

INSTITUTE FOR STEM CELL BIOLOGY AND REGENERATIVE MEDICINE

**STANFORD**  
**STEM CELL**  
**BIOLOGY**  
**& REGENERATIVE**  
**MEDICINE** PHD PROGRAM

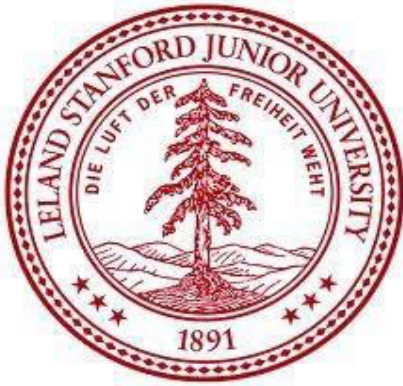
# 2024-2025 Student Handbook



## Stem Cell Biology and Regenerative Medicine Interdisciplinary Graduate Program

Revised June 1, 2024

SCBRM INTERDISCIPLINARY GRADUATE PROGRAM



Institute for Stem Cell Biology and  
Regenerative Medicine  
School of Medicine  
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# Welcome to Stanford!

The Stanford Stem Cell Biology and Regenerative Medicine (SCBRM) program is the first stand-alone, doctoral degree program in the United States devoted entirely to basic stem cell biology and its clinical translation. This guide outlines the requirements for SCBRM graduate students to select and complete their rotations and coursework, to prepare for and pass the qualifying exam, and to receive a PhD degree in SCBRM.

The Interdisciplinary SCBRM program is housed within the Lorry Lokey Stem Cell Research Building, a modern research facility completed in 2011. Our program is a part of the [Stanford Biosciences Program](https://biosciences.stanford.edu) (<https://biosciences.stanford.edu>) along with 13 other programs.

The SCBRM Program Administration includes the Director of Graduate Studies [Dr. Tushar Desai](mailto:tdesai@stanford.edu) ([tdesai@stanford.edu](mailto:tdesai@stanford.edu)) and Executive Director [Dr. Gerald Spangrude](mailto:spangrud@stanford.edu) ([spangrud@stanford.edu](mailto:spangrud@stanford.edu)). Program administration is overseen by Student Services Officer [Lorena Najarro](mailto:lnajarro@stanford.edu) ([lnajarro@stanford.edu](mailto:lnajarro@stanford.edu)) and a Student Services Specialist.

## Mission Statement

Our mission is to provide excellence in graduate education in the field of translational science through a combination of rigorous basic science education, innovative research training, and clinical/professional immersion. The Program coordinates relevant activities and provides interdisciplinary training during the first year of graduate school that is designed to equip students with a strong foundation for a career in stem cell biology and regenerative medicine. The Program coordinates activities such as student recruiting and admissions, academic advising, career development, curriculum, and social events.

## SCBRM Curriculum Overview

Our curriculum, combined with the research and rotation opportunities, provides a flexible but rigorous educational opportunity for doctoral students. During the first year of coursework and research rotations, students begin to understand the broad subject of translational medicine while focusing more specifically on the fundamentals of stem cell biology and regenerative medicine. The core of the SCBRM curriculum includes options for coursework in bioinformatics, genetics, cell biology, developmental biology, and biochemistry. Accompanying the formal classroom-based core curriculum is a requirement to complete three graduate research rotations in the first year. The autumn quarter rotation must be completed with a [faculty member of the Institute for Stem Cell Biology and Regenerative Medicine](#) (ISCBRM). After selecting a thesis advisor, the combined coursework and dissertation-directed research allows the completion of the requirements leading to a PhD degree. A minimum of 135 units of combined coursework and Graduate Research is required for the student to become eligible for the PhD degree. This is achieved after winter quarter of the 4th year of enrollment.

During the first quarter of the academic year, incoming SCBRM students are required to participate in weekly Stem Cell Intensive lectures (**STEMREM 200**) during which students are introduced to the ISCBRM faculty and their research. All SCBRM students enroll in the unique didactic core course Stem Cell Biology & Regenerative Medicine (**STEMREM 201A**) as well as **STEMREM 280**, which includes 5 weekly faculty-led introduction to graduate school discussions followed by 5 weekly student-organized journal club meetings during Autumn quarter. The Biosciences course Foundations in Experimental Biology (**BIOS 200**), which includes a grant-writing component plus individual group discussions, completes the Autumn quarter registration. During Winter quarter, SCBRM students enroll in **STEMREM 205**, Bioinformatics for Stem Cell

and Cancer Biology. **DBIO 210** Developmental Biology plus a stem cell-specific ethics course (**STEMREM 201B**) are required courses during Spring quarter of the first year. In addition to these required courses, first and second year students enroll in **STEMREM 250**, the Regenerative Medicine Seminar Series (ReMS). The ReMS course provides weekly lectures in stem cell biology and regenerative medicine and gives students firsthand exposure to emerging research, toolsets, and cutting-edge applications. ReMS also provides the students with an opportunity to evaluate faculty research topics for potential rotations and/or collaborations. Credit in **STEMREM 250** can also be accumulated by attendance at other lectures, including weekly research-in-progress presentations (Stem Cell Club) and SCBRM thesis defense presentations. The Journal Club class (**STEMREM 280**) meets regularly through Autumn, Winter, and Spring quarters. One half of classes during Autumn quarter are organized by faculty to include laboratory rotation updates from first year students, Individual Development Planning, and other topics. Upper-level graduate student TAs organize Journal Club for the remaining classes. Topics include current literature, discussions of newly emerging technologies, work/life balance discussions, and other subjects of interest to the graduate student community. Attendance in both **STEMREM 250** and **STEMREM 280** is required for 1<sup>st</sup> and 2<sup>nd</sup> year students to accumulate 5 units of credit in each course and is encouraged for all students in the program. In addition to required courses, students may choose elective courses based on their prior background and training, with the aim to fill any gaps in knowledge that may impact future success as a scientist. Additional required courses are a grant writing course in the second year (**BIOS 242** or a similar course or workshop) plus **STEMREM 203** and 3 electives chosen from a list of approved courses.

The required career development immersion or internship (**STEMREM 203**) can be completed any time after the second year of study and is aimed at moving the student's professional and personal goals forward by exploring novel opportunities in medicine, business, industry, human health, science policy, or other fields. The immersion is an essential component of the core curriculum and is designed by the student in consultation with academic advisors to provide an opportunity to acquire exposure to career opportunities outside of traditional academic roles. Prior to enrolling for credit, all immersion rotations must be approved by one of the SCBRM program directors; students must provide at least 4 weeks between notification of the Program Office about the proposed immersion prior to beginning the activity. Upon completion, a report of the immersion rotation is provided by the student with input from the immersion mentor as evidence of completion and is included in the student record. The duration is variable; an immersion can span 2 – 4 weeks full/part time or can be structured as one or more days per week for one quarter. Compensation for externships is allowed, but restrictions apply. Compensation exceeding 100% of student's stipend will require that the stipend for the academic quarter be suspended.

We encourage our students to explore areas that are of interest to them in the **STEMREM 203** immersion component of the curriculum. Examples include doing a clinical immersion (shadowing a clinician who practices in the student's area of research), doing an internship at a biotechnology company, a venture capital or law firm, taking a business or law course, etc. The students must discuss ideas for clinical immersion with their advisors and have their advisors' approval. For clinical rotations, students will participate fully in most of the usual medical student activities including attending patient rounds, diagnostic rounds, observing patient examinations, as well as attending grand rounds and other medical lectures. Alternatively, students can arrange to spend time attending clinic with their physician mentor or alternative clinical experiences as appropriate and agreed upon by their physician mentor and the graduate program directors. Students will be graded based on a final paper describing the current and future opportunities for the application of stem cell biology to the chosen discipline. Students in the SCBRM will be encouraged to also include clinical faculty on their advising team from qualifying to defense. MSTP (MD/PhD) students are not required to complete the **STEMREM 203** immersion, since their career tracks are likely to be clinical in nature.

Examples of immersion opportunities include:

1. Stanford Ignite: Powering Innovation and Entrepreneurship  
<https://www.gsb.stanford.edu/programs/stanford-ignite>  
Application Deadline March 15.
2. Attend Grand Rounds for any clinical department.

Here are a few links to some of the department's schedules.

<http://med.stanford.edu/seminars/medicine/depUpcomingEvents.do?department=231>

<http://radiology.stanford.edu/education/grandrounds.html>

<http://obgyn.stanford.edu/>

<http://neurology.stanford.edu/education/grandrounds.html>

3. Shadow PI or other physician in a clinical setting.
4. Approved business course (your choice, with program approval).
5. Business internship (your choice, with program approval). StartX provides access to companies for internships. <http://startx.stanford.edu/>
6. Law internship or law class (your choice, with program approval).
7. Course or mentored independent studies in policy or ethics (your choice, with program approval).
8. Teaching activities within or outside of the SCBRM program.

Electives: Students (with input from their research advisors) will select appropriate upper division elective courses that are relevant to dissertation and career goals from the Schools of Medicine, Humanities and Science, Engineering, Earth Sciences, Business and/or Law. Electives provide flexibility for the students to hone their knowledge and skills with in-depth training in areas of interest, including translational medicine; intellectual property development; legal and ethical issues; and/or entrepreneurship.

### SCBRM Guidance for Using Generative AI in Scientific Writing

The SCBRM graduate program recognizes the value of large language models (LLM) of artificial intelligence (AI) as a useful aid in scientific writing. STEMREM course instructors will determine whether to allow use of AI for assignments in accordance with [Stanford Community Standards](#) policy. Consistent with the policies of many scientific journals, we require disclosure and provide guidelines that must be followed when AI modules are used to assist in the preparation of written assignments, dissertations, and articles. The use of AI should be limited to assistance with grammar, syntax, spelling, sentence structure, and other general aspects of writing. The use of AI may be particularly useful for students whose first language is not English. AI should not be used to avoid critical thinking, for synthesis of hypotheses or experimental design, or as a substitute for thoughtful discussion of ideas and concepts. To do so would be detrimental to the learning process and severely handicap the student's progress toward academic independence.

