

# Caltech

**Graduate Option in  
Biochemistry & Molecular Biophysics**  
Divisions of Biology and Chemistry

**GRADUATE STUDENT INFORMATION**  
**2021-22**

## INTRODUCTION

This short handbook is a compilation of information about various aspects of the graduate program for the Ph.D. in Biochemistry & Molecular Biophysics (BMB) at Caltech, providing more detail than the *Institute Catalog*. It is intended as a reference source that can be used whenever questions arise about policies and practices relevant to the program. Please note, though, that the official policies and requirements are as specified in the Catalog. Should you have any questions, check with the BMB administration.

## ADMINISTRATION OF THE GRADUATE PROGRAM

The following persons share responsibility for administering the BMB Option:

### **BMB Option Representative: Bil Clemons**

The Dean of Graduate Studies considers the BMB Option Representative responsible for the BMB option, and who is therefore authorized to sign petitions, candidacy forms, etc. The Option Representative is also responsible for planning the financial support arrangements for each student and is the person to seek out if you have unusual problems that are not resolved through discussions with your advisor, advisory committee, or other colleagues.

**Contact:** [clemons@caltech.edu](mailto:clemons@caltech.edu); x1796; 157 Broad

### **BMB Graduate Option Manager: Courtney Oaida**

Handles the administrative aspects of the BMB Option including payroll, admissions, publications, website maintenance, and records for BMB graduate students.

**Contact:** [coaida@caltech.edu](mailto:coaida@caltech.edu); x6446; 162 Crellin

### **Executive Officer for Biochemistry in CCE: Shu-ou Shan**

Responsible for teaching assignments and other administrative responsibilities.

### **BMB Admissions Committee: Bil Clemons (Co-Chair), Shasha Chong, André Hoelz, Daniel Semlow, Shu-ou Shan, David Van Valen, and Rebecca Voorhees (Co-Chair)**

Responsible for organizing student recruitment and coordinating the admission processes.

Ultimate responsibility for your education rests with the Chairs of the Divisions of CCE and BBE, Dennis Dougherty and Richard Murray, and the Dean of Graduate Students, David Chan. You should consider them to be available as resources if you need help beyond that provided by the others involved in the graduate program.

Together, these individuals advise the Option Representative on policies for the graduate program in Biochemistry and Molecular Biophysics (BMB).

## POLICIES AND REQUIREMENT FOR THE PH.D. DEGREE

### Advisory Committees

Upon arrival, incoming students meet with the Option Representative and Option Manager, who will assist the student in organizing rotations through several laboratories and will also look at a student's past record and decide what additional course work is desirable. Both will counsel and oversee the student's progress upon admission to the graduate program.

### Required Courses

During the first year of graduate study, students are required to participate in the BMB 202 seminar course and BMB 174. Additionally, students are required to take five additional advanced courses of nine or more units for a grade (not Pass/Fail) that are appropriate for their particular research interests (as approved by the Option Representative).

### GPA

Students should maintain a GPA of 3.0 at all times. In the event that a student's GPA falls below a 3.0, they may be placed on academic probation. Admittance to Candidacy requires a GPA of 3.0 or higher.

### Rotations

In consultation with the Option Representative and individual professors, students will choose three laboratories in which to do 10–12-week research projects during their first year of residence. These laboratory rotations are designed to provide the student with an introduction to different areas of biochemistry. Research advisors are normally selected at the end of the first year. It is possible to waive one of the rotations by petitioning the Option Representative, although it is not guaranteed. All first-year students will discuss their projects in a 10-minute talk during the Rotation Seminar held at the end of each quarter.

### Teaching

All students are to serve as teaching assistants for two quarters with the first in the first year of residence and the second by the end of the fourth year. In addition to serving an educational purpose, funds for the TA assignments are a component of the stipend. Outside factors, such as previous TA positions prior to starting the Ph.D. program, may be considered as satisfying the requirement upon approval by the Option Representative.

Most incoming students will be assigned a GTA position in one of our introductory courses such as Bi 1, Bi 8, Bi 10, Bi 12 or Ch 1, Ch 3, Ch 4. The second TA will typically be for a BMB course, although alternatives are acceptable if they are appropriate to a student's interests. The Option Manager makes these assignments usually during the summer, and if you have preferences for a GTA assignment to a particular course, you should indicate your preference in June, or earlier.

