Stem Cell Biology and Regenerative Medicine Interdisciplinary Graduate Program (PhD)
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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 Ph.D. 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 School of Medicine Biosciences Program along with 13 other programs.

The SCBRM Program Administration includes the Director of Graduate Studies Dr. Tushar Desai and Executive Director Dr. Gerald Spangrude. Program administration is overseen by Student Services Officer Lorena Najarro.

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 is built on the foundations of genetics, cell biology, developmental biology, and biochemistry. Also accompanying the formal classroom-based core curriculum is a requirement to complete three graduate research rotations in the first year. 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 spring quarter of the 4th year of enrollment.

Before the start of the academic year, incoming SCBRM students are required to participate in a week-long Stem Cell Intensive (STEMREM 200) in which students are introduced to the SCBRM faculty through short lectures. All SCBRM students will enroll in the unique core SCBRM courses, STEMREM 201A, 201B, 202 and 203, as well as the Regenerative Medicine weekly seminar series (STEMREM 250) and a student-organized journal club (STEMREM 280). The curriculum starts by integrating didactic coursework in stem cell biology (STEMREM 201A) with a forum to discuss rotation laboratory experiences (STEMREM201B). This introduction is followed by an exploration of the basic and clinical properties of different stem cell systems with a focus on polishing skills in developing a research proposal (STEMREM 202). Finally, an immersion or internship is aimed at moving the student’s professional and personal goals forward with
novel opportunities in medicine, business, industry, human health, science policy, or other fields (STEMREM 203). The immersion is planned by the student in consultation with academic advisors and provides an opportunity to acquire a highly specialized subset of the knowledge, skills, and expertise for success.

The immersion rotation is an essential component of the core curriculum and is designed with input from the student’s academic and research advisors. Prior to enrolling for credit, all immersion rotations must be approved by one of the SCBRM program directors. Upon completion, a report of the immersion rotation is provided by 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.

We encourage our students to explore areas that are of interest to them in the 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. 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).
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).

The Regenerative Medicine Seminar Series (STEMREM 250) provides weekly lectures in stem cell biology and regenerative medicine. The ReMS series provide students with firsthand information about 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. The Journal Club class (STEMREM 280) meets regularly through the quarter and is organized by the graduate students. Topics include current literature, discussions of newly emerging technologies, work/life balance discussions, and other topics of interest to the graduate student community. Attendance in both STEMREM 250 and 280 is required for 1st and 2nd year students to accumulate 5 units of credit in each course and is encouraged for all students in the 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.

**Summary of Degree Requirements**

SCBRM graduate students enroll in 10 units per quarter (no more or less) and 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 units of Graduate Research (STEMREM 399) and electives each quarter, thereby completing the required minimum of 135 units by the end of spring 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. Stem Cell Intensive (STEMREM 200 – 1 units)
  2. Stem Cells and Human Development with Laboratory (STEMREM 201A & B – 4 units)
  3. Stem Cells and Translational Medicine (STEMREM 202 – 3 units)
  4. Stem Cells Immersion Applications in Business, Law, and Medicine (STEMREM 203 – variable units)
  5. ReMS Regenerative Medicine Seminar Series (STEMREM 250 – 5 units)
  6. SCBRM Journal Club (STEMREM 280 – 5 units)
  7. Advanced Genetics (GENE 205 – 3 units) or Genomics (GENE 211 – 3 units)
  8. Developmental Biology (DBIO 210 – 4 units)
  9. Biochemistry (2-5 units), 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)

- **Other Mandatory Courses**
  1. Responsible Conduct of Research (MED 255 – 1 unit)
  2. Graduate Research in Stem Cell Biology and Regenerative Medicine (STEMREM 399 – up to 10 units/quarter)
  3. Dissertation (STEMREM 802 – 0 units, Terminal Graduate Registration (TGR) is achieved after completing 135 total units and all required coursework).

**Elective Curriculum**

- **Electives.** Must take at least 2 courses totaling 6 units. Electives can be taken in any quarter. Additional electives are allowed and encouraged.

