

Intel International Science and Engineering Fair

A program of Society for Science and the Public



Going Nuclear

Blake Marggraff and Matthew Feddersen met in fourth grade. By fifth, they were performing science experiments in Marggraff's garage. "At the time, I certainly didn't think about it as an interest in science," says Feddersen. "It was more along the lines of simply doing cool, flashy projects: making flash powder, producing luminescence, using gibberellic acid for plant growth."

Marggraff, however, was already a long-time science enthusiast. He had become interested in nuclear science, in particular, after learning about a bomb made of atoms. He had been just eight at the time.

Fast forward several years to the summer before their senior year of high school, the two huddled over a chunk of Uraninite that Marggraff had purchased online, discussing how cool it might be to enter a science fair their senior year. Talking about an article they'd read on secondary radiation in protective barriers at nuclear power plants—barriers containing tin—the two were struck with an idea: Why not use the same principal to treat cancer cells?

By positioning tin particles near cancer cells during radiation treatment, they might be able to more accurately target those cells and intensify radiation treatment, killing cancer cells more quickly than standard radiation. Not only could this result in more effective cancer treatment, the approach would be much more affordable than other options. Treatments would be affordable, even in poverty-stricken countries.

Fast forward, again, through several months of labor-intensive labeling, massing, irradiating, centrifuging, measuring, recording, and analyzing, to Intel ISEF 2011. There, the duo's hard work paid off when they won the highest honor at the competition, the Gordon E. Moore Award and \$75,000, for their project, "Treatment of Simulated Cancer Cells with Compton Scattering-Produced Secondary Radiation."

Since the 2011 victory, Marggraff and Feddersen have continued to further their research, but have moved on to other pursuits as well. They spent the summer working as fellows at Science Buddies, an online resource for science fair project ideas, answers, and tools. And this year, both have launched their college careers. Marggraff is on the pre-med track, studying biology and biochemistry at Washington University in St. Louis. Feddersen is studying computer engineering at the University of Illinois, Urbana Champaign.

They are also collaborating on a new venture called "Inspiration Engine." Like personalized music sites on the Internet, this search engine would take a broader approach, connecting users with information and environments that are tailored to their individual preferences. "The idea," explains Marggraff, "is to help individuals enter the emotional and social environments that are most conducive to their happiness and potential success."

