



# Graduate Handbook 2011-2012

Department of Bioengineering  
Stanford University

Dear New Bioengineering Graduate Students,

Welcome to the Stanford Bioengineering Department graduate program! You are one of 24 outstanding students who comprise the incoming 2011 class of an exciting department that is a leader in preparing bioengineers for the future. You join with an internationally renowned faculty to create a prestigious center for graduate education that is committed to discovery and to the development of new technologies and therapies.

As you embark upon one of the most challenging phases of your career, I urge you to take advantage of the many special opportunities at Stanford. Meet with your advisors and talk with other faculty, students and staff to better understand the broad bioengineering environment here. Peruse the course offerings in departments throughout the university. Attend seminars and research meetings in labs of interest. If you are a Ph.D. student, take time to see and understand various research groups to find a research area and style that suits your needs and interests.

This handbook is designed to provide specific information and guidelines on the many aspects and stages of the MS and PhD programs. If you have any questions during your transition, please do not hesitate to contact me or Olgalydia Winegar, Student Services Manager at [owinegar@stanford.edu](mailto:owinegar@stanford.edu), 650-723-8632.

Our congratulations and warm welcome!

Sincerely,



Annelise E. Barron  
Chair of Graduate Studies

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## *Getting Started*

The [Office of the Vice Provost for Graduation Education \(VPGE\)](#) website is a very useful reference for graduate education at Stanford. Visit the [GAP Handbook](#) at [gap.stanford.edu](http://gap.stanford.edu) for graduate academic policies and procedure.

### **SUNet ID**

The SUNet ID is an account name that identifies each student, uniquely and permanently, as a member of the Stanford community. It is what is used to log into Stanford computer systems. Computing and Communication is a central source for information about Stanford's technology-based tools, from software and servers to cell phones and networks.

### *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 you wish 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
- Check registration status each quarter (e.g. 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

### *Registration*

**Students must be "in status" by 5:00 p.m. on the first day of classes each quarter.** This means that, at the end of the first day of classes in each quarter a graduate student must be enrolled in no fewer than 8 units. Students not "in status" by 5:00 p.m. on the first day of classes are subject to a \$200 late study list fee. Please review the new Academic Deadlines at the following link:

<http://studentaffairs.stanford.edu/registrar/academic-calendar-1112>

These deadlines can also be found on your login page on Axess.

### **For PhD Students Only**

The department requires that all students in the Ph.D. program register autumn, winter, spring and summer quarters. Depending on the funding source, Ph.D. students in Bioengineering will register for **10** units per quarter. Most funding, including the NSF predoctoral fellowship, pays for a maximum of 10 units. MSTP students should consult their Program Coordinator, [Lorie Langdon](#).

Units for individual courses may vary depending on how the course is organized each year. You need not register for research units (BIOE 391, BIOE 392) unless you need the extra units to total 10.

All students are strongly encouraged to read and keep as a reference the [Stanford Bulletin](#) which is available on-line at <http://bulletin.stanford.edu>.

### ***Grades***

Stanford allows a student the option of taking a course for a letter grade or for credit/no credit. Students are strongly encouraged to ask for grades in all courses when available. Please consult with the faculty member regarding the grading type for research courses (BIOE 391, 392).

Students are responsible for making sure grades are reported. If incomplete grades (I), grades not reported (GNR) or no credits (NC) appear on their transcripts, students should check with their instructor immediately. The Student Service Office can assist students in clearing any missing grades.

*For Medical Students Only:*

Medical students are required to take courses Pass/Fail, but need to keep a record of letter grades they would have received. Students should ask their instructors for an e-mail or letter stating the grade that was awarded, for purposes of computing the GPA.

### ***Laboratory Safety Training***

Every person working in a laboratory is required by various agencies to be trained in all aspects of laboratory safety. During Orientation Week, it is mandatory that new graduate students take the on-line University Laboratory Safety Training in Axess via the Training tab. Prior to working in the lab, new graduate students are required to complete 1) General Safety and Emergency Preparedness (EHS-4200), 2) Chemical Safety for Laboratories (EHS-1900), Biosafety (EHS-1500), and Compressed Gas Safety (EHS-2200).

### ***Finances***

[Stanford ePay](#), the University's online billing and payment services, provides a convenient way for students to view their student bill and make a payment to student accounts. If you have any questions regarding your student bill, please contact the Student Service Office in Clark S-166.

### **Check Distribution/Information**

Students with research, teaching or course assistantships will be on the regular University payroll. Checks will be available in the Department's Student Service Office on the 7th and 22nd of each month, or the preceding work day if these dates fall on a weekend or holiday. Your salary is taxable and will be withheld as you request on the W-4 Tax Data form. This form and other payroll forms will be available to complete at orientation.

Students not on an assistantship are paid on a quarterly basis and have their checks mailed to their home address each quarter on the first day of classes. **Please make sure to update your mailing address on Axess.** Students must complete all registration and financial paperwork, pay registration fees, and satisfy all stipulated departmental requirements before receiving stipend checks. No taxes are withheld, but the stipend is reportable and taxable.

### Direct Deposit

Stipend Checks and bi-weekly assistantship checks may be direct-deposited in local banks. Students can enroll for direct deposit on Axess. Click on "[Enrollment Instructions](#)" for more information.

Hold: Stipend checks will not be issued if University requirements such as submission of the federal employment eligibility form, federal and state tax withholding certificate, and patent agreement form, or if departmental requirements have not been fulfilled. Outstanding bills from the library, University, or Vaden Health Center will also result in holds. Holds must be cleared with the originating office before stipend checks will be issued.

### **Loans and External Awards**

Graduate Students who believe they will require loan assistance can apply for federal Stafford Student Loan, Federal Perkins Loan, and University loan programs. Inquiries for publications outlining loan program terms can be directed to the [Financial Aid Office](#), Montag Hall, 355 Galvez Street, Stanford, CA 94305; phone 650-723-3058.

International students who are not permanent residents are not eligible for long-term loans.

Graduate Fellowships awarded by external sources (i.e. NSF, NDSEG, Ford) are administered in Montag Hall by Maureen Grey, 725-0868.

Email: [mogrey@stanford.edu](mailto:mogrey@stanford.edu)

### **Taxes**

Tax information (limited) is available in:

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 by September 15, 2011. The decision made at the start of each academic year will be applied to the remainder of that year.

To waive out of 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: 723-2135, Email: [healthinsurance@stanford.edu](mailto:healthinsurance@stanford.edu)

## *Master's Degree Program Overview*

The Master of Science in Bioengineering requires 45 units of coursework.

The curriculum consists of core bioengineering courses, technical electives, seminars and unrestricted electives. Core courses focus on quantitative biology and biological systems analysis. Approved technical electives are chosen by a student in consultation with his/her graduate advisor, and can be selected from graduate course offerings in mathematics, statistics, engineering, physical sciences, life sciences, and medicine. Seminars highlight emerging research in bioengineering and provide training in research ethics. Unrestricted electives can be freely chosen by the student in association with his/her advisor.

It is expected that the requirements for the M.S., Bioengineering can be completed within approximately one year. There is no thesis requirement for the M.S.

### Program Proposal

Students are expected to meet with their assigned advisor to construct a coherent program in a specific focus area. To ensure that an appropriate program is pursued, all MS students are required to file a "Program Proposal for a Master's Degree" to the Student Service Office by **October 21, 2011**.