### Qualifying Examination and Admission to Candidacy

By the end of the sixth term of residency (spring term of the second year), the student will take an oral examination to assess mastery of the field of biochemistry and biophysics and to evaluate research progress. **Note: The course requirements must be completed before the student can advance to Candidacy.**

The student is responsible for finding a date, time, and location for the exam. The student in consultation with his/her thesis advisor will assemble a Candidacy Examination Committee. The committee should consist of the student's thesis advisor and three or four BMB faculty members (faculty outside of the BMB option may also be members of the committee) and is chaired by a faculty member other than the student's advisor. Once the exam is confirmed with all committee members, the student will schedule their exam through REGIS.

As part of this examination, each student will submit:

- A written research report summarizing the progress in their research and their plans for the thesis. Please plan a presentation length of approximately 20 minutes.
- An original research proposition in a field *outside* the student's chosen field of research. The committee chair should be contacted early in the winter term to discuss the idea for the outside proposal in order to ensure that the topic itself is acceptable. An oral presentation is not required but the student will be expected to defend the material.

Suggested guidelines for the exam are:

- An oral presentation of 15 to 20 minutes with 10 to 15 slides.
- Written proposals: 20 to 25 pages for your research proposal and approximately 15 pages for your out-of-field proposal.

At the time of the proposal defense, the Exam Committee will enter their results on REGIS indicating whether or not the student demonstrated the capacity to do research. This evaluation will include, but will not be restricted to, consideration of the following:

- The motivation to think about complex problems, and devise creative approaches to solving them
- The motivation to find out what is going wrong with experiments when they do not work and to fix them
- Patience
- Perseverance in the face of difficulty and frustration
- The motivation to work hard
- A commitment to science as a high priority in life
- The capacity to become *engaged* in a problem
- The capacity to identify the most important aspect of a problem and the discipline to maintain experimental focus on the issue

Guidelines for the evaluation of such proposals are attached (See Attachment #1).

When the student advances to candidacy upon successful completion of the exam, the Exam Committee will become the Thesis Advisory Committee and will meet with the student once a year to evaluate research progress. This committee will also serve as the Ph.D. Thesis Examination Committee.

In the event that there is inadequate evidence for the capacity to do research, the student may petition to allow postponement of admission to candidacy, for a period of up to six months (until December of

the third year of study). Both the Thesis Advisory Committee and the Option Representative must approve the petition. If there is a disagreement between the student and major professor (thesis advisor), the student may elect to switch to a different laboratory for the remaining six-month period to demonstrate the capacity to do research. Additional postponements beyond the end of the third year of study in the BMB Option would not be allowed except in extraordinary extenuating circumstances such as extended medical leave (i.e., the student must either be admitted to candidacy or asked to leave graduate school).

### **Thesis Advisory Committee meetings**

All graduate students in the BMB Option are required to hold yearly meetings with their thesis committee. These meetings are to be held by 15 June of each year. If a meeting is not held in any given year, the student will be prevented from registering for the subsequent fall term. Compliance with this policy will be monitored by submission of meeting details into REGIS, which are then approved by the Option Manager. Exceptions to this policy, which can be granted only by the Option Representative, will be granted only in extraordinary circumstances.

### **Meeting requirements**

For students who have passed their candidacy exam, the purpose of the annual thesis committee meeting is for students to get feedback on their experiments and future plans, so students should plan their presentation accordingly. Students should spend only a few minutes on background (1-2 slides), then present experimental results. Show as much data as possible, especially for experiments that are not working, because your committee members may have helpful suggestions. Bring relevant notebooks to the meeting and be prepared to show data that has not yet been made into slides. If you have published a paper in the last year, please forward it to your committee members before the meeting; however, do not spend a lot of time summarizing it. This meeting's purpose is to get feedback on your current experiments and your planned experiments, not to discuss experiments that have already worked. Please plan on presentation lengths of approximately 30 minutes (or not more than 20 slides).

### **Meeting format**

- At the beginning of the meeting, you will be asked to leave the room briefly while your thesis advisor and committee members discuss your progress.
- You will then give your presentation (plan a ~20-minute presentation, with ample time for questions), after which you will leave the room again.
- After you return, the chair of your committee will summarize any recommendations the committee members have for your thesis work.