In the context of the SBCRM graduate program, it is essential to clearly report the contributions of AI tools and technologies in all written work, including classroom assignments (if allowed by the instructor) and student dissertations. A dedicated section of the work should detail the name(s) of the tools used, how and when the student utilized and evaluated the validity of the tool's outputs, and a clear statement of which aspects of the study, article contents, data, or supporting files were affected/generated by AI tool usage. The work must also include an appendix that lists all prompts used to generate AI output, as well as any AI-generated output that is used either verbatim or in edited form in the text of the document. For dissertations, both the student and the student's thesis advisor must acknowledge their responsibility for ensuring the accuracy of the work, including the proper citation of sources and ensuring compliance with the [Stanford Honor Code](#).

#### Resources

[Stanford Community Standards](#) : Stanford Office of Community Standards

*"Absent a clear statement from a course instructor, use of or consultation with generative AI shall be treated analogously to assistance from another person. In particular, using generative AI tools to substantially complete an assignment or exam (e.g. by entering exam or assignment questions) is not permitted. Students should acknowledge the use of generative AI (other than incidental use) and default to disclosing such assistance when in doubt."*

[MIT: Using Generative AI](#) : Awareness of Journal Policies and Keeping Track of AI Usage

[CANGARU](#) : Emerging Guidelines for Accountable Use, Disclosure, and Reporting

## Summary of Degree Requirements

SCBRM graduate students must enroll in 10 units per quarter (**no more or less**); this is required due to the need to maintain full time student status without extra tuition costs to the program. Students are required to complete 135 units of coursework including core curriculum and ethics training. Generally, required didactic coursework is completed in the first two years of the doctoral program. After completing coursework, students enroll in 10 combined units of Graduate Research (**STEMREM 399**) and electives each quarter, thereby completing the required minimum of 135 units by the end of winter quarter of the 4th year. After this, students apply for Terminal Graduate Registration (TGR) status and focus on dissertation research while registering for 3 units of research or electives per quarter.

### Core Curriculum

#### ▼ Mandatory Coursework and Immersion

1. **STEMREM 200** Stem Cell Intensive (1 unit)
2. **STEMREM 201A** Stem Cell Biology & Regenerative Medicine (3 units)
3. **STEMREM 201B** Ethical Issues in Stem Cell Biology (1 unit)
4. **STEMREM 203** Stem Cells Immersion Applications in Business, Law, and Medicine (variable units)
5. **STEMREM 205** Bioinformatics for Stem Cell and Cancer Biology (3 units)
6. **STEMREM 250** Regenerative Medicine Seminar Series (ReMS) (5 units)
7. **STEMREM 280** SCBRM Journal Club (5 units)
8. **DBIO 210** Developmental Biology (4 units)
9. **BIOS 200** Foundations in Experimental Biology (5 units)
10. **BIOS 242** Writing Fellowships (2 units) OR any course or workshop offered by [Stanford's Grant Writing Academy](#)

#### ▼ Other Mandatory Courses

1. **STEMREM 399** Graduate Research (up to 10 units/quarter)
2. **STEMREM 802** TGR Dissertation (0 units, Terminal Graduate Registration (TGR) is achieved after completing 135 total units and all required coursework).

### Elective Curriculum

▼ **Electives.** Must take at least 3 courses totaling 10 or more units. One must be a Biochemistry topic, and another must be one of the courses listed under Elective Core Curriculum below:

1. **Biochemistry:** any course with SCBRM approval, including but not limited to:
  - **CSB 210** Cell Signaling (4 units)
  - **CSB 260** Concepts and Applications in Chemical Biology (3 units)
  - **BIOC 241** Biological Macromolecules
  - **BIOS 294** Chemistry for Biologists and Others (3 units)
  - **BIOS 204** Modeling of Signal Transduction Motifs (3 units)
  - **CSB 220** Chemistry of Biological Processes
  - **BIOE 331** Protein Engineering (3 units)
  - **BIOE 361** Biomaterials in Regenerative Medicine (3 units)
2. **Elective Core Curriculum:** One or more of the following courses:
  - **BIO 214** Advanced Cell Biology (4 units)
  - **GENE 205** Advanced Genetics (3 units)
  - **STEMREM 202** Regenerative Medicine (3 units)
3. **Statistical/Computational Electives:** In addition to **STEMREM 205**, other computational courses may be taken as electives.
  - **GENE 211** Genomics (3 units)
  - **BIOS 217** Foundations of Statistics and Reproducible Research (2 units)
  - **BIOS 207** Just Enough Software Engineering (2 units)

**(Elective curriculum continued)**

- **BIOS 274** Introductory Python Programming for Genomics (3 units)
- 4. **Additional electives are allowed and encouraged.** Consult the [Stanford Bulletin Explore Courses](#) resource and talk with other students and faculty for advice. Some examples include:
  - **BIOE 390, BIOE 80, ENGR 80, or MED 289** Introduction to Bioengineering Research (2 units)
  - **MCP 256** How Cells Work: Energetics, Compartments, & Coupling in Cell Biology (4 units)
  - **GENE 218, MI 218, PATH 218** Computational Analysis of Biological Information: Introduction to Python for Biologists (3 units)
  - **NBIO 254, BIO 254** Principles of Neurobiology (3-5 units)
  - **CBIO 240** Molecular and Genetic Basis of Cancer (4 units)
  - **IMMUNOL 201** Advanced Immunology I (3 units)
  - **COMP MED 210** Form & Funkiness of Lab Animals: Anatomy, Histology & Pathology (4 units)
  - **BIOMEDIN 210** Modeling Biomedical Systems (3 units)
  - **BIO 152 or MCP 222** Imaging Microscopy Biology (3 units)
  - **ME 208** Patent Law and Strategy for Innovators and Entrepreneurs (3 units)
  - **BIOE 374A/B or MED 272A/B** Biodesign Innovation (4 units)
  - **STRAMGT 353** Entrepreneurship: Formation of New Ventures (4 units)

For additional information on available electives, see <http://explorecourses.stanford.edu/CourseSearch/> for the Stanford course-offering website.

**Other Seminar Series Relevant to SCBRM Students**

Stanford University provides numerous opportunities to attend seminars of relevance in SCBRM including those hosted through the Department of Bioengineering, the BioX program, and other institutes such as the Neurosciences Institute, Cardiovascular Institute, and Institute for Immunology, Transplantation, and Infection. Seminars are generally of very high quality and lists will be distributed through the SCBRM graduate program home office and postings in the Lorry Lokey Stem Cell Research Building. Attendance exposes SCBRM students to important research questions in medicine. It will also expose them to a wide range of possible mentors engaged in stem cell biology and regenerative medicine for their PhD thesis work.

**Journal Club**

Graduate students in the SCBRM doctoral program organize **STEMREM 280**, a Journal Club designed for SCBRM students. Fellows and Faculty members attend at the request of the students. Journal Club allows students to develop rapport with each other, and other members of the community. Journal Club allows students to cover the latest publications in SCBRM and to hone their presentation skills. In addition, opportunities to include occasional guest speakers from Stanford and surrounding medical schools and the biotechnology community will also be explored. This Journal Club provides the opportunity for students to meet in small groups and to discuss recent research findings and topics not generally covered in the PhD curricula such as how to take a novel cell-based treatment from bench to bedside.

**Stem Cell Club**

Meeting Tuesdays at 1:00 PM, Stem Cell Club is a research-in-progress forum for predoctoral and postdoctoral trainees to present their research to faculty, students, and professional staff. Each hour includes 2 presentations of 25 minutes followed by a 5-minute discussion period. Stem Cell Club is not listed as a course and there is no formal registration process, however attendance will count toward the required attendance in **STEMREM 250**, Regenerative Medicine Seminar Series.

## Curriculum by quarter of registration

Please note that you must enroll in 10 units (**no more or less**) per quarter until you reach terminal graduate registration (TGR) status in the fourth year of study.

### First Year Autumn Quarter

Course	Title/Description	Units
STEMREM 200	Stem Cell Intensive	1
STEMREM 201A	Stem Cell Biology & Regenerative Medicine	3
STEMREM 280	Stem Cell Journal Club	1
BIOS 200	Foundations of Experimental Biology	5
		Total 10

### First Year Winter Quarter

Course	Title/Description	Units
STEMREM 205	Bioinformatics for Stem Cell and Cancer Biology	3
STEMREM 250	Regenerative Medicine Seminar Series	1
STEMREM 280	Stem Cell Journal Club	1
STEMREM 399	Graduate Research and/or electives	5
		Total 10

### First Year Spring Quarter

Course	Title/Description	Units
STEMREM 250	Regenerative Medicine Seminar Series	1
STEMREM 280	Stem Cell Journal Club	1
STEMREM 201B	Ethical Issues in Stem Cell Biology OR MED255	1
DBIO 210	Developmental Biology	4
STEMREM 399	Graduate Research and/or electives	3
		Total 10

### First Year Summer Quarter

Course	Title/Description	Units
STEMREM 399	Graduate Research and/or electives	10
		Total 10

### Second Year Autumn Quarter

Course	Title/Description	Units
STEMREM 250	Regenerative Medicine Seminar Series	1
STEMREM 280	Stem Cell Journal Club	1
BIOS 242	Writing Compelling Fellowships or other <a href="#">grant writing course or workshop</a>	2
STEMREM 399	Graduate Research and/or electives	4
		Total 10

### Second Year Winter Quarter

Course	Title/Description	Units
STEMREM 250	Regenerative Medicine Seminar Series	1
STEMREM 280	Stem Cell Journal Club	1
STEMREM 399	Graduate Research and/or electives	8
		Total 10

**Second Year Spring Quarter**

Course	Title/Description	Units
STEMREM 250	Regenerative Medicine Seminar Series	1
STEMREM 399	Graduate Research and/or electives	9
Total		10

**Second Year Summer Quarter**

Course	Title/Description	Units
STEMREM 399	Graduate Research and/or electives	10
Total		10

**Third Year Autumn, Winter, and Spring Quarters**

Course	Title/Description	Units
STEMREM 399	Graduate Research and/or electives	10
Total		10

**Fourth Year Autumn and Winter Quarters**

Course	Title/Description	Units
STEMREM 399	Graduate Research and/or electives	10
Total		10

**Fourth Year Spring Quarter and Onward (must apply for Terminal Graduate Status; TGR)**

Course	Title/Description	Units
STEMREM 399	Graduate Research and/or electives	3
STEMREM 802	TGR Dissertation	0
Total		3

**Other Course Requirements, to be taken at any time during matriculation**

- **STEMREM 203**, Stem Cell Immersion externship
- One biochemistry elective; e.g., **BIOS 294** Chemistry for Biologists and Others
- Two or more additional electives; e.g., **BIO 214** Advanced Cell Biology
- Students must complete at least 3 electives for at least 10 units of credit

The minimum unit requirement for the PhD is 135 units of course work and research completed at Stanford. When more than one Stanford advanced degree is pursued, the PhD must represent at least 90 units of work not used to meet the requirements of another degree. At least 3 units must be taken with each of four Stanford Faculty members.

