

Physics for Freedom:

Opening the Cosmos for Those Inside

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Photo of San Quentin Prison from the San Quentin Prison Newspaper

You're taking Physics in prison?

San Quentin inmate Aly Tamboura recounts answering his mother and close friend in the visiting room.

-Yes, I am taking Physics in prison.

Tamboura recalls the experience of learning a new language of science: "I am learning the same language used by nearly all of the well known scientists like Newton, Einstein and Galileo... Who would have thought that the thousands of calculations the brain makes when running to catch a fly ball on a baseball field could be jotted down on a chalkboard in a language I can understand?" (Tamboura, 2008).

San Quentin State Prison is located on the north waterfront of San Francisco Bay in Marin County. The all male prison is famous for its many notable inmates from Charles Manson to Merle Haggard, high profile media events like Johnny Cash concerts, and its grisly role as exclusive site for California state executions. Designated by The New York Times as the largest death row in the western hemisphere (Nieves, 2011) it is also the only prison in California to offer inmates college level classes inside.

The Prison University Project (PUP) is a non profit organization that, collaborating with Patten University in Oakland, offers college courses to inmates at San Quentin. PUP started in 1996 following the enactment of the Violent Crime Control and Law Enforcement Act, which denies prisoners federal Pell Grants during incarceration. Written by then-Senator Joseph Biden and signed into law by President Clinton in 1994, the bill led to the demise of nearly all of the country's more than 300 prison higher education programs (Henry, 2011, Marks, 1997).

Students at San Quentin Prison (an official extension site of Patten University) earn their Associate degree in about three and a half years, typically taking

two courses per semester in addition to working full time prison jobs ranging from landscaping to laundry. The program is tuition free. Over 300 inmates are currently enrolled and any prisoner classified as part of the general population with a record of good behavior is eligible to participate. The general population is roughly 1,800 men (Sheff, 2004) and includes those serving time for murder. This group does not include those on death row.



Figure 1. Serving for a three-strikes conviction, Jonathan Wilson graduates from the Prison University Project at age 46.

The PUP program is designed to allow inmates to complete the transfer eligibility requirements for the University of California system and California State universities. Students do not have access to the internet and they attend at least four hours of class per week. Students choose from courses in Astronomy, Biology, Geology and Physics (with a laboratory component) to fulfill their four-unit science requirement. They are encouraged to take an additional science course as an elective. Instructors are all volunteers and primarily consist of professors and graduate students from San Francisco State University, Stanford University and

Latshaw, personal communication, March 4, 2012).

A volunteer physics instructor working with the program recalled using the PffP textbooks in 2011 for the general physics course, which covers kinematics, electromagnetism and RC circuits. This is the same material that physics majors learn in their first year. But San Quentin students are not typical first year physics students. The instructor was surprised that they were far more vocal than any students of physics she had yet encountered. She met a student challenge to Newton's universal law of gravitation by directing pairs of students to calculate the gravitational force

*“San Quentin, what good do you think you do?
Do you think I’ll be different when you’re through?”
- Johnny Cash*

UC Berkeley.

About five years ago three such graduate students from UC Berkeley adapted the popular Cal class, Physics for Future Presidents (PffP), for use at San Quentin. Voted best class at Berkeley by students in a 2008 Daily Californian poll, PffP is the product of Professor Richard Muller's retooling of the Physics for Poets course. The class, started in 2001, is designed to teach students advanced physics topics without using difficult mathematics. It is now being taught at over 30 universities using Muller's custom textbook.

The state of California does not fund higher education in its prison system and PUP relies heavily upon donations for textbooks and student supplies. Muller contacted his publisher and the PffP textbook was donated for the SQ class. "It's ironic [because this is] the one group of people who have no chance of being future presidents," says Muller. He recalled one of the graduate student instructors telling him a story about walking through the main yard where inmates were lifting weights and playing basketball, "all the things you see in the movies." But "they were [also] discussing physics" (A.

between them. Students saw that this force is so small, orders of magnitude smaller than that from a breeze, that we do not feel it. The instructor described this experience as being unique to teaching at San Quentin, where students are unafraid to ask questions and challenge the material. Another instructor from 2008 re-

counts: "The students in our class will learn about a physical principle like the conservation of momentum and immediately inquire about how it applies to a car accident they observed. Every Friday morning, I look forward to the string of insightful questions that are sure to follow any lecture. The enthusiasm of the students for learning has made teaching at San Quentin a very enjoyable and rewarding experience" (Kressler, 2008). Students then give individual scientific talks at the end of the semester,

one highlight from 2011 being a presentation on the phenomenon of top spin on a tennis ball.