### **Progress towards your degree**

A graduate student who is making "normal progress" towards a Ph.D. degree can expect to continue as a registered student with full financial support. Normal progress should result in final selection of a laboratory in which to carry on your thesis research before the end of your first year in residence, passage of the qualifying examination in May of your second year, and completion of your Ph.D. within five years. However, we recognize that performing high-quality research is difficult, and that exceptions to these desired norms are sometimes necessary. In particular, extension of study beyond the fifth year

is becoming increasingly common. Although your research should be planned for completion within five years, extension into the sixth year may be necessary if there are unexpected setbacks or delays in the research. Extension of graduate study beyond that necessary to complete a respectable Ph.D. thesis—simply to allow a student whose work has gone well to accumulate more publications—is not encouraged.

Institute regulations (as stated in the [Institute Catalog](#)) require that you petition the Dean of Graduate Study for permission to enroll in your sixth year or beyond or if you have not been admitted to candidacy after three years. These petitions require the approval of the Option Representative for BMB, which will be given only if there is a positive recommendation from your Thesis Advisor. Petitions to extend registration for both Ph.D. and Candidacy are located [here](#).

A faculty member who is supervising graduate students is expected to be informed about the progress being made by each of his/her students. In any case where a faculty member believes that a student is making less than normal progress, it is that faculty member's responsibility to communicate that opinion to the student, and to the Option Representative. Most faculty members will also want to commend their students when things are going well and reassure them when progress is slow, but within the normal range, etc.

One of the important functions of our system of initial Advisory Committees and Thesis Advisory Committees is to provide an opportunity for a wider evaluation of a student's work in any case where a student feels that his/her supervising faculty member's judgment of less than normal progress is unfair or incorrect. However, this system can only work if the supervising faculty member behaves responsibly in communicating concerns to the student, and if the student takes the initiative to involve the Advisory Committee, either by discussions with individual committee members or by meeting as a group. A more formal operation of this system occurs at the time of admission to candidacy for the Ph.D. degree and at the time of the final Ph.D. examination. However, the system is intended to function to prevent any surprises at these meetings.

In a more positive vein, it needs to be emphasized that the primary function of the Thesis Advisory Committee is constructive guidance toward the timely completion of the Ph.D. program, to supplement the guidance provided by a student's faculty supervisor. For this purpose, you should meet with your Thesis Advisory Committee sometime during your fourth year for an interim review of your progress.

During your fifth year, there should ideally be a meeting with the Thesis Advisory Committee at approximately the time that the experimental work for the thesis is completed and you are ready to actually write the thesis. This is an especially important meeting, at which the committee members should satisfy themselves that the research results, when presented in detail, are likely to produce an acceptable thesis. The plan for the organization of the written thesis should also be approved. If the end of the fifth year is approaching, and it appears likely that continuation of study and research beyond the fifth year will be necessary, the meeting with the Thesis Advisory Committee must result in the preparation of a specific plan, approved by the committee, outlining what needs to be done to complete the thesis and when it should be expected to be done. This plan must be submitted to the Option Representative along with the [petition form](#) requesting permission to register beyond the fifth year.

In any cases where extension beyond the sixth year is anticipated, each request for extension must again be based on approval by the Thesis Advisory Committee for a specific plan for completion of the Ph.D. In these cases, the committee should also consider whether financial support for the student should be continued and make a recommendation to the Option Representative.

Students can request meetings with their Thesis Advisory Committee at other times, if particular problems arise. In addition, the student's faculty supervisor, or the Option Representative, can request that meetings be held if there are indications that more frequent monitoring would be valuable. This might include students who perform passably but not strongly on the qualifying examination, students who have been on leave of absence, and/or students whose work is erratic, perhaps indicating personal or motivational problems. However, such problems should be identified and resolved before admission to candidacy. The student's faculty advisor during the years before admission to candidacy has a particular responsibility to alert the student to any such problems at the earliest possible stage.

### **Completing the Ph.D.**

Requirements for the Ph.D. thesis and examination are determined by the Ph.D. examination committee that is appointed by the Dean of Graduate Study for each degree candidate. This committee is usually the same as the Thesis Advisory Committee, but this is not essential. The composition of the committee must be approved by the Option Representative. The committee usually has at least four members who are Institute faculty.

