

Chemistry you can dance to

June 18 2012, By Stuart Wolpert

UCLA psychobiology major Anantha Singarajah admits she disliked chemistry before taking professor Neil Garg's popular undergraduate organic chemistry course (Chemistry 14D) this quarter.

"Chem 14A was the first class I took as a first-year, and it was disheartening," she said. "By the end of 14C, I could not wait to get it over with. However, I had heard good things about 14D with Neil Garg and waited until spring quarter especially to take it with him. This class is just as amazing as everyone describes it, and now I enjoy chemistry. Professor Garg engages you, and he brings himself to your level so you achieve full comprehension. I can say that Chem 14D has been one of my favorite classes at UCLA."

You can see that joy in "Remember the Mechs," a music video that Singarajah and three of her [classmates](#) produced as an extra-credit assignment. As most undergraduates in the sciences know by now, [students](#) in Garg's course are given the option of making their own music videos about [organic chemistry](#), with lyrics containing mostly technical information about [chemical structure](#), reactions and synthesis.

Maria-Kassandra "Kassey" Coronel, a psychobiology major who helped create "Remember the Mechs" with Singarajah, said that because of this course, she now finds herself "falling back in love with learning."

"Who knew putting a chem spin on an old song could be so educational?" Coronel said. "What's funny is that after making the video, I realized every time the instrumental came up on my playlist, I found

myself rapping my chem lyrics instead of the original ones by Fort Minor.

"Professor Garg is without a doubt the best professor I have had at UCLA. He finds revolutionary ways to combine what college students like — music videos, technology and expressing ourselves — with what they need to know: organic chemistry. His passion for teaching and dedication to students is such a breath of fresh air, and it really shows when so many students, like me, are even more inspired to learn. What I love most about organic chemistry is it combines problem-solving and deduction skills with creativity, and gives me that great feeling that I'm accomplishing something meaningful. Shhh! I'm an O-chem nerd at heart now! If UCLA had a chemistry minor, I would do it in a heartbeat."

When Garg gave his students the guidelines for the music video assignment, he first showed them "Chemistry Jock," a video produced by his students in 2010 that is now approaching 60,000 views on YouTube. (Its creators, Justin Banaga, Kimberly Bui and Yannick Goeb, are graduating from UCLA this month, and all will attend graduate school.) The classroom echoed with laughter throughout the video, and one student gasped, "How did they do that?"

Then they went to work. For Singarajah, Coronel, Oz Davis and Brian Dickey, that meant 6:30 a.m. meetings that resulted in "Remember the Mechs," which itself has a few "how did they do that?" moments. (The "mechs," Coronel explained, refer to the mechanisms that show the step-by-step occurrences of a particular reaction, given certain chemical conditions.)

A common reaction among people who watch the chemistry music videos made by Garg's students is, "I love them, but what do the lyrics mean?" The answer is that they are about various chemical reactions the

undergraduates study in organic chemistry.

Garg said he is amazed by the quality and creativity of the videos. Among this year's best are "Payphone," by Karla Canizales, China Magno and Anuvir Singh, (with beautiful lead vocals by Canizales) and "Hey There Neil Garg" by Firuz Yumul, Aaron Lalehzarian, Neda Ghassemi and Tianna Wilson.

"Organic chemistry is definitely much different than I imagined; I fell victim to the horrors of chemistry when my friends told me how hard it was," said Lalehzarian, a sophomore double-majoring in neuroscience and philosophy and minoring in biomedical research. "It's not impossible. It's not even that hard. It's logical."

"Organic chemistry is usually dreaded by students," said Lalehzarian's music-video cohort Yumul, a junior majoring in Middle Eastern and North African studies. "Many students told me how dry organic chemistry was going to be and that all you do is memorize reactions. Professor Garg turned my world upside down. He showed me that chemistry can be fun, and most importantly, that chemistry can be understood. It's not magic. There's a reason why reactions occur the way they do. Professor Garg taught us how to understand the reasons behind the answers.

"Every time I forget a concept," Yumul added, "I sing the lyrics to our chemistry song. There have been a couple of instances where our song has helped me remember the reagents needed to solve a problem."

"Taking organic chemistry with Professor Garg has definitely been a highlight of my time here at UCLA and was one of the best decisions I've made here," said second-year psychobiology major Ghassemi, a pre-med student and "Hey There Neil Garg" collaborator. "It's as if his passion for chemistry literally spreads throughout the entire lecture hall.

He teaches in a way that makes organic chemistry interesting and understandable for all of his students. I think I can speak for almost everyone when I say that missing a lecture never even crossed our minds because Professor Garg makes each class so intriguing.

"I have come to love O-chem after taking his course because not only did we learn essential problem-solving skills from all of the reactions, but we were also given the chance to understand the bigger picture of how these problem-solving skills are used by chemists to synthesize drugs and make cutting-edge discoveries that can create a difference in the world. Just as he told us, the problem-solving skills we develop in Chem 14D can help us excel in any field we choose to follow."