In addition to the college program, San Quentin offers academic programs in adult basic education, high school/GED completion, English as a Second Language and literacy programs. Berkeley undergraduates may experience San Quentin classrooms directly through participation in the Teach in Prison DeCal on campus. The two credit course consists of



Figure 2: Johnny Cash performing at San Quentin State Prison



Figure 3. Ed Ballenger, Inmate and San Quentin Vocational Machine Shop Student, with the Magnetic Wave Machine, 2008.

students volunteering for weekly tutoring shifts inside the prison. Much of the work involves one-on-one interaction with individuals in the GED program. San Quentin is located in one of the country's most affluent counties and the prison never lacks for volunteers. Some 3,000 community volunteers help to run about 70 inmate programs (Gonzales, 2011). "This is a unique prison. It shouldn't be a unique prison," said now retired San Quentin teacher Jane Curtis at a 2011 inmate graduation for GED and college degrees (Padgett, 2011). San Quentin also has many vocational programs for inmates including training in dry cleaning, electrical work, graphic arts and printing, landscaping, plumbing, sheet metal and machining.

In 2008 four students from San Quentin's Machine Shop program built a magnetic wave machine based on Exhibit Artist Shawn Lani's design from San Francisco's Exploratorium Museum. The inmates entered the project in the California State Fair and won a top prize for their work (Rubio, 2008). A few years prior to this two other students built parts for the original magnetic wave machine that was on exhibit at the Exploratorium. NASA Ames Research Center became aware of San Quentin's machining capacity through the award and in 2011 created a training program wherein inmates are manufacturing a Poly Picosatellite Orbital Deployer, or P-POD. P-PODs are small aluminum containers (approximately 5 inches square and 16 inches in length) that are used to launch tiny satellites from NASA expendable launch vehicle missions. San Quentin's P-POD will be used as a prototype for testing.

The NASA program at San Quentin uses a college level text Understanding Space-An Introduction to Astronautics to give students an

understanding of space system engineering. Guest lecturers also teach inmates about the U.S. Space Program and the history of space exploration. "This program is the first of its kind that we know of," said Adriana Cardenas, NASA Ames Laboratory Associate Director of engineering who serves as liaison to San Quentin (Krizman, 2011). San Quentin's machine shop is the only one in the California prison system with the capability of manufacturing metal projects direct from the casting stage. "There are a maximum of 27 students enrolled in the machine shop training, and there is always a waiting list," says machine shop instructor Richard Saenz. Ames Center Deputy Director Charles Duff told participants: "The skills that you're developing are useful around a wide array of employment opportunities" (as quoted in Harris, 2011).

The United States constitutes only 5% of the world's population, but houses 25% of the world's prisoners, making us the world's largest jailer (ACLU, 2011). Finding that the medical and mental health care for inmates fell below a constitutional level of care in 2011, the U.S. Supreme Court ordered that California reduce the number of inmates in the state's 33 prisons to 137.5% capacity by 2013 (CDCR, 2011). The cost per year to incarcerate an inmate in our state prisons is about \$47,000 (LAO). UCLA professor Chan Noriega remarked that "California could send every last prisoner to a UC campus, covering all expenses, and still save nearly \$2.3 billion per year. That's not right" (Noriega, 2010). In 2010 Governor Schwarzenegger said "[Spending] more on prisons than universities is no way to proceed into the future. What does it say about a state that focuses more on prison uniforms

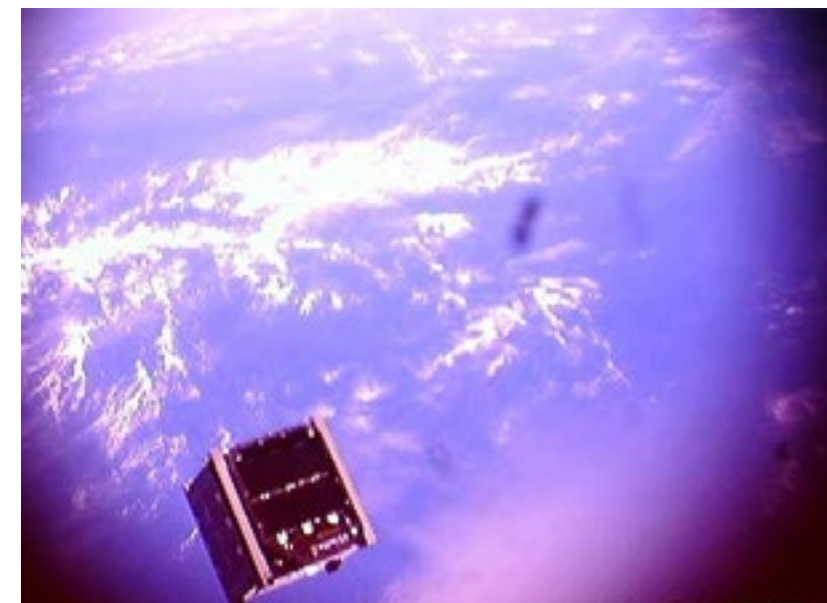


Figure 4: Picosatellite Orbital Deployer built by Cal Poly, 2007.

than caps and gowns? It simply is not healthy.”

