

Department of Materials Science and Engineering, University of Illinois

GRADUATE DEGREE REQUIREMENTS

Revised August 2018

The Department offers the M.S. and Ph.D. degrees in Materials Science and Engineering. The academic requirements of the Graduate College, the Department and its Concentration Areas are summarized in this handbook. Detailed information can be found on the following web sites:

MatSE Department (www.matse.illinois.edu/academics/grad/index.html)

University of Illinois Programs of Study (<http://courses.illinois.edu/cis/index.html>)

Graduate College Handbook (<http://www.grad.illinois.edu/gradhandbook>)

Students are also welcome to consult with the Director of Graduate Studies (currently Professor Shim) for further interpretation of the requirements.

I. General Requirements

Students may elect to complete the M.S. degree prior to entering the Ph.D. program or they may enter the Ph.D. program directly on being admitted to the Department's Ph.D. program. A student originally accepted for the M.S. program and desiring to transfer to the Ph.D. program needs the approval of the Graduate Recruiting Committee; if approved the student must submit a petition to the Graduate College.

All students must satisfy the Departmental requirements and maintain a minimum grade point average (GPA) equal to or greater than 3.0. Students falling below this level will be placed on probation and will have one semester to get their GPA above 3.00. Failure to maintain a GPA ≥ 3.00 will result in termination of graduate student status.

Conduct. The Department requires that students adhere to the high standards of conduct and integrity as defined in the University Student Code (<http://studentcode.illinois.edu>). Please take the time to read ARTICLE 1–STUDENT RIGHTS AND RESPONSIBILITIES. Among the important sections are the following:

- 1-107 Religious Beliefs, Observances, and Practices
- 1-108 Nondiscrimination Policy
- 1-109 Sexual Harassment Policy
- 1-110 Reasonable Accommodations for Students with Disabilities
- 1-201 Responsibilities of Students
- 1-302 Rules of Conduct
- 1-401 Academic Integrity
- 1-402 Infractions of Academic Integrity
- 1-403 Penalties for Infractions of Academic Integrity

Further details concerning Academic Integrity are given in the Policy and Procedures on Integrity in Research and Publication (https://www.vpaa.uillinois.edu/UserFiles/Servers/Server_420372/File/Integrity-Policy.pdf). Additional information is also available from the Office of the Vice Chancellor for Research (<http://research.illinois.edu/regulatory-compliance-safety/research-integrity-and-ethics>). One example is when a student *plagiarizes* material from another source, i.e., uses text, figures or results in his/her own work without citing the original source of the information. Violations can result in dismissal from the program.

In the event of alleged violations or of graduate student grievances, the Department follows Graduate College-approved policy and procedures to reach a resolution. Copies can be obtained from the Department office upon request.

Medical situations. If a student has a diagnosed medical issue that may affect performance in the program, he/she should inform the Director of Graduate Studies (currently Professor Moonsub Shim). This is asked so that accommodations, if needed, can be implemented ahead of time.

Transfer Credit. Students may petition to apply credit for courses taken elsewhere, or excess courses for the B.S. degree at UIUC, to their graduate degree at UIUC. Students should submit the petition to the Director of Graduate Studies together with outlines of the relevant courses taken at other institutions and an official transcript from the appropriate institution. The following conditions apply: 1) the student must have completed at least 8 hours of coursework on the UIUC campus towards the degree; 2) the non-UIUC coursework must have been completed within the previous 5 years; 3) the credit shall not have been applied towards another degree, either at UIUC or another institution; and 4) generally, a maximum of 12 hours of transfer credit may be counted toward a graduate degree. All Ph.D. candidates, regardless of transfer credit, must complete at least 64 hours of credit while in residence.

Time Limits. The Graduate College specifies that all requirements for the M.S. degree must be met within 5 years of entering the Graduate College. Candidates for the M.S. degree must spend at least 2 semesters in residence.

