

Evolution of a weaponeer

She wasn't sure about working on weapons;
now the mission is what drives her

By Nolan O'Brien/LLNL

It was 2007 when Heather Whitley interviewed for a postdoc role at Lawrence Livermore National Laboratory. She was wrapping up her Ph.D. thesis at UC Berkeley and was interested in running supercomputer simulations that would help improve the efficiency of solar panels. The science at LLNL drew her, and just 11 days after filing her thesis, she started work with the Quantum Simulations Group. But like many researchers fresh out of school, Whitley wasn't sure about the prospect of working on nuclear weapons.

"I remember the postdoc interview like it was yesterday, and I was excited that the projects that were presented to me were related to renewable energy," Whitley said. "Having grown up in the 1980s, I remember the end of the Cold War, and the relief that the arms race had come to an end. While I was passionate about national security and had even contemplated joining the Air Force rather than going to graduate school, I didn't yet understand the enduring legacy of nuclear weapons as a strategic deterrent. I wasn't sure whether I would want to work directly on weapons."

Little did she know, the Lab's role in ensuring national security would become her driving passion. Her path to leadership at Lawrence Livermore — and in the weapons program in particular — is a story of evolution and self-discovery.

FORMATIVE YEARS

The eldest of seven, Whitley and her family moved across southern New Mexico to Roswell at age 8, in the hopes that her father would be able to get a job at the bus plant there. But the plant soon closed, Whitley's father experienced some health problems, and the family found themselves on hard times.

"We didn't have much in terms of material things growing up, but there was plenty of love in our house, and my parents always put a very high emphasis on the importance of education and doing well in school, and academics always took priority," Whitley said. "I saw education as a way of making sure that I'd be able to ensure a better financial future for myself and my family."

Despite a trying childhood, Whitley excelled at school, eventually earning scholarships that would support her through college. She also had the support of her family for one of her first passions: ballet. She started dancing at age 10 and continued pursuing this lifelong devotion through college and into adulthood.



When Heather Whitley moved to Livermore, she got involved in the Valley Dance Theater, where she has performed many roles in “The Nutcracker” over the years, including “Waltz of the Flowers” and “The Mouse King.” A typical week during her first few years at the Lab would include six days of cross-training after work to make

sure she maintained the strength and flexibility to perform with grace and power on stage.

“Ballet is one of the few things that completely took my mind off of everything else,” Whitley said. “It forced me to be much more comfortable in

“...if you can get on stage in a giant mouse costume, then what’s the big deal with a physics presentation?”

my own skin. After all, if you can get on stage in a giant mouse costume, then what’s the big deal with a physics presentation?”

While she still maintains her annual tradition of teaching choreography to children, after getting married and taking on more responsibility at work “it got hard burning the candle at both ends.” She was faced with a problem common among the ambitious and successful: increasing demands on her time.

“I keep thinking that maybe I’ll go back to dancing en pointe,” Whitley said. “But that becomes more difficult as our bodies age, so for now I’m enjoying my character roles in ‘The Nutcracker,’ my evolving roles at the Laboratory and spending more time with my husband on the weekends.”



Above: Whitley dances as the Mouse King in the Valley Dance Theater's version of “The Nutcracker” in 2010.

Left: Whitley performing in the “Waltz of the Flowers” in 2015.





Whitley's husband, James Kucera, bidding her congratulations on receiving the Presidential Early Career Award for Scientists and Engineers at the Smithsonian Museum of Natural History.

Emergence of a leader

As Whitley transitioned from postdoc to staff scientist, she got her first tastes of leadership at the Lab. She was part of the group that transformed what was then a fledgling Lawrence Livermore Postdoc Association into the mature organization that it is today, writing its bylaws and serving as the vice president. In the same time frame, she also was responsible for leading an effort in studying electron transport within a Laboratory Directed Research and Development project from 2009 to 2012. Whitley performed quantum calculations and compared various methods for computing transport properties for the project. Her work in this area led to her earning the Presidential Early Career Award for Scientists and Engineers in 2012, the highest honor bestowed by the U.S. government on outstanding early career scientists and engineers.

As her career progressed and she was exposed to more of the work taking place around the Lab, Whitley's interest in weapons science grew. In 2011, she joined what was then AX Division to be mentored by John Castor. Her goal was to become a subject matter expert in plasma science and materials. It wasn't long before she started to make a name for herself in this new role, researching high-energy density physics in support of stockpile stewardship.

Around that time, Whitley also decided to form a meet-up group for women at the Lab. She wasn't trying to change the world.

Rather, she found herself the only woman in her group, and she wanted to build a social network with other women in STEM (science, technology, engineering and math) at the Lab. It wasn't long before the Lawrence Livermore Laboratory Women's Association (LLLWA) took notice and invited her to fold the informal group into the association as the Women in Science and Engineering (WISE) committee. Over the next few years, Whitley grew into another leadership role, this time as president of the LLLWA.

By 2015, leadership opportunities came calling again. Reorganization in the weapons program led to the merger of divisions, and Whitley took on a role as group leader in the newly formed Design Physics Division. In 2017, she also took over leadership of JOWOG 32Mat, a joint working group between the United States and United Kingdom that explores material models. Her current research interest is in developing platforms to perform plasma experiments at laser facilities and coupling those experiments with fundamental theory to develop new models.

While Whitley has stepped back from her leadership roles in the LLLWA, she continues to be an advocate for the Office of Strategic Diversity and Inclusion at the Laboratory. She almost never passes the opportunity to give back by participating in STEM outreach and helping to build community within the Laboratory. She recently made a trip back to New Mexico, where she met with students at both the University of New Mexico and New Mexico State University (NMSU), many with backgrounds similar to her own, to discuss career opportunities within the national laboratories.

Driven by mission

While she didn't initially join the Lab to support the weapons program, Whitley will say without a second thought that "the mission" is what drives her today. This evolution is common among researchers at the Lab. But while she is now a vital part of Weapons Physics and Design, she is far from a war hawk. In this, she exemplifies a sentiment that is prevalent at the Lab: She does not want to ever see nuclear weapons used to inflict harm, but she also has dedicated herself to the science that supports weapons due to their role in deterrence. While on the surface it may seem that these two elements of her psychology are contradictory, they are intimately intertwined.

Whitley feels compelled by the work because she believes in the ability of the nuclear stockpile to prevent a catastrophic war among world powers. She has grown to understand how decades of stability have been built on the U.S. nuclear deterrent, and ensuring the viability of this deterrent has become her passion.

"I was recently asked by a student at NMSU how one morally reconciles supporting work on nuclear weapons," Whitley said. "The fact is that they've helped stabilize the world. At the end of the day, democracy and freedom are worth defending. The Constitution and our sovereignty are worth defending. I've grown to see the stockpile as one of our greatest tools to defend what I love about this country, and to keep ourselves and our allies safe. And I find a lot of meaning in that."