LAB & LIFE

When labs welcome under-represented groups

To diversify science, some labs open summer doors wide to reach out to under-represented groups.

"Whoa, this is something you can do?" says Angelica Rippee, a Latina who is the first college graduate in her family. "I didn't know about higher education." When she applied to the one-week Undergraduate Student Initiative for Biomedical Research (USIBR) in the lab of Michelle Digman in the Department of Biomedical Engineering at the University of California Irvine, "I was a very confused undergraduate student," says Rippee. After a short stint at a Florida college she had returned to Orange County, California, and was attending two community colleges — Cypress College and Fullerton College — and worked part time. The USIBR week with Digman, who is Latina, and her team is geared toward people from backgrounds under-represented in science: undergraduates, local community college students and 'exceptional' high school students. "She's a great professor," says Rippee about Digman, and "super easy to talk to."

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Rippee recently graduated from the University of Hawaii in marine biology. She is working toward her master's degree, working part-time at a pharmaceutical company and hunting for a PhD program. During her USIBR week, lectures in the morning were followed by hands-on work with Digman and her team in the W.M Keck Nanoimaging Laboratory and the Laboratory for Fluorescence Dynamics. Rippee learned how to use optical imaging for 3D tracking of lysosomes in cells and how to analyze the data. The experience made her realize she wants to become a scientist.

Sabreen Alam, who is South Asian, is an incoming freshman at Princeton University. She first applied to USIBR in the summer after eighth grade and has interned in the Digman lab ever since. "My favorite part of USIBR was definitely the unique hands-on lab experiences," says Alam. She learned how to culture cells, do fluorescence microscopy and, she says, experience the creative and analytic approaches a researcher needs. Because of COVID-19, USIBR

was virtual one year. In that week, she and her cohort optimized a do-it-yourself gel electrophoresis system. Overall, she experienced how much it matters to meticulously plan an experiment and learned "the dedication required to work on the cells' schedule and not my own."

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"It's just amazing how much these students can do in a week," says Digman who integrates USIBR projects with ongoing research in her lab. She grew up in Kane County, Illinois, which has two community colleges, and was surprised to find, in UC Irvine's vicinity, 17 community colleges that serve nearly 170,000 students. She reached out to engage students who lack, for instance, access to imaging systems and the typical training at four-year institutions. At the end of the USIBR immersion week, students present findings to one another. "You could see how happy they were," says Digman. "They accomplished something and they contributed to science."

Before Mackenzie Weygandt Mathis became a scientist and open-source developer, she showed horses professionally in her native California, she says. She had met veterinarians, but never a scientist, and didn't know science was a career choice. Now, in her integrative neuroscience lab at EPFL's Geneva campus, she wants to democratize artificial intelligence techniques and make computer science more diverse. She and her EPFL collaborator Alexander Mathis, who is also her husband, have just started the summer DeepLabCut AI residency for groups under-represented in computer science. "I'm super-excited," she says. The program has support from the Chan Zuckerberg Initiative's Diversity Equity and Inclusion program, EPFL and Nvidia. The two researchers co-developed the open-source DeepLabCut (DLC) and Multi-Animal DLC to help neuroscientists more easily track animals in their behavior experiments. The software has been downloaded over 375,000 times and applied to a wide variety of animals. "I'm super proud and humbled," she says. "And at the same time, it's a huge responsibility."

Vic Shao-Chih Chiang is in the inaugural group of DeepLabCut AI residency fellows and self-defines as a gay cisgender male born in Taiwan. When he was seven, his parents emigrated to New Zealand with him. Growing up, he faced both racism and homophobia. When he moved to University College London to study neuroscience, he took part in a range of events and, he says, "I became more woke." He began hosting debates through Open Mind, which fosters discussion across divides, and he read widely beyond neuroscience. It gave him deeper cultural awareness and shaped his motivation to empower marginalized communities, he says.

At the University of Massachusetts, Boston as a PhD student in the lab of Jin Ho Park, he studies the neuroscience of sexual diversity, such as how sexual behavior can be independent of sex steroid hormones. When studying sexual behavior in animals, Chiang has come across issues such as experimental bias due to too few behavioral parameters, the variability of results between observers, and labor-intensive manual methods.

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Although not formally trained in computer science, he learned to code and began exploring machine-learning-based high-throughput approaches such as DLC. Among its features, it lets labs collect data from a smaller number of animals. The residency appeals to him as a way to support diversified AI and to make open-source software widely accessible. Chiang plans to use DLC in a research methods course he is teaching in the fall of 2022. Says Chiang, "I want to shape DeepLabCut in a way that makes it even easier for marginalized minorities, a prevalent population in my university, to use." ❐

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