In the Community

Ask a Caltech Student

Group • 587 members

+ Join

On "Ask a Caltech Student," a Facebook group begun this spring, students and families in both the local Pasadena area and beyond have been encouraged to reach out to Caltech graduate students with science and math questions that are related to the schoolchildren's schoolwork and homework.

The group was created in March 2020 by the Institute's Center for Teaching, Learning, and Outreach (CTLO), in collaboration with Raj Katti (BS '14, MS '19), a graduate student in physics, in response to the closure of schools in Los Angeles County due to the COVID-19 crisis and the resultant move to distance learning.

"I realized that if there were Caltech grad students with some free time and Pasadena-area students with questions about their homework, there had to be a way to connect up those two groups," says Katti, who brainstormed with CTLO outreach program manager Kitty Cahalan (PhD '00) to come up with the plan. Since CTLO is not set up to run direct tutoring programs, Cahalan and Katti landed on the concept of an open forum on social media where people could ask questions and potentially receive multiple answers from students in a threaded conversation.

Within 24 hours of creating the Facebook group, 220 people had become members; about two-thirds of those were graduate students, and a third were local community members.

Katti attributes the enthusiasm around this initiative to three factors: "the enjoyment of teaching, an interest in helping out the community, and good old-fashioned boredom." Fellow graduate student Michael Mazza, whose expertise is in chemistry, adds, "Grad students had to suspend their research activities for weeks. Engaging with students who are learning the material for the first time can reignite the feeling of discovery and excitement that first pushed us down this career path."

"What are some good ways to explain to a 9-year-old why batteries shouldn't be allowed to connect to each other's ends?"

"It's really providing an opportunity for the grad students to share and celebrate what they love about what they do," says Cahalan, "and they're hungry for that right now."

Rather than provide answers to specific problems or equations, the goal is for the Caltech students to explain the underlying concepts, post links to outside content, and share resources for additional help. The group is moderated by Cahalan and CTLO associate director for educational outreach Mitch Aiken.

"How do scientists know what's in the middle of planets?"

The Caltech students need to calibrate their responses to a K–12 audience, which brings its own challenges but has become a learning opportunity those involved have embraced. "Thinking of how to best describe and introduce new scientific concepts to students is an intellectually demanding and rewarding experience in its own right, so I definitely gain a greater understanding of the material myself," says Mazza. "The sign of a talented scientist isn't how complicated they make their work sound, it is how clearly and concisely they can illustrate it."

As Cahalan notes, the threaded conversation format is also helpful, since a student who does not understand the first explanation of a problem offered may have an "aha" moment with the second or third. "Somebody may explain it one way," she says, "but then maybe somebody else says, 'Here's how I learned it,' or, 'Here's another way of approaching this problem.'"

Though the focus has been on schoolwork and homework, Cahalan sees the potential for a broader community impact. "I would love to have a space where kids who have these questions can go in and just say, 'Talk to me about your research or career path.'"

"If we all have to slow down and explore things from our computer now," she adds, "there are probably worse things to have access to than a bunch of really smart, excited grad students who have some time to talk about what they're interested in."

—Judy Hill

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Origins

Ready, Set, Spark!

When Caltech's former Sloan Lab reopened in January 2019 as the Linde Hall of Mathematics and Physics, staff, faculty, and students encountered a structure with a transformed interior that was originally built 97 years ago. The modernized building now boasts open, flexible meeting spaces and ample blackboards for its resident mathematicians.

Over the course of a century, it has witnessed many changes, evolving to suit the needs of the disciplines it has served: physics, mathematics, and electrical engineering. Originally known as High Volts, the building came into being in 1939 out of a partnership between Caltech and the Southern California Edison company, which contributed money to its construction in exchange for its use for research. The interior during those early days was dominated by a single large industrial space packed with high-voltage apparatus. A million-volt surge generator produced rapid impulses of artificial lightning (as seen in the c. 1920s image below of a lab demonstration).

In a 1985 oral history, Caltech chemistry professor Jack Roberts (1918–2016) recalls visiting High Volts as a teenager for a demonstration on high-voltage electricity by Royal Sorensen, professor of electrical and mechanical engineering: "It looked like Frankenstein's laboratory. Great transformers topped with big mushroom rings … they'd charge up these things, and they'd start shooting off sparks, or they'd have a 'horn gap,' where a pair of wires would be close together at the top of the transformer and far apart at the top of the room. They would start an arc at the bottom and it would grow in length and rise to the ceiling. … They'd make this crackling noise as they'd go up. And then they'd charge up the condensers and shoot off a big spark. … That was really impressive!"

—Peter Collopy, University Archivist

Learn about early Caltech at "Becoming Caltech, 1910–1930," a series of online presentations (**library.caltech.edu/becoming-caltech-presentations**). Read more on the origins of High Volts at **magazine.caltech.edu/post/spark.**