing, more specifically at NASA? How big of a part, do you think, supercomputing plays in current NASA operations?

"I see many of the technologies at NASA being driven by the free market…I see NASA continuing to be a key contributor to the field of computing. I also believe that as our ability to model complex systems continues to expand, the use of supercomputers by problem solving organizations will expand….making it cheaper to expand our ability to model more complex systems. I feel this virtuous cycle will continue to make supercomputing a key part of NASA's current and future operations."

Q: What do you think is the biggest advancement in the field of supercomputing?

"From my perspective, training. We now have better training and more training opportunities for supercomputing than ever before. Because our training is beginning to encompass a broader range of researchers outside of the traditional Math and Science related fields, we will see more robust and interesting solutions to many more fascinating problems. Training will also accelerate the adoption of supercomputing. As a campus champion, I can help any SWOSU faculty or student get an account on some of the world's most powerful machines. But without training on how to use those machines, this is like being very wealthy in a currency you can't spend."

Q: What do you think is the biggest obstacle for NASA supercomputing currently or supercomputing in general?

"Legacy code. Golden handcuffs. We have very large piles of code that work reasonably well. But as we continue to cut funding to academic and government research, we have to prioritize software development not for sustainability but for appeal to the interests of congress. This forms a bad cycle….[Budget Managers] ask for just enough to get by. This process has been building up technical debt in the form of code that is difficult to learn and manage. This makes the cost of the next project higher." (J. Evert, personal communication, February 28, 2019)

This material is based upon work supported by the National Aeronautics and Space Administration under Grant No. NNX15AK02H NASA Oklahoma Space Grant Consortium