

Joining a research group at Caltech

“The advisor is the primary gatekeeper for the professional self-esteem of the student, the rate of progress toward the degree, and access to future opportunities.”

--- Professor Sheila Widnall, past president of AAAS (Science 1988, 241, 1740.)

Finding an advisor and lab group is one of the most important tasks you will have during your first few terms at Caltech. A good fit will allow you to grow as a scientist and set you up for success after graduation. A bad fit can lead to headaches and frustration for both you and your adviser.

This page contains tips on how to go about the group selection process and maximize your odds of finding a good fit. However, even with due diligence, bad fits can happen. If you eventually find that the relationship you have with your adviser / lab group is not working out, don't despair – switches from bad fits to good fits happen more often than you think, and we have another page on how to tackle that problem.

Tip #1: Start early

The deadline to join a lab group is by the end of the second term. In practice, most students join a group by the end of the first term. Funding constraints often limit the number of the students an adviser can accept each year. Therefore, you increase your odds of finding a good fit by starting the group selection process early. After the visit weekend and confirming your acceptance to Caltech, you should have a preliminary list of research groups that could be good fits.

Over the summer, contact these potential advisers and students in their groups with additional questions that did not come up during visit weekend. Student contact info is almost always on the research group website.

When you arrive at Caltech, set up meetings with professors to discuss potential research projects and also try to hang out with their students. One approach is to email a student asking for a lab tour, and then ask them informal questions during the tour. Another approach is to simply invite a student to coffee and discuss what life in the lab is like.

You don't want to rush the selection process; starting early gives you plenty of time to make a decision before a lab group fills up. Neither professors nor students can commit to an advising relationship until November of the first year. Use the time before this wisely.

With Tip #1 in mind, should I come early and start a research project the summer before graduate school?

This is a tough question. There is no denying the benefits to coming early. Since chemistry does not do formal rotations, starting a research project over the summer is effectively a way to do a rotation. There is no commitment that you continue the project after the summer ends. If both

you and the professor thought the experience went well and would like to continue the project, then you can most likely join that group come November. If the experience did not go well, then you benefit from that knowledge and can just cross that group off your list.

You are also more familiar with Caltech and Pasadena in general before the stresses of coursework begin. However, many students use this summer as a chance to travel, spend time with family and friends, pursue non scientific interests, or simply relax before the grad school marathon begins. Those who have just finished undergrad may especially need this time to reenergize. Ultimately, the decision to start early or a take break is a personal one.

Tip #2: Consider more than just research interests

It is important to join a lab that does research you find exciting, as this is the work you will be doing for the next 5 – 6 years. However, there are many factors to consider beyond just research interests. If you are unhappy in a lab, you are unlikely to be productive no matter how interesting you find the work. It may be a good idea to join a lab where the research is slightly less exciting, but the overall fit is better for you. Here are some things to consider:

- Is the adviser hands-on or hands-off? How often do they meet with students?
- What is the hierarchy within the lab? Will you discuss your project with a senior grad student or postdoc, or will you discuss it directly with your adviser?
- Is there a support system for getting new students started on their projects?
- What is the group dynamic like? Do group members spend time together outside of lab or are they solely colleagues?
- What is the reputation of the adviser among students within the department?
- How is the work-life balance? How many hours / week are expected and how much vacation time is allowed? What time of day are you expected to work? Are you expected to work over weekends and institute holidays?
- How much funding does the lab have? Are you expected to be a teaching assistant, be applying for fellowships, or will your adviser pay for you from research grants?
- How often is group meeting and how often do you present? Is the meeting formal or informal? Is there a regular subgroup meeting? Journal club?
- How often does the adviser publish? How often do individual students publish?
- What do alumni end up doing? How supportive is the adviser in helping graduates acquire their next position? (try talking to senior students)
- What opportunities are there for professional development? Do students get to attend conferences and/or workshops?

You can find out the answers to these questions by talking to the potential adviser and a variety of graduate students. You should then evaluate these factors based on your own individual preferences for advising style and group culture.

Tip #3: Talk to students both in and out of the groups you are considering

Talking to students in a research group is the best way to learn what life is like in that lab. Experiences often vary across different projects and student personalities. Therefore, it is important to talk to multiple students in a group. Try and find both the happiest and unhappiest students to get an accurate representation. Be respectful of students who open up and share information with you. If a student shares something personal about their experience in a lab, do not tell others without their permission.

It is also beneficial to talk to students that are outside the research group of interest but in the same subfield. They may have a different perspective on that group and you can evaluate if any of the reasons they chose not to join apply to you. However, keep in mind that they are secondary sources of information.

Tip #4: Attend group meetings, group lunches, journal clubs, etc.

Professors and students can tell you what their interactions are like, but there is no better way to find out than by observing them firsthand at a group meeting. After arriving on campus and meeting with a professor, ask them if you can sit in on their group meetings – almost all will say yes. This allows you to actually observe how scientific discussion and feedback takes place between an adviser and their students. If the group has a regular lunch together or journal club, ask a student if you can attend. This allows you to observe informal interactions and assess the group dynamic for yourself.

Tip #5: Attend the first-year seminar nights

During the first few weeks of the fall term, there will be an evening seminar series where faculty present on the research taking place in their groups. While it is a good idea to already have potential advisers in mind, these seminars give you up-to-date information on the research activities and directions an adviser envisions over the next 5 – 6 years. Group websites are often out-of-date, and a faculty member may be starting work in a new field where they have yet to publish. These seminars give you a way to receive the most current information.

You may also learn about a project that is outside your current expertise, but sounds really cool. Students often end up happily working projects that are very different from their initial interests. It pays to keep an open mind. And finally, you never know when you'll need help from another field. A physical chemist might need help one day with a synthesis, and an organic chemist might need help one day with a laser. Knowing broadly what research takes place in the department can be very valuable.