Powell teacher cracks Adobe code, wins software

Travis Dorman, USA TODAY NETWORK - Tennessee Published 8:58 p.m. ET March 13, 2017 | **Updated 9:50 a.m. ET March 14, 2017**

(Photo: Alexa Rickard, Adobe)

Atop a building at Adobe's World Headquarters in San Jose, Calif., four orange LED circles shifted every 7.2 seconds, broadcasting a looping, encrypted message that remained unsolved for four years until the company announced Monday that a Knox County math teacher had finally cracked the code.

Jimmy Waters, 31, teaches advanced algebra, geometry and trigonometry at Powell High School. Last summer, Waters devoted a month of his vacation time to solving the puzzle presented by the San Jose Semaphore, a project created by New York-based artist Ben Rubin in 2006.

Adobe planned on rewarding Waters with a one-year subscription to its Creative Cloud software, but at his request, the company is donating 40 one-year subscriptions to Powell High School's computer lab, on top of a 3-D printer "to help the students push the boundaries of creativity even further," according to a company news release.

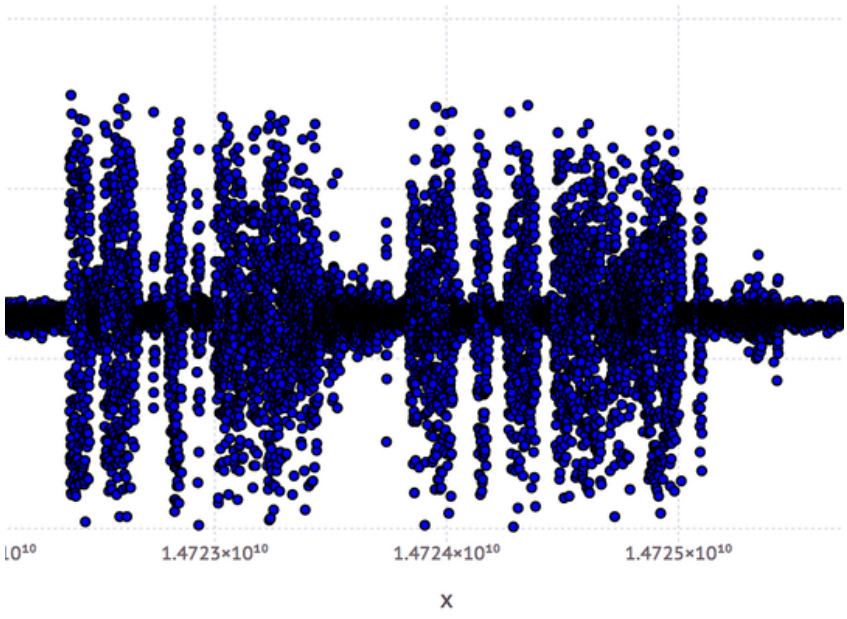
Waters first learned of the project during an online search after reading Thomas Pynchon's novella "The Crying of Lot 49." The full text of the book was the first encrypted broadcast of the Semaphore.

"I saw that (the current message) had been up since 2012," Waters said, "so it'd been about four years since they put it up, and I kind of figured that anybody that had been working on it probably gave up."

Each of the four circles has four possible positions — with the line through the middle displayed vertically, horizontally or diagonally on either side — for a total of 256 possible configurations.

Waters treated each circle's position as a digit, and each configuration as a number in base-4 (a system where each place value is determined by raising 4 to powers, instead of 10). He assigned values to each circle's position: horizontal was 0, the first diagonal, 1, vertical, 2, and the second diagonal, 3.

Waters then wrote a code to parse the circles' configurations from the website that broadcasted the Semaphore's message. He converted the numbers to base-10 and graphed his findings.



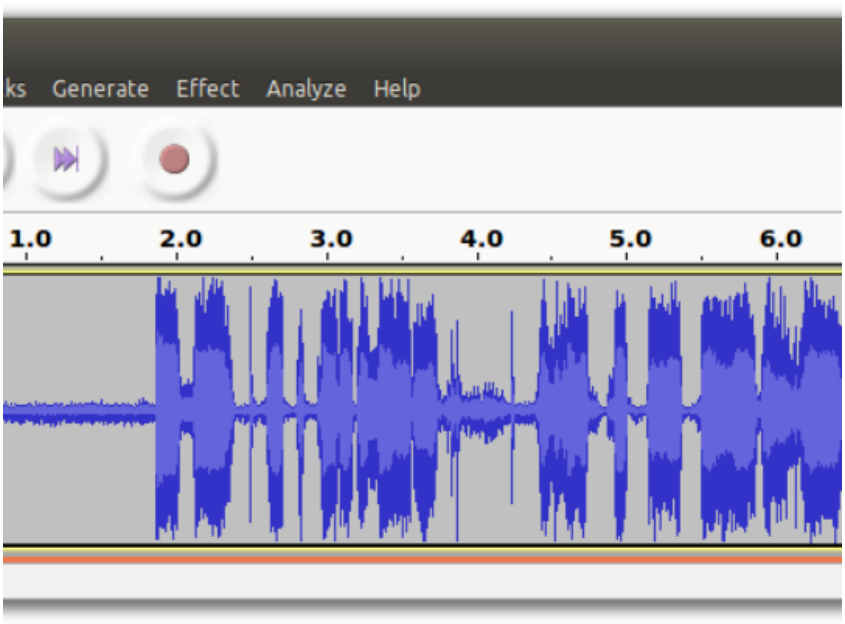
Jimmy Waters' graph of the San Jose Semaphore broadcast. *(Photo: Submitted by Jimmy Waters)*

Waters said he was surprised to find that the message wasn't text like the Pynchon broadcast, but instead resembled waves "like what you might see in the visualization of an audio file."

He searched online for a way to turn numbers into sound and found a script using the programming language, Julia.

The first time he converted the file, Waters said he "didn't know what the frequency was supposed to be, so it came out sounding like chipmunks" — he could tell there were voices, but couldn't understand what they were saying.

Waters slowed down the audio and recognized the phrase "I'm at the foot of the ladder." He said that although he hadn't heard that part of the recording before, he thought the voice and audio quality sounded familiar and successfully pinned it as a recording of Neil Armstrong's communications when he walked on the moon.



Waters' audio of the message broadcasted by the Semaphore. *(Photo: Submitted by Jimmy Waters)*

Each configuration of the circles represented 1/8000th of a second when converted into audio, Waters said. Since the circles rotate every 7.2 seconds, that means the roughly minute-long recording took around 40 days to broadcast to completion.

Now, Waters is in California, courtesy of Adobe, and will be meeting the CEO of the company on Tuesday.

The Semaphore will begin broadcasting a new code this summer.

“The Semaphore is intriguing to people — they’re captivated by those mysterious spinning dials,” Siri Lackovic, Adobe senior brand strategist, said in a news release. “And we can’t wait for Ben to begin broadcasting a new challenge. The only thing I can reveal is that, with the next code, there will be new twists and surprises. Will it be another four-and-a-half years before someone solves it? That’s something no one knows.”

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