

# Agnese Nelms Haury

Program in Environment and Social Justice

## Arizona STEM Cats

In an effort to leverage the science outreach goals of the University of Arizona and student science clubs and meet the desire for STEM programming expressed by the Pima County Libraries, a robust, community outreach partnership has been created. Student clubs formally partner with a specific library and commit to provide STEM outreach for a 6-8 week program each school year, with a new teaching team each year. Students receive annual outreach training, advising, supervision and compensation from the Office of Recruitment & Student Engagement in the College of Science. Students not only hone their science communication and activity development abilities, but also gain invaluable administrative, organizational and community partnership building skills. This program was specifically designed to deliver dynamic, engaging science activities by STEM college students that serve as role models to underserved communities.

<b>College</b>	College of Science
<b>Credit</b>	No
<b>Project initiated by</b>	Erin Deely, College of Science, building on longtime outreach work of Arizona science clubs
<b>Faculty and/or Advisor(s)</b>	Erin Deely, College of Science
<b>Community partner(s)</b>	Pima County Public Libraries
<b># of students reached each year</b>	500-600 participants (3yrs - 70yrs)/25-30 science student presenters
<b>Funding</b>	College of Science
<b>Evaluation</b>	Informal, reflective



Student Engagement  
& Career Development

## **Setting Your Hands on Fire: Arizona STEM Cats Engage Tucson Youth in Science Education**

**By Kimi Eisele**

On a Thursday afternoon in December, Mira Thielmann sets up an assortment of musical instruments in a side room of Mission Library on the southwest side of Tucson. There's a large guitar, ukulele, two xylophones, a triangle, over a dozen Boomwhackers, a pink plastic viola, and a Vietnamese đàn bầu from Mira's personal collection. "I'm going to teach them about wavelengths today," she says.

One of the librarians leads a young girl into the room a little before starting time, but Mira kneels down and starts showing the girl all the instruments, letting her play and listen to them. Later, another boy comes in and makes a beeline for the viola. He tells her he plays violin. "Well, I play viola!" she says, and lifts her own out of its case. She holds it out for him and asks him to pluck a string and watch it vibrate. "Is that a high note or a low note?" Mira says.

Mira, a graduate student in environmental sciences at the University of Arizona, has been volunteering at Mission Library for two years through STEM Cats, a cadre of Arizona undergraduate science majors who volunteer to bring science, technology, engineering, and math programs to youth through the Pima County

Public Library system. Mira joined the project as an undergraduate and has stayed on as a graduate.

STEM Cats taps existing science clubs—among them, Student Members of the American Chemical Society (or Chemistry Club), Marine Awareness and Conservation Society, Neuroscience & Cognitive Science Association of Students, Society of Earth Science Students, and Catalyst Club—who then assign two co-leaders to run a semester-long program (usually 8 to 10 sessions, total) in one of Tucson's public library branches. Team leaders participate in a two-day training before working in the libraries, in which they learn about creating engaging activities, the demographics of the population they'll be serving, as well as relevant social or environmental justice issues.

STEM Cats don't receive academic credit, but each duo is awarded a \$1200 stipend for completing 40 hours of work.

### **Libraries are ideal partners**

Currently the program serves seven libraries, chosen because

of their proximity to campus or because of community interest, said Erin Deely, Arizona staff sponsor of STEM Cats.

Public libraries are ideal partners. “They have trust and respect from their members,” Deely said.

And since many of the library branches are located in underserved communities, the STEM Cats activities offer opportunities many children and families might not otherwise have. “We are reaching them where they are growing up in informal non-threatening settings. We are getting into communities that don’t get this kind of rich experience,” Deely said.

“We have such a siloed university and we have a lot of ‘inreach,’ but we rarely do effective outreach, really meeting people where they are.”

Libraries offer flexibility with programming hours, which is key for busy college students. And unlike other venues, such as Boys & Girls Clubs, libraries offer greater opportunities for reaching other youth and families, Deely said. Most importantly, however, the library partnerships enable STEM Cats to offer more consistent outreach. Many student clubs do “one-offs,” single visits to schools

or community events, but STEM Cats commit to a semester of workshops, at least six, Deely said.

