M.S. and Ph.D. in Materials Science and Engineering

GRADUATE HANDBOOK

Effective August 1, 2016

College of Engineering
Department of Materials Science and Engineering
The University of Tennessee

Welcome to Materials Science and Engineering.

Thank you for choosing the Department of Materials Science and Engineering at The University of Tennessee for your graduate education. We are dedicated to becoming a world class facility for the most recent technological developments in our field. The quality of our faculty, many of which are international leaders in their fields of specialization, assures excellent opportunities for an outstanding graduate education. Our strong ties to Oak Ridge National Laboratories, as well as our involvement in many high-tech partner sites make the MSE department the premier choice for students wishing to develop skills that will ensure exciting careers available all over the world.

We encourage you to explore this handbook, which describes all degree requirements and procedures pertinent to the M.S. and Ph.D. degrees in Materials Science and Engineering. Please do not hesitate to see your advisor or contact me or the director of graduate studies if you have any questions about our programs.

Sincerely,

Prof. Veerle Keppens

Department Head

Table of Contents

1. Introduction

In order to serve the mission and vision of the Graduate School and preserve the integrity of Graduate Programs at the University of Tennessee, Knoxville, information related to the process of graduate education in each department is to be provided for all graduate students. Based on Best practices offered by the Graduate Council of the Graduate School, it is important that detailed articulation of the information specific to the graduate degrees offered in each department/program be disseminated. This Graduate Handbook does not deviate from established Graduate School Policies noted in the Graduate Catalog, but rather provides the specific ways in which these policies are carried out.

All graduate students are expected to be aware of and satisfy all regulations governing their work and study at the university. The purpose of this handbook is to describe all degree requirements and procedures pertinent to the M.S. and Ph.D. degrees in Materials Science and Engineering. For general campus policies and procedures, standards of conduct, academic policies and procedures, and information about student support, services, and organizations, please consult the Hilltopics Student Handbook. As a graduate student, you are bound by the Graduate School policies, which are listed in the Graduate Catalog (http://catalog.utk.edu/) and can also be found on the Graduate School website, together with appeals procedures (http://gradschool.utk.edu/GraduateCouncil/AcadPoli/appealprocedure.pdf).

The Department of Materials Science and Engineering offers graduate programs that lead to the degrees of Master of Science and Doctor of Philosophy in Materials Science. The Graduate Affairs committee oversees all issues relevant to these programs. The committee consists of the following faculty members: K. Sickafus (chair), G. Duscher, Y. Gao, B. Hu, D. Mandrus, T.G. Nieh, S. Wang, W. Weber, and H. Xu. Dr. Sickafus serves as the Director of Graduate Studies for Materials Science and Engineering.

2. General duties and responsibilities of faculty and graduate students

All faculty and graduate students in the MSE department are expected to be fully committed to the department's graduate programs. In addition to satisfy the requirements specific to the MSE graduate programs outlined below, graduate students are expected to satisfy all university regulations in a timely manner.

3. Admission requirements and application procedures

All students who wish to pursue a graduate degree in the department of Materials Science and Engineering must first be admitted through the UT Graduate School. Candidates must have earned a bachelor's degree with grade point average of at least 2.7 out of 4.0 from a college or university accredited by the appropriate regional accrediting agency or a foreign equivalent. The College of engineering also requires that all students take the Graduate Record Exam (GRE) test when applying for admittance. Additionally, students whose native language is not English must submit results of the Test of English as a Foreign Language (TOEFL) or other tests specified by the Graduate Admission Office.

Students wishing to apply to the MSE graduate programs must submit the UT Graduate Application for Admission to the UT Graduate School (with on-line application available at http://gradschool.utk.edu/admissions/).

The MSE Graduate Handbook (i.e., this document, http://web.utk.edu/~mse/future/Graduate Handbook.pdf) includes information about the Materials Science and Engineering Department including summaries of research programs and facilities. Additional information may be obtained by visiting the MSE Web pages (http://www.engr.utk.edu/mse/).

4. Financial support

Many graduate students in the MSE department receive financial assistance through a Graduate Research Assistantship (GRA). Graduate Research Assistants perform duties in support of university research, which typically relates directly to the students' thesis/dissertation. A student appointed as a GRA works under the direct supervision of his/her major professor. Research assistantships may be financed through funds from gifts, grants, contracts, state appropriations designated for research, or the university's internally sponsored programs. Students who receive financial support are expected to be in residence throughout the calendar year pursuing full time research and study. Typical annual vacation time is two weeks plus University holidays.

5. Registration and advising

All graduate students are admitted to Materials Science and Engineering program. The details of this program are discussed in section 6. Students receiving financial assistance through a GRA should report to the professor providing the support, who will be the student's advisor.