### Instructions:

1. Obtain the Program Proposal for a Master's Degree Form
2. Type or print neatly. Course Titles and units are to be included.
3. Consult with your advisor and obtain his/her signature.
4. Submit the form to the Student Service Office for review and final approval of the Chair of Graduate Studies.
5. Proposals can take up to 14 working days to be reviewed and processed. Axess will indicate the approval of your proposals.

All programs are subject the approval of the student's advisor and the Chair of Graduate Studies.

Program Proposal Revision:

Students who alter their MS program must submit a new program proposal by the third week of their final quarter.

All program revisions are subject the approval of the student's advisor and the Chair of Graduate Studies.

*Notes to All M.S. Students:*

\*All research units applied toward the Masters Degree program requirements must be completed with Stanford faculty.

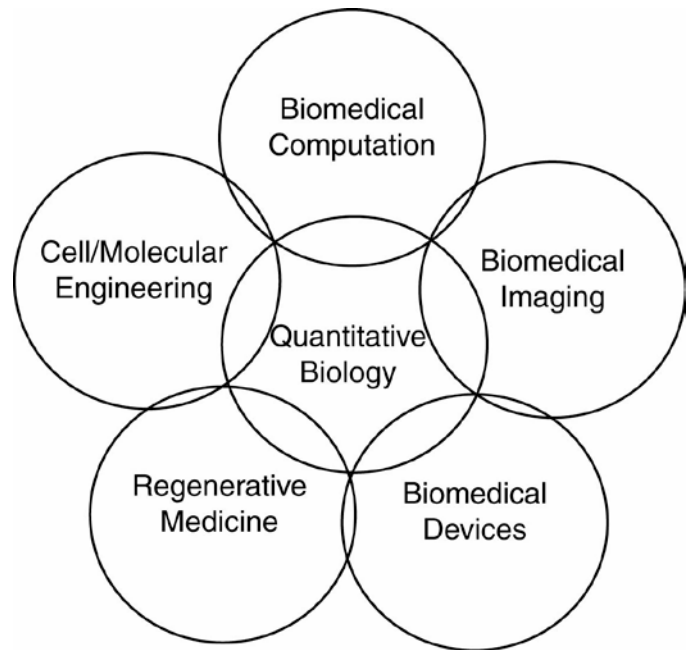
*Special Notes to BS/MS (coterminal) Students:*

\*No courses taken more than two quarters before admission to the M.S. program may be used to meet the department's minimum 45-unit requirement for the Master's degree.

\*Course units can only apply toward one degree. You may not count course units toward both the B.S. and M.S. program requirements.

**Areas of Research Include:**

- \* Biomedical Computation
- \* Tissue Engineering/Regenerative Medicine
- \* Molecular and Cell Engineering
- \* Biomedical Devices
- \* Biomedical Imaging





**Master of Science in Bioengineering  
Degree Requirements - total 45 units**

1. **Core Bioengineering courses** – 9 units

BIOE 300A Molecular and Cellular Bioengineering (Autumn)  
BIOE 300B Engineering Concepts Applied to Physiology (Winter)  
BIOE 301A Molecular and Cellular Engineering Lab (Autumn)  
BIOE 301B Clinical Needs and Technology (Winter)

These courses, together with the Approved Technical Electives, should form a cohesive course of study that provides depth and breadth.

2. **Approved Technical Electives** - 26 units

These units must be selected from graduate courses in mathematics, statistics, engineering, physical science, life science, and medicine. They should be chosen in concert with the bioengineering courses to provide a cohesive degree program in a bioengineering focus area. **Students are required to take at least one course in some area of device or instrumentation.** Up to 9 units of directed study and research may be used as approved electives.

3. **Seminars** - 4 units

BIOE 393 Bioengineering Departmental Research Colloquium  
BIOE 390 Introduction to Bioengineering Research  
MED 255 The Responsible Conduct of Research

4. **Unrestricted Electives** - 6 units

Students must complete a proposed M.S. degree form listing their proposed courses during their first quarter at Stanford to assure that the planned program provides appropriate depth and breadth. The student's faculty advisor and the Associate Chair for Graduate Studies must approve this list of courses.

Sample M.S. programs are provided in the following focus areas:

Biomedical Computation  
Regenerative Medicine/Tissue Engineering  
Molecular and Cell Bioengineering  
Biomedical Imaging  
Biomedical Devices

**Working with faculty advisors, students have flexibility to tailor course selections to their areas of interest.** Suggested approved courses are listed after each sample program. For courses not on this list, please consult with your advisor for approval.

**EXAMPLE PROGRAM**  
**M.S. in Bioengineering**  
**Focus Area - Biomedical Computation**

Core Bioengineering Courses

BIOE 300A	Molecular and Cellular Bioengineering - 3 units
BIOE 300B	Engineering Concepts Applied to Physiology- 3 units
BIOE 301A	Molecular and Cellular Engineering Lab – 2 units
BIOE 301B	Clinical Needs and Technology- 1 unit

9 subtotal

Sample Approved Electives

BIOE 214	Representations and Algorithms for Computational Molecular Biology – 3 units
BIOC 218	Computational Molecular Biology - 3 units
BIOE 212	Intro to Biomedical Informatics Research Methodology – 3 units (Taken 2 <sup>nd</sup> YR)
BIOE 220	Introduction to Imaging and Image-based Neuro Anatomy - 3 units
CS 106X	Programming Abstractions (Accelerated) – 5 units
BIOMEDIN 210	Modeling Biomedical Systems - 3 units
BIOE/ME 284A,B	Cardiovascular Bioengineering - 3 units
BIOE 391	Directed Study – 3 units

26 subtotal

Seminars

BIOE 393	Bioengineering Departmental Research Colloquium - 1 unit
BIOE 390	Introduction to Bioengineering Research - 2 units
MED 255	The Responsible Conduct of Research - 1 unit

4 subtotal

Sample Unrestricted Electives

CS 161	Design and Analysis of Algorithms - 3 units
ARTSTUDI 167	Introduction to Animation- 3 units

6 subtotal

TOTAL UNITS 45

## Suggested Approved Courses for Biomedical Computation Theme

### Biochemistry Course

BIOC 218 "Same as BIOMEDIN 231"	Computational Molecular Biology	3	Aut, Win, Spr
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### Bioengineering Course

BIOE 332	Large-Scale Neural Modeling	3	Spr
BIOE 334	Engr Principles in Mol Bio	3	Win

### Biology Courses

BIO 141 "Same as Stats 141"	Biostatistics	4-5	Aut,
BIO 214 "Same as BIOC 224, MCP 221"	Advanced Cell Biology	2-5	Win
BIO 217	Neuronal Biophysics	4	Win
SBIO 241 "Same as BIOC 241, BIOPHYS 241"	Biological Macromolecules	3-5	Aut

### Biomedical Informatics Courses

BIOMEDIN 200	BMI Colloquium	1	Aut,Win, Spr
BIOMEDIN 201	Biomedical Informatics Student Seminar	1	Aut,Win, Spr, Sum
BIOMEDIN 210 "Same as CS 270"	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3	Win
BIOMEDIN 211 "Same as CS 271"	Smart Health through Effective Design	3	Win
BIOMEDIN 212 "Same as BIOE 212, CS 272, GENE 212"	Intro to Biomedical Informatics Research Methodology	3	Spr
BIOMEDIN 214 "Same as BIOE 214, CS 274, GENE 214"	Representations and Algorithms for Computational Molecular Biology	3-4	Aut
BIOMEDIN 216	Representations and Algorithms for Molecular Biology: Lectures	1-2	Aut
BIOMEDIN 217 "Same as CS 275"	Translational Bioinformatics	4	Spr