**SCBRM curriculum requirements for MSTP and ARTS students**

Medical students and medical residents have already completed coursework equivalents for many required elective courses in our curriculum. Therefore, these students are not required to complete electives. All courses should be enrolled for a letter grade while students are matriculated in our program unless the course is only offered pass/not pass. Required courses are: STEMREM 201A: Stem Cell Biology and Regenerative Medicine; STEMREM 205: Bioinformatics for Stem Cell and Cancer Biology; STEMREM 250: Regenerative Medicine Seminar Series (5 quarters in the first two years); STEMREM 280: Stem Cell Journal Club (5 quarters in the first two years); BIOS 242: Writing Compelling Fellowships and Career Development Awards or a similar course; check with the Stanford Grantwriting Academy (<https://grantwriting.stanford.edu>) for suggested courses that best fit your career stage and research interest; and STEMREM 201B: Ethical Issues in Stem Cell Biology or MED 255: The Responsible Conduct of Research. An ethics course is required in the first year and repeated in the 5th year.

# Graduate Advising Expectations

The SCBRM program is committed to providing academic advising to support the scholarly and professional development of all graduate students. Each incoming student will be appointed an interim **academic** advisor drawn from the faculty, as well as a **peer** advisor drawn from the senior graduate student pool. Advising expectations should be discussed periodically to ensure mutual understanding between student and advisor. Faculty academic advisors serve as intellectual and professional mentors to graduate students. As such, faculty academic advisors assist students in planning a program of study to meet degree requirements, provide knowledgeable support concerning academic and non-academic policies that pertain to graduate students, and give guidance for each student in choosing the first year during rotations. Faculty advisors can provide advice to help students prepare to be competitive for employment. The SCBRM program expects a high level of professionalism and open dialogue in the advising relationship. Students are expected to take an active role in the advising relationship and to be proactive in seeking academic and professional guidance. Students are responsible for informing themselves of the policies and degree requirements of the SCBRM program.

Students typically select their thesis laboratory after completion of the first year of study and must choose a thesis laboratory and PI before the end of Autumn quarter of the second year. Once the thesis lab has been selected, the thesis mentor serves as the student's PhD **research** advisor.

**Additional advising resources** for students include the Director of Graduate Studies (Dr. Desai) and the curriculum/advising designee (Dr. Spangrude). In addition, the student and initial academic advisor may, by mutual consent, continue in a formal advising relationship throughout the student's time in the Program.

## General Responsibilities of Faculty Advisors.

The University requires that each department or program sets minimum advising expectations for both advisor and advisee. The SCBRM policies are specific to doctoral students and include two types of advisors (academic vs. research) as described above. Our Program follows the requirements as described under **POLICY** and **IMPLEMENTATION** in the Stanford Graduate Academic Policies. The Program expectations are distributed to faculty and graduate students on an annual basis at the start of each academic year and are easily accessible on the web using the links above. Faculty are expected to affirm that they have received the advising expectations. Each faculty member has the prerogative to augment the SCBRM advising expectations with their specific additional expectations, while remaining consistent with the Program advising policies.

## Individual Development Plan.

The process of career planning begins in the first year as part of **STEMREM 280**, where students initiate an individual development plan (IDP). The IDP begins with critical self-assessment to identify strengths and weaknesses and continues throughout the students' careers as training progresses and interests mature. Students are encouraged to take ownership of their training and professional development by being serious about initiating and updating their IDPs. Students are instructed to think intentionally about their training and career development goals, and to meet with their academic or research advisor annually to discuss them. The annual IDP meeting should be specifically devoted to student career discussions, not simply added on to a routine research advising meeting.

See <http://biosciences.stanford.edu/current/idp/> for more information and IDP forms, including extensive FAQs and resources for both faculty and students. IDP meetings are tracked on the Graduate Student Tracking system ([gst.med.stanford.edu](http://gst.med.stanford.edu)). Failure to comply with annual IDP meetings and requirements will result in a hold on student registration that prevents stipends from being funded. Questions about the IDP can be directed to [bioscicareers@stanford.edu](mailto:bioscicareers@stanford.edu).

## Decisions regarding thesis lab and research project.

Students must select their rotations and ultimately their research advisor (principle investigator, PI) and

thesis laboratory and before the end of Autumn quarter of the second year. Students should seek laboratories headed by faculty who are Members of Academic Council to assure proper mentorship and resources. Students can determine the type of academic appointment held by faculty members by consulting [Stanford Who](#) after logging in using Stanford IT credentials.

### Changing advisors.

Advisors can be changed by student appeal to the SCBRM Director of Graduate Studies, Dr. Desai. An Executive Committee of program faculty will consider the request. Changing research advisors is a major decision that must be discussed with program. Important issues to consider are the impact on time-to-degree and the financial obligation of the proposed PI to support the student's stipend and tuition.

### Research Rotations.

Research rotations serve to expose students to the science and culture of a laboratory where they may choose to conduct their doctoral thesis research. The student chooses rotation laboratories with input and discussion with the academic advisor on a quarterly basis or more frequently if desired. Rotations are set up directly between student and the faculty member of interest. First-year students must complete one rotation under the direction of a member of ISCBRM during autumn quarter of the first year.

Stanford faculty research interests can be viewed online at <https://med.stanford.edu/profiles/>. The Stem Cell Intensive course (**STEMREM 200**) and the weekly Regenerative Medicine Seminar series (**STEMREM 250**) provides students with firsthand information on ongoing research projects within [ISCBRM](#). Each student should independently contact prospective faculty members and arrange a one-on-one meeting to discuss if a rotation is in alignment for both the student and the faculty. Students are also encouraged to sit in on the faculty member's lab meetings, if permitted in advance by the individual faculty; students should not consider individual lab meetings as public events. Students can rotate and choose a thesis lab from any of Stanford's faculty. The student should consult with their Program academic advisor for rotations that are not with one of the primary SCBRM Graduate Program faculty. Students should use the [Stanford Who directory](#) to identify prospective mentors who are members of Academic Council rather than University Med Line (Clinical) faculty.

During rotations, it is recommended that the student go to lab daily and coordinate a schedule with the student's direct mentor. Generally, rotating students spend at least 20 hours per week in lab and the remaining time in class and doing coursework; however, the specific amount of time required varies by project and lab and should be discussed with the faculty member before the rotation begins.

Rotations should be no longer than one quarter in length and students are expected to complete 3 rotations by the end of the student's third quarter in the program (i.e., typically before the beginning of the fall quarter of second year). At least one rotation during autumn quarter of the first year must be undertaken in a [ISCBRM faculty laboratory](#).

# Academic Milestone Assessment

Milestones in the SCBRM graduate program will be similar or identical to other programs in Biosciences and Bioengineering. Milestones have pass/conditional pass/fail grading structure.

## For all years:

- a. Students must complete the required curriculum with a B average; exceptions or substitutions in the required curriculum need program approval for inclusion in credit requirements. Both MSTP and PhD students must enroll in required courses for a letter grade if offered; courses that offer only Pass/Not Pass options are also allowed.
- b. Students will be required to complete additional courses, or alternative mechanisms such as writing a manuscript or review article, in order to demonstrate proficiency if the grade requirement is not met.
- c. Students not able to meet PhD milestones after remediation may be offered a terminal MS degree if they have completed the SCBRM Program's required coursework and successfully complete the qualifying exam.
- d. At the end of the second year, students are required to pass a qualifying examination to enter PhD candidacy.
- e. Starting in the 2<sup>nd</sup> year, all students must meet annually with their thesis committee. Starting in year 5 and onwards, all students must meet twice each year with the thesis committee.
- f. Starting in the 2<sup>nd</sup> year, all students must prepare an individual development plan and meet annually with the thesis advisor to review progress and update the individual development plan.

## PhD First Year Milestones

### *Lab Rotations:*

The students will be required to explore research activities in three labs during their first academic year. An interim advisor is assigned to each student and assists the student with research rotation selection. Rotation evaluation forms are required for the completion of each rotation.

### *Choosing a Research Advisor:*

Students must choose a thesis advisor prior to the end of Autumn quarter of the second year. The thesis advisor assumes primary responsibility for the future direction and funding of the student and will ultimately direct the student's dissertation. Please notify the Student Services Officer and your first-year advisor as soon as a research advisor is chosen.

### *Applying for Pre-doctoral Fellowship Applications:*

All incoming and eligible PhD students will be required to apply for outside pre-doctoral fellowships such as an NSF or NRSA during their 1st or 2nd year. The Foundations in Experimental Biology course (**BIOS 200**) includes guidance for NSF applications, while the Writing Compelling Fellowships and Career Development Awards course (**BIOS 242**) focuses on F31 and similar fellowships. The [Stanford Grantwriting Academy](https://grantwriting.stanford.edu/nsf-grfp/) has useful information for NSF grants (<https://grantwriting.stanford.edu/nsf-grfp/>). SCBRM students who qualify based on citizenship are required to submit NSF applications, which are due in October. **Students are eligible to submit to NSF prior to the end of their second year of training, so eligible second year students should submit NSF applications for the October deadline.** F31 applications should be submitted by students in the third or later years of training. Check with Student Services and Financial Aid for further details and any questions concerning eligibility. Students are encouraged to consult with their faculty advisors when preparing fellowship applications.

**PhD First Year Milestones (continued)***Required Courses:*

**STEMREM 200** Stem Cell Intensive, **STEMREM 201A&B**, **STEMREM 205** Bioinformatics, **STEMREM 250** ReMS (5 units total over 2 years), **STEMREM 280** Journal Club (5 units total over 2 years), **BIOS 200** Foundations in Experimental Biology, **DBIO210** Developmental Biology. PhD students will have accumulated 40 units total by the end of year 1. MSTP students should enroll in additional **STEMREM 399** units per quarter (18 total units per quarter) to accumulate 72 units total.