Students admitted without financial support should report to the Directors of Graduate Studies. The Director of Graduate Studies will review the student's background experiences and advise the student on a program of coursework appropriate to the first year of study. A permanent advisor should be chosen before the end of the first semester who will direct the thesis or dissertation, the Director of Graduate Studies serving as the interim advisor. Students are advised to arrange an appointment with each professor active in the chosen program in order to learn about the research projects available. The student should choose carefully, discussing subjects as often as desired with each potential advisor. When an advisor and a research project have been chosen, the student should inform the Director of Graduate Studies of the decision. The Director will then confirm that the advisor is willing and a formal transfer will occur. At this point, a copy of the student's file will be provided to the advisor, who will then assume all advising responsibilities.

For the M.S. program, any faculty member may be chosen. For the Ph.D. program, only faculty approved by the Graduate School for directing of doctoral students are automatically acceptable; however, other faculty may apply for permission to the Dean of the Graduate School to direct individual students. A list of all potential advisors is given in Appendix 1.

6. Degree requirements

Graduate programs are offered leading to the degrees of Master of Science and Doctor of Philosophy in Materials Science and Engineering. This program is flexible and interdisciplinary in nature. Students may be admitted from a wide range of disciplines; these include physics, chemistry, chemical engineering, mechanical engineering, electrical engineering, materials engineering, and engineering science programs.

Areas of concentration within the Materials Science and Engineering degree program include materials science, metallurgy, polymers, nanomaterials, biomaterials, automotive materials, and energy science & engineering. Specializations include, but are not limited to: ceramics, composites, electronic materials, physical metallurgy, materials processing, welding metallurgy and materials joining, biomedical materials, and mechanical and physical behaviors of materials.

Detailed requirements for Master and PhD programs are given below. For the 5-year BS-MS program and the Dual MS-MBA Program, information can be found at the UT Graduate Catalog.

6.A. *Master Program with Thesis*

The Graduate School requires that each student has an advisor from the main department and that the student and advisor together select a committee. The committee must consist of the advisor and at least two faculty members at the rank of assistant professor or above from MSE department. The department requires that the advisor be chosen prior to the end of the first semester of study and that the committee be appointed prior to the end of the second semester of study.

Thesis Registration and Thesis

A student must be registered for course MSE 500 each semester during work on the thesis, including a minimum of 3 hours during the semester in which the thesis is accepted by The Graduate School. Six hours of MSE 500 are required for the thesis option. After receiving the Master's degree, a student is no longer permitted to register for MSE 500.

The thesis represents the culmination of an original research project completed by the student. It must be prepared according to the UTK Guide to the Preparation of Theses and Dissertations (http://web.utk.edu/~thesis/thesisresources.shtml). Two copies of the thesis must be approved and accepted by The Graduate School on or before the deadline specified each semester (http://gradschool.utk.edu/ddategraduation.shtml). Each copy must include an approval sheet, signed by the members of the Master's committee, certifying that they have examined the final copy of the thesis and judged it to be satisfactory. Two additional copies are required by the department for use as future reference documents.

A candidate presenting a thesis must pass a final oral (or oral and written) examination on all work offered for the degree. The examination, which is concerned with coursework and the thesis, measures the candidate's ability to integrate material in the major and related fields, including the work presented in the thesis. This examination, scheduled through your major advisor, your committee and your academic department (please come by the office to schedule a conference room as soon as your advisor and committee agrees on a date), must be held at least three weeks before the final date for approval and acceptance of thesis by The Graduate School. Final examinations not properly scheduled must be repeated. The final draft of the thesis must be distributed to all committee members at least two weeks prior to the date of the final examination. In case of failure, the candidate may not apply for re-examination until the following semester. The result of the second examination is final.

Students using University facilities and faculty time must be registered for MSE 502 (Registration for Use of Facilities) if not registered for other courses.

Candidates have six calendar years from the time of enrollment in The Graduate School to complete the degree. Students who change degree programs during this six-year period may be granted an extension after review and approval by The Graduate School. In any event, courses used toward a Master's degree must have been taken within six calendar years of graduation.

Coursework Requirements

A total of 30 semester hours is required for a M.S. degree in Materials Science and Engineering.

Additional requirements include:

- 12 hours of graduate courses in materials science and engineering consisting of MSE 511, MSE 512, MSE 513, and MSE 514.
- Additional courses up to 12 hours total in related areas. These courses must include MSE 515 and MSE 516 for the metallurgy concentration; two courses out of MSE 539, MSE 540, and MSE 552 for the polymers concentration; two graduate specialization courses approved by the student's faculty committee for the materials concentration; two courses from the approved nanomaterials specialization list for the nanomaterials concentration; two courses from the approved automotive materials specialization list for the automotive concentration; and two courses from the approved biomaterials specialization list for the biomaterials concentration.
- Master's thesis MSE 500, totaling 6 to 12 hours.
- Satisfactory performance on a comprehensive oral examination administered by the faculty committee.