“[It is] completely embarrassing the way we treat people in prison. One of the most shameful things we do in this country,” said Muller. And this embarrassment is growing at an alarmingly rapid rate. The U.S. prison population has risen 700% since 1970 (ACLU, 2011). While white Americans make up the majority of our population and commit crimes at comparable rates to that of people of color, people of color constitute 60% of our prison population (ACLU, 2011). Assembly Bill 109, signed by Governor Brown in 2011, is decreasing state prison populations by allowing non-violent, non-serious, and non sex offenders to serve their sentence in county jails instead (CDCRa, 2011). But this move hardly addresses the problem of overcrowded prisons or discrimination against minorities. Inmates currently in state prison will not be transferred to county jails or released early under the bill (CDCRb, 2011).

This brings us to the problem of recidivism, inmates returning to prison after release. A U.S. Bureau of Justice Statistics study revised in 2002 tracked 272,111 former inmates for three years after their release in 1994. The rearrest rate for the group (which represented two-thirds of all prisoners released in the United States that year) was 67.5% with 51.8% returning to prison (DOJ, 2002). When the same individual appears in the prison system over and over again it makes sense to look for solutions to end this cycle.

A major study conducted by the Correctional Education Association investigated whether participation in correctional education reduces recidivism. The Three-State Recidivism Study, released in 2001, followed 3170 inmates for a period of three years after release from incarceration in prisons in Maryland, Minnesota, and Ohio. Correctional education participants had significantly ($p < 0.01$) lower rates of re-arrest (48%) when compared to the group of non-participants (57%). Correctional education participants had significantly ($p < 0.01$) lower rates of re-incarceration (21%) when compared to the group of non-participants (31%) (CEA, 2003). “The more educated people are, the better decisions they make,” said Curtis. “We know that education programs behind the walls reduce recidivism. There is plenty of proof for that. So why aren’t we doing what works?”

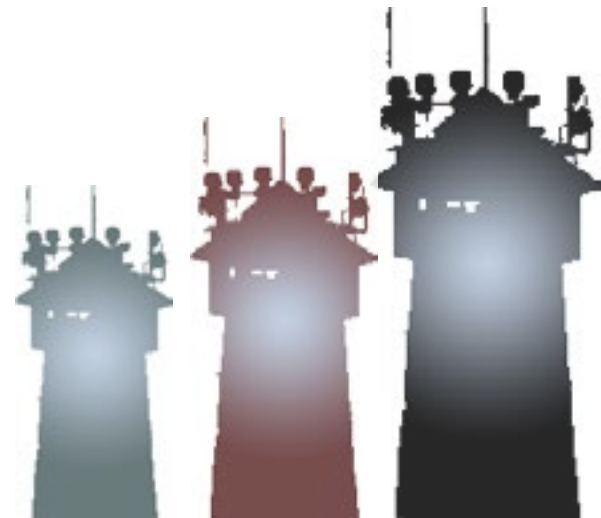
In a 2004 lecture on education and incarceration, social activist and retired UC Santa Cruz professor Angela Davis encouraged the audience to think about education as the practice of freedom: “If we think about education not as... the imposition of facts... about the world on growing minds, but rather education as the ability to raise questions about those facts, to develop analysis to ask why injustice still prevails? And to develop creative strategies to transform the

universe” (Davis, 2004). For inmates in San Quentin and prisons throughout the U.S., education is essential to rebuilding their lives after prison.

In his essay on the value of science, famed physicist and Manhattan Project collaborator Richard Feynman remarked that “scientific knowledge is an enabling power to do either good or bad -- but it does not carry instructions on how to use it...” (Feynman, 1955). President Truman’s decision to drop the atomic bomb at the end of World War II gave the world a powerful demonstration of the destructive capabilities of our scientific advances. As physics moves into our prisons, we see that this same discipline has the constructive ability to open minds and restore lives. Tamboura says: “Being in a place where I am able to learn means the world to me. Physics is just the beginning of the knowledge I wish to attain.”