  (Below is a subset of elective offerings. Other courses are available in Computer Sciences, Engineering, Law, Business and Medicine, among many other courses can selected in consultation with academic and thesis advisors.) One elective must provide instruction in computational and/or statistical methods.

     - Advanced Cell Biology (BIOC 224/BIO 214)
INSTITUTE FOR STEM CELL BIOLOGY AND REGENERATIVE MEDICINE

- Introduction to Bioengineering Research (such as BIOE 390)
- How Cells Work (MCP 256)
- Computational Analysis of Biological Information (GENE 218)
- Introduction to R for Data Analysis (SOMGEN 223)
- Molecular and Cellular Neurobiology (NBIO 254)
- Molecular and Genetic Basis of Cancer (CBIO 240)
- Advanced Immunology (IMMUNOL 201)
- Anatomy and Histology (COMPMED 210A)
- Bioinformatics (BIOMEDIN 210)
- Imaging (BIOE 222A or MCP 222)
- Patent Law and Strategy for Innovators and Entrepreneurs (ME 208)
- Biodesign Innovation (BIOE 374, MED 272, ME 374)
- Entrepreneurship: Formation of New Ventures (STRAMGT 353)

For additional information on available electives, see Appendix or 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 allow 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 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.
### 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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title/Description</th>
<th>Units</th>
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<tbody>
<tr>
<td>STEMREM 200</td>
<td>Stem Cell Intensive</td>
<td>1</td>
</tr>
<tr>
<td>STEMREM 201A</td>
<td>Stem Cells and Human Development</td>
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</tr>
<tr>
<td>STEMREM 201B</td>
<td>Stem Cells and Human Development Laboratory</td>
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</tr>
<tr>
<td>STEMREM 250</td>
<td>Regenerative Medicine Seminar Series</td>
<td>0*</td>
</tr>
<tr>
<td>STEMREM 280</td>
<td>Stem Cell Journal Club</td>
<td>0*</td>
</tr>
<tr>
<td>BIOS 200</td>
<td>Foundations of Experimental Biology</td>
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</table>

**Total 10**

*attendance without registration

#### First Year Winter Quarter

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<tr>
<th>Course</th>
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<th>Units</th>
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</thead>
<tbody>
<tr>
<td>STEMREM 202</td>
<td>Stem Cell and Translational Medicine</td>
<td>3</td>
</tr>
<tr>
<td>STEMREM 250</td>
<td>Regenerative Medicine Seminar Series</td>
<td>1</td>
</tr>
<tr>
<td>STEMREM 280</td>
<td>Stem Cell Journal Club</td>
<td>1</td>
</tr>
<tr>
<td>STEMREM 399</td>
<td>Graduate Research and/or electives</td>
<td>1</td>
</tr>
<tr>
<td>MED 255</td>
<td>Responsible Conduct of Research</td>
<td>1</td>
</tr>
<tr>
<td>GENE 205 or 211</td>
<td>Advanced Genetics or Genomics</td>
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</table>

**Total 10**

#### First Year Spring Quarter

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<th>Units</th>
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<tbody>
<tr>
<td>STEMREM 250</td>
<td>Regenerative Medicine Seminar Series</td>
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</tr>
<tr>
<td>STEMREM 280</td>
<td>Stem Cell Journal Club</td>
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</tr>
<tr>
<td>STEMREM 399</td>
<td>Graduate Research and/or electives</td>
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</tr>
<tr>
<td>DBIO 210</td>
<td>Developmental Biology</td>
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**Total 10**

#### First Year Summer Quarter

<table>
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<th>Course</th>
<th>Title/Description</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>STEMREM 399</td>
<td>Graduate Research and/or electives</td>
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**Total 10**

#### Second Year Autumn, Winter, and Spring Quarters

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<th>Course</th>
<th>Title/Description</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEMREM 250</td>
<td>Regenerative Medicine Seminar Series</td>
<td>1</td>
</tr>
<tr>
<td>STEMREM 280</td>
<td>Stem Cell Journal Club</td>
<td>1</td>
</tr>
<tr>
<td>STEMREM 399</td>
<td>Graduate Research and/or electives</td>
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**Total 10**