For the first time, Garg, an assistant professor of chemistry and biochemistry who will be promoted to associate professor next month, also gave the students an assignment to create ringtones this year. The "Still Chemin" ringtone by Yumul and Lalehzarian is arguably the best.

Many of the music videos are quite clever. The inspired lyrics to "Payphone," written by China Magno, include:

If 'happy ever after' did exist...

BR wouldn't need a catalyst...

SN1 would only be one step

Retrosynthetic analysis, we wouldn't have to do those on a test

"I've always dreaded chemistry, and it actually used to be my least favorite subject," said Canizales, the second-year psychobiology major and pre-med student who provided the "Payphone" vocals. "However, after taking this class with Professor Garg, my mind has completely changed. Chemistry 14D with Professor Garg has been one of my favorite classes I've taken at UCLA thus far. I have never had a professor like Neil Garg. He cares so much about his students and wants

everyone to learn. I loved this class. Singing is my passion, and I have been doing it since I was little. I'm grateful I had the chance to do what I love and actually learn chemistry at the same time."

"I didn't realize that while making the video — writing and recording the song and hearing it over and over - the concepts were constantly being reinforced," said Magno, a second-year student majoring in molecular, cell and developmental biology who was also a "Payphone" collaborator. "I definitely catch myself singing the lyrics in my head whenever I forget a concept. Chem 14D is hands-down one of the best classes here at UCLA if you have Neil as your professor."

This quarter, 250 students created 83 music videos. A few of the students said — and Garg agreed — that they receive relatively few extra-credit points for all the hours they spend creating the music videos. But none said they regretted doing so. At Garg's recommendation, many of them incorporated a "Lord of the Rings" theme into their videos.

One of the favorite videos of Garg and his teaching assistants is "The Beastie Gargs" by Basheer Alas, Haddy Alas, Tarik Takkesh and Neyamatullah Akbar.

Garg, who last year won UCLA's Hanson-Dow Award for Excellence in Teaching, knows the vast majority of his students start the class with no love for organic chemistry, but that doesn't bother him. It motivates him.

"I welcome the challenge," he said.

The students learn a tremendous amount by creating the [music videos](#).

"When I sit down and see an SN1 problem, for example, our lyrics come to mind: 'They call it SN1 and it's in three little steps,' and I know how to approach it instantly," said Singarajah of her "Remember the Mechs"

video.

"I am so grateful that Professor Garg gave us the opportunity to make an O-chem music video," said Ghassemi ("Hey There Neil Garg"). "Trying to think of lyrics that rhymed for our video was one of my favorite parts. My group members and I got together in a classroom, took a piece of chalk and just started writing verses on a board. We had so many great laughs that day with all of our spontaneous ideas. I found myself remembering steps to reactions more easily when doing problems because I was unconsciously singing our lyrics in my mind throughout the day. It was great!"

Writing the lyrics was intellectually stimulating, said Oz Davis, one of the creators of "Remember the Mechs." He said it helped him to remember chemical reactions.

Lalehzarian said he enjoyed collaborating with Yumul, Ghassemi and Tianna Wilson on "Hey There Neil Garg" and found making the music video to be fun and educational.

Many of Garg's students praise him for the genuine concern he shows for them, his love of teaching and passion for chemistry, his ability to connect with students, his skill at teaching critical thinking and a 'problem-solving mindset,' and his creativity, patience and ability to create a sense of camaraderie.

"There's a lot of praise for him on websites like Bruinwalk Professors," Lalehzarian said, "but they actually understate how great a professor he truly is. When we have a professor whose goals are to teach organic chemistry as well as humanly possible and to see every single one of his students succeed, then the teaching and classroom experience become genuine and unparalleled. He is not teaching Chem 14D because it is mandated by UCLA. He is teaching Chem 14D because he has a strong

passion for it. Go to one of his classes and you will see for yourself. Quite honestly, any praiseworthy words for Neil as a professor and dear friend should be considered understatement. He is just that good."

"Professor Garg really showed us a different side of organic chemistry by teaching us concepts that are applicable to real world chemistry and life in general," Wilson said.

Ghassemi was impressed that the second time she went to office hours, Garg knew her name and the names of the other undergraduates who were there - from a class of more than 300 students.

On the last day of class, Garg asked his students how difficult the course was. Three-fourths said it was not too difficult.

"This is a really hard class," he told them, "and you've done really well."

Garg said he expects great things from many of them in the future. The students gave him a rousing standing ovation.

"I will really miss this class and the enthusiasm among the students when learning," Coronel said. "Professor Garg and his super TAs have worked so hard to achieve this, and our standing ovation is only a small window into our deep appreciation."

"I know I will never forget Professor Garg's class," Ghassemi said, "and will forever treasure the lessons learned and the memories made in organic chemistry. He really wants all of us to excel. We experienced unforgettable moments in organic chemistry that we shall always cherish."

[See the teaching section of Garg's website for more information.](#)

Provided by University of California, Los Angeles

Citation: Chemistry you can dance to (2012, June 18) retrieved 2 May 2024 from <https://phys.org/news/2012-06-chemistry.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.