Physics Education for the Incarcerated

Erin Flowers adapts laboratory courses for incarcerated students, an endeavor that she says is both challenging and rewarding.

By **Rachel Berkowitz**

As an astrophysics undergraduate, Erin Flowers enjoyed tutoring math and science to high school students almost as much as she enjoyed studying planetary atmospheres. Flowers hoped to teach undergraduates when she started her PhD at Princeton University, but she found that there were few formal opportunities to do so. Instead, Flowers found another teaching option in an unlikely venue: a prison.

Flowers volunteers on a Princeton University-run program called the Prison Teaching Initiative (PTI). This outreach program, which started in 2005, offers coursework to men and women at six federal and state prisons in New Jersey who are working toward associate's and bachelor's degrees. As part of the program, Flowers prepares and delivers math and science courses, and she recently helped adapt to the prison classroom one of the country's first physics laboratory courses for incarcerated students through a partnership with Raritan Valley Community College, New Jersey. Flowers spoke to *Physics Magazine* about the challenges and rewards of teaching physics inside prisons.

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All interviews are edited for brevity and clarity.

How did you become involved with the Prison Teaching Initiative?

The initiative was started by postdoctoral researchers and faculty from Princeton's astrophysics department, where I study, so I heard about it when I joined. After the first semester of my PhD study, I applied to be a teacher on the program and started teaching a prealgebra course to people in the Albert C. Wagner Youth Correctional Facility. Since then, I've taught various math and physics courses, including a lab-based astronomy course where the students observed the sky and learned about what they saw. Now I help create content for classes on topics ranging from prealgebra to the history of astronomy, and then I arrange for volunteers to go into the prisons to teach those classes.

What does it look like to teach in a prison?

First I have to make sure I'm dressed appropriately. For example, no hair pins or certain items of jewelry. I can't wear a digital watch, and if I brought in a phone, I would get permanently banned from entering prisons.

When coming to teach, I have to arrive forty-five minutes ahead of the start time to go through the airport-style security checks for any metal objects and anything sharp. And then, once I am

in, I am restricted in terms of where I can be—I can't be in a corridor if there is a large "movement" of the prison population, for example.

Don't those restrictions get in the way of bringing in the materials you need for teaching?

Yes; adaptation is necessary. Particularly for lab courses: labs are one of the trickiest courses to teach in prisons because we can't bring in a lot of stuff we would use in a regular classroom.

Which labs have been the trickiest to teach?

One is the momentum lab. In high schools and colleges, momentum experiments are often done with a frictionless metal track, toy cars, and magnets. The students measure how fast the cars move in different scenarios to determine the mathematical equation for momentum. Instead, we made tracks from strips of folded posterboard and used centimeters-long cars made from plastic.

Another tricky lab to teach is the projectile lab. To study the properties of projectile motion, high school students might launch an object and then mark where it falls with carbon paper. We use a ball marked with lots of chalk, which leaves a mark where it hits the ground.

And which are the easiest?

Those related to understanding specific heat, buoyancy, and density. We're not allowed to use open flames, but we can use induction heaters. So for the heat capacity lab, for example, the students use a conductive pot to heat water or metal cubes, and they then measure how long it takes that water or the cubes to get to various temperatures to determine the heat capacity of each material.

What do the students in your prison classrooms think about the lab classes?

They are in the classroom because they're eager to learn. While the equipment might differ from an academic course, the demands on the students are the same—there are exams to complete and papers to write—and the grades have the same standards as those of a community college. The students have told me that they talk about what they learn with each other—and with their families—outside of class time.

What do you find most rewarding about teaching in a prison?

Having a positive impact on someone's life trajectory. I've had students tell me that taking the course has changed their life by providing them with the opportunities that come with having a degree, such as access to a wider range of jobs, and with the skills that come from obtaining one—being able to study and complete a goal. Statistically, incarcerated individuals who participate in a program such as PTI are more likely to stay out of prison once they leave. Being part of this journey is incredibly rewarding.

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