#### Second Year Summer Quarter

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<th>Course</th>
<th>Title/Description</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>STEMREM 399</td>
<td>Graduate Research and/or electives</td>
<td>10</td>
</tr>
</tbody>
</table>

**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 (2 – 5 units); e.g., BIOS 294 Chemistry for Biologists and Others
- Two or more additional electives (6 units required); e.g., BIO 214 Advanced Cell Biology
- One elective must provide instruction in computational or statistical methods; GENE 211 (Genomics) fulfills this requirement. Other options are STEMREM 205 (Bioinformatics for Stem Cell and Cancer Biology) or GENE 218 (Computational Analysis of Biological Information: Introduction to Python for Biologists)

The minimum unit requirement for the Ph.D. is 135 units of course work and research completed at Stanford. When more than one Stanford advanced degree is pursued, the Ph.D. 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.
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 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 before the end of fall 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 201B, 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. Questions about the IDP can be directed to somcareers@stanford.edu.

Decisions regarding research interests.
Students should select their rotations and ultimately their thesis laboratory and research advisor according to their scientific interests by the end of their 4th quarter in the SCBRM graduate program.
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. In general, there will be little restriction on changing of advisors to accommodate student educational goals as they may change over the course of the doctoral program.

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.

Faculty research interests can be viewed online at https://med.stanford.edu/profiles/ and the weekly Regenerative Medicine Seminar series (STEMREM 250) provides students with firsthand information on ongoing research projects. 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 by the individual faculty. Students can rotate and choose a home 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.

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). Students in the SCBRM program will be encouraged to include clinical faculty on their advising team throughout their thesis research. Students are encouraged to complete three full rotations, however an exception maybe considered after completing two rotations with their academic advisors’ approval.
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.

b. Students will be required to complete additional courses, or alternative mechanisms such as writing a manuscript or review, 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 2nd year, all students must meet annually with their thesis committee. Starting in year 4 and onwards, all students must meet twice each year with the thesis committee.

f. Starting in the 2nd 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 the first year. The thesis advisor assumes primary responsibility for the future direction 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 first-year PhD students who are eligible to apply for outside pre-doctoral fellowships such as an NSF or NRSA are required to do so. Applications are generally available in October and are due in November. 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.

Required Courses:
STEMREM 200, 201A&B, 202, STEMREM 250 (5 units total over 2 years), Foundations in Experimental Biology, Advanced Genetics or Genomics, MED 255 Responsible Conduct of Research or BIOS 258 Ethics, Science, and Society, DBIO210 Developmental Biology, STEMREM 280 Journal Club (5 units total over 2 years). STEMREM 203 is not required in the first year and can be deferred to any year but must be completed prior to defending. 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), 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 student.

Qualifying Exam:
All students are required to pass a qualifying exam before the end of the second 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 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 may be completed any time after the second year. 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 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.

**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.

**Committee Meetings:**
Starting in the 5th 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.

Course Equivalency for MSTP and MD 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 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. For MSTP students, the required courses consist of STEMREM 201A, STEMREM 202, STEMREM 203, & 5 units each of STEMREM 250 and 280. In addition, MSTP students are required to complete MED 255, Responsible Conduct of Research and 6 units of electives. One elective must provide training in computational or statistical methods. Advanced Genetics, Developmental Biology, and Biochemistry requirements are fulfilled during medical school. MSTP students are not required to take these courses but must still 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.
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; see Appendix II of this handbook) 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 must be taken prior to the end of spring 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.

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 Form 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. If former Academic Council members, emeritus Academic Council members, or non-Academic Council members are to serve as the principal dissertation adviser, the appointment of a co-adviser who is currently on the Academic Council is required.

Your thesis committee is an important complement and counterbalance to your advisor. 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.

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.