All resident students are required to participate in the graduate seminar in materials science and engineering during each semester in which it is offered. Three hours of MSE 503 may be counted toward degree requirements.

6.B. *Master Program without Thesis*

Any candidate may apply for a non-thesis option. Upon acceptance, a supervisory committee of three will be appointed. At least two members of the committee will be from the faculty in the major area. The requirements for completion of the non-thesis option are as follows:

- Completion of a total of 30 hours of graduate course work. At least 18 of those hours must be in the department and include the same courses that are required for the thesis-option. Three hours of MSE 503 may be counted toward degree requirements. The non-thesis option for all concentrations must include the same courses required for the thesis option. The faculty committee must approve the candidate's degree program.
- Satisfactory completion of MSE 580 (Critical Review) as a culminating experience. It is a part of the 30-hour requirement. This course shall include a comprehensive examination administered by the faculty committee, and should be taken during the semester in which the degree is to be awarded.

6.C. *Doctoral Programs*

General Information and Course Requirements

After one year in residence and with the approval of the faculty, a student may proceed directly to the doctoral program without completion of a master's degree.

Departmental requirements for completion of the doctoral degree are:

- Satisfactory performance on the applicable comprehensive examination (see below)
- Active participation in graduate seminars conducted by the department.
- For students proceeding directly to the PhD from the baccalaureate degree, a minimum of 72 graduate hours is required. These hours must include 42 graduate course hours, including MSE 511, MSE 512, MSE 513, and MSE 514, at least 6 hours of 600-level courses, and 30 hours of dissertation. Six hours of MSE 503 may be counted toward degree requirements. At least 24 hours must be courses taught in the department. Courses must include the courses required for the master's program. For students in the nanomaterials concentration at least 12 hours of course work must be from the approved nanomaterials specialization list. For students in the biomaterials concentration at least 12 hours of course work must be from the approved biomaterials specialization list. For students in the automotive materials concentration at least 12 hours of coursework must be from the approved automotive materials specialization list. For students in the Energy Science and Engineering concentration, at least 18 hours of course work must be from the curriculum jointly approved by the center for Interdisciplinary Research and Education (CIRE) and the MSE graduate affairs committee.
- For students having a thesis-based master's degree from UT in materials science and engineering or a master's degree in materials science and engineering from another

university, a minimum of 48 graduate hours is required. These hours must include 18 hours of graduate course work with at least 6 hours of 600-level courses and 30 hours of dissertation. Three hours of MSE 503 may be counted toward degree requirements. For students in the nanomaterials concentration at least 12 hours of course work must be from the approved nanomaterials specialization list. For students in the automotive materials concentration at least 12 hours of coursework must be from the approved automotive materials specialization list. At least 12 hours must be courses in the department. For students in the Energy Science and Engineering concentration, all 18 hours of course work must be from the curriculum jointly approved by the center for Interdisciplinary Research and Education (CIRE) and the MSE graduate affairs committee.

- For students having a non-thesis master's degree from UT in materials science and engineering, a minimum of 48 graduate hours is required. These must include 15 hours of graduate course work with at least 6 hours of 600-level courses and 33 hours of dissertation. For students in the nanomaterials concentration at least 12 hours of course work must be from the approved nanomaterials specialization list. For students in the automotive materials concentration at least 12 hours of coursework must be from the approved automotive materials specialization list. Three hours of MSE 503 may be counted toward degree requirements. At least 12 hours must be courses in the department. For students in the Energy Science and Engineering concentration, 18 hours of course work must be taken from the curriculum jointly approved by the center for Interdisciplinary Research and Education (CIRE) and the MSE graduate affairs committee.
- For students having a master's degree in a related discipline, a minimum of 72 graduate credit hours is required. These must include 42 graduate course credit hours with at least six hours of 600-level courses, and 30 hours of dissertation. The courses must also include those required for the Master's program. Three hours of Materials Science and Engineering 503 may be counted toward the degree requirements. Upon approval of his/her major advisor, the student may petition the department head for acceptance of up to 30 hours of coursework and thesis credits, based on the master's degree, toward the 72 credit-hour requirement. At least 30 of the total 42 course credit hours approved for the degree must be in the materials science and engineering area.

Doctoral Committee

The student and the major professor, who has been chosen during the student's first semester of study, identify a doctoral committee composed of at least four faculty members,

holding the rank of Assistant Professor or above, three of whom, including the chair, must be approved by The Graduate Council to direct doctoral research. At least one member must be from a department other than that of the student's major field. This committee is nominated by the department head or college dean and approved by The Graduate School.