### Chemical and Systems Biology Course

CSB 210	Signal Transduction Pathways and Networks	4	Win
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### Computer Science Courses

CS 161	Design and Analysis of Algorithms	3-5	Aut, Spr, Sum
CS 221	Artificial Intelligence: Principles and Techniques	3-4	Aut
CS 223A	Introduction to Robotics	3	Win
CS 224N	Natural Language Processing	3-4	Aut
CS 227	Knowledge Representation and Reasoning	3	Not given this year
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4	Win
CS 248	Interactive Computer Graphics	3-4	Win
CS 262 "Same as BIOMEDIN 262"	Computational Genomics	3	Win
CS 273A "Same as BIOMEDIN 273A, DBIO 273A"	A Computational Tour of the Human Genome	3	Aut

CS 278 "Same as BIOE 310, CSB 278"	Systems Biology	4	Alternate years, given next year
CS 279	Computational Methods for Analysis and Reconstruction of Biological Networks	3	Not given this yr
CS 346	Database System Implementation	3-5	Spr
CS 348A	Computer Graphics: Geometric Modeling	3-4	Win
CS 374 "Same as BIOMEDIN 374"	Algorithms in Biology	2-3	Aut
CS 468	Geometry Processing Algorithms	3	Spr
<b>Institute for Computational and Mathematical Engineering Courses</b>			
CME 200 "Same as ME 300A"	Linear Algebra with Application to Engineering Computations	3	Aut
CME 204 "Same as ME 300B"	Partial Differential Equations in Engineering	3	Win
CME 206 "Same as ME 300C"	Introduction to Numerical Methods for Engineering	3	Spr
CME 302	Numerical Linear Algebra	3	Aut
CME 306	Numerical Solution of Partial Differential Equations	3	Spr
<b>Electrical Engineering Courses</b>			
ENGR 206	Control System Design	3-4	Not given this yr
EE 376A, B "Same as STATS 376A,B"	Information Theory	3	Win (A), Spr (B)
EE 418	Topics in Neuroengineering	3	Not given this yr
<b>Genetic Courses</b>			
GENE 203 "Same as BIO 203, DBIO 203"	Advanced Genetics	4	Aut
GENE 211	Genomics	3	Win
<b>Management Science &amp; Engineering Courses</b>			
MS&E 152	Introduction to Decision Analysis	3-4	Spr
MS&E 211	Linear and Nonlinear Optimization	3-4	Aut
<b>Mechanical Engineering Courses</b>			
ME 281 "Same as BIOE 281"	Biomechanics of Movement	3	Win
ME 331A "Same as AA 242A"	Advanced Dynamics and Computation	3	Win
ME 331B	Advanced Dynamics and Simulation	3	Spr
<b>Neurobiology Courses</b>			
NBIO 206	The Nervous System	7-8	Win
NBIO 254 "Same as BIO 154/254"	Molecular and Cellular Neurobiology	5	Alternate years, given next year
<b>Neurology and Neurological Sciences</b>			
NENS 220	Computational Neuroscience	4	Alternate years, given next year
<b>Psychology Course</b>			
PSYCH 209A	The Neural Basis of Cognition: A Parallel Distributed Processing	3-4	Not given this year
SBIO 228 "Same as BIOPHYS 228"	Computational Structural Biology	3	Not given this yr
<b>Statistic Course</b>			
STATS 166	Computational Biology	3	Spr

**EXAMPLE PROGRAM**  
**M.S. in Bioengineering**  
**Focus Area - Tissue Engineering/Regenerative Medicine**

Core Bioengineering Courses

BIOE 300A	Molecular and Cellular Bioengineering - 3 units
BIOE 300B	Engineering Concepts Applied to Physiology- 3 units
BIOE 301A	Molecular and Cellular Engineering Lab – 2 units
BIOE 301B	Clinical Needs and Technology- 1 unit

9 subtotal

Sample Approved Electives

BIOE 260	Tissue Engineering – 3 units
ME 335A, B	Finite Element Analysis - 6 units
DBIO 210	Developmental Biology - 5 units
ME 381	Orthopaedic Bioengineering - 3 units
BIOE/ME 284A,B	Cardiovascular Bioengineering - 3 units
BIOE 220	Introduction to Imaging and Image-based Neuro Anatomy – 3 units
BIOE 392	Directed Investigation – 3 units

26 subtotal

Seminars

BIOE 393	Bioengineering Departmental Research Colloquium - 1 unit
BIOE 390	Introduction to Bioengineering Research - 2 units
MED 255	The Responsible Conduct of Research - 1 unit

4 subtotal

Sample Unrestricted Electives

CME 200	Linear Algebra with Application to Engineering Computations – 3 units
ARTSTUDI 167	Introduction to Animation- 3 units

6 subtotal

TOTAL UNITS 45

## Suggested Approved Courses for Tissue Engineering/Regenerative Medicine Theme

### Bioengineering Courses

BIOE 236	Biophysics of Innate Immunity	3	Spr
BIOE 260	Tissue Engineering	3	Spr
BIOE 261 "Same as NSUR 261"	Principles and Practice of Stem Cell Engineering	3	Not given this yr
BIOE 284 A,B	Cardiovascular Bioengineering	3	Not given this year
BIOE 361 "Same as MATSCI 381"	Biomaterials in Regenerative Medicine	3	Not given this year
ME 385	Tissue Engineering Lab	1-2	Not given this yr

### Institute for Computational and Mathematical Engineering Courses

CME 200 "Same as ME 300A"	Linear Algebra with Application to Engineering Computations	3	Aut
CME 204 "Same as ME 300B"	Partial Differential Equations in Engineering	3	Win
CME 206 "Same as ME 300C"	Introduction to Numerical Methods for Engineering	3	Spr

### Biology Course

BIO 217	Neuronal Biophysics	4	Win
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### Chemical and Systems Biology Courses

CSB 210	Signal Transduction Pathways and Networks	4	Win
CSB 260	Quantitative Chemical Biology	4	Spr, alternate years, not given next year

### Developmental Biology Courses

DBIO 201	Development and Disease Mechanisms	4	Aut
DBIO 210	Developmental Biology	5	Spr

### Immunology Course

IMMUNOL 205	Immunology in Health and Disease	2-4	Win
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### Material Science Course

MATSCI 380	Nano-Biotechnology	3	Win
MATSCI 210 "Same as MATSCI 190"	Organic and Biological Materials	3-4	Spr

### Mechanical Engineering Courses

ME 239	Mechanics of the Cell	3	Not given this year
ME 287	Mechanics of Biological Tissue	3	Spr
ME 335 A, B	Finite Element Analysis	3	Win (A), Spr (B)
ME 338A	Continuum Mechanics	3	Win
ME 351 A, B	Fluid Mechanics	3	Aut (A), Win (B)
ME 354	Experimental Methods in Fluid Mechanics	4	Aut
ME 382A	Biomedical Engineering in Research & Development	4	Win
ME 382B	Medical Device Design	4	Spr
ME 387	Soft Tissue Mechanics	3	Not given this yr
ME 485 "Same as BIOE 485"	Modeling and Simulation of Human Movement	3	Spr

### Molecular and Cellular Physiology Course

MCP 256	How Cells Work: Energetics, Compartments, and Coupling in Cell Biology	4	Alternate years, given next year
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### Neurobiology Course

NBIO 206	The Nervous System	7-8	Win
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**EXAMPLE PROGRAM**  
**M.S. in Bioengineering**  
**Focus Area – Molecular and Cell Engineering**