*Advisor Meetings:*

All students are required to meet with their interim academic advisor prior to the upcoming quarter and must report the date for each meeting to the Student Services Officer.

**Summary of PhD Second Year Requirements***Required Courses:*

**STEMREM 250** and **STEMREM 280** (fall, winter, & spring quarter until 5 Units are accumulated in each course), **BIOS 242** Writing Compelling Fellowships and Career Development Awards or equivalent, electives, biochemistry course or equivalent, and independent research. Students will have accumulated 80 units total by the end of year 2.

MSTP Students enroll in additional **STEMREM 399** units per quarter (18 total units per quarter) and accumulate 144 units by the end of year 2. Following completion of the qualifying exam, MSTP students transition to terminal medical registration (TMR) status.

*Advisor Meetings:*

All students are required to meet with their advisor prior to the upcoming quarter and also report the date of each meeting to the Student Services Officer. Students must also update their individual development plan (IDP) and discuss and revise this plan with their advisor once each year.

*Yearly Evaluations:*

At the end of each academic year (usually in early June) the student's committee will evaluate progress for each PhD students.

*Qualifying Exam:*

**All students are required to pass a qualifying exam before the end of Autumn quarter of the third year.** This meeting serves as the first thesis committee meeting. After completing the qualifying exam, the student and advisor may elect to revise thesis committee membership. The thesis committee should include 2 SCBRM program faculty members. The student and advisor may petition to substitute one of the program faculty for non-program faculty member with appropriate expertise.

**Summary of PhD Third Year Requirements***Required Courses:*

Electives & independent research for a total of 10 units per quarter. **STEMREM 203** Stem Cells Immersion: Applications in Medicine, Business Law may be completed any time after the second year but must be completed prior to thesis defense. The STEMREM 203 topic must be developed by consulting with the PI after successful completion of the Qualifying Exam. The topic must be discussed and approved by the SCBRM graduate program directors at least four weeks prior to the start of the activity. The amount of time spent in the STEMREM 203 activity should be consistent with 3 academic units (3 to 12 hours per week) within one quarter of the academic year. Exceptions can be considered. Students will have accumulated 120 units total by the end of year 3.

MSTP students with TMR status enroll in 0 (zero) units of STEMREM 802 Dissertation and 3 units of

### PhD Third Year Milestones (continued)

STEMREM 399 Graduate Research or any combination of electives and graduate research totaling 3 units per quarter. All students are required to meet with their committee members once each year to review progress and plans for the following year. All students are also required to update and review their IDP with their advisor. Students must have committee members complete and sign their committee meeting report form, which must be returned to the Student Services Officer after each committee meeting.

### Summary of PhD Fourth Year Requirements

#### *Required Courses:*

Electives & independent research in Autumn and Winter Quarters totaling 10 units per quarter.

MSTP students with TMR status enroll in 0 (zero) units of STEMREM 802 Dissertation and 3 units of STEMREM 399 Graduate Research or any combination of electives and graduate research totaling 3 units per quarter.

By the end of Winter Quarter, PhD students will have completed 140 total units. The student must select members of the Dissertation Reading Committee and submit the petition for Terminal Graduate Registration Status ([TGR status forms](#)).

Once a student is awarded TGR status (Spring quarter of year 4 and onwards), the student enrolls in 0 (zero) units of STEMREM 802 Dissertation and 3 units of STEMREM 399 Graduate Research or any combination of electives and graduate research totaling 3 units per quarter.

#### *Committee Meetings:*

Students are required to prepare a 1–page thesis progress report and discuss progress and plans towards completing the dissertation with their thesis committee during the annual committee meeting. Students must have committee members complete and sign their committee meeting report form, which must be returned to the Student Services Officer after each committee meeting.

The student's IDP should be updated to reflect plans and milestones leading to the thesis defense. These goals should be discussed with the advisor and revised as necessary. Failure to comply with annual IDP and thesis committee meetings and requirements will result in a hold on student registration that prevents stipends from being funded.

### Summary of PhD Fifth Year Requirements and Onwards

#### *Required Courses:*

Both PhD and MSTP students enroll in 0 (zero) units of STEMREM 802 Dissertation and 3 units of STEMREM 399 Graduate Research or any combination of electives and graduate research totaling 3 units per quarter. Students are required to re-take **STEMREM 201B**, Ethical Issues in Stem Cell Biology, or enroll in **MED 255**, The Responsible Conduct of Research, after 5 years of training.

#### *Committee Meetings:*

Starting in the 5<sup>th</sup> year, all students must meet twice each year with the goal of defining discrete and achievable milestones that will lead to completion of the dissertation and oral exam (thesis defense). Students must have committee members complete and sign their committee meeting report form, which must be returned to the Student Services Officer after each committee meeting.

## Alternative Methods for Fulfilling Course Requirements

Students can demonstrate competence in each knowledge area and fulfill the course requirement by one of the following alternative methods:

1. Take and pass a substitute course on the same topic. **STEMREM 299** Directed Reading fulfills this option if the study plan engages 2 SCBRM program faculty members, the course is taken for a letter grade, and the student enrolls in an equivalent number of units as the required course that is being substituted.

OR

2. Demonstrating graduate level proficiency in the topic by:

- Taking and passing the course final exam

OR

- Taking and passing an oral exam that is administered and certified by 2 SCBRM Faculty members. The oral exam can be included in the Qualifying exam or can be administered at any other time by the 2 examining faculty members.

If an oral exam is administered, one of the administering faculty members will notify the Program Director and/or Student Services Associate in writing that an exam was administered for the waived course and that the student: 1) passed; 2) passed with contingencies (e.g., requires directed reading or other training); or 3) did not pass and will be required to complete the required core course.

### How to petition:

1. The student will first meet with their research advisor to discuss a proposed alternative. First year students should meet with their academic advisor.
2. The Advisor will send a brief e-mail to the Student Services Officer outlining the reason for the request and the proposed alternative.
3. The SCBRM Curriculum/Advising designee (Dr. Spangrude) will review the request.

## Application and Course Requirements for MSTP and MD / post-MD (ARTS) Students

MSTP students must declare their interest in joining the SCBRM Graduate Program by February 1 of the M2 year to be considered for entry into the program (exceptions to the rule are considered on an individual basis). Non-MSTP MD students or medical residents interested in doing a PhD in our program must submit application materials through the regular Biosciences program application process. MSTP students can enroll in up to 35 units for quarters 9-13, and up to 18 units for quarters 14-16. Medical students and medical residents have already completed coursework equivalents for many required elective courses in our curriculum. Therefore, these students are not required to complete electives. All courses should be enrolled for a letter grade while students are matriculated in our program unless the course is only offered pass/not pass.

MSTP students should enroll in sufficient units of STEMREM 399: Graduate Research each quarter to reach a total of 18 units per quarter and 72 units per year as directed by the School of Medicine. MSTP students should accumulate 144 units by the end of year 2. Following completion of the qualifying exam, MSTP students transition to terminal medical registration (TMR) status. MSTP students must complete a total of 135 units during the PhD years before they are eligible to defend their thesis. These units are separate from Medical School units and primarily consist of units listed above, STEMREM 399 Graduate Research units, and electives. Please confirm this information with the MSTP office if you have further questions.

# The Qualifying Examination

Prior to being formally admitted to candidacy for the PhD degree, the student must demonstrate knowledge of Stem Cell Biology and Regenerative Medicine fundamentals and a potential for research by passing a qualifying oral examination. Qualifying exams are typically scheduled for spring or summer quarter of Year 2. Students must complete the qualifying exam process by the end of autumn quarter of Year 3.

Each student is responsible for scheduling their own examination to conform to the following requirements and deadlines.

## Format of the Qualifying Examination

1. A 5 page minimum and 10 page maximum NIH-style proposal of your thesis project excluding references.
2. An oral examination

## Required Forms

1. The student is required to fill out the [Application for Candidacy](#) for Doctoral Degree.
2. The student is responsible for bringing the Qualifying Examination Report Form (obtained from the Student Services Officer) to the exam. This form must be completed and submitted after the exam has ended.

## Qualifying Exam Committee

The examining committee includes a total of three faculty, all of whom must be Academic Council members. Two faculty members must be from the Stem Cell Biology and Regenerative Medicine Graduate Program. The student must also select a chair who cannot be the student's advisor or a member of the SCBRM program. The composition of this committee is chosen by the student and their thesis advisor and must be submitted to and approved by the Program Director prior to the end of autumn quarter, second year.

## Purpose of Exam

The PhD qualification exam has several intended goals to:

- 1) Motivate students to review and synthesize course work and research material.
- 2) Determine the student's ability to understand and apply fundamental concepts.
- 3) Develop and test the student's ability to communicate orally and to respond to questions and comments.
- 4) Evaluate the student's potential to pursue doctoral research.
- 5) Identify areas that need to be strengthened for the student to be successful as a PhD student, independent scholar, and teacher.
- 6) Provide a mechanism for a range of faculty to evaluate the student's capabilities

## Mechanics of the Exam

Each student is responsible for scheduling their own examination to conform to the above deadlines and must correspond with the Program Administrator when the meeting is scheduled.

The written and oral proposal should represent the student's own efforts to identify a question of interest

and to develop appropriate experimental approaches. Preliminary data generated by the student are NOT required. Students are strongly encouraged to develop a written Specific Aims section by the end of winter quarter, second year. The qualifying exam should be taken prior to the end of summer quarter, second year. If necessary, one retake will be permitted prior to the end of autumn quarter, third year.

The written proposal shall be given to the qualifying examination committee members **at least one week** prior to the oral exam date. Just prior to beginning the oral exam, the student's advisor is expected to meet with the examination committee for a brief closed-door session without the student present. A copy of the student's Stanford University transcript and laboratory rotation evaluations will be made available to the examination committee. The student's advisor may be present during the remainder of the examination as a non-participating observer. The chair will formally be in charge of the proceedings and, in the student's absence, will take a vote of the qualifying examination committee to determine whether the written document is acceptable prior to the beginning of the oral portion of the exam. The student will then be invited into the room to begin their presentation.

Generally, students prepare a 30 minute oral presentation that briefly reviews the background, but largely focuses on the Specific Aims and the proposed experiments. Quite often this presentation is interrupted by questions from the examination committee. The goal of the examination is not necessarily to finish the prepared presentation, but rather to assess the student's readiness to pursue their dissertation work in the laboratory. When the chair determines that the examination is completed (generally after about 90 to 120 minutes), the student is asked to leave the room and the committee deliberates in private about the student's performance.