All requirements for the Ph.D. degree must be completed within 7 years after first registering in the Graduate College, within 6 years after entering the University with a M.S. degree, and within 5 years of completing the preliminary examination. Candidates for the Ph.D. degree must spend at least two consecutive semesters in residence.

Extensions to the above time limits may be granted upon petition to the Graduate College. However, the Department reserves the right to reduce its level of financial support for a student who requires a time extension.

Annual Reviews. All graduate students are required to complete an online review form each year. The annual reviews are conducted to ensure timely progress toward the graduate degree. Instructions will be provided by the Department during the spring semester along with the announcement of the due date.

Credit for 590 and 599. Students can only apply credit obtained in these courses toward a degree administered by the Department if registered under the Course Reference Number (CRN) of a member of the Graduate Faculty in the Department. Students who wish to take research under a person who is not a member of the Graduate Faculty in the Department must have the approval of the Department Head and be assigned an Academic Advisor within the Department. Except under unusual circumstances these students will register for 590 and 599 courses using the CRN of the Advisor within the Department.

Course signups for newly arrived students. Newly arrived graduate students should sign up for at least 12 hours of course credit including the seminars, colloquium, and Introduction to Laboratory Safety course listed at the end of this document. Students on the Ph.D. track should include MSE 500, Thermodynamics of Materials (or CHEM 544 or PHYS 504). Once they choose an advisor, they should add two hours of course credit for MSE 599 (thesis) to achieve a total of 14 hours of credit. The student must select an advisor by the end of September, as announced at the new student orientation. Note that the deadline for online course add/drops is the first week of September. However, changes can be made after that date by picking up a form from the department office.

II. Departmental Requirements

MSE 529/559 Requirement. All students in both the M.S. and Ph.D. programs are required to register for (0 or 1 hour) and receive satisfactory grades in either Hard Materials Seminar (MSE 529) or Soft Materials Seminar (MSE 559) every semester in residence. Usually, having more than 2 unexcused absences for a given semester will lead to an unsatisfactory grade for that semester. Specific requirements, including attendance requirements, for a given semester will be announced by the instructor of the course. An approval from the Director of Graduate Studies is required if there is a schedule conflict that prevents a student from registering for one of these seminar courses and satisfying its requirements. A request for such an approval must be made before the semester with conflict begins. Credit hours allowed to count toward degree requirements are indicated below for each degree.

1. M.S. Degree

All students must satisfy the MSE 529/559 requirement (see above). Allowed credit for participation in seminars (e.g., group meetings with thesis advisor MSE 590; Hard Materials Seminar MSE 529; or Soft Materials Seminar MSE 559) is a maximum of 4 hours. All M.S. students must register (for 0 or 1 hour) and complete satisfactory attendance at the weekly Colloquium on Materials Research (MSE 595) every semester in the first two years of residence; up to 2 hours may be counted toward the M.S. degree. Students must also complete MSE 492, “Fundamentals of Laboratory Safety,” but *credit earned in this course does not count toward the degree*. There is no foreign language requirement.

Non-Thesis Option: The non-thesis M.S. degree requires the completion of a minimum 36 hours of graduate level course work. At least 14 hours of credit must be at the 500 level and 10 hours of MSE courses are required.

Thesis Option: The M.S. degree with thesis option requires the completion of a minimum 32 hours of graduate level credit consisting of 8 hours of thesis credit (MSE 599) and 24 hours of course work. At least 14 hours of credit must be at the 500 level and 10 hours of MSE courses are required. In addition, candidates for the M.S. degree with thesis option must submit a thesis that is approved by their Advisor and signed by the Department Head to complete degree requirements.