Core Bioengineering Courses

BIOE 300A	Molecular and Cellular Bioengineering – 3 units
BIOE 300B	Engineering Concepts Applied to Physiology- 3 units
BIOE 301A	Molecular and Cellular Engineering Lab – 2 units
BIOE 301B	Clinical Needs and Technology- 1 unit

9 subtotal

Sample Approved Electives

BIOE 260	Tissue Engineering- 3 units
BIOE/CHEMENG 355	Advanced Biochemical Engineering – 3 units
BIOE/CHEMENG 454	Synthetic Biology and Metabolic Engineering – 3 units
BIOE 331	Protein Engineering – 3 units
BIO 230	Molecular and Cellular Immunology – 4 units
CSB 210	Signal Transduction Pathways and Networks – 4 units
BIOE 284A	Cardiovascular Bioengineering– 3 units
BIOE 220	Introduction to Imaging and Image-based Neuro Anatomy – 3 units

26 subtotal

Seminars

BIOE 393	Bioengineering Departmental Research Colloquium – 1 unit
BIOE 390	Introduction to Bioengineering Research – 2 units
MED 255	The Responsible Conduct of Research – 1 unit

4 subtotal

Sample Unrestricted Electives

CHEM 171	Physical Chemistry – 3 units
CHEM 173	Physical Chemistry – 3 units

6 subtotal

TOTAL UNITS 45

## Suggested Approved Courses for Molecular and Cell Engineering Theme

### Bioengineering Courses

BIOE 260	Tissue Engineering	3	Spr
BIOE 261 "Same as NSUR 261"	Principles and Practice of Stem Cell Engineering	3	Not given this yr
BIOE 331	Protein Engineering	3	Spr
BIOE 334	Engineering Principles in Molecular Biology	3	Win
BIOE 355	Advanced Biochemical Engineering	3	Win
BIOE 361 "Same as MATSCI 381"	Biomaterials in Regenerative Medicine	3	Not given this year
BIOE 454 "Same as CHEMENG 454"	Synthetic Biology and Metabolic Engineering	3	Alternate years, given next year

### Biology Courses

BIO 104/200	Advanced Molecular Biology	5	Win
BIO 203 "Same as DBIO 203, GENE 203"	Advanced Genetics	4	Aut
BIO 217	Neuronal Biophysics	4	Win
BIO 230	Molecular and Cellular Immunology	4	Aut

### Biophysics Course

BIOPHYS 228 "Same as SBIO 228"	Computational Structural Biology	3	Not given this yr
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### Civil and Environmental Engineering Courses

CEE 274A "Same as CHEMENG174/274"	Environmental Microbiology I	3	Aut, Sum
CEE 274B	Metabolic Biochemistry of Microorganisms	3	Win

### Chemical and Systems Biology

CSB 210	Signal Transduction Pathways and Networks	4	Win
CSB 240A, B	A Practical Approach to Drug Discovery and Development	3	Alternate years, given next year
CSB 260	Quantitative Chemical Biology	4	Spr, alternate years, not given next year

### Molecular and Cellular Physiology Course

MCP 256	How Cells Work: Energetics, Compartments, and Coupling in Cell Biology	4	Alternate years, given next year
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### Structural Biology Courses

SBIO 228 "Same as BIOPHYS 228"	Computational Structural Biology	3	Not given this yr
SBIO 241 "Same as BIOC 241, BIOPHYS 241"	Biological Macromolecules	3-5	Aut



**EXAMPLE PROGRAM**  
**M.S. in Bioengineering**  
**Concentration Area – Biomedical Devices**

Core Bioengineering Courses

BIOE 300A	Molecular and Cellular Bioengineering – 3 units
BIOE 300B	Engineering Concepts Applied to Physiology- 3 units
BIOE 301A	Molecular and Cellular Engineering Lab – 2 units
BIOE 301B	Clinical Needs and Technology- 1 unit

9 subtotal

Sample Approved Electives

BIOE 374A, B	Biodesign Innovation: Needs Finding and Concept Creation – 4,4 units
ME 381	Orthopaedic Bioengineering – 3 units
ME 208	Patent Law and Strategy for Innovators and Entrepreneurs-3 units
EE 312	Micromachined Sensors and Actuators – 3 units
ME 300A	Linear Algebra with Applications to Engineering Computations – 3 units
BIOE 220	Introduction to Imaging and Image-based Neuro Anatomy – 3 units
BIOE 392	Directed Investigation – 3 units

26 subtotal

Seminars

BIOE 393	Bioengineering Departmental Research Colloquium – 1 unit
BIOE 390	Introduction to Bioengineering Research – 2 units
MED 255	The Responsible Conduct of Research – 1 unit

4 subtotal

Sample Unrestricted Electives

CS 106X	Programming Abstractions (Accelerated) – 5 units
ATHLETIC 52	Golf: Advanced Beginning – 1 unit

6 subtotal

TOTAL UNITS 45

## Suggested Approved Courses for Biomedical Device Theme

### Bioengineering Courses

BIOE 222A	Molecular Imaging	4	Aut
BIOE 281 "Same as ME 281"	Biomechanics of Movement	3	Win
BIOE 332	Large-Scale Neural Modeling	3	Spr
BIOE 374A, B "Same as ME 368, MED 272, OIT 581/3"	Biodesign Innovation: Needs Finding and Concept Creation	4,4	Win (A), Spr (B)
BIOE 371 "Same as MED 271"	Global Biodesign: Medical Technology in an International Context	1-2	Spr
BIOE 485	Modeling and Simulation of Human Movement	3	Spr

### Institute for Computational and Mathematical Engineering Courses

CME 200 "Same as ME 300A"	Linear Algebra with Application to Engineering Computations	3	Aut
CME 204 "Same as ME 300B"	Partial Differential Equations in Engineering	3	Win
CME 206 "Same as AA 214A, ME 300C"	Introduction to Numerical Methods for Engineering	3	Spr

### Electrical Engineering Courses

EE 268	Introduction to Modern Optics	3	Aut
EE 312	Micromachined Sensors and Actuators	3	Win
EE 418	Topics in Neuroengineering	3	Not given this yr

### Management Science and Engineering Courses

MS&E 250A	Engineering Risk Analysis	3	Given next year
MS&E 256	Technology Assessment and Regulation of Medical Devices	1-3	Spr
MS&E 273	Technology Venture Formation	3-4	Aut
MS&E 277	Creativity and Innovation	4	Spr
MS&E 310	Linear Programming	3	Aut
MS&E 380	Doctoral Research Seminar in Organizations	3	Aut

### Material Science and Engineering Course

MATSCI 210	Organic and Biological Materials	3-4	Spr
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### Mechanical Engineering Courses

ME 208	Patent Law and Strategy for Inventors and Entrepreneurs	2-3	Aut
ME 218A	Smart Product Design Fundamentals	4-5	Aut
ME 218B	Smart Product Design Applications	4-5	Win
ME 218C	Smart Product Design Practice	4-5	Spr
ME 220	Introduction to Sensors	3-4	Spr
ME 280 "Same as BIOE 280"	Skeletal Development and Evolution	3	Not given this year
ME 287	Mechanics of Biological Tissue	3	Spr
ME 294	Medical Device Design	1	Aut
ME 309	Finite Element Analysis in Mechanical Design	3	Spr
ME 310A, B, C	Project-based Engineering Design, Innovation, and Development	4	Aut (A), Win (B), Spr (C)
ME 318	Computer-Aided Product Creation	4	Aut, Win, Spr
ME 335A,B	Finite Element Analysis	3	Win(A), Spr (B)
ME 335C	Finite Element Analysis	3	Not given this year
ME 338A	Continuum Mechanics	3	Win