### **The Ph.D. Thesis**

The thesis is expected to demonstrate that the student has learned how to conceive, plan, and execute experimental and/or theoretical work that reveals new biological information and is comprised of a coherent body of novel scientific work. In addition, it must reveal a deep, broad, and rigorous understanding of the area of research to which the thesis is relevant. Development of new methods may be a major part of the work, but the successful use of these methods to attack important problems must also be accomplished.

The thesis is normally expected to contain work that should and will be published in appropriate research journals. However, there is no absolute rule requiring publication, and in rare cases a thesis committee may accept work that probably will not be published. An example of such a case would be that of a student whose work is "scooped" by progress in another laboratory, but where the work would otherwise be considered to constitute a solid thesis demonstrating the student's ability to carry out research.

The recommended format for a thesis is to have individual chapters written up in a form consistent with standard practice for publication of research papers. These chapters may be photocopies or typescripts of papers that have already been published or prepared for publication. Supplementary materials may be added as appendices to these chapters, or may be written as additional chapters, as appropriate. However, the option of writing the thesis as an independent document is also available to the student with the approval of the thesis committee. Detailed instructions on thesis preparation and the required forms are available from the Graduate Office and the Caltech Library.

Regardless of the format chosen, the thesis must demonstrate the degree of knowledge of relevant work in the research field that is needed to place the research results in their proper context. This is normally accomplished by a scholarly introduction that reviews the research field more broadly than is appropriate for the introduction to a research paper, and by a concluding discussion chapter that assesses the results in relation to other past, present, and future work in the field.

In cases where all or part of the work submitted for the thesis has been carried out in collaboration with others, the thesis must contain explanatory notes detailing the individual contributions of the student and the student's collaborators. In cases where some of a student's work forms a minor part of collaborative work, publications resulting from that work may be added to the thesis as appendices, or the student's contributions may be written up separately for inclusion in chapters of the thesis. However, the thesis is expected to be a thesis, with a unifying theme or themes, and not just an aggregation of unrelated pieces of research.

### **The Final Ph.D. Examination**

All Ph.D. candidates must present their work in a thesis seminar. As a matter of policy, a closed examination of the candidate by the thesis committee will be held immediately following the thesis seminar.

*Please note:* At the time of submission for approval to the Option Representative, a hard copy of the written thesis must accompany the *Petition for PhD Examination*. No exceptions will be made.

The purposes of the final Ph.D. examination are:

- 1) To expose any residual weaknesses in the thesis and arrange for thesis corrections. In the Biochemistry and Molecular Biophysics Option, we expect that students will meet with and discuss their work with members of their Thesis Advisory Committee throughout the years before the final examination, and that this process will eliminate any serious concerns that the members of the Ph.D. examination committee might have with the thesis research.
- 2) To allow the committee members to certify that the work constituting the thesis is quantitatively sufficient for the Ph.D. degree. Again, the basis for this determination will probably have been established by earlier discussions between the candidate and the members of the committee. It is difficult to specify universally useful standards for the quantity of work required for the Ph.D. However, it would probably be generally agreed that work that would not be sufficient for at least one substantial paper in a major research journal is not sufficient for a thesis.
- 3) To provide the committee members with an opportunity to satisfy themselves that the work presented in the thesis is actually the work of the candidate.
- 4) To assess, through oral examination following the thesis seminar, the breadth and depth of knowledge of the candidate relating to his/her field of interest.

The examination is considered to be passed when four or more members of the committee approve the thesis and the candidate's performance in the examination.

## INFORMATION FOR BMB GRADUATES

### Fall Term Registration - Incoming Graduates

All G1s will use the blue Graduate Registration card to register for courses during Fall term. The last day to registrar is **Friday, October 15** and the drop day is **November 17**.

Register for a total of 36 units. BMB Students will always register for BMB299 Graduate Research (up to 36 units, and the section will be the name of your official advisor. The interim advisor for G1s will be *Clemons*.

For winter and spring terms, G1s will register online using REGIS, which you login through [access.caltech](http://access.caltech)

### Mailboxes

All G1 mailboxes are located at the north end of the Braun labs, building #75. The campus mail code for Braun is 147-75CH. G1's will have after-hour access through card swipe.

The U.S. postal address for your mailbox is *First & last Name, m/c 147-75Ch, 1120 E. California Ave. Pasadena, CA 91125*.