2. Ph.D. Degree

The Ph.D. degree requires the completion of 96 hours of graduate work beyond the B.S. degree. A student entering with a B.S. degree must complete 96 hours of graduate work: 52 hours of thesis work and 44 hours of course work. A student entering with an M.S. degree must complete 64 hours of graduate work: 44 hours of thesis work and 20 hours of course work. Students must receive a total of 24 hours of credit at the 500-level (i.e., 10 hours beyond those credited towards a M.S. degree) and take at least 20 hours of MSE courses (10 hours beyond the M.S. degree).

Other than MSE 492, 529/559, 595 and 599, the only course that all students in the Ph.D. program are required to take is one on statistical thermodynamics. The course can be selected from the following list. Similar courses taken at other schools may qualify; students requesting transfer of such credit shall supply a course outline and title of the text used for approval by the Director of Graduate Studies who will consult with the instructor of MSE 500 as to the equivalence. *Because graduate-level credit in thermodynamics is part of the requirement for the Ph.D. qualifying examinations (as described in section I below), the student should enroll in one of the following classes in the fall of the year that he/she enters the Ph.D. program.* This allows the student, in the event that he/she does not obtain a grade of “B” or higher, to audit one of the courses the following fall, which is within the 2-year time frame for completing the qualifying examinations.

MSE 500, Statistical Thermodynamics of Materials: Atomistic concepts of statistical thermodynamics and their relationship to classical phenomenological thermodynamics. Application of the methods of statistical thermodynamics and statistical mechanics to describe the structure, phase behavior, and properties of both hard and soft materials.

CHEM 544, Statistical Thermodynamics: Fundamentals of thermodynamics and statistical mechanics, covering equilibria, thermodynamic transforms, phase transitions, ensembles and non-equilibrium statistical mechanics, from single molecules to complex biological systems.

PHYS 504, Statistical Physics: Single-particle distribution functions; classical and quantum mechanical systems, Boltzmann equation, virial theorem, and equations of state for gases; formal theory: ensembles, identical particles, thermodynamics of simple systems, and distribution functions; nonequilibrium problems; conservation laws and hydrodynamic equations, sound waves, and transport coefficients; plasmas, normal Fermi fluid, superfluids, and systems with internal degrees of freedom.

Students receiving less than a “B” grade in these courses (i.e. B- or lower) will be required to audit one of the above courses the next time it is given and pass the final examination. A failing grade in this retake examination will result in the student being dropped from the Ph.D. program.

All students must satisfy the MSE 529/559 requirement (see above). Allowed credit for participation in seminars (e.g., group meetings with thesis advisor MSE 590; Hard Materials Seminar MSE 529; or Soft Materials Seminar MSE 559) is a maximum of 8 hours (or 4 hours after the M.S. degree). All students must register (for 0 or 1 hour) and attend the weekly Colloquium on Materials Research (MSE 595) during their first two years of residence. Up to 4 hours can be counted toward the Ph.D. degree including the 2 hours for the M.S. degree. Students must also complete MSE 492 “Fundamentals of Laboratory Safety,” but *credit earned in this course does not count toward the degree*. There is no foreign language requirement.

Thesis: A written thesis and successful completion of the final examination is required of all Ph.D. students.

Ph.D. Examinations

i. Qualifying Examinations

The qualifying examination requirement consists of two oral examinations based on two topics selected by the student in consultation with his/her advisor, plus a grade of “B” or better in a graduate level course on thermodynamics (as described in section II.2. above). The Director of Graduate Studies will assign the two examiners for the oral examinations and determine, if “other” is chosen, whether or not the topic is acceptable. The topics must be selected from the following list:

Biomaterials	Optical properties of materials
Ceramic processing	Physical metallurgy
Composites	Physics and physical chemistry of polymer liquids
Computational/ simulation methods	Polymer synthesis
Dynamics of macromolecular fluids	Solid state physics
Electron microscopy and scattering	Surfaces and colloids
Electronic materials processing	Other (one only, requires approval by the Director of Graduate Studies)
Macromolecular solids	
Mechanical properties	

Descriptions of the material covered by these exams are listed on the MatSE web site (<https://matse.illinois.edu/academics/graduate-programs/graduate-exams/graduate-exams-qualification-preliminary-and-final>). Note that many of our 500-level classes – some of which provide recommended background for the qualifying exams – are offered only once every two years (<https://matse.illinois.edu/academics/graduate-programs/graduate-courses>), so plan accordingly. Only registered Ph.D. degree students in the Department of Materials Science and Engineering are eligible to take the qualifying examinations.