The committee should be formed during the student's first year of doctoral study. Subject to Graduate Council policies and individual program requirements, the committee must approve all coursework applied towards the degree, certify the student's mastery of the major field and any cognate fields, direct the research, and recommend the dissertation for approval and acceptance by The Graduate School.

Dissertation Prerequisite

The student must register continuously for MSE 600 (minimum of 3 hours) from the time the doctoral research proposal is approved, admission to candidacy is accepted, or registration for MSE 600 is begun, whichever comes first, including summer semesters and the semester in which the dissertation is approved and accepted by The Graduate School. A minimum total of 24 hours of MSE 600 is required before the dissertation will be accepted. A student who will not be using faculty services and/or university facilities for a period of time may request leaves of absence from dissertation research up to a maximum of six semesters. The request will be considered by The Graduate School upon written recommendation of the department head.

Concurrent Master on the Way to PhD

The Graduate School permits PhD students to apply for a Concurrent Master on the Way to PhD. The student who is interested in obtaining this degree will remain active in the PhD degree program and complete the master's degree in the same major along the way to the PhD. The request form (http://gradschool.utk.edu/forms-central/) must be submitted by the student's Major Professor to the Director of Graduate Studies.

7. Examinations

7.A. *Comprehensive Examination*

The Comprehensive Examination consists of: the Preliminary Examination and the Dissertation Proposal. The Preliminary Examination is usually offered in August. All students in

Materials Science and Engineering are required to take the Preliminary Examination no more than one and a half year following admission to the Ph.D. program.

7.B. ***Preliminary Examination in Materials Science and Engineering***

The Materials Science and Engineering Preliminary Examination has a required part (consisting of three exams) and an optional part. Each exam is graded independently. No student will be allowed to register for/take the Preliminary Examination more than twice. To satisfy the required part, the student will register for/take three out of four offered exams: 1) Structure and X-ray diffraction 2) Kinetics and Thermodynamics 3) Electronic Properties and 4) Mechanical Properties. The student should select which three exams to register for in consultation with his/her major advisor. These exams must be taken during the same examination period. The exams will be prepared by the Materials Science and Engineering faculty and will typically be "Closed Book," and no notes or other aids, with the exception of calculators, will be allowed. Any student who fails one or more exam may retake that part the next time the Preliminary Examination is offered. However, no student will be allowed to take the Preliminary Examination more than twice.

The optional part of the Preliminary Examination will be prepared by the student's Doctoral Committee. The decision on whether the student should or should not take this optional part rests on the student's major advisor. This exam will be in the student's specialty, and will be administered as a "Take Home" examination with an allowed completion time of two weeks. No assistance, from any source, except already existing documentation in the open "literature," is permitted. This examination is intended to test the independent thought processes of the student and assess his/her ability to do independent research. It will be prepared by the student's Doctoral Committee, may consist of one or more of the following: a critical review of specific literature, problem solving, application of specific scientific principles to the dissertation topic, preparation of a proposal for research, or other creative assignments as may be devised by the student's Doctoral Committee. The student will prepare a written response to the assignment (the response document will be typewritten and formally composed) and will submit the document to his/her Doctoral Committee within two weeks. The Doctoral Committee will study the response and orally examine the student on the response to the assignment. The Doctoral Committee will grade the student on a "pass-fail" basis and report the results to the Director of Graduate Affairs within 1 week of the oral examination.

A failure in the Preliminary Examination or in obtaining a satisfactory GPA will lead to either probation or termination. The standard policies in the UT Graduate Catalog will be followed.

7.C. *Dissertation Proposal*

Within two years after passing the Preliminary Examination, and at least one year before defending the dissertation, each candidate needs to submit a proposal describing the proposed research. This proposal and the subsequent oral examination comprise the second part of the Comprehensive Examination. The proposal should contain sufficient detail, by way of literature search and preliminary experimental and/or theoretical development, to demonstrate understanding of the methodology to be used and allow the examining committee to assess the likelihood of success. The oral examination of the proposal material will be scheduled within one month of submission of the proposal. The examination will be conducted by the student's faculty Ph.D. committee. If the committee decides that the proposal does not demonstrate a clear path towards a successful Ph.D., the dissertation proposal defense can be repeated. When a successful dissertation proposal has been presented, all committee members will sign the students "Comprehensive Exam Tracking Form", which is kept in the student's file in the department office. An example of such tracking form is shown in appendix 3. To ensure steady progress towards the Ph.D. degree, it is strongly suggested that the student meets with his/her PhD committee on a regular base following the dissertation proposal defense.

The Graduate School rules state that all requirements for the Ph.D. degree must be completed within eight years of the time of a student's first enrollment in a doctoral degree program.

7.D. *Admission to Candidacy*

Admission to candidacy reflects agreement among the student, graduate committee, and The Graduate School that the student has demonstrated the ability to do acceptable graduate work and that normal progress has been made toward a degree. This action usually connotes that all prerequisites to admission have been completed and a program of study has been approved.