A student's performance will be deemed satisfactory or unsatisfactory by a simple majority vote of the qualifying examination committee. The student will be assessed on their written proposal, oral presentation, and mastery of the specific field of research including background literature and experimental techniques, and general knowledge about the broader field of cancer biology. The decision of the examination committee is conveyed orally to the student immediately following the exam. In addition, the chair is responsible for summarizing the strengths and weaknesses of the written proposal and oral presentation on the examination form. The original examination form shall be given to the Program Administrator and then kept in the student's file in the SCBRM Graduate Program Office. **Copies of the completed examination form shall be given to the student and the student's advisor by the Program Administrator.**

If the qualifying examination committee deems the student's performance unsatisfactory, the committee can request a revision or retake of the written proposal, the oral examination, or both.

## Frequently asked questions about the examination process:

### Is the qualifying exam committee the same as the thesis committee?

Not necessarily. The qualifying exam committee is composed of three faculty members, two of whom are from Stem Cell Biology and Regenerative Medicine, excluding your advisor (see above). Often the thesis committee (doctoral dissertation reading committee) might include these same individuals plus your advisor. However, you and your advisor are free to reconstitute a different thesis committee after completion of the qualifying exam. Sometimes students want to add individuals from outside the program or even from other institutions to their thesis committee. Often your thesis committee members serve as references for future positions and fellowship applications, so one should give this some careful thought.

### How do I choose the topic of my proposal?

This is a major part of the exercise. The most common critiques of grant proposals at all levels are "overly ambitious" and "too narrowly focused". The real trick is to find the middle ground on this spectrum.

You need to understand broadly how your work fits into your field. What is the motivation, and why will it make a difference? What are the possible approaches you can take to answer the question, and what are the strengths and weaknesses of those approaches?

Know the literature that pertains to your chosen topic, both directly and indirectly.

You will need to demonstrate that you can effectively design experiments that answer the question that you are asking. You should go through the process of writing and presenting a proposed set of experiments in a logical format.

It is always a good idea to seek feedback from classmates and your fellow lab mates as you develop your proposal. This may even include a practice talk.

### What is the written format of the qualifying exam?

The goal is to have the student defend the work that they propose for a thesis project. This includes background as well as experimental design and expected results and conclusions. The written part of the exam should be no longer than 10 pages (excluding references) and should be written in the format of an NIH grant proposal.

The general format of an NIH grant proposal includes a Specific Aims page, a Background and Significance section, and a Research Design and Methods section. The proposal should include sufficient information needed for evaluation of the project, independent of any other document. Be specific and informative and avoid redundancies. Organize the proposal to answer these questions: What do you intend to do? Why is the work important? What has already been done? How are you going to do the work?

#### a. Specific Aims

State a clear hypothesis to be tested, and list the broad, long-term objectives and what the specific research you propose is intended to accomplish. Two or three specific aims, each of which address the hypothesis, are typical for a grant application. One page is recommended. The Specific Aims page should serve as a stand-alone summary that completely describes the research project.

## What is the written format of the qualifying exam (continued)

### b. Background and Significance

Briefly sketch the background leading to your proposal, critically evaluate existing knowledge, and specifically identify the gaps that the project is intended to fill. State concisely the importance and health relevance of the research described in your proposal by relating the specific aims to the broad, long-term objectives. Two to three pages are recommended.

### c. Research Design and Methods

Describe the research design and the procedures to be used to accomplish the specific aims of the project. Each aim should be addressed in a separate section that includes an introduction to the aim, how it addresses the hypothesis, and how the data will be collected, analyzed, and interpreted. Describe any new methodology and its advantage over existing methodologies. For each specific aim, discuss the anticipated results of your approach, potential pitfalls, expected difficulties and limitations of the proposed procedures, and alternative approaches that you might use to achieve the aims if your primary approach fails. As final section, provide a tentative sequence or timetable for the project.

[Samples of actual NIH grant applications](#) are available for your review. It is helpful to ask your PI to see a real grant application, but it would be a pointless exercise (and would constitute plagiarism) for you to simply copy chunks of their grant application into your own exam proposal. Qualifying exams completed by more senior students are also helpful to review. Figures within your proposal can be helpful to the reviewer but should generally not be too complex. Figures are often more effective if inserted directly into the text at the appropriate places. The Figures are included in the page limit. Part of the exercise is learning how to present your data and plans concisely.

## Oral Examination

The general format is for the student to plan a ~30 minute presentation for an exam that generally will last from 90-120 minutes. **The student must provide the final written portion of the exam to the examiners at least one week before the oral exam.** Students should practice their oral presentations; often this is done at a lab meeting or with a group of fellow students. However, students should be aware that during the actual examination, they likely will not complete their planned oral presentation before the questions begin. One member of the committee, the designated Chair, will formally be in charge of the proceedings and will decide when the exam is over. The Chair will take a vote of the qualifying exam committee in the student's absence and will be responsible for conveying the results of the exam to the student orally and to the Student Services Officer using the Qualifying Exam form.

## PhD Candidacy

Upon passing the qualifying exam, the student has qualified for admission to candidacy for the Doctoral Degree. Being admitted to candidacy signifies that the department considers the student capable of completing the requirements necessary for earning a PhD degree. **Candidacy is valid for five calendar years** (through the end of the quarter in which candidacy expires), unless terminated by the department for unsatisfactory progress. An extension of candidacy may be obtained **for a maximum of one additional year**. In order to receive candidacy status, the student must file the [Application for Candidacy for Doctoral Degree](#) to the Student Services Officer. This form is to be approved and signed by the Principal Dissertation Advisor, PhD Program Director or Co-Director.

# Terminal Graduate Registration (TGR)

TGR status is reached when PhD students have been admitted to candidacy, completed a minimum of 135 units of coursework, and submitted the [Doctoral Dissertation Reading Committee](#) form. Student Services will contact students when they are approaching TGR eligibility. Students must complete the following paperwork and submit it to the Student Service Office *before the beginning of the quarter* in which they first become eligible for TGR status:

## Request for TGR Status.

Students should then register for TGR Dissertation, STEMREM 802 through AXESS. TGR Grading is as follows: "S" for satisfactory progress, "N-" for unsatisfactory progress, and "P" for a final grade when everything has been finished. A hold on registration is placed for a student who receives an "N-" grade for more than two consecutive quarters. As course work is no longer considered necessary during this advanced stage of study, units are no longer counted towards residency. The TGR tuition rate will cover 3 units of tuition. TGR students may enroll in additional courses at their own expense.

# Thesis Advisor, Thesis Committee and Dissertation

Any member of the Academic Council may serve as the **principal dissertation adviser**. Your thesis committee is an important complement and counterbalance to your principal dissertation advisor (PI). Although it is important to choose committee members who can contribute scientifically, it is also important that they be supportive of your graduate career. Your committee influences when you graduate and will write letters of recommendation, so choose them carefully. At least two members of your qualifying exam committee must be SCBRM Graduate Program faculty. After completing the qualifying exam, the student and advisor may revise committee membership and may also request that one of the 2 SCBRM Program faculty be substituted for a committee member with more appropriate expertise. At least one committee member must be an SCBRM Program faculty member.

**Meet with your committee at least once a year** — and more often if you are having problems. Ask them candid questions about your progress towards graduation (time frame, remaining experiments, constructive criticism, etc.). Submit the signed Committee Meeting Report form after every committee meeting.

In the third year, students will still meet annually with their thesis committees to provide an update on research progress and to solicit feedback toward the goals of publications and thesis defense. Beginning in the fifth year, students must meet twice a year with their committee.

Committee meetings are your chance to bring up new and interesting data, problems you're having with experiments or choosing a direction, potential implications, and new projects that come out of your work. These are very valuable opportunities for you to get feedback, suggestions, and advice on anything pertaining to your PhD. With that in mind, you should prepare for your committee meeting and have a sense of what you want to get out of it when you walk in. If you want help in specific areas, be ready to bring them up and discuss them.

## Thesis Advisor, Thesis Committee and Dissertation (continued)

Your committee is there to help you, but the initiative is yours to get what you want. Help them help you.

Annual committee meetings are not something to be feared. This is an opportunity for you to talk about your work with a group of people who are giving you their undivided attention. Turn it into an interactive discussion and enjoy it!

## University Dissertation Reading Committee Requirements

The thesis committee is typically the same as the dissertation reading committee. Each PhD candidate is required to establish a thesis committee for the doctoral dissertation within six months after passing the department's PhD Qualifying exams. The qualifying exam committee may also serve as the thesis committee, but students may also substitute committee members to better suit the thesis topic and/or the student's professional goals. The student should consult frequently with all members of the committee about the direction and progress of the dissertation research.

SCBRM Students must have at least three faculty members on the Dissertation reading committee: the principal dissertation advisor and two other readers who read and certify the dissertation. Stanford University limits the reading committee to a maximum of 5 members. At least three members must be members of the Academic Council. It is expected that at least one member of the Stem Cell Biology and Regenerative Medicine faculty be on each reading committee.

The [Doctoral Dissertation Reading Committee Form](#) is to be completed and filed with the Student Services Officer *before* scheduling a university oral examination that is a defense of the dissertation. The Director of Graduate Studies (Dr. Desai) may in some cases approve the appointment of a reader who is not on the Academic Council, if that person is particularly well-qualified to consult on the dissertation topic and holds a PhD or equivalent foreign degree. Approval is requested on a [Petition for Non-Academic Council Doctoral Committee Members](#) form.

## Preparation of the Doctoral Dissertation

Each doctoral student must compose a written dissertation, which presents novel research contributing to the larger scientific community and exemplifying the highest standards in scholarship. The dissertation represents research that the student has completed during graduate training. The purpose of the dissertation is to demonstrate that the student has critical thinking skills and the ability to develop interesting and testable hypotheses; and that the student is prepared to become an independent researcher. The student will work closely with the Primary Research Advisor to prepare the Dissertation in advance of the Dissertation Defense.