Examination Times. Students are required to take the qualifying examinations for the first time no later than the beginning of their fourth semester (counting fall and spring terms) and must complete the qualifying examinations, without exception, by the end of their fourth semester (this includes the examination period in May). Both oral exams must be taken in the same time period. Oral examinations will be held approximately the first several weeks of classes at the beginning of the Fall and Spring semesters and a third examination period will be held after finals week in May.

Students should submit their topics for examination to the Department’s Graduate Programs Office (i.e., sign up) *at least one month prior to the above times*. The signup form is available on the MatSE web site (<http://www.matse.illinois.edu/academics/graduate/exams/>). On the form, you are required to list the classes that you intend to take in order to complete the requirements of the Ph.D. degree. You should discuss this plan of study with your advisor before he/she signs the form.

Once a student has signed up, he/she may not cancel or postpone taking the qualifying exam unless dire circumstances occur. A student who faces such circumstances should consult with the Director of Graduate Studies.

Admission to Stage II. To be allowed to advance to Stage II of the Ph.D. program (as defined by the Graduate College) a student must have:

- a. GPA \geq 3.00
- b. Grade of at least B in either MSE 500, CHEM 544, or PHYS 504
(if the grade is B- or less, he/she must audit the next class and pass the final exam)
- c. Pass in both topics of the oral qualifying examinations.

Students having Research Assistantship appointments receive an increment in their stipend following admission to Stage II.

Appeals Process. A student who fails the oral qualifying examination on the second attempt is allowed to appeal the assigned grade if and only if there is a strong evidence that clearly shows the grade received is not representative of the student's understanding of and fluency in the topics covered in the exam at the time when the exam was administered. If such a situation arises, the student should discuss the possibility of the appeal with his/her adviser then fill out the "Oral Qualifying Examination Appeal Request Form." This form can be obtained from the Department office upon request. Appeal requests must be made within 2 weeks of receiving the notice of second failing grade in order to be considered by a committee of MatSE faculty appointed by the Department Head. If this committee decides that there is enough evidence to consider a third attempt at the examination, the student must make the third attempt within 30 calendar days of receiving the notice of the committee's decision as long as s/he remains registered as a student at the University. If the student fails the third attempt or if the committee does not approve the appeal request, the student will no longer be eligible for the Ph.D. program.

ii. Preliminary Examination

All Ph.D. candidates must pass a preliminary examination covering the student's proposed Ph.D. thesis research. It is strongly suggested that you complete the "prelim" by the end of the sixth semester (counting fall and spring terms) after admission to the Department.

The preliminary examination will be administered by a committee consisting of a minimum of four voting faculty members, including at least one member from outside of the student's Concentration Area (or Department). The Thesis Advisor will normally chair the committee, but if that person is not a member of the Graduate Faculty and/or the Department, the Academic Advisor will act as the chair. At least three of the voting members must be members of the Graduate Faculty and at least two must be tenured. A majority of the committee must be members of the Department faculty with greater than 50% appointments. The members of the committee must be approved by the Director of Graduate Studies.

Students should submit the preliminary examination form to the Department secretary *at least three (3) weeks prior to the proposed date*. It is the student's responsibility to identify a date on which all the committee members can meet for 2 hours, and to reserve a conference room and necessary equipment (e.g., projector). The form is available at <https://matse.illinois.edu/academics/graduate-programs/graduate-program-forms>. You are also required to complete an on-line DARS audit of your progress towards the coursework requirements (<http://registrar.illinois.edu/dars-audit>) and attach a printout to the form. The purpose of the audit is to identify any remaining coursework requirements (especially, any omissions).