A student may be admitted to candidacy for the doctoral degree after passing the comprehensive examination, and maintaining at least a B average in all graduate coursework. Falling below B (or cumulative GPA < 3.0) will automatically place the student under probation. Refer to the Graduate Catalog for polices on probation and termination. Admission to candidacy must be applied for and approved at least one full semester prior to the date the degree is to be conferred. Each student is responsible for filing the admission to candidacy form, listing all courses to be used for the degree, signed by the doctoral committee and approved by The Graduate School.

Please note that The Graduate School will not accept any "D" grade on the form of Admission to Candidacy. The students must ensure a grade above "D" on all the MSE required courses such as MSE 511 to MSE 514. A failure to achieve this required grade on these courses will result into a failure to satisfy the MSE degree requirements.

The Graduate School has a continuous registration requirement of MSE 600 (Doctoral Research and Dissertation). Initial registration for MSE 600 should be determined by the student's Major Professor, which generally corresponds to the time at which a student begins work actively on dissertation research. From this time on, students are required to register continuously for at least 3 hours of 600 each semester, including summer term. Under certain circumstances, a leave of absence from continuous registration of MSE 600 can be granted (refer to the forms on http://gradschool.utk.edu/forms-central/).

7.E. *Dissertation*

The dissertation represents the culmination of an original major research project completed by the student. The organization, method of presentation, and subject matter of the dissertation are important in conveying to others the results of such research.

A student should be registered for the number of dissertation hours representing the fraction of effort devoted to this phase of the candidate's program. Thus, a student working full-time on the dissertation should register for 12 hours of 600 per semester.

Two copies of the dissertation (prepared according to the regulations in the UTK Guide to the Preparation of Theses and Dissertations (http://web.utk.edu/~thesis/thesisresources.shtml) must be submitted to and accepted by The Graduate School. Each copy must include an approval sheet, signed by all members of the doctoral committee, which certifies to The Graduate School that they have examined the final copy and found that its form and content demonstrate

scholarly excellence. Doctoral forms are also submitted at this time. Two additional copies of the dissertation are required by the department for use as future reference documents.

7.F. *Defense of Dissertation Examination*

A doctoral candidate must pass an oral examination on the dissertation. The defense of dissertation will be administered by the members of the doctoral committee after completion of the dissertation and all course requirements. This examination must be passed at least three weeks before the date of acceptance and approval of the dissertation by The Graduate School. The examination must be scheduled through the Graduate Admissions and Records Office. Final examinations not properly scheduled must be repeated. The dissertation, in the form approved by the major professor, must be distributed to the committee at least two weeks before the examination. The examination is announced publicly and is open to all faculty members.

8. Appeals Procedures

Grievances against any policy or action by the University or its personnel may be presented according to the procedures specified in the Graduate Catalog.

In addition, complaints or disputes involving the Department of Materials Science and Engineering or its personnel may be addressed within the department. When appropriate, the student should request a meeting with his/her advisor, or his/her committee. If a resolution of an issue cannot be achieved with either the advisor or the student's committee, or if the dispute involves them, then the student should request a meeting with the Department Head and any departmental personnel involved in the dispute. If a resolution satisfactory to the student cannot be achieved within the Department, then the student may request a meeting with the Dean of Engineering or may follow procedures described in the Graduate Catalog. University appeals procedures are listed on the graduate school website (http://gradschool.utk.edu/GraduateCouncil/AcadPoli/appealprocedure.pdf).

APPENDIX 1: FACULTY AND THEIR RESEARCH INTERESTS

(* indicates approval to direct doctoral dissertations by The Graduate School)

* **Sudarsanam Suresh Babu**, Ph.D., University of Cambridge (UK): *Advanced Manufacturing, Non-Equilibrium Phase Transformation Computational Materials Science*

* **Roberto S. Benson**, Ph.D., Florida State: *Biopolymers, Polymer Degradation, Composites*

* **Hahn Choo**, Ph.D., Illinois Institute of Technology: *Powder Metallurgy, Physical/Mechanical Metallurgy, Neutron Scattering*

* **Gerd Duscher**, Ph.D., Sci., University of Stuttgart (Germany): *Interface Science, Analytic (Scanning) Transmission Electron Microscopy*

* **Takeshi Egami**, Ph.D., University of Pennsylvania: *Amorphous and Nanocrystalline Solids, Neutron and X-Ray Scattering, Electronic Oxides*

* **Jason Fowlkes**, Ph.D., University of Tennessee: *Laser-induced Nanostructures in Silicon*

* **Yanfei Gao**, Ph.D., Princeton University: *Computational Materials Science, Mechanics of Materials, Friction and Adhesion.*