The Dissertation should be a culmination of the student's research and should address at least the following critical areas:

- Table of contents, including a list of all tables and illustrations
- Background and significance of the research problem
- Hypothesis and specific aims
- Outline of experiments to test the central hypothesis, including materials and methods
- Data and results
- Discussion and interpretation of the results
- Future directions
- Literature cited

The Thesis should be formatted according to University requirements, found on the Registrar's Office Student Affairs [Dissertation and thesis submission website](#). While preparing the Thesis, the student is advised to consult with Student Services for the most current University requirements and formatting

## Preparation of the Doctoral Dissertation (continued)

specifications. The student is encouraged to include research that has already been published and to

which the student contributed as an author. However, there must be adequate information detailing the student's contribution to the work, and written permission is required for copyrighted information. Once the Dissertation has been prepared, it should be submitted to the Thesis Reading Committee at least one week in advance of the Thesis Defense.

### **Authorship Requirement Prior to Defense**

The SCBRM Graduate Program requires a first author (or co-first author paper) to be submitted for publication around the time of the oral defense of their PhD thesis. This requirement is consistent with the expectations that students have for their degree and is conveyed as part of the orientation of the students when they enter the program in their first year as part of the student handbook. Moreover, 80% of SCBRM PhD students graduate with at least one first author paper (or co-first author paper) and SCBRM PhD students publish a median of 5 papers each. Rare exceptions may be made if both the student and PI provide a 1-page written document outlining the rationale for an exception. The document will be reviewed by the Program Leadership who will consult in a confidential manner with the student's thesis committee before making a decision. The program believes that given the importance of generating a diverse and inclusive workforce and the nuances of any individual student's career path, that having the requirement with the possibility for rare exceptions provides the right balance for the program.

### **Defense of the Doctoral Dissertation**

The student will confer with the Primary Thesis Advisor and Doctoral Dissertation Reading committee that the requirements of the PhD program have been fulfilled and that the thesis studies have been completed to the satisfaction of both Advisor and Reading Committee. At that time, an oral exam committee will be selected. The oral exam committee must consist of at least five Stanford faculty members: four examiners and the committee chair. The committee may be identical to the reading committee but must also include at least 2 SCBRM faculty members. At least 3 members of the oral exam committee must be Academic Council members. A Dissertation Oral Exam Chairperson will be selected from a Department or Program outside of the student's home program. The Chair must be an Academic Council member. The Defense of the Dissertation should be scheduled at least six months before the student intends to leave the University, to allow sufficient time for thesis revisions.

At least one week before the oral exam, the student will provide the committee members with a draft of the written Dissertation. The PhD Candidate will prepare a 1-hour lecture and the title and topic will be advertised to the Stanford University research community.

The 1-hour lecture by the PhD Candidate will be open to the public. The lecture will be followed by a brief public question and answer period (approximately 15 minutes). The audience will be excused, and a closed final exam session will commence. The Dissertation Oral Exam Chairperson will moderate, and the Oral Exam Committee members will examine the PhD Candidate on any topic deemed relevant to the Thesis or the Candidate's training, professional accomplishments, and preparedness to receive a Doctoral Degree. The exam portion of the defense will last no longer than 1.5 hours. The Candidate will be asked to leave the room. The Chair and Oral Exam Committee will then confer on the Candidate's performance and vote by anonymous ballot to pass or fail the candidate. The Reading Committee may pass the student, may require revisions to the Dissertation, or may require an additional Thesis Defense.

The student is responsible for obtaining the necessary signatures, as required by the Stanford University. This includes signature pages for the written Dissertation as well as signatures for the oral exam completion form.

# Practical Issues Regarding Graduate Study

## AXESS

<http://axess.stanford.edu>

This is the University's web based administrative system wherein most student business is conducted.

Students must use Axess to accomplish the following tasks:

- File or adjust a study list (the list of courses in which the student wishes to enroll) and elect grading options each quarter.
- Confirm, through Axess, that the University has your correct address and telephone number.
- Update emergency contact information.
- Print a history of courses and grades.
- Complete necessary safety training.
- Check registration status each quarter (i.e., pending holds).
- Review grades.
- Ensure University bill is paid.
- Apply to graduate in final quarter.

Axess also provides students with the following services:

- Official transcript request.
- Campus housing application.
- Print an enrollment certification.

## Laboratory Safety Training

Every student working in a laboratory is required by various agencies to be trained in all aspects of laboratory safety. Prior to working in the lab, new graduate students are required to complete the Training Advisor found online through Axess – STARS (Training) tab by clicking on the “My Training Needs” link. Students in the SCBRM program must complete the following training online:

- 1) General Safety and Emergency Preparedness (EHS-4200);
- 2) Bloodborne Pathogen Training (EHS-1600);
- 3) Chemical Safety for Laboratories (EHS-1900);
- 4) Biosafety (EHS-1500);
- 5) Laboratory Ergonomics (EHS-4800)

Also, depending on the nature of the student's research, additional training includes:

- 6) Compressed Gas Safety (EHS-2200);
- 7) Radiation Safety Training (EHS-5250);
- 8) Laser Safety Training (EHS-4820);
- 9) Laboratory Animal Care and Use (VSC-0001).

In addition, all School of Medicine affiliates must take the on-line HIPAA training and agree to abide by the School of Medicine's policies and procedures. To take the on-line training please check-in with your Student Services Officer who will register you and will provide the email and a login ID and password to you that allows you to proceed with the training.

- Discuss required (and recommended) training and its related priority with your mentor and/or lab manager.
- After you have completed the Training Needs Assessment in Axess and discussed options and priorities with your mentor, log back into Axess, click the STARS (Training) tab, and click the link to “My Learning” to review courses that has been added to your Learning Plan. Click Enroll next to the session you wish to attend.

### Laboratory Training (continued)

After completing this training, please report to Christina Lum [[Clum@stanford.edu](mailto:Clum@stanford.edu), (650) 725-2495] to obtain the building access form. Christina is located in the Stem Cell Research Building Administrative Suite on the 3<sup>rd</sup> Floor (G3101E). This form will require the signature of the Lokey Building Manager, Linda Heneghan [[heneghan@stanford.edu](mailto:heneghan@stanford.edu), 650-906-2381, G1100]. Christina Lum will provide you with directions to the ID Card Office located in the Stanford Hospital. For students rotating in labs outside of the Stanford Institutes of Medicine-1 (SIM1) building, arrangements must be made with the relevant building manager.

### Building Access

The Lorry I. Lokey Stem Cell Research Building is open weekdays from 7:00am to 6:00pm. The Stanford School of Medicine badge serves as a dual purpose in that it identifies you as an employee of Stanford and allows you access to the facility after hours.

### Taxes

Tax information is available at:

1. [Stanford Student Services](#)
2. The [Bechtel International Center](#) (for international students)
3. [Graduate Student Council](#)

### Health Insurance

At the start of each academic year, students will be automatically enrolled in Cardinal Care in their first registered quarter (Autumn Quarter). At that time, and that time only, they will be able to waive Cardinal Care for the rest of the year by documenting equivalent health insurance in Axxess. Generally, the deadline for waiving the right to Cardinal Care is mid-September of each academic year (check with the Student Services Officer). The decision made at the start of each academic year will be applied to the remainder of that year.

To waive Cardinal Care, a student must enter Axxess and follow the health insurance waiver link and complete the steps indicated. A health plan name and group policy number are required to complete the health insurance waiver. A student must waive health insurance for the entire academic year. Contact Info: 650-723-2135, Email: [healthinsurance@stanford.edu](mailto:healthinsurance@stanford.edu).

### Core Facilities

Stanford offers many [core facilities](#) that can facilitate your research efforts. In some cases (for example, flow cytometry) multiple core facilities offer complementary services. ISCBRM operates a [unique flow cytometry core facility](#) that is available to all SCBRM students. Upper-level students or faculty will be able to advise you about which core facilities are optimal based on turnaround time, fees, training opportunities, and other questions.

### CIRM Training Grant

Most PhD students (non-MSTP) in the SCBRM graduate program are supported for their first three years through a training grant awarded by the California Institute for Regenerative Medicine (CIRM). Some students are funded through other sources, such as the Stanford Graduate Fellowship (SGF) program or the National Science Foundation (NSF). All PhD students are expected to apply for additional funding throughout their training periods.

### ISCBRM PhD Trainee Support Policy

All students must receive approval from the SSO before making any purchases.

#### 1. First Year Trainees

- Attendance at annual ISCBRM retreat (all trainees)
- Computer/Tech allowance: up to \$1500 (non-MSTP / ART trainees only\*)+
- Optional ISCBRM FACS Training; arrange with SSO (non-MSTP / ART trainees only\*)
- Attendance at annual CIRM symposium, contingent on CIRM approval (CIRM trainees only)

\* MSTP / ART trainees should be supported by their thesis lab PI.

## ISCBRM PhD Trainee Support Policy (continued)

### 2. Second year trainees

- Attendance at annual ISCBRM retreat (all trainees)
- Attendance at annual CIRM symposium (CIRM trainees only)
- Research-related expenses: PI should assume responsibility for research-related expenses. Please discuss with your thesis lab PI. PI may request other research-related expense funds to support trainee, budget permitting. See below for allowable expenses.

### 3. Third year and beyond

- PI will assume responsibility for ISCBRM retreat costs
- Attendance at annual CIRM symposium (CIRM trainees only)
- Research-related expenses: PI will assume responsibility for research-related expenses. Please discuss with your thesis lab PI. PI may request other research-related expense funds to support trainees, budget permitting. See below for allowable expenses.

## Research Related Expenses

Research related expenses should be funded by your thesis lab PI. For trainees funded by CIRM, funds are available for project-specific research related expenses (eg, RNA sequencing, multichannel pipettes, a centrifuge, reagents). Ordering these items requires agreement between the CIRM student, lab PI, and CIRM PI.

Examples of expenses not allowed (not a complete list):

- Headphones
- Virtual reality headsets
- Non-research specific software (i.e. Endnote, Adobe Creative Cloud)
- Printers / 3D Printers
- Phones
- Professional society dues or journal subscriptions

\* MSTP / ART trainees should be supported by their thesis lab PI.

+ The technology allowance (personal technology) is available only to students in the first year of the program and can be used to purchase **one** of the following non-capital items (in entirety or partially):

- Laptop/Desktop
- Monitor (remains University property)
- Tablet
- Computer peripherals and upgrades (eg, mouse, trackpad, keyboard, RAM storage)

## Travel Policy

The thesis lab PI is responsible for all travel arrangements and funding, with the exception of the required annual meeting for CIRM-funded trainees. Travel must be preapproved and organized at least 4 weeks in advance. OGE provides the opportunity to apply for travel funds.

