



2025 Caltech SURF Reflection

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Background

My major is electrical engineering, but my research interest is theoretical physics. Apart from the electrical engineering curriculum, I also explored a lot of physics elective courses in my first and second year, such as atomic & molecular physics, quantum optics, statistical mechanics, and quantum field theory. Last summer I interned at Academia Sinica to work on measuring and controlling a superconducting quantum computer. I was a rising junior when I participated in the SURF program, during which I worked on Monte-Carlo simulation of an atomic beam in the Stern Gerlach experiment.

My career goal is to become a researcher, therefore, I applied for SURF for three major reasons: to see the frontier areas of research, to experience different cultures and life as a researcher, and to build connections. SURF gave me all these and more.

Which Lab should I Join?

When I was applying to SURF, I spent a lot of time trying to decide which lab would be the most helpful to me or best matched my skill set. However, I later realized that this is actually a great opportunity to explore areas you aren't familiar with and expand your toolbox. Your project should be related to your skill set, but it doesn't need to be something you are already an expert in.

How to Apply?

I reached out to many professors by email, watching their talks and skimming through their papers to come up with details I can mention. Honestly, I couldn't understand a large portion of what I was reading—but I don't think that's a problem. You're there to learn, and showing genuine passion for a project is just as important as showing prior knowledge.

One thing you should definitely do is reach out not only to professors but also to postdocs. If you discover a topic that excites you through a postdoc's work, it's worth contacting them directly. In many labs, postdocs play a key role in deciding who to take on. Building a connection with them can really help, and they're often more willing to guide you through material that initially feels overwhelming.

Socializing

One very important thing is to socialize with others. You can learn what life is like at other universities, discover the projects they are working on, and simply make good friends. I learned about many research opportunities and discovered areas of research I had never even known existed! Going out with them is also really fun—especially if they're from California, as they can take you to places you wouldn't be able to reach without a car or to hidden spots you didn't know about.

Interesting Events

In addition to the usual weekend tours, Hixton Writing Center talks, and other activities listed on Caltech Canvas, here's a list of interesting events that not many people know about, but are definitely worth checking out:

Quantum SURF: Professors give talks about their labs, offer lab tours, and even take you out for dinner (free and delicious!). It's a great opportunity to learn about different research areas and see research from a professor's perspective. There's also a poster presentation in the 9'th week where you can showcase your own work.

I was not initially in the Quantum SURF program (it is for quantum experimentalists), but after contacting the event organizer Prof. Faraon, he kindly let me join.

Climbing sessions: Every Tuesday and Thursday, a professional climber supervises the vertical wall. I learned how to climb

Basketball games: Held every Wednesday and Friday night.

Badminton club: Every Tuesday and Friday night.

Just talk with professors: Many of them are really approachable and happy to chat. If there are other professors who you'd like to work with, just email them or knock on their doors!

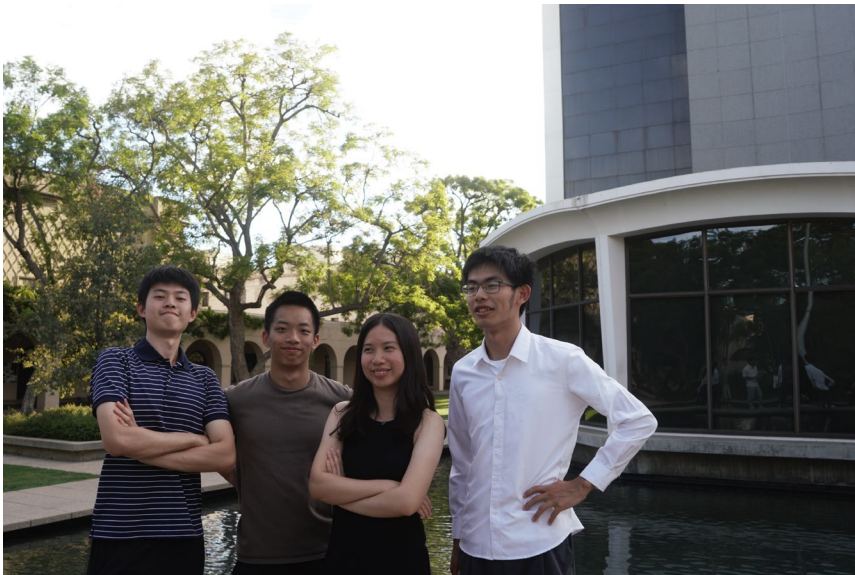
Outside of School

Living in the U.S. taught me how to handle daily life on my own—from managing banking and grocery shopping to cooking—basically everything needed to get by independently. At the same time, hanging out with friends from Taiwan was a lot of fun and helped us build a strong bond and a real sense of camaraderie.

Summary

This SURF gave me opportunity to explore many areas of physics research and meet a lot of interesting people. Conversations with professors prompted me to think more about whether I want to work on high energy theory, condensed matter theory, or quantum computing, and my own research taught me how to work with a mentor and how to overcome obstacles. This combined with new friends I made along the way make this experience incredibly memorable.

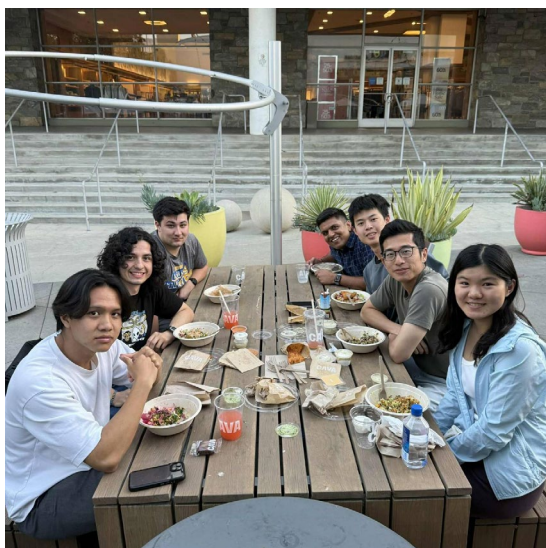
I want to express my deepest thanks to my PI, Lihong Wang, for his mentorship. A special thank you also goes to James Oyang. His support was not only financial; he truly brought us together as a group and cared for our needs every step of the way."



"Hell's Kitchen"
Group photo

6-Flag





Quantum SURF
Dinner at Cava



Mt. Wilson Observatory Trip



Dodgers Game
My first in-person
baseball game

Dinner at Sichuan
Street Food