* **Wei He**, Ph.D., University of Connecticut: *Novel Polymers for Tissue Engineering*

* **Bin Hu**, Ph.D., Chinese Academy of Sciences (China): *Electronic and Optical Polymeric Materials and Devices*

* **David C. Joy**, Ph.D., Oxford (UK): Electron Microscopy, *Electron-Solid Interactions, Device Metrology*

* **"Ramki" Ramakrishnan Kalyanaraman**, Ph.D. North Carolina State University: *Thin Films, Laser Processing, Electronic Properties, Nanocomposites*

* **David J. Keffer**, Ph.D., University of Minnesota: *Multiscale Materials Modeling with Applications in Fuel Cells, Nanoporous Materials, Polymers, Explosive Sensors, etc.*

* **Veerle Keppens**, Ph.D., Katholieke Universiteit Leuven (Belgium): *Physical Acoustics, Synthesis and Characterization of Novel Materials*

* **Kevin M. Kit**, Ph.D., University of Delaware: *Polymer Blends, Agricultural Materials*

* **Peter K. Liaw**, Ph.D., Northwestern: *Mechanical Behavior, Composite Materials, Life Prediction and Extension*

* **Carl D. Lundin**, Ph.D., Rensselaer: *Welding, Joining, Non-Equilibrium Metallurgy*

* **David G. Mandrus**, Ph.D., SUNY Stony Brook: *synthesis and characterization of novel materials*

* **Carl J. McHargue**, Ph.D., University of Kentucky: *Physical Metallurgy, Ion Implantation in Ceramics, Nanoscience/Technology*

* **Charles L. Melcher,** Ph.D. Washington University: *Crystal Growth and Characterization of Novel Scintillation Materials*

* **James R. Morris,** Ph.D. Cornell University *Computational Materials Science*

* **T. G. Nieh,** Ph. D., Stanford University; Metallic Glasses, Nanostructured Materials, Composites, Lightweight Alloys, Intermetallics, Refractory Metals, Thin Films, Bioceramics, Superplasticity, High Temperature Mechanical Properties.

* **George M. Pharr**, Ph.D., Stanford University : *Mechanical Behavior, Nanoindentation, Thin Films*

* **Philip D. Rack**, Ph.D. University of Florida; *Electronic and Optoelectronic Materials, Thin Film Processing and Characterization, and Selective Nanoscopic Processing*

* **Claudia J. Rawn**, Ph.D., University of Arizona: *Ceramics Processing, X-Ray Diffraction, Neutron Scattering*

* **Kurt Sickafus,** Ph.D., Cornell University: *crystallography, radiation damage effects, and microstructure of materials.*

* **Michael L. Simpson,** Ph.D., University of Tennessee: *Electronic Materials, Nanostructured Materials, Nanofabrication, Biomaterials*

* **Larry C. Wadsworth**, Ph.D., North Carolina State: *Textile Science*

* **Shanfeng Wang,** Ph.D., University of Akron: *Polymer, Biomaterials and Tissue Engineering*

* **William Weber**, Ph.D., University of Wisconsin: *Radiation Effects, Ion-Beam Modification of Materials, Nuclear Materials, Defect Properties in Ceramics*

* **Haixuan Xu**, Ph.D., University of Florida: *Electronic Structure of Point Defects to Physical Properties of Complex Materials using Atomistic Simulations*

* **Yanwen Zhang**, Ph.D., Lund Institute of Technology (Sweden): *Ions and Electrons Interactions with Solids, Radiation Effects and Radiation Detector Physics, Ion Beam Analysis*

* **Steven J. Zinkle**, Ph.D., University of Wisconsin: *Physical Metallurgy of Structural Materials; Ion and Neutron Irradiation Effects; Fusion and Fission Reactor Materials; Deformation and Fracture Mechanisms*

* **Mariya Zhuravleva**, Ph.D., Tohoku University (Japan): *Crystal Growth, Scintillation Materials*