<https://oge.stanford.edu/financial/travel-grant-program/>

# Student Organizations

**Complete List of Stanford Student Groups:** Over 650 current and recently active university recognized voluntary student organizations (VSOs), all registered with Office of Student Engagement (OSE).

**Stanford Biosciences Student Association (SBSA):** SBSA organizes monthly social events, provides a discussion forum for graduate student issues, and represents the Biosciences graduate student population. First-year students are encouraged to attend the SBSA camping trip and participate in the SBSA mentor program.

**The Biomedical Association for the Interest of Minority Students (BioAIMS):** BioAIMS promotes diversity and offers opportunities for minority students in the Biosciences. BioAIMS projects have included mentoring programs, team-building retreats, and career development. The purpose of BioAIMS is to address the needs and concerns of current minority graduate students in the biosciences.

**Graduate Student Council:** The Graduate Student Council (GSC) serves Stanford's graduate student population by representing student interests in University affairs.

**Stanford Medicine Enterprise Strategy Team (EST)** is the trusted partner to Stanford Medicine and steward of the integrated strategy and organizational initiatives. We partner with teams across the enterprise to Support Stanford Medicine's Tri-partite Mission by developing platforms and initiatives to support cutting-edge scientific discoveries, defining a "system of care" as a leading academic health system, and creating a sustainable environment to grow the next generation of leaders.

**Stanford Healthcare Club (HCC):** Based in the Graduate School of Business and including Biosciences PhD students, the HCC organizes speakers, social gatherings, and educational sessions for students interested in pursuing a career in healthcare.

**Stanford Black Bioscience Organization (SBBO):** The Stanford Black Bioscience Organization (SBBO) seeks to build a community among Black bioscientists in the school of Medicine in conjunction with the greater Black community at Stanford.

**Sisters in STEM:** Sisters in STEM offers a quarterly networking meeting addressing the particular needs and interests of Black women graduate students and postdoctoral scholars in science and engineering.

**Society for Advancement of Chicanos and Native Americans in Science (SACNAS):** Society for Advancement of Chicanos and Native Americans in Science's (SACNAS) mission is to foster the success of underrepresented scientists in attaining advanced degrees, careers and positions of leadership in STEM.

**Stanford Hermanas in STEM:** Stanford Hermanas in STEM's main goal is to unite and build a community of support among Latina graduate students and postdoctoral fellows on campus.

**Asian American Graduate Student Association:** The Asian American Graduate Student Association (AAGSA) is a graduate student organization that serves to build a strong graduate community through Asian American culture-related events and activities.

**Association of Chinese Students and Scholars at Stanford:** ACSSS is a student-run organization whose mission is to broaden the channels of communication between the Stanford mainland Chinese community and various other cultural, academic, and professional communities in the Bay Area.

**Stanford Taiwanese Students Association:** The community of Taiwanese students and staff at Stanford, is a non-political, non-religious and non-profit voluntary student organization.

**Native American Cultural Center:** Ours is a history of working to improve the quality of life for American Indians, Alaska Natives, Native Hawaiians and Indigenous Pacific Islanders. Our community reaches out to new students and their families to help them adjust to life at Stanford—to help them realize their goals and prepare for the future.

**Alaska Native Student Association (ANSA):** ANSA provides a cultural, educational, and social presence for Alaska Native students, staff, and alumni at Stanford.

**Hillel at Stanford:** The mission of Hillel at Stanford is to empower Jewish students at Stanford to explore and deepen their Jewish identities, and to envision their futures with choices inspired by Jewish values and commitments.

**Markaz Resource Center:** The Markaz supports a vibrant community of students who identify with or are interested in Muslim experiences both here and around the world. We provide a welcoming space, resources, and programming to engage, educate and empower the entire Stanford community.

**LGBTQ-Meds:** As an activist and social organization, we are dedicated to raising awareness of queer health issues and promoting equal social and political rights for lesbian, gay, bisexual, transgender and queer people.

**Out in STEM (oSTEM):** The Stanford Chapter of Out in Science, Technology, Engineering, and Mathematics (oSTEM@Stanford) is part of the national student society dedicated to serving sexual and gender minority students, with a primary goal of fostering successes in leadership, academic pursuits and professional activity.

**Medical Students with Disabilities and Chronic Illnesses (MSDCI):** The purpose of the organization is to provide a support system and platform for advocacy for students with disabilities and chronic illness. We also hope to begin conversations about the difficulties about becoming a healthcare provider with personal connections to and experience with illness and disease.

## Fellowships and Mentorship Programs

**Knight-Hennessy Scholars:** The Knight-Hennessy Scholars develops a community of future global leaders to address complex challenges through collaboration and innovation.

**DARE Fellows:** The DARE (Diversifying Academia, Recruiting Excellence) Doctoral Fellowship Program awards two-year fellowships to advanced doctoral students who want to investigate and prepare for academic careers and whose presence will help diversify the professoriate.

**ADVANCE Summer Institute:** ADVANCE seeks to prepare students for a successful graduate career at Stanford and continuously builds on their successes.

**Bio Peers:** The biosciences Peer Mentors (BioPeers) provide free and private peer-to-peer support for the Biosciences graduate student community

**1<sup>st</sup> Generation Mentorship Program:** The 1<sup>st</sup> Generation Mentorship Program's goal is to provide first-generation students with broadened academic and professional networking opportunities and advocacy through continued mentorship.

**SoLID Mentorship Program:** The Solidarity, Leadership, Inclusion, Diversity (SoLID) Mentorship program connects biosciences students with faculty who can provide additional mentorship to guide and support

students on issues that may be largely outside their research.

**Someone Like Me:** This postdoc-graduate student mentoring program seeks to provide more professional guidance to graduate students from minoritized backgrounds, who often struggle to find relatable role models at the faculty level.

**National Science Foundation Graduate Research Fellowship Program (GRFP):** The program recognizes and supports outstanding graduate students in NSF-supported science, technology, engineering, and mathematics disciplines who are pursuing research-based master's and doctoral degrees at accredited United States institutions.

**HHMI Gilliam Fellowship for Advanced Study:** The goal of the Gilliam Fellowships for Advanced Study is to increase the diversity among scientists who are prepared to assume leadership roles in science, particularly as college and university faculty. The program provides awards to pairs of students and their dissertation advisers who are selected for their scientific leadership and commitment to advance diversity and inclusion in the sciences.

**Ford Foundation Predoctoral Fellowship:** Predoctoral fellowships will be awarded in a national competition administered by the National Academies of Sciences, Engineering, and Medicine (the National Academies) on behalf of the Ford Foundation. The awards will be made to individuals who, in the judgment of the review panels, have demonstrated superior academic achievement, are committed to a career in teaching and research at the college or university level, show promise of future achievement as scholars and teachers, and are well prepared to use diversity as a resource for enriching the education of all students.

**NIH Individual Predoctoral to Postdoctoral Fellow Transition Award (F99/K00):** The purpose of the Predoctoral to Postdoctoral Fellow Transition Award (F99/K00) is to encourage and retain outstanding graduate students who have demonstrated potential and interest in pursuing careers as independent researchers. The award will facilitate the transition of talented graduate students into successful research postdoctoral appointments.

**Ruth L. Kirschstein National Research Service Award (NRSA) Individual Predoctoral Fellowship (F31):** The award is to enable promising predoctoral students to obtain individualized, mentored research training from outstanding faculty sponsors while conducting dissertation research in scientific health-related fields relevant to the missions of the participating NIH Institutes and Centers. The proposed mentored research training must reflect the applicant's dissertation research project and is expected to clearly enhance the individual's potential to develop into a productive, independent research scientist.

**NRSA Individual Predoctoral Fellowship to Promote Diversity in Health-Related Research (F31-Diversity):** The purpose of the award is to enhance the diversity of the health-related research workforce by supporting the research training of predoctoral students from population groups that have been shown to be underrepresented in the biomedical, behavioral, or clinical research workforce, including underrepresented racial and ethnic groups and those with disabilities. Through this award program, promising predoctoral students will obtain individualized, mentored research training from outstanding faculty sponsors while conducting well-defined research projects in scientific health-related fields relevant to the missions of the participating NIH Institutes and Centers. The proposed mentored research training is expected to clearly enhance the individual's potential to develop into a productive, independent research scientist.

**Ruth L. Kirschstein Individual Predoctoral NRSA for MD/PhD and other Dual Degree Fellowships (F30):** The purpose of the Kirschstein-NRSA, dual-doctoral degree, predoctoral fellowship (F30) is to enhance the integrated research and clinical training of promising predoctoral students, who are matriculated in a combined MD/PhD or other dual-doctoral degree training program (e.g. DO/PhD, DDS/PhD, AuD/PhD, DVM/PhD), and who intend careers as physician/clinician-scientists. Applicants must propose an integrated research and clinical training plan and a dissertation research project in scientific health-related fields relevant to the missions of the

participating NIH Institutes and Centers. The fellowship experience is expected to clearly enhance the individual's potential to develop into a productive, independent physician/clinician-scientist.

**P.D. Soros Fellowship for New Americans:** The Paul & Daisy Soros Fellowships for New Americans program honors the contributions of immigrants and children of immigrants to the United States. Each year, we invest in the graduate education of 30 New Americans—immigrants and children of immigrants—who are poised to make significant contributions to US society, culture or their academic field.

Additional resources can be found on the SBSA [Funding and Training](#) page

# Forums and Lecture Series

**Annual Diversity and Inclusion Forum:** The Annual Diversity and inclusion Forum is an enriching opportunity to learn about tool and strategies to enable participants to become effective change agents for diversity and inclusion in medical education

**Stanford Medicine LGBTQ+ Forum:** The Forum features LGBTQ+ members of the Stanford Medicine community, as well as networking opportunities and opportunities for allies to show support.

**Women's Health Forum:** The Annual Stanford Women's Health Forum, provides an in-depth look at pressing topics in women's health.

**Dean's Lecture Series:** An opportunity for students, trainees, faculty and staff to explore current topics that impact Stanford Medicine's mission areas including lectures on diversity, equity, and inclusion topics.

**McGann Lecture Series:** A lecture series that features seminars on the intersection of women, sexual and gender minorities, and health.

**Diversifying Graduate Admissions:** Admissions processes are inherently biased, but can we make them better? Topics will include bias (unconscious bias, performance bias, bias in publishing and funding), the myth of meritocracy, and ambient belonging.

