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C&EN TALKS WITH

Rachel Morgan Theall

Postdoctoral fellow's passion is trying to get high school students interested in science

[Rachel Petkewich](#)

"Do you have a business card?" I asked [Rachel Morgan Theall](#). She had just finished a presentation summarizing the past year of her ambitious, community-motivated science education project based at the [University of Arizona](#).



Courtesy
of Rachel Morgan Theall

"High school kids don't care about business cards," the energetic postdoctoral fellow said with a smile, "so I have this." Theall handed me a red and yellow ballpoint pen emblazoned with the project name— Science in the City—and her e-mail address. The pen and the project have hooked both students and adults.

"The idea behind Science in the City is for students to understand that science is all around them and that it impacts their lives all the time, whether they are thinking about it or not," Theall tells me. She developed the first-of-its-kind idea to build exhibits with students in conjunction with staff at the University of Arizona's [Flandrau Science Center](#). The center was looking to expand its focus beyond

astronomy, move into its own building off-campus, and strengthen its ties to the community.

One way to generate excitement about science, Theall says, is to ask the students what interests them. Over the past year, she has collaborated with small groups of local high school students and their teachers to find the answer to that question. She helped the students, who are based at two schools in Tucson, to identify scientific issues relevant to their lives, learn the science behind these issues, and create exhibits based on their findings.

Although the students received some guidance on presentation from Flandrau staff, the final display are not professional-quality exhibits. What's important, Theall says, is that the students came up with the ideas, did the research, and will take the projects to community events and into middle schools to enthuse literally thousands of younger children. The exhibits will be installed in Flandrau this fall.

The students at City High School, a two-year-old, downtown charter school, chose to explore alternative fuels for their project. Because they commute to school from 25 different zip codes by car or public transit, the students have a strong interest in transportation. Part of their exhibit included designing and building a working ethanol engine for a go-kart, and they did their work during specially designated class time.

Students at Palo Verde High Magnet School worked on their project in an after-school program. They decided to learn about the chemistry of caffeine because a Starbucks had recently opened across the street from their school, and many students were skipping class to go and get coffee drinks. They titled their exhibit "Stim Sells."

The two projects flourished despite serious challenges. For example, class attendance is a problem in Arizona because many students are immigrants and may arrive from or return to their home countries with no warning, Theall explains. Some of the students' personal problems, including drug abuse and violent behavior, exploded in the classroom, she adds. Yet the students stayed interested and a few students talked to their parents for the first time about a school project. Families were thrilled to lend expertise where they could. "The parents [from City High] are calling the school saying, 'Thank you for this class,'" Theall says.

Science in the City will expand to three high schools in the Tucson area next year. And, as the students develop exhibits, they will fill out surveys so Theall can track changes in their knowledge and attitudes about science.

Theall, 32, discovered chemical education research in 1999 during an Internet search for job opportunities. She had worked in the pharmaceutical industry for almost two years after obtaining a B.S. from Truman State University in Kirksville, Mo. Within two months of the search, Theall enrolled at Arizona State University, in Tempe. She completed all of the requirements for chemistry graduate students, but a classroom was her laboratory. Her 2003 dissertation centered not on new chemical compounds but on students using 3-D animations in general chemistry labs.

Theall completed her first postdoctoral fellowship at the University of Arizona in the National Science Foundation's Science & Technology Center on Materials & Devices for Information Technology Research. She helped design Internet modules about information technology and ran workshops to teach K-12 teachers how to implement the programs in their classrooms.

For her second postdoctoral stint, Theall was named in 2005 as one of seven Discovery Corps Fellows. The pilot program for these fellows was initiated by NSF's Division of Chemistry three years

ago to support scientists who combine research expertise with service to society.

Unlike traditional laboratory postdocs, Theall directs and solely manages the funding for her two-year project. She has also had to learn new skills, such as how to produce T-shirts for the students to wear when they present their projects. She doesn't have lab space, but she does have an office in which she updates student progress on her project's blog (scienceinthecity.arizona.edu). Among the packed bookcases, stuffed file cabinets, computer, and other typical office supplies sit the T-shirt press and about 20 boxes of materials for the students' exhibits.

Theall rarely stays in her office. Instead, she says, "I get to do all sorts of fun things." She bustles between the high schools and meetings with government and business leaders in the community to acquire resources for the exhibits.

One day when I chatted with her, she was scheduled to speak at the Tucson Association of Museums; meet with a former Ford engineer to keep up-to-date with what's happening with alternative fuels in Tucson, which would be useful for the City High biodiesel project; and then attend a town hall meeting about Flandrau's new downtown building. She and her husband, Christopher, a 36-year-old graduate student in neuroscience, also juggle child care for their two-year-old son.

Theall is "casting a wide net" for her future, she says. Options that appeal to her include finding funding to extend Science in the City, a full-time position designing exhibits in a science center, or a faculty position at a small, primarily undergraduate college. "Nonmajor courses would be fine with me," she says, because "I really like trying to get people interested in science."

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