APPENDIX 2: PERTINENT GRADUATE STUDENT WEB PAGES

- Best Practices in Teaching: http://gradschool.utk.edu/files/2009-10_BPIT-Flyer.pdf
- Center for International Education: http://web.utk.edu/~globe/index.php
- Counseling Center: www.utk.edu/counselingcenter
- Department and College: http://www.engr.utk.edu/mse/ http://www.engr.utk.edu/
- Funding, Fellowships, Assistantships for Graduate Students: http://gradschool.utk.edu
- Graduate School: http://gradschool.utk.edu
- Graduate Catalog: http://gradschool.utk.edu
- Graduate Student Appeals Procedure: http://gradschool.utk.edu/GradAppealHbook.pdf
- Graduate Student Senate: http://web.utk.edu/~gss
- Graduate and International Admissions: http://admissions.utk.edu/graduate/
- International House: http://web.utk.edu/~ihouse
- Judicial Affairs: http://web.utk.edu/~osja/
- Office of Equity and Diversity: http://oed.utk.edu
- Office of Minority Student Affairs/Black Cultural Center: http://omsa.utk.edu
- Research Compliance/Research with Human Subjects: http://research.utk.edu/compliance/
- SPEAK Testing Program: http://gradschool.utk.edu/speaktest.shtml
- Thesis/Dissertation Website: http://web.utk.edu/~thesis/
- VolAware: http://volaware.utk.edu
- Library Website for Graduate Students http://www.lib.utk.edu/refs/gradservices.html
- OIT: http://oit.utk.edu/
- Housing: http://uthousing.utk.edu/sutherland/sutherlandresources.htm

APPENDIX 3: FORMS AND ADDITIONAL RESOURCES

I. Masters Student Forms

ADMISSION TO CANDIDACY APPLICATION
MASTER'S OR SPECIALIST DEGREE

The University of Tennessee
The Graduate School

Submit Form by Deadline to:
The Graduate School
111 Student Services Building
Knoxville, TN 37996-0214

Name: _____
Last First Middle

Student ID #: _____

Street: _____

_____
City State Zip

To be completed by the Graduate School

Admitted to Candidacy: _____

Time Limit
Your degree must be granted by the _____ Term

_____
Dean of the Graduate School

Major: _____ Email Address: _____

Concentration: _____ Degree: _____

Choose One: ◯ Thesis ◯ Non-Thesis Program

X _____ _____
Signature of the Applicant *Date*

List ONLY graduate-level courses to be counted toward the degree. Include those completed and those planned to be used for requirements.

Year/Term	Department	Course #	Course Title	Hours	Grade

Please complete requirement statements on next page

Name: _____

Year/Term	Department	Course #	Course Title	Hours	Grade

Minor:

Year/Term	Department	Course #	Course Title	Hours	Grade

Transfer Credit (A majority of the total hours required for a master's degree must be taken at the University of Tennessee, Knoxville.)

Institution Name: _____

Year/Term	Department	Course #	Course Title	Hours	Grade

(Two-thirds of program, including not more than six (6) hours of thesis credit, must be numbered 500 or above, taken at the University of Tennessee.)

Departmental Approval ***(To be completed with the assistance of the academic department)***

We certify that the above program, when successfully completed, meets all coursework requirements for this degree. We also certify that all University regulations regarding research compliances (use of human subjects, animal care, radiation, legend drugs, recombinant DNA, or handling of hazardous materials) have been appropriately approved prior to the initiation of the research if approval is relevant to the applicant's research.

Faculty Committee Signatures

(Print Name)	*(Department)*	*(Signature)*
_____ (Major Professor)	_____	X _____
_____ (Minor Professor or Committee Member)	_____	X _____
_____ (Committee Member)	_____	X _____

X _____
Graduate Program Director Signature

Important: This form will not be accepted by the Graduate School without original signatures of the three committee members and the Graduate Program Director in your department. If you have a minor, one of the three professors must be from the minor department.

TO BE COMPLETED BY THE OFFICE OF THE UNIVERSITY REGISTRAR ONLY

Diploma Ordered: _____

Diploma Received: _____

GRADUATION APPLICATION FOR GRADUATE STUDENTS

The University of Tennessee The Graduate School

Submit Form by Deadline to:
The Graduate School
111 Student Services Building
Knoxville, TN
37996-0211

STUDENT INFORMATION

NAME: _____ STUDENT ID #: _____
Last First Middle

(NOTE: the name listed on your official transcript at the university will be the name listed on your diploma unless noted below under "DIPLOMA INFORMATION.")

To assure your addresses are correct go to WWW.CPO.UTK.EDU. Your diploma will be mailed to the PERMANENT ADDRESS listed with the University (CPO).

PHONE: (_____) _____ UNIVERSITY EMAIL*: _____

*Information in regards to your graduation status, deadlines, and commencement will be sent to your UTK email address.

X _____ _____

Signature (Application must be signed and dated before it can be processed.) Date

DEGREE INFORMATION

TERM AND YEAR OF GRADUATION: FALL _____ (YEAR) SPRING _____ (YEAR) SUMMER _____ (YEAR)

DID YOU APPLY TO GRADUATE IN THE PREVIOUS TERM? ◯ YES ◯ NO

DEGREE NAME: _____ (Choose One) ◯ THESIS/DISSERTATION ◯ NON-THESIS
Examples: MA, MBA, MS, MSSW, MSN, MPH, EdS, PhD

MAJOR*: _____

*Please confirm your major/program by logging into CPO. YOU MUST BE ADMITTED TO YOUR PROGRAM BEFORE YOU CAN GRADUATE.