ME 351A, B	Fluid Mechanics	3	Aut (A), Win (B)
ME 354	Experimental Methods in Fluid Mechanics	4	Aut
ME 381 "Same as BIOE 381"	Orthopaedic Bioengineering	3	Not given this year
ME 382A	Biomedical Engineering in Research and Development	4	Win
ME 382B	Medical Device Design	4	Spr
ME 385	Tissue Engineering Lab	1-2	Not given this year
ME 387	Soft Tissue Mechanics	3	Not given this year
<b>Medicine Courses</b>			
MED 217	Technological Frontiers in Digestive Diseases	1	Spr
MED 276	Careers in Medical Technology	2-3	Spr
<b>Orthopedic Surgery Course</b>			
ORTHO 222	Anatomy of Movement	3-4	Not given this year

**EXAMPLE PROGRAM**  
**M.S. in Bioengineering**  
**Concentration Area - Biomedical Imaging**

Core Bioengineering Courses

BIOE 300A	Molecular and Cellular Bioengineering - 3 units
BIOE 300B	Engineering Concepts Applied to Physiology- 3 units
BIOE 301A	Molecular and Cellular Engineering Lab – 2 units
BIOE 301B	Clinical Needs and Technology- 1 unit

9 subtotal

Sample Approved Electives

EE 261	The Fourier Transform and its Applications - 3 units
BIOE/RAD 220	Introduction to Imaging and Image-based Neuro Anatomy- 3 units
EE 369A	Medical Imaging Systems I - 3 units
EE 369B	Medical Imaging Systems II - 3 units
EE 369C	Medical Image Reconstruction - 3 units
RAD 226	In Vivo Magnetic Resonance Spectroscopy and Imaging - 3 units
ME 300A	Linear Algebra with Application to Engineering Computations- 3 units
BIOE 392	Directed Investigation - 5 units

26 subtotal

Seminars

BIOE 393	Bioengineering Departmental Research Colloquium - 1 unit
BIOE 390	Introduction to Bioengineering Research - 2 units
MED 255	The Responsible Conduct of Research - 1 unit

4 subtotal

Sample Unrestricted Electives

EE 268	Introduction to Modern Optics – 3 units
ME 335A	Finite Element Analysis - 3 units

6 subtotal

TOTAL UNITS 45

## Suggested Approved Courses for Biomedical Imaging Theme

### **Bioengineering Courses**

BIOE 220 "Same as RAD 220"	Introduction to Imaging and Image-based Neuro Anatomy	3	Win
BIOE 222A,B,C	Molecular Imaging	4	Aut (A), Win (B), Spr (C)

### **Biology Course**

BIO 212 "Same as HUMBIO 133, BIO 112"	Human Physiology	4	Win
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### **Institute for Computational and Mathematical Engineering Course**

CME 200 "Same as ME 300A"	Linear Algebra with Application to Engineering Computations	3	Aut
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### **Electrical Engineering Courses**

EE 168	Introduction to Digital Image Processing	3-4	Win
EE 225	Bio-chips, Imaging and Nanomedicine	3	Win
EE 261	The Fourier Transform and its Applications	3	Aut, Win
EE 262	Two-Dimensional Imaging	3	Not given this year
EE 268	Introduction to Modern Optics	3	Aut
EE 302	Biomedical Electronics	3	Win
EE 355	Imaging Radar and Applications	3	Not given this year
EE 368	Digital Image Processing	3	Spr
EE 369A	Medical Imaging Systems I	3	Not given this year
EE 369B	Medical Imaging Systems II	3	Spr
EE 369C	Medical Image Reconstruction	3	Aut
EE 469B	RF Pulse Design for Magnetic Resonance Imaging	3	Not given this yr

### **Molecular and Cellular Physiology Course**

MCP 222 "Same as BIO 152"	Imaging: Biological Light Microscopy	3	Spr
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### **Radiology Course**

RAD 226	In Vivo Magnetic Resonance Spectroscopy and Imaging	3	Win
RAD 227 "Same as BIOPHYS 227"	Functional MRI Methods	3	Win

### ***The Ph.D. Degree Program Overview***

A total of 135 units are required for the Ph.D degree. A student studying for the Ph.D. degree must complete a master's degree (45 units) and must, in essence, fulfill the requirements for the Stanford M.S. degree in Bioengineering. Up to 45 units of master's degree residency units may be counted towards the degree. The maximum number of transfer units is 45. Students admitted to the Ph.D. program with an M.S. degree must complete at least 90 units of work at Stanford.

In addition to the course requirements of the M.S. degree, doctoral candidates must complete a minimum of 15 additional units of approved formal course work (excluding research, directed study, and seminars).

The Department of Bioengineering graduate program is designed to bring together in one department the cadre of faculty who perform bioengineering research and teach bioengineering courses. Our mission is to train students at the intersection of biomedicine and engineering in both academia and the burgeoning biomedical and biotechnology industries.

#### **Timetable for the Doctoral Degree**

It is expected that the doctoral degree will require five years of full-time study following enrollment into the program.

##### **First Year:**

- Consultation with Advisors
- Apply for Predoctoral Fellowships
- Coursework (10 units required each quarter)
- Involvement in Research
- Choose a Research Advisor
- First Year Review

##### **Second Year:**

- Continuation of Coursework (10 units required each quarter)
- Complete the MS degree Requirements
- Complete Initial Research
- Pass Qualifying Exam

##### **Third Year**

- Define Dissertation Project
- Complete All Courses
- Build Momentum and Confidence in Research

##### **Fourth Year**

- Complete TA Requirement

##### **Fifth Year**

- Complete and Defend your Doctoral Research

### ***Combined M.D. /Ph.D. Degree***

Students interested in a career oriented towards bioengineering and medicine can pursue the combined MD/PhD degree program. Stanford has two ways to do an MD /PhD. US citizens and permanent residents can apply to the Medical Scientist Training Program (contact Lori Langdon, 723-6176) and can be accepted with funding from both MD and PhD with stipend/tuition. They can then select a bioengineering laboratory for their PhD. Students not admitted to the Medical Scientist Training Program must apply and be admitted separately to the MD program and the PhD program of their choice.

The PhD degree is administered by the Department of Bioengineering. To be formally admitted as a PhD degree candidate in this combined degree program, the student must apply through normal departmental channels and must have earned or have plans to earn an MS in bioengineering or other engineering discipline at Stanford or another university. The MS requires 45 units of coursework which consists of core bioengineering courses, technical electives, seminars, and 6 unrestricted units. In addition, students will be expected to pass the Department of Bioengineering Ph.D. qualifying examination.

For students fulfilling the full MD requirements who earned their master's level engineering/bioengineering degree at Stanford, the Department of Bioengineering will waive its normal departmental requirement of the 15 units applied towards the PhD degree (beyond the master's degree level) be formal course work. Consistent with the University PhD requirements, the department will instead accept 15 units comprised of courses, research, or seminars that are approved by the student's academic advisor and the department chair. Students not completing their MS engineering/bioengineering degree at Stanford will be required to take 15 units of formal course work in engineering related areas, as determined by their academic advisor.

If you have any further questions, please contact Olgalydia Urbano, Student Services Manager at [ourbano@stanford.edu](mailto:ourbano@stanford.edu).