When a G1 chooses an advisor, they should arrange to move their mailbox to the building in which you now reside. Update your new mail code through [access.caltech](http://access.caltech)

### Parking Permits

To register for a parking permit, please complete a [permit application](#) and bring the completed form to the Parking Office at 515 S. Wilson Ave.

### Personal Information

To update your personal contact info in the Caltech database, log on to [access.caltech](http://access.caltech)

### Pay/Stipend Information

Payday occurs on the 26<sup>th</sup> of each month. You may access your online paystub through the Electronic Paycheck Stub menu, which is available through [access.caltech](http://access.caltech)

To set-up direct deposit (EFT) of your paycheck, stop by the Records Dept. in Human Resources (building #84) and complete the appropriate forms. You will need to provide them with a voided check and your ID.

You may also arrange for tax withholding at Human Resources. (Taxes are not automatically withheld from your pay and you will owe the IRS on April 15th.)

Your \$750 travel reimbursement award will be included in your first check.

If your pay (received outside fellowships) should change at any time throughout the year, **it is very important that you contact the BMB Option Manager with the details.**

## Financial Assistance

### New Student Start-Up Loan

For many students, relocating can incur unexpected costs and often presents a financial burden. To help alleviate this burden, Caltech offers a 0% interest loan of \$2,500 to incoming students. The loan funds will be disbursed through the Bursar's Office starting in September and repayment begins in April over the course of 18 months. Incoming students are provided information on this directly from the Graduate Office. Those interested in applying for the loan will be instructed by the Grad Office to complete the necessary application in July. Further instructions will then be sent regarding completing the loan documents and the disbursement of funds.

### Short-term Emergency Loan

A non-interest-bearing loan for the first 90 days after disbursement for up to \$2,000 may be obtained by graduate students for unexpected emergencies. If the loan is not paid within the 90 days after disbursement, interest at 5% will begin to accrue. Loan applications can be completed in the Graduate Studies Office. For additional information, please contact the [Assistant Dean of Graduate Studies](#).

Student Emergency Funds are available to students who are faced with an emergency hardship that affects their ability to continue their studies. Examples of qualifying needs include but are not limited to:

- medical or dental bills not covered by insurance
- travel to a funeral or to attend to an important family matter
- loss from theft or fire
- loss of income or housing
- recovery from illness or accident

A student seeking a grant from the Student Emergency Fund to deal with an emergency hardship should write to the Dean of Graduate Studies to explain the situation and justify the amount sought.

Special needs allowances to help defray dependent health care costs are available to students. To apply for a reimbursement, contact the Graduate Office for an application. Reimbursements are paid through Payroll on the next pay period following submission.

Conference Travel Funds are available through the Graduate Office to students who qualify. Requirements include advisor support and satisfactory academic standing.

The Child Care Assistance Program (CCAP) is available to students to help defray childcare costs. Awards are available to students with dependent children ages 10 and under. Please visit the [CCAP website](#) for information and application materials.

## Vacations

The Institute policy is that graduate students are “entitled to two weeks” annual vacation (in addition to Institute holidays). Graduate students are expected to coordinate their vacation plans with their research advisors sufficiently far ahead of time to avoid conflicts at the last minute. In addition to the

regularly scheduled Holidays, graduate students are also entitled to take time off during the Special Release days during the winter break. Students who are asked to work during this time are entitled to take an equal number of days off in the winter term, to be arranged in consultation with their research advisers.

### Email Distribution Lists

#### BBE Mail

All Biology seminars, symposiums, and occasional general announcements are sent via BBE Mail. To receive BBE Mail notices, you may sign up at the [BBEmail](#) website.

#### CCE Seminars

All CCE seminars, symposiums, and occasional general announcements, are sent via CCE Seminar mail. All BMB Students are automatically added to this email list.

#### Women in Chemistry

To receive Women in Chemistry notices, please email [wic@caltech.edu](mailto:wic@caltech.edu) to be added to the mailing list.

### Caltech Calendar

Seminar announcements appear in the [Caltech Master Calendar](#), where personalized e-mail alerts may be established.

