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Teen Mentored by UC San Diego Professors Wins \$250,000 in Science Prizes

Research on anti-flu drugs relies on NSF's XSEDE supercomputers



Eric Chen and UC San Diego Professor Rommie Amaro. Image by Erik Jepsen/UC San Diego Publications

A 17-year-old senior at Canyon Crest Academy in San Diego's North County recently won not one, but three major science competitions after being mentored by two University of California, San Diego, professors in a project that combined supercomputer modeling with experimental research to speed up the discovery of influenza virus inhibitors.

In all, Eric Chen was awarded \$250,000 in prize money within the past 12 months by winning the trifecta of science competitions: the [2014 Intel Science Talent Search](#); the [2013 Siemens Competition in Math, Science & Technology](#); and the grand prize in the international [2013 Google Science Fair](#).

Sometimes called the “high school version of the Nobel Prize,” the Intel Science Talent Search is one of the oldest and most prestigious pre-college national science and math competitions in the U.S. The latest competition attracted nearly 1,800 entries. The Siemens Foundation prize, started in 1998, attracted a record 2,440 students who submitted nearly 1,600 projects this year.

Chen’s computations focused on analyzing molecules that might block the activity of an enzyme called endonuclease, which all flu viruses use to reproduce. From a database of more than 450,000 compounds, he whittled down the list to 237. Subsequent lab work identified six candidates as potential anti-flu drugs. UC San Diego has applied for patents on those potential drugs.

Chen received his training in computational biology at UC San Diego, where he used resources at the San Diego Supercomputer Center (SDSC), including the center’s *Gordon* supercomputer – another cluster that is part of XSEDE – to run molecular dynamics computations as part of the BioChemCoRe outreach program organized by UC San Diego Professor Rommie Amaro, an associate professor of chemistry and biochemistry at UC San Diego. She and Gen-Sheng Feng, a professor of pathology in the UC San Diego School of Medicine, mentored Chen.



Eric Chen holds a check for the \$100,000 he won in scholarship money in the national Siemens Competition in Math, Science & Technology. Image by Siemens Foundation

Chen used 399,000 core hours on the *Ranger* supercomputer at the Texas Advanced Computing Center (TACC), one of the systems available to researchers via the National Science Foundation’s XSEDE (eXtreme Science and Engineering Discovery Environment) program, the most advanced collection of integrated digital resources and services in the world.

“The supercomputers were vital tools in my project, allowing me to perform simulations and virtual screens requiring huge amounts of computational power,” Chen said in a UC San Diego feature story article after winning the Google prize late last year.

“Eric is a great example of an ultramodern scientist – one who is not afraid to combine all sorts of methods, not only experimental, but also computational,” said Amaro. “The computational models he developed after learning about computational biology at SDSC allowed him to

virtually prune through about half a million compounds, ultimately enabling predictions that accelerated his discovery, making his experimental bench work much more efficient and effective.”

Brian Shay, Chen’s math teacher at Canyon Crest Academy, said: “Eric won the high school equivalent of a Nobel Prize, and he’s normal and fun and goofy – and also ridiculously brilliant.”

Meanwhile, Chen said his friends have teased him on his science-fair victories, while others have stopped him in the school halls and asked to shake his hand: “It’s very humbling and awkward. I just want to inspire and motivate students to think about pursuing careers in science.”

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