## ***PhD First Year Advising***

### ***Autumn Quarter***

Students will be assigned an initial faculty advisor on the basis of the research interests expressed in their application. Initial faculty advisors will assist students in selecting courses and identifying research opportunities. To ensure that an appropriate program is pursued, students will submit the following advising form by **October 21, 2011**:

- 1) Students completing the bioengineering master's degree (45 units) and studying for the Ph.D. degree will **only** submit the **Program Proposal for a Master's Degree Form**. (See the Master's Degree Program Overview on page 7 for instructions).
- 2) Students admitted to the Ph.D. program with an M.S. degree, will submit the **PhD First Year Advising Form** to be signed by the student's advisor and submitted to the Student Service Office, Clark Center S-166.

### ***Spring Quarter***

In spring quarter of the first year, the assigned advisor will again meet with the student to evaluate his or her progress. **The First-Year Evaluation Report** must be submitted to the Student Services Office by June 16th of the student's first year in the Ph.D. program. A faculty meeting is scheduled to review Graduate student progress.

## ***PhD First Year Requirements***

### ***Lab Rotations***

The department will not require formal lab rotations, but students will be encouraged to explore research activities in two or three labs during their first academic year.

### ***Choosing a Research Advisor***

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

### ***Applying for Predoctoral Fellowship Applications***

All first-year Ph.D. students who are eligible to apply for outside predoctoral fellowships such as NSF, and NASA are strongly encouraged to do so. Applications for both 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 advisers when preparing fellowship applications.

### ***Teaching***

The Bioengineering Department believes that teaching is an important part of graduate level education in Bioengineering.



Each Ph.D. student is required to teach two 50% appointments. Students on full fellowship such as the NSF may hold a concurrent teaching assistantship up to a maximum of 25% with no additional hourly employment. In this case, students may teach three 25% appointments to fulfill this requirement. Students should satisfy their teaching requirements within the first four years of the program.

### ***Yearly Evaluations***

At the end of each academic year (usually in early June) the bioengineering faculty will evaluate the progress of all PhD students.

### ***Qualifying Exam Process***

Prior to being formally admitted to candidacy for the Ph.D. degree, the student must demonstrate knowledge of bioengineering fundamentals and a potential for research by passing a qualifying oral examination.

A student is expected to take and pass the PhD qualifying examination by the end of their 8<sup>th</sup> quarter.

### ***Purpose of the Exam***

The PhD qualification exam has several goals.

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

### ***Procedure for the Exam***

The procedure for the exam consists of six steps.

- 1) An Academic Council Member must be willing to supervise the student's PhD program and dissertation. The decision by the faculty member to supervise the student's program and dissertation is based on the potential of the student to become an independent scholar, and is based on many factors, such as the student's undergraduate and graduate course record, graduate record exam scores, and research, teaching and professional experience. The most important factor is the direct knowledge the faculty sponsor has obtained of the student's capabilities (e.g., as acquired through supervising the student in a multi-quarter project course, independent study, or as Research Assistant). The student must have a graduate Stanford GPA of 3.25 to be eligible for the exam. Students typically have a GPA of

3.50. Students are encouraged to take the exam during the academic year and to work together to prepare for the exam. Typically the exam is taken shortly after the student earns the masters degree.

- 2) Once a faculty member agrees to be the “faculty sponsor,” the student must submit an application folder containing the items listed below (a-f) to initiate the PhD Qualification Exam. The faculty sponsor will notify the department faculty that the application has been submitted and is on file for perusal by the faculty at the Student Services Office. Normally, the application will be discussed at the next faculty meeting (but no sooner than one week). The application should contain the following:
  - a) Updated transcripts of all undergraduate and graduate course work
  - b) Curriculum vitae
  - c) Calculation showing the student's GPA for courses taken at Stanford (Please exclude research and activity courses).  
<http://studentaffairs.stanford.edu/registrar/students/gpa-how>
  - d) Research project abstract (<300words). This abstract should be written by the student and represent the topic on which the student would lecture if asked (see below)
  - e) Preliminary dissertation proposal (one page). Knowledge and work of the student, and/or others, should be synthesized to present a rationale for the proposed dissertation topic (e.g., theory to be developed, hypotheses to be tested) as well as proposed methodology to fulfill the dissertation objective.
  - f) A list of four independent areas in which the student feels he/she has depth. One of these areas must come from a fundamental engineering topic (e.g., thermodynamics, fluid mechanics, control systems, signal processing, mathematics). A second area must be from a biological or medical specialty (e.g., molecular biology, cell biology, neuromuscular physiology, cardiovascular medicine). The other two areas may come from any medical, biological, bioengineering, or other engineering topics that lead to a cohesive program of graduate study (e.g., genetics, developmental biology, biotechnology, neurology, medical imaging, computer graphics, mathematics, robotics, polymer physics). The student should discuss these areas with their advisor in the process of planning their graduate program and prior to preparation of their application folder.
- 3) The student, in absentia, will be evaluated by the faculty at one of their meetings (other faculty may be requested to be present to participate in the evaluation). The evaluation will be based on the student’s potential to become an independent scholar (see #1). The faculty will determine if the student should be allowed to proceed to the next step in the PhD Qualifying Examination. If the student is not allowed to proceed, the faculty sponsor will convey to the student the reasons for the faculty’s decision. Otherwise, the faculty will appoint a subcommittee consisting

of three or four faculty, at least two of whom will be Academic Council Members of the Bioengineering Department.

- 4) The subcommittee is to obtain additional information regarding the student's potential to become an independent scholar. To accomplish this objective, the student will present to the subcommittee a 15-minute technical lecture on the topic contained in the abstract (see #2d). (One week prior to the lecture, the student will give each subcommittee member a one page "reminder" containing the short abstract of the lecture, and the time and place of the lecture.) This lecture, followed by a short question/answer session, will be open to all faculty and students. Afterwards, in a closed session (up to 1.5 hrs.) with the subcommittee, the student will answer additional questions regarding the topic presented at the lecture, the four areas chosen by the student (see #2f), the preliminary dissertation proposal (see #2e), or other related topics. (The two-hour time-slot and the place of the lecture and questioning will be arranged by the student and the faculty sponsor with consent of all subcommittee members.) The subcommittee will deliberate on all the information it has acquired (from the preliminary evaluation by all the faculty [see #3], and from the lecture and the question/answer session) and will decide on a recommendation of pass, conditional pass, or fail (see #5). This recommendation will be communicated to the student.
- 5) Possible outcomes are that the student:
  - a) Passes unconditionally;
  - b) Passes conditionally;  
In this case, the faculty will outline the weaknesses and how the conditions the student could (or must) fulfill before reconsideration (e.g., specific courses must be taken with performance at a specified level; communication skills need to be improved as evidenced by ...). With the faculty sponsors' endorsement, the student will later request a change from "conditional pass" to "pass" after he/she believes that the conditions have been fulfilled. The student will outline in this request the reasons for this belief. The faculty will meet again to act on the request.
  - c) Fails, with or without option to retake.
- 6) The student's sponsor will notify the student and the Student Services Office of the results of the examination.

## ***University PhD Requirements***

### ***Reading Committee***

Each Ph.D. candidate is required to establish a reading committee for the doctoral dissertation within six months after passing the department's Ph.D. Qualifying exams. Thereafter, the student should consult frequently with all members of the committee about the direction and progress of the dissertation research.

Students must have at least three faculty members: the principal dissertation advisor and two other readers serve on their Doctoral Dissertation Reading Committee who read and certify their dissertation. At least two members must be on the Stanford Academic Council. It is expected that at least one member of the Bioengineering faculty be on each reading committee.