### Seminars

There are both regular and irregular seminar series. For 2021/22 there are likely to be changes in the meeting times. Some of the regular seminars include:

Mondays at 4:00 pm

Bioengineering (BE) Seminars (Kerckhoff 119). Molecular, Cellular, and Developmental Biology seminars, and Inorganic Electrochemistry (147 Noyes) seminars are also held on Mondays

Tuesdays at 4:00 pm

General Biology (Kerckhoff 119) seminars and Chemical Physics (147 Noyes) seminars

Wednesdays at 4:00 pm:

Neurobiology Seminars (24 Beckman) and Organic Chemistry seminars (153 Noyes)

Thursdays at 4:00 pm, 147 Noyes

Biochemistry Seminars

Chemical Engineering

Biology seminars are announced via “BBEmail” To receive BBEmail notices, you may sign up [here](#). Chemistry seminar announcements are sent to the cceseminar mailing list, which automatically includes BMB students.

Micro Mornings are held the second Wednesday of each month from 9:30 - 10:30 am in Beckman Behavioral Biology, room B180 and feature two presentations from members of labs interested in microbiology.

New Student Orientation Seminars are presentations by the faculty to the new graduate students in chemistry, biology and biochemistry. The Graduate Office in the Chemistry and Biology Divisions organize these seminars. In addition, the Biology Division has an annual weekend seminar retreat usually held at the end of Orientation Week. For more information, contact the Biology Division office.

### **Acknowledgments**

Please remember to acknowledge the source of your financial support on all of your publications resulting from work during your graduate program. For NIH trainees, the suggested format is *“This work was supported in part by a National Research Service Award (T32GM07616) from the National Institute of General Medical Sciences.”* Contact the BMB Option Manager if you do not have information pertaining to your funding source.

## ADDITIONAL RESOURCES

### Graduate Office

From admission to graduation, and all of the milestones in-between, our mission is to support and to promote the personal and academic development of all graduate students. Through administration of the graduate program, we work closely with faculty and staff within the various options to monitor academic progress, advise students with diverse needs, and administer a wide range of financial support for graduate students including emergency funds, parent support funds, dependent health care reimbursements, and external and internal fellowships.

**Location:** Center for Student Services Room 203, 414 S. Holliston Avenue Pasadena, CA 91125

**Hours:** Monday – Friday: 8:00 am - 5:00 pm (except on Institute and national holidays).

**Telephone:** (626) 395-6346

**Email:** [gradofc@caltech.edu](mailto:gradofc@caltech.edu)

**Website:** <https://www.gradoffice.caltech.edu/>

### Center for Inclusion & Diversity

The Caltech Center for Inclusion & Diversity (CCID) mission is to provide education, advocacy, and allyship to create a community of Equity and Inclusive Excellence at CIT. We create and implement campus-wide initiatives and programs that will increase the knowledge, skills, and attitudes for all members of the Caltech community to thrive in a diverse world. Upcoming events are posted on the [CCID website](#) and you can sign up for the [newsletter](#) there too.

**Location:** Center for Student Services (2<sup>nd</sup> floor), 414 S. Holliston Avenue Pasadena, CA 91125

**Hours:** Monday – Friday: 8:00 am - 5:00 pm

**Telephone:** (626) 395-6207

**Website:** <http://diversitycenter.caltech.edu/>

### Equity and Title IX at Caltech

The Equity and Title IX Office addresses issues of unlawful discrimination and harassment on the basis of race, national origin, ethnicity, sex, pregnancy, gender, gender identity, gender expression, sexual orientation, and other individual characteristics protected by federal and state law. Unlawful discrimination and harassment encompass racial harassment, sexual and gender-based harassment, and sexual misconduct.

**Location:** 205 Center for Student Services

**Hours:** Monday - Friday: 8:00 am - 5:00 pm

**Phone:** 626-395-3132

**Email:** [equity@caltech.edu](mailto:equity@caltech.edu)

### Counseling Services

Counseling Services supports and promotes the mental health of Caltech students in order to improve the quality of their lives and aid them in achieving academic success.

**Appointments:** (626) 395-8331 or stop by the front office (room 140) to schedule an appointment. The address is 1239 Arden Road just south of campus.

Your initial visit will be scheduled within 1-3 days; this meeting will be 20-30 minutes in length and is designed to address any immediate needs, learn more about your needs for services, and screen for any safety concerns. Click here to learn about [What to Expect at Your First Visit](#).

If you are experiencing a crisis or feel the need to be seen on an urgent (same day) basis, please inform the receptionist immediately.