“We have such a siloed university and we have a lot of ‘inreach,’ but we rarely do effective outreach, really meeting people where they are,” she said.

## Adaptable activities for all ages

While STEM Cats activity sessions are usually one-hour-long sessions, they still need to be adaptable for young people who might come and go.

After the boy at Mission Library plays some notes on the viola, he leaves. Mira turns her attention to the girl and helps her make a pan flute out of plastic straws of different sizes. Two middle schoolers enter the room, and Mira introduces all the instruments to them. Her co-leader couldn’t make it today. “It’s easier when he’s here,” she says.

Leila Duncan is the Young Adult librarian at the Joel Valdez Library in downtown Tucson, which has been hosting students from the Neuroscience & Cognitive Science Association as part of STEM Cats for four years. Programs are mainly geared toward teens, and between 10 and 20 youth attend the STEM Cat sessions at the downtown library every week, Duncan said.

Duncan said she appreciates how

the Arizona students adapt to the situations they’re presented with, particularly given the drop-in nature of teens in the library. Kids don’t want to sit and listen after doing that all day in school. STEM Cats is not a sit-down program, it’s not like school. It’s casual learning, drop-in learning and they’ve adapted really well to that. That’s a really key thing with teens. After school time is a little freer and it should be.”

As the subject matter is focused on brain science, STEM Cats have been able to introduce information about life decisions and mental health in engaging ways. One exercise allowed youth to put on glasses that approximated what it feels like to be impaired—either by alcohol, concussion, or seizure. That kind of experience is useful and easy for them to understand quickly. “It’s not something they’ll encounter on a state test, but it gets them thinking about everyday uses of their brain.”

Another lesson covered what happens in the brain in mental illness. “Talking about how the brain responds to things is less charged way than talking about mental illness, which is something many of these kids or their friends deal with every day,” Duncan said.

## More than science education

While the programs are good at exposing youth to actual science,

they also introduce youth to college-aged role models.

For their library sessions, every Arizona student “logos-up”—Deely’s phrase for wearing a STEM Cats t-shirt—which allows youth in the programs to identify them and be curious.

“Chemistry workshops draw elementary school students from the predominantly Hispanic community nearby, where schools are largely underfunded.”

This kind of mentoring and relationship building brings depth to university outreach. Duncan says college students who are passionate and excited about their studies can rub off on younger students. “It’s the kind of mentoring teens get that opens up their eyes to options for future studies and careers,” she said. “Because they’re college kids, local teens can see themselves in them. It ends up being a lot of relationship building and knowledge building.”

Isabelle Harrison, a chemistry major, said she joined ChemCats, the Arizona chemistry club, after attending an outreach program led by a friend. “I saw the kids’ faces light up. So I signed up.”

She was drawn to the opportunity to share and communicate

science. “For a long time, I was considering becoming a teacher after graduating, but didn’t want to be an education major and limit myself.”

Harrison has been volunteering with the ChemCats club at the Eckstrom-Columbus Library branch for the past two semesters. There, chemistry workshops draw elementary school students from the predominantly Hispanic community nearby, where schools are largely underfunded. “These kids come in being exposed very little or not at all to chemistry,” Harrison said. She says two lessons in particular tend to be kids’ favorite. The first involves fire. “We light our hands on fire with propane bubbles. They’ve never seen that. You dip your hand in soapy water and the layer of water between your hand and the bubbles protects your hand when the propane bubbles burn.”

The second involves making Silly Putty. “On that day, more than just elementary kids come in the room. We get teens and adults, too!”

Harrison said exposing children to the magic of chemistry is powerful. But the work has also changed her, as well. “I used to hate public speaking. I would shake the whole time, not make eye contact, stutter. But I made myself go to the events. My friends were going. I’d say, ‘I can do this.’”

It’s true, she can. At the end of every semester, the Chemistry Club puts on a magic show

of chemistry experiments for hundreds of Tucson students. Harrison is now the event’s emcee. And next semester, she’ll co-lead the STEM Cats activity sessions at Eckstrom-Columbus Library.