[The Doctoral Dissertation Reading Committee Form](#) is to be completed and filed with the Student Service Office *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 Ph.D. or equivalent foreign degree. Approval is requested on a [Petition for Doctoral Committee Form](#).

### ***PhD Candidacy***

Students must be admitted to candidacy by the 6<sup>th</sup> quarter of the student's post-master's registration. Being admitted to candidacy signifies that the department considers the student capable of completing the requirements necessary for earning a Ph.D. 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 [PhD candidacy form](#) to the Student Service Office. This form is to be approved and signed by the advisor, reading committee and the Associate Chair of Graduate Curriculum, Annelise Barron.

### ***Terminal Graduate Registration (TGR)***

TGR status is reached when Ph.D. students have been admitted to candidacy, completed 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:

- a) [Request for TGR Status](#)

Students should then register for TGR Dissertation, **BIOE 802 (TGR Dissertation for zero units) each quarter** 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.

Students register at a special tuition rate, \$2604/qtr in 2011-2012. As course work is no longer considered necessary during this advanced stage of study, units are no longer counted towards residency. Within certain restrictions and after tuition adjustment to the appropriate unit rate, TGR students may enroll in additional courses at their own expense. This year the TGR tuition rate will cover 3 units of tuition.

### ***University Oral and Dissertation***

The Ph.D. candidate is required to take the University oral examination after the dissertation is substantially completed (with the dissertation draft in writing), but before final approval. The examination consists of a public presentation of dissertation research, followed by substantive private questioning on the dissertation and related fields by the University oral committee (four selected faculty members, plus a chair from another department). Once the oral has been passed, the student finalizes the dissertation for reading committee review and final approval. Forms for the [University oral scheduling](#) and a one-page dissertation abstract should be submitted to the department student services office at least three weeks prior to the date of the oral for departmental review and approval.

Please consult with the [Registrar's Dissertation and Thesis Submission](#) page for the most current specifications for formatting of dissertations and procedures for completing and delivering dissertations. It is the student's responsibility to obtain all required signatures on all forms and on the dissertation. The Registrar's Office in conjunction with the Stanford University Library is offering students the option to submit their dissertation/thesis in electronic format. The electronic submission process is free of charge to students and allows students the ability to log into Axess and check their pre-submission requirements in the eDissertation/eThesis Center under the academics tab. Once these requirements have been met the "Proceed to Dissertation/Thesis Submission page" button will open up in the student eDissertation/eThesis center and this will allow the student proceed and upload a soft copy of their dissertation/thesis. Students are responsible for purchasing bound copies for personal use.

### ***Graduation Quarter***

Registration is required for the term in which a student submits a dissertation or has a degree conferred. Students who meet the following conditions are eligible to be assessed a special tuition rate for the quarter in which they are receiving a degree.

All course work, degree requirements, and residency requirements have been completed; Graduate students must have enrolled in the applicable 801 or 802 section relevant to their degree during the Graduation Quarter.

1. The student has formally applied to graduate via Axess.
2. The student has filed all necessary forms regarding Graduation Quarter before the first day of the term chosen as the Graduation Quarter.

3. A graduate student must have an active program status, which may include an approved leave of absence, in the term immediately preceding the term chosen as the Graduation Quarter (not applicable for undergraduates).
4. A graduate must have passed the oral examinations and successfully defended the dissertation/thesis. The graduate student has only to submit the dissertation/project or Master's thesis by the deadline for submission in the term designated as the Graduation Quarter (not applicable for undergraduates).

Students on Graduation Quarter are registered at Stanford and, therefore, have the rights and privileges of registered students. There is a registration fee of \$100 for the Graduation Quarter; students will be assessed University health insurance (unless waived) and ASSU fees. Only **one** Graduation Quarter may be requested for each degree program. Students who, for whatever reason, are not graduated during the Graduation Quarter will be assessed a higher, standard tuition rate in subsequent terms. Requests should be directed to the Student Service Office.

### ***Commencement***

Commencement is held once a year in June. There are two ceremonies. The first one is the University ceremony (main event) and the department ceremony (diploma distribution) follows. Information about commencement is typically available around mid to late April.

### ***Personal Leave for Graduate Students***

If a break in continuous formal study is needed, graduate students must request a leave of absence from the department Chair. The maximum period of leave granted is one year. The Leave of Absence petition should explain the request and include a proposed schedule for completion of the Ph.D. degree, taking into account the requested leave period. A letter of support from the major adviser and the official University Leave of Absence form should also be submitted to the department Chair.

If the student is not able to resume studies by the quarter originally approved by the department Chair, a one-time extension may be granted. If she or he wishes to return after an approved leave of absence has expired, the student must apply for reinstatement. Financial support from the department cannot be guaranteed in the event of an extended leave of absence.

### ***Honor Code***

Stanford examinations are not proctored. This is not the tradition at many other universities. We do deal firmly with honor code violations. Students have been suspended, and have had degree conferral delayed, following convictions for honor code violations. Please read the [Stanford University Honor Code](#).

**Bioengineering Faculty Directory**  
(The Prefix for all Campus Numbers is 72)

<b><u>Professors</u></b>	<b><u>Email</u></b>	<b><u>Research</u></b>	<b><u>Phone/Location</u></b>
Russ Altman Chair, Professor	Russ.Altman@stanford.edu	Biomedical Computation	5-3394, Clark S170
Annelise Barron Associate Professor	aebarron@stanford.edu	Biophysics of Innate Immunity	1-1151, Clark W300B
Kwabena Boahen Associate Professor	boahen@stanford.edu	Neural Systems in Silicon	4-5633, Clark W125
Zev Bryant Assistant Professor	zevry@stanford.edu	Molecular Biophysics	4-3090, Clark E302
David Camarillo Assistant Professor	dcamarillo@stanford.edu	Smart Biomedical Devices	5-2590 Bldg. 540 Rm. 128
Dennis Carter Professor	dcarter@stanford.edu	Skeletal Mechanobiology	3-4784, Durand 215
Jennifer Cochran Assistant Professor	cochran1@stanford.edu	Cell and Molecular Engineering	4-7808, Clark W250
Markus Covert Assistant Professor	mcovert@stanford.edu	Systems Biology	5-6615, Clark W153
Karl Deisseroth Associate Professor	deissero@stanford.edu	Neuroscience Cell and Tissue	6-4325, Clark W083
Scott Delp Professor	delp@stanford.edu	Neuromuscular Biomechanics	5-4009, Clark S321
Drew Endy Assistant Professor	endy@stanford.edu	Synthetic Biology	3-7027, Y2E2 269B
KC Huang Assistant Professor	kchuang@stanford.edu	Cell and Molecular Engineering	1-2483, Clark S325
Michael Lin Assistant Professor	mzlin@stanford.edu	Human Gene Therapy	1-1681, CCSR 2105
Norbert Pelc Professor	pelc@stanford.edu	Biomedical Imaging	3-0435, Lucas P263
Manu Prakash Assistant Professor	manup@stanford.edu	Physical Biology	5-3731, Clark E350B
Stephen Quake Co-Chair, Professor	quake@stanford.edu	Biofluidics	4-8891, Clark E300

Ingmar Riedel-Kruse Assistant Professor	riedel-kruse@stanford.edu	Physics of Development	3-2380, Fairchild D243
Christina Smolke Assistant Professor	csmolke@stanford.edu	Synthetic Biology	1-6371, Y2E2 269A
James Swartz Professor	jswartz@stanford.edu	Cell and Molecular Engineering	3-5398, Keck 185
Charles Taylor Associate Professor	taylorca@stanford.edu	Cardiovascular Biomechanics	5-6128, Clark E350B
Fan Yang Assistant Professor	fanyan@stanford.edu	Stem Cell and Biomaterials	5-7128; Edwards R152
Paul Yock Professor	yock@stanford.edu	Biomedical Devices	6-1160, Clark E100