References

- American Civil Liberties Union. (2011). Additional Resources; Mass Incarceration Problems. American Civil Liberties Union. Retrieved from <http://www.aclu.org/safe-communities-fair-sentences-0>
- Buruma, Ian (2005, February 20). Uncaptive Minds. The New York Times. Retrieved from http://www.nytimes.com/2005/02/20/magazine/20PRISON.html?_r=1
- California Department of Corrections and Rehabilitation (CDCR). (2011, June 7). State Responds to Three-Judge Court’s Order Requiring a Reduction in Prison Crowding. Retrieved from <http://cdcrtoday.blogspot.com/2011/06/state-responds-to-three-judge-courts.html>
- CDCR (2011). Realignment Explained: Official CDCR Release. San Quentin News, 2011(7), 1.
- Correction Education Association. (2003). Three State Recidivism Study: Executive Summary. Centerville, UT: Stuerer, S., & Smith, L. G.
- Davis, A. (2004, December 18). Angela Davis: Education not Incarceration. St. Paul, Minnesota: Twin Cities Public Television.



Feynman, R (1955). [Speech on The Value of Science.] Speech presented at 1955 meeting of the National Academy of Sciences. [Transcript]. Retrieved from <http://werner.ly/feynman-on-the-the-value-of-science>

Gonzales, R (2011, June 20). Inside San Quentin, Inmates Go to College. National Public Radio. Retrieved from <http://www.npr.org/2011/06/20/137176620/inside-san-quentin-inmates-go-to-college>.

Harris, M R (2011). NASA to Start Program With S.Q’s Machine Shop. San Quentin News, 2011(6), 1.

Henry, M (2011, August 24). Pell Grants for Prisoners. The Cornell Daily Sun. Retrieved from <http://cornellsun.com/node/47372>

Kressler, B (2008). Scientific Inquiry at San Quentin: Introduction to Physics. Prison University Project Newsletter, 3(3), 2.

Legislative Analyst’s Office. (nd). How Much Does it Cost to Incarcerate an Inmate? Legislative Analyst’s Office. Retrieved from http://www.lao.ca.gov/laoapp/laomenus/sections/crim_justice/6_cj_inmatecost.aspx?catid=3

Marks, A. (1997). One inmate’s push to restore education funds for prisoners. Christian Science Monitor, 89, 3.

Nieves, E (2001, May 22). Rash of Violence Disrupts San Quentin’s Death Row. The New York Times. Retrieved from <http://www.nytimes.com/2001/05/22/us/rash-of-violence-disrupts-san-quentin-s-death-row.html?pagewanted=all&src=pm>

Noriega, C (2010, January 21). To Cut Costs, Send Inmates to College. UCLA Today. Retrieved from <http://www.today.ucla.edu/portal/ut/to-cut-costs-send-inmates-to-college-152131.aspx>

Padgett, J (2011). A Teacher’s Perspective on Prison Education and Offender Recidivism. San Quentin News, 2011(6), 5.

Rubio, L (2008). Machine Shop Receives State Fair Award. San Quentin News, 2008(3), 2.

Krizman, D (2011). NASA Training Starts for Machine Shop. San Quentin News, 2011(7), 5.

Sheff, D (2004, March 14). The Good Jailer. The New York Times. Retrieved from <http://www.nytimes.com/2004/03/14/magazine/14WARDEN.html?pagewanted=all>

Tamboura, A (2008). You’re taking Physics in Prison? Prison University Project Newsletter, 3(3), 3.

U.S. Department of Justice. (2002). Recidivism of Prisoners Released in 1994. Bureau of Justice Statistics. Washington, DC. Retrieved from bjs.ojp.usdoj.gov/content/pub/pdf/rpr94.pdf

Image Sources

- <http://richmondconfidential.org/2010/08/11/prison-university-at-san-quentin-prison/>
- <http://oaklandlocal.com/sites/default/files/i/oakland%20gang%20injunction%20rally%20d300s%20007>.
- <http://richmondconfidential.org/2010/08/11/prison-university-at-san-quentin-prison/>

http://www.calpolynews.calpoly.edu/general_images/CubeSat-07-orbit-big.jpg

<http://sanquentinnews.files.wordpress.com/2010/09/outofsfsan-quentin-19991.jpg>

Endnotes

1. San Quentin houses all male inmates on death row. California’s 12 female death row inmates are housed at Chowchilla.
2. Only 0.01% of the Pell Grant budget went to the education of prisoners (Buruma, 2005).
3. The study discusses the inaccuracy of recidivism statistics (CEA, 2003):

To an unknown extent, recidivism rates based on State and FBI criminal history repositories understate actual levels of recidivism. The police agency making the arrest or the court disposing of the case may fail to send the notifying document to the State or FBI repository. Even if the document is sent, the repository may be unable to match the person in the document to the correct person in the repository or may neglect to enter the new information. For these reasons, studies such as this one that rely on these repositories for complete criminal history information will understate recidivism rates.