The student will write a proposal of no more than 4000 words – excluding references, figure captions, and data tables – and deliver it to each member of his/her committee *at least two weeks before the examination*. The proposal should include the following sections, with literature references inserted in journal format as specified by the American Institute of Physics or by the American Chemical Society. Due to the length limitation, the statements will need to be highly focused. It is not acceptable to use the manuscript of a publication as the proposal document.

- a. A statement of the problem to be solved, i.e., the ways in which the leading edge of knowledge will be advanced by this thesis research.
- b. A literature review that summarizes the present state of knowledge and the key unknowns. Work performed by other students in the group, if any, should be identified as such.
- c. The results obtained to date by the student.
- d. The proposed work, including the methods to be used and discussion of how and why the methods are expected to solve the problem defined in (a). It is important that the proposed work be carefully thought through; it is understood that not every detail can be anticipated.

The preliminary examination will be oral. The student will give a presentation, not to exceed 20 slides / 30 minutes in length, which includes the statement of the problem, key results from the literature and from the student's preliminary work, and the proposed work. Figures, tables, or other data should be referenced in compact format on the bottom of the slide (e.g., *Jones PRB 2005* or *This Work*) to make explicit whether they derive from the literature or from the student's own results. The committee members will discuss both the presentation and related knowledge in the field with the student. Note that the preliminary examination continues to build the skill area of *scientific fluency* that was essential on the qualifying examination.

The unanimous approval of the members of the preliminary examination committee is required for the student to pass. The members also serve on the final thesis examination committee; substitution is allowed if a member becomes unavailable. The committee members are meant to be a valuable resource to the student and should be consulted throughout the course of the student's research. It is strongly suggested that the student contact his/her committee members at least once per year to provide a report of progress and to solicit feedback and suggestions.

Students having Research Assistantship appointments receive an additional increment in their stipend after they pass the preliminary examination.

iii. Final Examination

All students are required to pass a final oral examination (the defense) before receiving the Ph.D. degree. The final examination will be administered by a committee which is appointed under the same rules as outlined above, and which will normally be comprised of the same members as the preliminary examination committee. Any changes require the approval of the Director of Graduate Studies. The student must present a final unbound copy of the Ph.D. thesis to each member of the committee at least 2 weeks prior to the examination. The examination will be oral and will be based on, but not limited to, the research reported in the thesis. It will ordinarily consist of an oral presentation by the student, approximately 30-40 minutes in length, of the research described in the thesis followed by a discussion with the committee members. The committee chair, defending student, and at least one additional voting member of the committee must be physically present for the final examination. All voting members of the committee must be present in person or participate via teleconference or other electronic communication media for the duration of the final examination, and the deliberation and determination of the result. Passing the exam requires the unanimous consent of the voting members of the committee as well as the Department Head.

Students should submit the final examination request form to the Department Office *at least three (3) weeks prior to the proposed date*. It is the student's responsibility to identify a date on which all the committee members can meet for 2 hours, and to reserve a conference room and any other necessary equipment. The form is available on at <https://matse.illinois.edu/academics/graduate-programs/graduate-program-forms>. Prior to the exam, the student should pick up from the Department Office the Final Exam Result forms to be signed immediately following the exam.

III. Policy on Transferring into the MatSE Ph.D. Degree Program

Current MatSE M.S. students who have completed at least two semesters of studies are eligible to apply for admission to the Ph.D. program. Students in other graduate degree programs at Illinois who have a strong record of scholarship in Materials Science and Engineering may also apply for transfer to the MatSE Ph.D. program provided that there is a compelling reason for a change in program of study. All transfer applications will be judged in comparison to the entire pool of applicants to the Ph.D. program. Interested students should submit the following to the department office:

1. One-page statement of purpose
2. Resume
3. Three letters of reference
4. Updated GRE and/or TOEFL scores, if available
5. A copy of M.S. thesis (or a near complete draft), if currently enrolled in M.S. program with thesis option

Transfer requests have the same deadlines as PhD applications indicated on the Department website. Note that Spring transfer requests are considered only by request of a MatSE faculty member or an affiliate faculty. Fall requests are considered along with all current year PhD applications.