## ***Bioengineering Administration***

Raul Felipa, Director of Finance and Administration  
Jocelyn Hollings, Grants Manager  
Tiffany Murray, Faculty Affairs Coordinator  
Olgalydia Winegar, Student Services Manager  
Teri Hanks, Undergraduate Student Services Officer  
Laura Sasportas, Student Coordinator  
Grace Tang, Student Coordinator  
Jianbin Wang, Student Coordinator  
Monica Ortiz, CTL Student Liaison and TA MinT Fellow  
Isis Trenchard, CTL Student Liaison and TA MinT Fellow

[felipa@stanford.edu](mailto:felipa@stanford.edu)  
[jocelyn.hollings@stanford.edu](mailto:jocelyn.hollings@stanford.edu)  
[tiffany.murray@stanford.edu](mailto:tiffany.murray@stanford.edu)  
[owinegar@stanford.edu](mailto:owinegar@stanford.edu)  
[thankes@stanford.edu](mailto:thankes@stanford.edu)  
[lss@stanford.edu](mailto:lss@stanford.edu)  
[gtwang@stanford.edu](mailto:gtwang@stanford.edu)  
[wangjb@stanford.edu](mailto:wangjb@stanford.edu)  
[meortiz@stanford.edu](mailto:meortiz@stanford.edu)  
[isist@stanford.edu](mailto:isist@stanford.edu)

## ***Facilities***

Bioengineering is jointly supported by the School of Engineering and the School of Medicine. The facilities and personnel of the Department of Bioengineering are housed in the James H. Clark Center, the William F. Durand Building for Space Engineering and Science, the William M. Keck Science Building, the Jerry Yang and Akiko Yamazaki Environment and Energy Building, and the Richard M. Lucas Center for Magnetic Resonance Spectroscopy and Imaging.

## ***Responsibility of Living in Clark***

- Bike Parking is on the east and west side of the building. Please do not park bikes in the courtyard, or along the handrails, as this creates a hazard.
- The seminar rooms and auditorium are available for general use, but must be reserved ahead of time through the online reservation system. Please contact Olgalydia Winegar, Student Services Manager for assistance. Conference rooms located on each floor are available to Clark residents only.
- Requests for IT support are made directly online at <https://helpsu.stanford.edu>. When submitting your help ticket, select "Clark Center" for the department in the drop down box on the web form. You may also phone 650-725-HELP and mention Clark Center to the consultant.

## ***Staying Connected***

Never hesitate to call security. They are here to help you feel safe and be secure in your work place. If you see something suspicious, if you are in harm's way, or if you are alone here at night and want an escort to your car, please call them. Security: 723-7222

Everyone working in Clark should subscribe to the Clark Center e-mail distribution list. This is the Clark center's primary means of disseminating information to all occupants of the building. Please send an e-mail to [majordomo@lists.stanford.edu](mailto:majordomo@lists.stanford.edu), and put "subscribe clark\_center" in the body of the message.

Student email lists are as follows:

[bioengphd@lists.stanford.edu](mailto:bioengphd@lists.stanford.edu) (PhD students)  
[bioengmasters@lists.stanford.edu](mailto:bioengmasters@lists.stanford.edu) (MS students)  
[bioecoterm@lists.stanford.edu](mailto:bioecoterm@lists.stanford.edu) (Coterm students)  
[bioesocial@lists.stanford.edu](mailto:bioesocial@lists.stanford.edu) (Everyone)

### *Student Lounges*

The bioengineering student lounge, located next to the Student Service Office is a great place to take a break. The Clark building is wireless so you can take your computer anywhere. NeXus restaurant is open until 7:00pm. Feel free to gather there before or after lunch time. The most obvious places are Peet's Coffee (on the third floor) and the many tables and chairs scattered throughout the exterior terraces, and the courtyard. In case you are looking for a calming walk, Clark has close to one mile of exterior walkways with fabulous views.

### *Mail*

Graduate students will have shared mailboxes located in the Student Service Office in Clark Center S-166. Please check your mail periodically.

### *Student Organizations*

#### [Stanford Student Biodesign \(SSB\)](#)

This group aims to prepare students for careers in biotech, biomedical technology, bioengineering, and other fields at the intersection of life sciences and engineering. They offer career seminars, lectures, dinners with industry and faculty, community service opportunities, and hands-on innovation experience.

#### [SBSA](#)

Stanford Biosciences Student Association (SBSA) provides useful career resources and information, arranges fun social events, and imparts a political voice to the approximately 600 students enrolled in biological science graduate programs in 14 research departments here at Stanford University.

#### [BioNeXus](#)

BioNeXus is a student group on campus aiming to promote collaboration and a greater sense of community among Bio-X graduate students and post-docs, for both research and recreation.

#### *BMES*

The purpose of the Stanford Biomedical Engineering Society (BMES) chapter is to promote and enhance biomedical engineering knowledge among undergraduate and graduate students at Stanford University. It accomplishes this by connecting existing student groups, establishing mentorships, and performing community outreach.

### *Places to Get Help*

Problems and conflicts can arise over the course of your graduate career. If you are having a conflict, let the other person know as they might be unaware of the situation. However, realize that you are not alone in the process. Here is just a sample of individual/offices that you can turn to. They are not listed in any particular order, so feel free to chat with whomever you feel most comfortable with.

[CAPS-Counseling Services](#) (completely confidential) 723-3785

[Bridge Peer Counseling Center](#), (completely confidential) 723-3392

[Olgalydia Winegar](#), Student Services Manager

## *Campus Computer Resources*

There are a numerous facilities and options for computer resources at Stanford. Most students have their own computers, but there are many places on campus for non-owners to use computers.

### **Meyer Computer Cluster/Multimedia Studio 723-9407**

The second floor of Meyer Library is home to a state-of-the-art multimedia production facility available to anyone with an e-mail account. It includes digital-film video workstations, video editing stations, flat bed and 35mm slide scanners, MIDI keyboards, and removable media disc drives. Meyer also possesses a large bank of PCs and Macs. Connection stations in the cluster allow you to hook your laptop into SUNet.

### **Tresidder LAIR Computer Cluster 723-1315**

The LAIR on the second floor of Tresidder offers a self-serve cluster of PCs and Macs that are accessible 24 hours a day!

[The UNIX Computer Resources](#) provides UNIX facilities for general and research computing to anyone with a full-service [SUNet ID](#). The computers are housed in a [remote computing facility](#) run by Information Technology Services. Additional resources may be available to students or faculty affiliated with a specific department.

### **Visual Arts Services 723-6813**

If you need to produce high quality slides, posters, or color handouts, visit Visual Arts Services on the first floor of the Medical School Office Building (MSOB) 125 Welch Road.

### **Residential Computer Consultants (on-campus housing)**

If you live on campus and have a personal computer, you can hook up to the network from your room. Ask you Residential Computer Consultant (RCC) for more details about PhoneNet and Ethernet connections or visit their web site at <http://rescomp.stanford.edu>. Each residence hall also has its own computer cluster.

### **Computer Department (at the Stanford bookstore)**

When purchasing a computer or software, try the Computer Department in the main campus Stanford bookstore. The Computer Department offers educational discounts on personal computers, peripherals and software. They have a demonstration area where you can try the merchandise and an on-site service center.