**Diversity Perspectives Seminar Series:** The Diversity Perspectives Seminar Series is a trainee-hosted event that contributes to the ongoing, university-wide discussion on diversity and inclusion in academia.

**Topics in Neurodiversity: Introduction and Advocacy:** Topics in Neurodiversity: Introduction and Advocacy provides the foundation knowledge and essential skills for understanding, engaging with, and advocating for the neurodiverse population.

**Civic Engagement Symposium:** The Civic Engagement Symposium explores multidisciplinary approaches towards improving health, illness, and wellness.

**Community Health Symposium:** The Community Health Symposium is an annual event showcasing a wide range of service and partnership research projects undertaken by Stanford students, trainees, and faculty in underserved communities here and around the world.

**Hidden Figures:** A social media series organized by the Stanford Black Postdoc Association that highlights marginalized scientists that have continued to ascend up the academic ladder, or have pursued careers beyond the traditional academic roles.

# Centers

**WHSDM Center:** The Stanford Women’s Health and Sex Differences in Medicine (WHSDM) center acknowledges the wisdom of conducting innovative, multi-disciplinary research on women’s health and sex differences in biology and medicine.

**SPHERE Center:** SPHERE is one of five national centers funded by the National Institute on Minority Health and Health Disparities to focus on using precision-medicine tools to improve the health of underserved ethnic and racial groups.

**Center for Innovation in Global Health (CIGH):** The Center for Innovation in Global Health (CIGH) strives to enable collaborative programs in global health by reaching across geographic, cultural, economic, and gender boundaries to inspire a new generation of global health leaders.

# Courses

**Unconscious Bias in Medicine CME Course:** This CME activity provides education on unconscious bias in the academic medicine workspace.

**Diversity and Inclusion in Science (DAIS) Minicourse:** A minicourse that provides an introduction to the social science literature on factors contributing to gender disparities in the scientific workplace.

**Certificate in Critical Consciousness and Anti-Oppressive Praxis:** The goal of this certificate is to educate and prepare trainees with the tools necessary to navigate a dynamic future from a position of knowledge, empathy, and justice.

**Social Determinants of Health: Achieving Health Equity:** This course examines theoretical basis and societal context of social determinants of health, health disparities and health equity.

**Academic Career Prep:** The Preparing for Faculty Careers course is designed for advanced doctoral students and postdoctoral scholars from any discipline who are considering a faculty career.

## Other Resources

**Gateway for new Graduate Students**

**Student Wellness - Red Folder**

**Wellness Courses**

**See Next Page for More Wellness Resources**

**Stem Cell Biology and Regenerative Medicine Wellness Resources**

**Financial Well Being**

- Travel Grant Program
- Graduate Student Assistantship
- Salary and TAL tables
- Financial Aid and Tax Information
- Student Mini-Grants
- Financial Hardship Funding

**Academic Well Being**

- Graduate Academic Advising
- Schwab Learning Center
- Student E-Forms

**Diversity and Inclusion**

- SOLID Program
- Peer Mentoring Program
- Graduate Life Office
- Inclusion and Diversity Office
- First Generation Office
- Womens Center

**Mental Well Being**

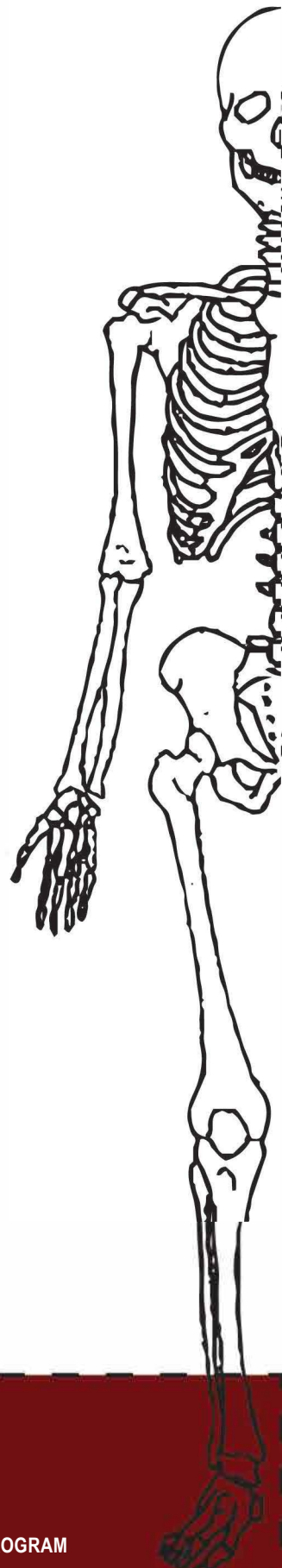
- CAPS
- Wellness Network
- Well Being at Stanford

**Social Well Being**

- Asian American Activities Center
- Black Community Services Center
- El Centro Chicano y Latino
- Hillel at Stanford
- Markaz Resource Center
- Native American Cultural Center
- Queer Student Resources

**Physical Well Being**

- Vaden Medical Services
- Office of Accessible Education
- Diversity and Access Office
- Physical Education Recreation and Wellness
- Stanford Recreation Classes



**Other Questions**

- Gateway for new Graduate Students
- Student Affairs - Red Folder
- Wellness Courses

**Clickable Links --> Wellness**

## Appendix I: Additional courses outside of the School of Medicine

*Note that this list is not comprehensive; check web listings for latest course offerings*

### ENGINEERING

SEE (Stanford Engineering Everywhere) programming includes one of Stanford's most popular engineering sequences: the three-course Introduction to Computer Science taken by the majority of Stanford undergraduates, and seven more advanced courses in artificial intelligence and electrical engineering.

### INTRODUCTION TO COMPUTER SCIENCE

Programming Methodology CS106A  
 Programming Abstractions CS106B  
 Programming Paradigms CS107

### ARTIFICIAL INTELLIGENCE

Introduction to Robotics CS223A Natural  
 Language Processing CS224N Machine  
 Learning CS229

### LINEAR SYSTEMS AND OPTIMIZATION

The Fourier Transform and its Applications EE261  
 Introduction to Linear Dynamical Systems EE263  
 Convex Optimization I EE364A  
 Convex Optimization II EE364B

### ADDITIONAL SCHOOL OF ENGINEERING COURSES

Programming Massively Parallel Processors CS193G

iPhone Application Programming CS193P  
 Seminars and Webinars

### MATHEMATICS/STATISTICS

STATS 166: Computational Biology (BIOMEDIN 366, STATS 366)  
 STATS 167: Probability: Ten Great Ideas About Chance (PHIL 166, PHIL 266, STATS 267)  
 STATS 202: Data Mining and Analysis  
 STATS 203: Introduction to Regression Models and Analysis of Variance  
 STATS 205: Introduction to Nonparametric Statistics  
 STATS 206: Applied Multivariate Analysis STATS  
 207: Introduction to Time Series Analysis STATS  
 208: Introduction to the Bootstrap  
 STATS 211: Meta-research: Appraising Research Findings, Bias, and Meta-analysis (HRP 206, MED 206)  
 STATS 215: Statistical Models in Biology  
 STATS 217: Introduction to Stochastic Processes  
 STATS 222: Statistical Methods for Longitudinal Data (EDUC 351A) STATS  
 253: Spatial Statistics (STATS 352)

**Appendix I: Additional courses outside of the School of Medicine (continued)**

**BUSINESS**

CON 90/190. Introduction to Financial Accounting  
 ECON 91/191. Introduction to Cost Accounting  
 FINANCE 221. Finance for Non MBAs  
 LAW 226. Accounting  
 LAW 262. Corporate Finance  
 LAW 327. Introduction to Organizational Behavior  
 PUBPOL 204. Economic Policy Analysis  
 (ECON 150, PUBLPOL 204.)  
 PUBPOL 301A. Microeconomics  
 MATH 51 or equiv. (Same as IPS 204A.)  
 PUBPOL 301B. Cost-Benefit Analysis and Evaluation  
 ECON 51. (Same as IPS 204B.)  
 GSBGEN 111Q. Seminar in Entrepreneurial Communication

**Law School**

Science, Technology, and Intellectual Property Law  
 Biotechnology Law & Policy  
 Communications Law: Broadcast and Cable Television  
 Communications Law: Internet and Telephony Computer  
 Crime Seminar  
 Cyberlaw Clinic  
 Cyberlaw Clinic: Advanced  
 Cyberlaw: Difficult Problems  
 FDA's Regulation of Health Care  
 Health Care Regulation, Finance and Policy  
 Health Law & Policy I  
 Health Law & Policy II  
 Intellectual Property and Antitrust Law  
 Intellectual Property as a Strategic Asset  
 Intellectual Property Strategy for Technology Companies  
 Intellectual Property: Advanced Topics in Patent Law  
 Intellectual Property: Commercial Law  
 Intellectual Property: Fair Use in Film  
 Intellectual Property: Innovation Industries  
 Intellectual Property: Copyright Intellectual  
 Property: Patent Litigation Intellectual  
 Property: Patents  
 Intellectual Property: Trade Secrets  
 Intellectual Property: Trademark  
 International Intellectual Property  
 Internet Business Law and Policy  
 Introduction to Intellectual Property  
 Law and Biosciences  
 Law and the Biosciences: Genetics  
 Law, Science and Technology Colloquium  
 Legal Design for the Entertainment and Information Future  
  
 Patent Litigation Workshop  
 Scientific Evidence and Expert Testimony: Patent Litigation

**Appendix I: Additional courses outside of the School of Medicine (continued)**

**HUMANITIES AND SCIENCES**

**HUME WRITING CENTER - WORKSHOPS**

Writing the Dissertation: Getting Started  
Publishing the Journal Article: Writing and Submitting  
Creating Effective Multimedia Presentations  
Writing the Research Statement for Fellowship and Grant Proposals  
Finishing the Dissertation  
Developing an Online Presence  
Publishing the Journal Article: Resubmitting the Journal Article

**Social Sciences, Humanities, AND Interdisciplinary Policy Studies in Education (SHIPS)**

Anthropology  
Economics  
Educational Policy  
Higher Education  
History  
International Comparative Education (ICE)  
Linguistics  
Organizational Studies  
Philosophy  
Race, Inequality, and Language in Education (RILE)  
Sociology

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