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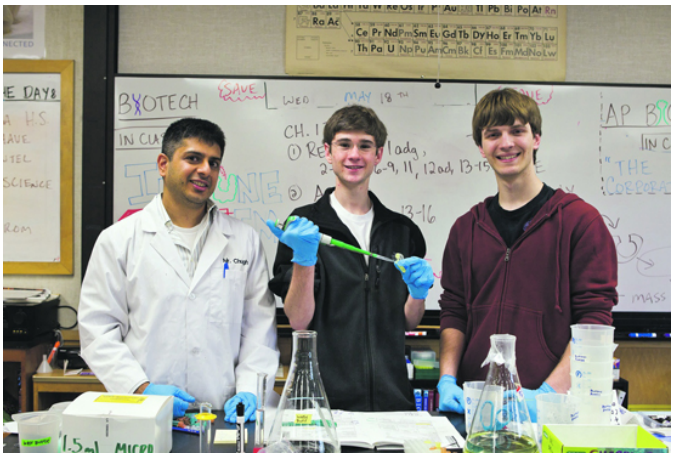
Acalanes Student-Scientists Take International Prize

By Lou Fancher



From left: Jay Chugh, Blake Marggraff and Matthew Feddersen Photo Doug Kohen

Two Lafayette students, Matthew Feddersen and Blake Marggraff, took first prize at the Intel International Science and Engineering Fair on May 13th.

The global fair is the world's largest high school science research competition. This year, over 1,500 students were selected to enter, with 17 Best of Category winners from the United States, India, China, Thailand and South Korea taking home prizes.

Breaking any stigma about Friday the 13th and making good on what the Lamorinda community holds dear-it's celebrated schools-Marggraff's and Feddersen's project offered the potential for developing a less costly and more effective cancer treatment.

The simple exhibit, describing how the two Acalanes seniors injected tin in yeast cells to capture and repurpose radiation aimed at a tumor, carried a hefty title: "Simulated Treatment of Cancer with Compton Effect-Produced Secondary Radiation".

Marggraff said he came up with the idea four months after reading an article about secondary radiation in a nuclear power plant. He and Feddersen tried to develop a drug or material that could combine with radiation to increase its lethal effect on tumors.

"We used tin metal, with no special isotopes. We used tin because it's not toxic, it has the electron binding properties that allow it to create secondary radiation, and it's a soft, malleable metal," said Marggraff.

The $75,000 Gordon E. Moore Award, given in honor of the Intel co-founder and retired chairman and CEO, sent Marggraff and Feddersen into a tornado of media attention.

"This is like nothing I've ever experienced before. It's not quite as scary as I thought it would be. It started before we won; the camera operators knew, like, two days before we knew! From there, it just got crazier and crazier," remembered Marggraff.

Feddersen said they didn't see it coming.

"The team that got first at State, where we got second, was just two booths away from us in L.A. We saw that and thought, 'Maybe, just maybe, we could win fourth,'" he said.

The awards were announced in a grueling fashion, with numerous fourth place awards given in each of the 17 categories.

"It goes on forever," Feddersen recalled. "Everyone is squirming in their seats. When we won, it was wild. The atmosphere was electric. It still hasn't quite sunk in."

Which doesn't mean the students are not looking to the future. "Our award comes with opportunities," Marggraff said. "We'd like to move to real cancer cell testing; possibly animal testing. The night before we won the prize we sat down and discussed it. I have no doubt it would be worthwhile to advance the project as much as possible."

"We're going to want to stay together, especially for the provisional patent and developing future research," Feddersen agreed.

The back-story-their long-time collaboration-also holds indications for what lies ahead.

"I've had a lot of ideas over the years," Marggraff said, "and Matt, every time, is the best person I can speak to. With this project, we both started researching and got really excited. As far as I'm concerned, this is a project we both developed."

He said the partnership is successful because he and Feddersen are different. He likes biology and chemistry. Feddersen is talented when it comes to applying math to science.

"He sees flaws and opportunities that I would miss. It makes it possible for us to combine our ideas and find things that wouldn't have been possible if they came out of a single field of view," Marggraff explained.

"We've been friends since fourth grade," Feddersen added. "We've had conflicts over the years and there have definitely been stressful times. Sparks will fly, but overall, it's a good mix. It's pretty equal."

They are also united when it comes to their teacher, Jay Chugh, who led them to and through the science fair.

"He doesn't like the rote, fact-based learning. He's a proponent of hands-on, project learning. He's had us do a lot of lab projects where we come up with the questions and ideas ourselves," said Feddersen.

"He's been absolutely fantastic," Marggraff exclaimed. "His teaching style is to inspire and motivate. Students don't realize how important that is. I think it boils down to conversation and discussions in class. He gets students to talk, to solidify ideas and to advance questions."

Jay Chugh has taught science at Acalanes for eight years. He's learned to never underestimate his students.

"Blake is by far the most genuinely curious student I have ever taught," Chugh said. "His zest for science is contagious, it's unparalleled. Because of that, he is the brain trust of the whole operation.

"Matt is the strongest possible co-pilot. He's equally bright, and verbal; being able to speak articulately about the project contributed to them doing so well."

Chugh is exceptionally proud of the fact that his students, unlike most of the other teams at the competition, won the award without the assistance of professional scientists, or even a class devoted to preparing for the science fair.

"As a teacher, this is as good at it gets. Luckily, for me, no matter what happens in the future, I'll always know I helped two students get to the International Science Fair-and win!" he said.

Feddersen, asked to consider the larger implications of the project, had plenty to say about cancer and the three criteria the judges identified in selecting the winners: projects had to demonstrate innovation in science, contain an original idea, and have application for real world improvement.

"One of the things we showed our judges was a map about radiation treatment in Africa: many of Third World countries have limited access to equipment. We showed that the ratio of equipment to patients is 1 to 500 in LA. In Africa, it's 1 to 1 million at the low end, and up to 1 to 10 million at the high end," Feddersen explained.

Their project, if developed, would improve the efficiency and cost-effectiveness of radiation treatments that are largely expensive and inaccessible to Third World cancer patients.

"We both have relatives with cancer. It's something you don't think will happen to you, but it affects so many people," Feddersen said.

He called the financial award "fortuitous" and will no longer have to take out a student loan to attend the University of Illinois in Champaign-Urbana next year.

Marggraff, too, will apply his $37,500 share towards tuition at Washington University in St. Louis, Missouri.

They both said they plan to continue working together, even though geographic distance will make it tricky.

Fortunately, these two young men are masterful at coming up with simple ways to solve complex problems.

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