IV. Policy on change to thesis option within the MatSE M.S. Degree program

Current MatSE M.S. students enrolled in the non-thesis option can request to be considered for the thesis option if they have joined a research group and have secured a Research Assistantship. Request can be made by contacting the MatSE graduate office. A letter indicating support with a Research Assistantship from the sponsoring faculty member is required. A committee of Department faculty will evaluate the request and make a decision. Additional information or documentation may be requested by the committee if necessary.

V. Graduate Option (Certificate) Programs

Computational Science and Engineering: The Department provides students the opportunity to participate in the College-wide option in Computational Science and Engineering (CSE), which fosters interdisciplinary, computationally oriented research among all fields of science and engineering, and prepares students to work effectively in such an environment.

The option requires student to work with faculty in two different disciplines and amounts to (roughly) a M.Sc. in CS. Students electing the CSE Option become proficient in computing technology, including numerical computation and the practical use of advanced computer architectures in one or more applied disciplines. Students pursuing theoretical and experimental research programs have opted for this option, but is highly recommended for computationally oriented theory graduate students.

Requirements are listed on the CSE site (<http://www.cse.illinois.edu/>). For further information, contact the CSE Faculty Representative in the MatSE Department (currently Professor Trinkle).

Energy and Sustainability Engineering: The Department provides students the opportunity to participate in the College-wide option in Energy and Sustainability Engineering (EaSE). The EaSE program is designed to provide both a breadth and depth of knowledge for students who are enrolled in a departmental masters or Ph.D. program, where they build a core competence in a discipline. Participation in the EaSE option will not delay a student's progress towards the degree or add to the total course load.

Requirements are listed on the EaSE site (<http://EaSE.Illinois.edu>). For further information, contact the EaSE Faculty Representative in the MatSE Department (currently Professor Abelson).

SUMMARY OF REQUIREMENTS FOR GRADUATE DEGREES IN MATERIALS
SCIENCE AND ENGINEERING

MS degree

Requirements	Thesis Option	Non-thesis Option
Credit Hours	Hours	Hours
<i>Total Credit for the Degree</i>	32	36
Thesis Research – MSE 599 (min-max applied toward the degree)	8	n/a
Course Work	24	36
MSE 492 (1 hour); credit does not apply toward the degree	0	0
MSE 595	0-2	0-2
Advisor group meetings (MSE 590) and area seminars (MSE 529, MSE 559) (subject to Other Requirements and Conditions below)	0-4	0-4
Elective courses – chosen in consultation with advisor (subject to Other Requirements and Conditions below)	18-24	30-36
Other Requirements and Conditions (may overlap):*		
A minimum of 10 hours of MSE course work.		
A minimum of 14 500-level credit hours overall applied toward the degree (excluding 599).		
MSE 595 (0 or 1 hour) must be taken every semester in the first two years of residence. A maximum of 2 hours may be applied toward the degree.		
MSE 529 or MSE 559 (0 or 1 hour) must be taken every semester. A maximum of 4 hours may be applied toward the degree.		
The minimum program GPA is 3.0.		
The completed masters thesis must be approved by the advisor and the department head.		
Generally, students on a research assistantship will not be allowed in the non-thesis option.		