**After-hours crisis service (for issues that cannot wait until the next business day):**

For after-hours and weekend response, call the Counseling Services main line **(626) 395-8331** and press "2" to be connected to a clinician. You may experience a brief hold while your call is connected; please stay on the line.

**Location:** 1239 Arden Rd, Pasadena, CA 91125

**Hours:** Monday - Friday 8:00a.m. - 5:00p.m.

**Telephone:** 626-395-8331

**Website:** <https://counseling.caltech.edu/>

### Health Services

The Health Center medical staff consists of physicians, nurse practitioners trained in family practice and women's health, administrative staff, and a health advocate coordinator.

**Appointments:** Call **(626) 395-6393** to schedule, cancel or reschedule an appointment, or to request a specific provider. The health center is open year-round, except during Institute holidays and weekends.

**To schedule an appointment, access the Student Health Portal here:**

<https://mycaltechhealth.caltech.edu/>. *Please login using your access.edu credentials.*

**Location:** 1239 Arden Rd, Pasadena, CA 91125

**Hours:** Monday - Friday: 8:00 am - 5:00 pm

**Phone:** 626-395-6393

**Website:** <https://wellness.caltech.edu/health>

### Gym

The Braun Athletic Center features the main gymnasium (used for intercollegiate competition as well as recreation); a 3,500-square-foot weight room including a Cybex Circuit, free weights and various cardiovascular machines such as treadmills, ellipticals, rowing machines, cross-trainers and upright and recumbent bikes; four racquetball courts; two international squash courts; a multipurpose room with spring floor for group fitness activities and locker rooms with showers.

Day lockers are available in both the men's and women's locker rooms. Towel service is coordinated through the front desk. Sports equipment is available for rental. Reservations are recommended and often required for many activities and room

**Braun Athletic Center**

Monday – Friday: 6:00 am - 10:00 pm

Saturday & Sunday: 8:00 am - 4:00 pm

**Caltech Aquatics**

Monday – Friday: 6:00 am - 8:30 pm

Saturday & Sunday: 8:00 am - 3:45 pm

**Phone:** 626-395-3253

**Website:** <http://www.gocaltech.com/Recreation/index>

### **Chemistry Shop Facilities**

The chemistry student shop is located in the sub-basement of Church (room B209). Contact Ricardo Zarazua at x6057/ [rzarazua@caltech.edu](mailto:rzarazua@caltech.edu) to use the student shop, which is available for students during the week from 7:00 am -12:00 pm and 1:00 pm - 4:00 pm. For more details about facilities, please refer to the [Chemistry Service Centers](#). For Biology resources and service centers, see [Biology Facilities and Resources](#).

### **Stockrooms**

Chemistry stockrooms are in 157 Crellin

Biology stockrooms are in 181 Alles and 127 Beckman Behavioral

### **Guidelines for evaluating defense of the research proposition**

The point of this exercise is to encourage the student, in collaboration with his/her adviser, to think through as deeply as possible the series of experiments that would form the basis of a thesis research project. The following criteria are suggested to provide the students with an indication of what is expected of them and to guide faculty in evaluating both the research proposal and the out of field proposal for the qualifying exam in the second year:

- Has the student clearly defined the problem to be addressed?
- Has the student clearly explained the significance of the problem?
- Has the student become sufficiently familiar with the relevant field of research? Can he/she put the problem in context?
- Are the experimental questions to be asked laid out in a logical manner? Is their rationale clearly presented? Are the experiments and their controls adequately described?
- Has the student considered various possible outcomes of the experiments, and their interpretations?
- Has the student considered contingencies in case the experiments do not work (or yield uninterpretable results)?
- Based on his/her preliminary data, does the student have a feeling for the practicality of the experiments and their possible technical problems?  
(Relevant only to the research proposal).
- Does the student have a rough timetable for the proposed project?  
(Relevant only to the research proposal).

During the oral examination, the student can expect to be asked questions about general topics in biochemistry in addition to questions about the proposals.

The thesis advisory committee is encouraged to provide the student with constructive suggestions for the proposed project. In this way, the committee initiates an important ongoing role in helping to guide the student's research, not simply in evaluating the end product. However, the committee is also encouraged to base their evaluation as much as possible on the student's ability to formulate a scientific problem and to pose it in experimental terms, and to avoid biases that reflect their value judgments about the proposed research.