

CNS-ASU's "PhD+" Education program helps science & engineering doctoral students to develop insight into the societal dimensions of their research. Graduate students are matched with a social scientist or humanist mentor who also serves on the student's thesis and dissertation committee. Students participate in CNSrelated curricular and co-curricular activities that lead to a chapter in their dissertations – or other significant publication – on the societal context of their research.

"PhD+" Education in the Societal Dimensions of Nanoscale Science & Engineering

In 2008, the first student graduated from CNS's PhD+ program: Quinn Spadola, with a PhD in physics. Spadola has contributed greatly through her management of the monthly Science Cafés. From the first few programs at local coffee shops with attendance between 7-12 people, Spadola has developed the cafés into a monthly staple at the Arizona Science Center, with 50-80 attendees.



Spadola's doctoral research concerned inexpensive human genome sequencing technologies, which the National Institutes of Health has described as "the \$1000 genome." The government's hope is that cheaply-derived genomic data can both improve health care and reduce per capita health care costs. Spadola's research also addresses the ethical ramifications of "cheap and easy" gene sequencing, such as genetic discrimination, especially if genetic data becomes readily available to employers.



Areas of social implications study for other doctoral students in the PhD+ program include:

- anticipatory explorations of lab-on-a-chip, designer enzymes and directed evolution;
- scientific advisory processes, nanoparticle regulation and water quality;
- sustainability and consumer products.

Research, education and outreach activities at the Center for Nanotechnology in Society at Arizona State University are supported by the National Science Foundation under cooperative agreement #0531194.