PhD Degree

Requirements	Entering with approved M.S. degree	Entering with approved B.S. degree*
Credit Hours:	Hours	Hours
<i>Total Credit for the Degree</i>	64	96
Thesis Research – MSE 599 (min-max applied toward the degree)	44	52
Course Work	20	44
One of CHEM 544, MSE 500, PHYS 504 with a grade of B or higher	4	4
MSE 492 (credit does not apply toward the degree)	0	0
MSE 595	0-2	0-4

Advisor group meetings (MSE 590) and area seminars (MSE 529, MSE 559) (subject to Other Requirements and Conditions below)	0-4	0-8
Elective courses (subject to Other Requirements and Conditions below)	10-16	28-40
Other Requirements and Conditions (may overlap):		
MSE course work hours	10	20
500-level credit hours applied toward the degree (excluding 599)	10	24
MSE 595 (0 or 1 hour) must be taken every semester in the first two years of residence. A maximum of 2 hours (if entering with an M. S. degree) or 4 hours (if entering with a B. S. degree) may be applied toward the degree.		
MSE 529 or MSE 559 (0 or 1 hour) must be taken every semester. A maximum of 4 hours (if entering with an M. S. degree) or 8 hours (if entering with a B. S. degree) may be applied toward the degree.		
The minimum program GPA is 3.0.		
Ph.D. exam and dissertation requirements: Qualifying exam Preliminary exam Final exam or dissertation defense Dissertation deposit		

* These students may earn a Master of Science degree during the Ph.D. program.

Appendix I: Preparing Future Faculty

For students with a possible interest in academic careers, there are many opportunities to develop your skills. → If you are interested in course development or an in-class teaching experience, consult with the director of graduate studies.

1. EOL 585, College Teaching, 4 hours. “Scholarly approach to curriculum and pedagogy at the college level: instructional methods, active and cooperative learning, technology-enhanced teaching, evaluation and assessment, faculty roles and responsibilities.”
2. The Center for Teaching Excellence (<https://citl.illinois.edu/>) offers:
3. The Graduate College Career Services Office offers workshops, symposia, and other events. <http://www.grad.illinois.edu/careerdevelopment>
4. The College Teaching Effectiveness Network is a campus student organization that helps students prepare for academic careers. CTEN offers workshops that address issues relevant to being an effective teacher at the college level. <http://uoficten.weebly.com/>
5. There are “Preparing Future Faculty” programs at other schools. www.preparing-faculty.org
6. The Howard Hughes Medical Institute provides a downloadable book for new faculty, “Making the Right Moves: A Practical Guide to Scientific Management for Postdocs and New Faculty” as well as other useful information. <http://www.hhmi.org/developing-scientists/making-right-moves>
7. A comprehensive book is Donald H. Wulff and Ann E. Austin, eds., Paths to the Professoriate: Strategies for Enriching the Preparation of Future Faculty, (Jossey-Bass, San Francisco, 2004).

Appendix II: Professional Skills

Business

Illinois Business Consultants, <http://www.ibc.illinois.edu>

Leadership

Illinois Leadership Center, <http://leadership.illinois.edu/>

Entrepreneurship

Technology Entrepreneur Center, <http://tec.illinois.edu/>

Appendix III: External Fellowship Opportunities

Current and prospective graduate students are encouraged to apply for external fellowships that they are eligible for. In addition to the list below, many governments and corporations award fellowships.

Fellowship office at the Graduate College (search for fellowships)

<http://www.grad.illinois.edu/fellowships/about>

National Science Foundation Graduate Research Fellowship Program

<http://www.nsfgrfp.org/>

National Defense Science and Engineering Graduate Fellowship

<http://ndseg.asee.org/>

SMART Fellowship

<http://smart.asee.org/>

DoE Office of Science Graduate Fellowship Program

<http://scgf.ornl.gov/>

DoE Computational Science Graduate Fellowship

<http://www.krellinst.org/csgf/>

Hertz Foundation Graduate Fellowship

<http://www.hertzfoundation.org/>

National Physical Science Consortium, graduate fellowships in science, mathematics, and engineering

<http://www.npsc.org/>

Fulbright Program

<http://us.fulbrightonline.org/home.html>