**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. On occasion, the department chair 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 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 before the oral defense of their Ph.D. 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, 79% of SCBRM Ph.D. students graduate with at least one first author paper (or co-first author paper) and SCBRM Ph.D. students publish a median of 5 papers each. Rare exceptions will 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 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 2 weeks 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.
After completing this training, please report to Amy Erickson [amy.erickson@stanford.edu, 650-721-1017], to obtain the building access form. Amy is located in the Stem Cell Research Building Administrative Suite located on the 3rd Floor, Room G3101F. This form will require the signature of the Lokey Building Manager, Linda Heneghan [heneghan@stanford.edu, 650-906-2381, G1100]. Amy Erickson will provide you with directions to the ID Card Office located in the Stanford Hospital.

**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. The Student Financial Gateway.
2. The Bechtel International Center (for international students).
3. Graduate Student Council (GSC).

**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 Axess. 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 Axess 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.

**T32 Training Grant**
Most PhD students (non-MSTP) in the SCBRM are supported through a T32 training grant. The program accepts 5 training grant eligible students each year. Non-training grant eligible students are funded through other sources. If you are funded through the training grant, you will receive an invitation to submit a statement of participation through the eRA Commons website.

The aims of the training program are listed below:
Specific Aim 1: To identify the graduate program applicants with the highest confidence of success in graduate school and in a career track that will address stem cell biology and regenerative medicine through a selection process that is holistic and inclusive;
Specific Aim 2: To develop and maintain a training program that includes a rigorous scientific basis with respect to reproducibility of methods, data collection, and publication while emphasizing the safety, inclusiveness, and diversity of our research community, and that provides comprehensive understanding of biomedical enterprise, from basic discovery to the development of therapies;
Specific Aim 3: To provide individualized opportunities for our students to explore potential careers as an essential aspect of the training program.

Other information about the T32 training program, including a list of current and past trainees can be found on the SCBRM webpage.
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.

**Cross-disciplinary Healthcare Innovation Partnership at Stanford (CHIPS):** CHIPS brings together students interested in healthcare. Biosciences, medical, business, and engineering students participate in the networking events, innovation forums, and seminars.

**Biomedical Computation at Stanford (BCATS):** Stanford students organize BCATS, a one-day conference highlighting biocomputational research by students and postdocs in the Bay Area.

**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 Association for Multi-disciplinary Medicine and Science (SAMMS):** SAMMS facilitates discussion and collaboration between graduate students by hosting networking events and discussion-based seminars and panels.

**Palo Alto Association for Women in Science (AWIS):** AWIS sponsors monthly networking dinners, speakers, and workshops for women in science. A mentoring program matches graduate students with mentors.

**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 Graduate Students (SNAGS):** SNAGS is a group of Native American students in graduate study in the schools of Business, Earth Sciences, Education, Engineering, Humanities and Sciences, Law, and Medicine.

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

**Stanford Hawai‘i Club:** The Stanford Hawai‘i Club is for anyone who is from, has been to, or wants to visit the Aloha State. We are unified by our interest, love, and respect for Hawai‘i, its local culture, and its people. Through our social and cultural events, we strive to connect students who share an appreciation for Hawai‘i and aim to share our cultures and experiences with the Stanford community.

**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.

**ALLYlist:** Allies within Stanford Medicine are essential in sponsoring LGBTQ+ visibility and acceptance, and are vital components of an increasingly inclusive medical community.

**OUTlist:** The +OUTlist is a resource supporting Stanford Medicine LGBTQ+ individuals and community-building, mentorship and visibility.

**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

**Stanford Medicine Abilities Coalition (SMAC):** The Stanford Abilities Coalition (SMAC) fosters and advocates for equal treatment and well-being of all students, trainees, faculty and staff at Stanford Medicine, regardless of their physical or cognitive differences.

**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.

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

**1st Generation Mentorship Program:** The 1st 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 LGTBQ+ 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.
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
- SCBRM Interdisciplinary Graduate Program

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)
INSTITUTE FOR STEM CELL BIOLOGY AND REGENERATIVE MEDICINE

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

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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