



Local Students Form Nucleus on Published Academic Article

By Charlie Peters
The Outlook

Thanks to hours of research, the right leadership and a desire to change the way science is taught, six intrepid local students can proudly say that they've been published in a peer-reviewed article for an internationally read scientific journal.

Under the direction of USC assistant professor of biological sciences, chemistry, physics and astronomy Dr. Remo Rohs and La Cañada High School AP Biology teacher Patty Compeau, five students from La Cañada High – Skyler Saleebyan, Sharon Kim, Bailey Holmes, Masha Karelina and Julia Tam along with Keziah Kim from Flintridge Prep are authors in the online Journal of Biochemistry and Molecular Biology Education.

The group of students are part of the Bioinformatics Institute (DNA and Proteins) under the umbrella of LCHS' Institutes for the 21st Century program. They met on Saturdays with Rohs and Compeau during the past school year to develop a new way to describe molecular processes.

The students tested theories and pieced the article together, paragraph by paragraph. According to Compeau, the Institutes program goal is to allow students to further research their academic passions that are not

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covered in depth in the classroom. In this case, the students' work may one day be in a classroom.

“In particular, it has not been digested for educational purposes. In a good high school setting like this one, it can be used, applied and understood,” Rohs said while sitting in the Information Resource Center last month.

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According to Rohs, the terminology for protein DNA complexes was outdated.

“The idea was to find better terms to describe protein DNA recognition,” Rohs said. “There were many terms coined many years ago, when there was very little information.”

So during the school year, the students gathered every other



Photo courtesy Dr. Remo Rohs

Keziah Kim (left) LCHS AP Biology teacher Patty Compeau, Julia Tam, Sharon Kim, Masha Karelina, Bailey Holmes, Skyler Saleebyan and USC's Dr. Remo Rohs joined forces to co-author an academic article published in an online science journal this month.

month at LCHS or USC for two- to three-hour sessions to analyze three-dimensional structures of protein DNA complexes that are important in biological processes.

“What I thought would happen is that once you become serious and have to meet here every Saturday for so many hours, maybe nobody would be left but the two of us,” said a smiling Rohs, while gesturing to himself and Compeau.

But the students didn't need to be pushed: they had already created a Facebook group to organize transportation, on their own, to USC to work in Rohs' on-campus lab. During the past summer, the work only intensified. The group met every weekend for eight hours at a time, according to Compeau.

While students enjoyed the process of working through a theory as a group, the thought of being labeled as a published author while still in high school created motivation.

“I want to be a doctor, and this was a great project for me to be a part of something related to the biomedical science field,” Sharon Kim said. “When I see high school students working on something that post-doc or doctors do, I think it's really cool. It's not every day you get to see high school students working with doctors to produce something special.”

Rohs made it clear that listing the students' names as authors was not ceremonial. According to him, the students contributed just as much research and knowledge as the more seasoned academic professionals.

“I have high standards. The people who are on the paper really contributed to it,” Rohs said. “We don't just put somebody on a publication. That's why there are only six students.”

“That's a commitment far beyond what you usually see for high school students.”

In addition to six students, Rohs and Compeau, the other co-authors were Harvard Medical School's Eran Hodis, University

of Massachusetts' Eric Martz and USC's Ana Carolina Dantas Machado and USC's Iris Dror.

The Institutes for the 21st Century program – featuring approximately 15 different focuses in Compeau's estimation – allows for students to identify a subject that interests them, then actively pursue mentor-led research in that field. The program has been around for 15 years and covers everything from sports medicine to computer design to a group that worked on local trail conservation. The Institutes can be created by the students and only require school approval and a mentor with experience in a relevant field of study.

“I love the Institutes program because it's an extension of the classroom,” Holmes said. “It's not dry material you're reading. You get your hands on something.”

The program awards one unit to a student's transcript after approximately 20 hours of qualified interest work and justification have been completed, Compeau said. These students, who set goals for the project and kept journals, easily passed the time requirement.

Saleebyan is a Glendale Community student who graduated from LCHS in June. He carries on with the Bioinformatics Institute not for academic credit, but for pleasure. Compeau urged him last September to find more members for the first-year Institute.

“It was like, ‘Hey, you like biology, come here!’” Saleebyan recalled of the recruiting process. “I'm really proud of where the program went and impressed with what we did in the first year. It started small, but in the upcoming year, we can do some amazing stuff.”

Despite a sales pitch that promised even more research by its members than the academically advanced school already demanded, students were receptive to the offer to join because the value in the program was apparent, according to Saleebyan.

“What's so exciting about the Institutes program is that it gives you an opportunity to excel beyond the classroom,” said Saleebyan, who is a veteran of several Institute programs. “Most people at LCHS are passionate about something, and if they looked into creating Institutes, they'd be amazed about how worthwhile and beneficial it is to pursue their passions, and to branch out to connect with students and experts in their fields.”

None of it would have been possible without the vision of Compeau, who has helped keep the Institutes for the 21st Century alive in the science department. But the veteran teacher isn't taking any credit.

“I got to be listed [on the article] because of the brilliance here,” said Compeau, motioning to the students gathered around her. “And, because I had a key to the door.”

That key – Rohs – opened up a world of possibilities for research

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at USC's lab. Several of the students called the experience on campus in USC's biological sciences department invaluable to the process.

While Saleebyan, Tam, Holmes and Sharon Kim all easily identified their favorite aspects of scientific study, Keziah Kim was more than a little apprehensive at first.

“I didn't like science before this,” the Flintridge Prep junior admitted. But desiring more of a focused biology class she reached out to several USC professors asking how she could find an out-of-the-classroom program.

Rohs responded to her inquiry

and invited her on campus at LCHS, an offer similar to one Compeau made to him not long before.

In 2010, Rohs moved to LCF, in large part, he said, because of the quality of the school district. A parent of a Palm Crest Elementary first-grade student, Rohs wanted to do outreach at the high school so he contacted Compeau last June. She helped create an Institute tailored to Rohs' specialties and the result is something students can use as a boost in their upcoming college applications. Rohs sits on the graduate student admissions committee at USC and notices when an undergraduate has been published.

“Some students have publications, and some don't. The ones that do stick out,” Rohs said. “To have a publication as a high school student is extremely rare.”

For now, Rohs and Compeau aren't exactly sure how many people will read the article. But with two of the paper's co-authors also working with Protopedia – an online encyclopedia of molecules – there's no telling how far the students' efforts might reach.

“These pages are online, so somebody can look at them from a neighboring high school, or even worldwide,” Rohs said. “This can have an impact, potentially, far beyond the local community.”

The local community is already impressed. The students were honored at a La Cañada Unified School district board meeting last month, and first-year LCHS principal Ian McFeat was already sharing the story of their achievements on campus before school started in late-August.

The students' work showcases the value of the Institutes for the 21st Century program, and may influence more students to make their own mark.

“There are lots of students that have interest, and just need the door to be opened a bit to be inspired,” Compeau said. “If the door never gets opened, you don't even know of another level.”