CONCENTRATION: _____

MINOR: _____

DIPLOMA INFORMATION

PLEASE PRINT YOUR NAME BELOW AS YOU WANT IT TO APPEAR ON YOUR DIPLOMA ONLY IF IT IS DIFFERENT THAN THE NAME ON YOUR OFFICIAL TRANSCRIPT.

_____

ADDITIONAL INFORMATION

Students cannot graduate with incomplete grades ("I") or NR on their transcripts.

A new Graduation Application must be submitted if you do NOT graduate in the term for which you have specified on this form.

Information about the Graduate Hooding Ceremony is available online at http://gradschool.utk.edu/hooding/hoodinginfo.shtml

REPORT OF FINAL EXAMINATION/ DEFENSE OF THESIS
MASTER'S OR SPECIALIST IN EDUCATION DEGREES

The University of Tennessee
The Graduate School

This is to certify that

_____
(student name)

a candidate for the _____ degree,

_____
(passed or failed)

the final examination in partial fulfillment of the requirements.

Date: _____

Student ID #: _____

Committee Names and Signatures

_____
Name (Major Professor) Signature

_____
Name Signature

_____
Name Signature

_____
Name Signature

_____
Name Signature

Submit Exam Results by Deadline to:
The Graduate School
111 Student Services Building
Knoxville, TN 37996-0211

Last Updated: September 25, 2009

II. Doctoral Student Forms

DEPT. MATERIALS SCIENCE AND ENGINEERING

PH.D. PROGRAM

COMPREHENSIVE EXAM TRACKING FORM

Student Name:_____ **ID #:**_____

Preliminary Exam Part 1: □ Passed (Date:_____) □ Failed (Date:_____)

Preliminary Exam Part 2: □ Passed (Date:_____) □ Failed (Date:_____)

Preliminary Exam Part 3: □ Passed (Date:_____) □ Failed (Date:_____)

Preliminary Exam Part 4: □ Passed (Date:_____) □ Failed (Date:_____)

Preliminary Exam Part 5 (optional): □ Passed (Date:_____)

□ Failed (Date:_____)

□ Opted out

Dissertation Proposal: *Within two years after passing the Preliminary Examination, and at least one year before defending the dissertation, each candidate needs to submit a proposal describing the proposed research. This proposal and the subsequent oral examination comprise the second part of the Comprehensive Examination.* ***The proposal should contain sufficient detail, by way of literature search and preliminary experimental and/or theoretical development to allow the examining committee to assess the likelihood of success of the proposed Ph.D. thesis work by evaluating the importance of the problem(s) to be addressed in the research, the appropriateness of the research approach, the student's understanding of the proposed research and the methodology to be used, and the feasibility of the proposed timeframe for completion of the Ph.D.*** *The oral examination of the proposal material will be scheduled within one month of submission of the proposal. The examination will be conducted by the student's faculty Ph.D. committee. If the committee decides that the proposal does not demonstrate a clear path towards a successful Ph.D., the dissertation proposal defense can be repeated. When a successful dissertation proposal has been presented, all committee members will sign the student's "Comprehensive Exam Tracking Form", which is kept in the student's file in the department office. The director of the graduate program will not sign the "admission to*

candidacy form" without a timely completion of the tracking form. To ensure steady progres towards the Ph.D. degree, it is strongly suggested that the student meets with his/her Ph.I committee on a regular basis following the dissertation proposal defense.

Date of Dissertation Proposal Defense: _____

Committee members:

Name: _____ Signature: _____

Name: _____ Signature: _____

Name: _____ Signature: _____

Name: _____ Signature: _____

Name: _____ Signature: _____

Name: _____ Signature: _____

Follow-up meeting with Committee (if applicable)

Date: _____

Committee members:

Name: _____ Signature: _____

Name: _____ Signature: _____

Name: _____ Signature: _____

Name: _____ Signature: _____

Name: _____ Signature: _____

Name: _____ Signature: _____

ADMISSION TO CANDIDACY APPLICATION
DOCTORAL DEGREE

The University of Tennessee
The Graduate School

Submit Form by Deadline to:
The Graduate School
111 Student Services Building
Knoxville, TN 37996-0211

Name: _____
Last First Middle

Student ID #: _____

Street: _____

_____
City State Zip

To be completed by the Graduate School

Admitted to Candidacy: _____

Met Residence Requirements? ☐ YES ☐ NO

Time Limit
Your degree must be granted by the _____ Term.

_____
Dean of the Graduate School

Email Address: _____

Major: _____

Concentration: _____

X _____ _____
Signature of Applicant *Date*

List all graduate courses to be counted toward the doctoral degree in chronological order of courses taken. Must include a minimum of six (6) hours of 600-level courses and 24 hours of 600 dissertation, taken at the University of Tennessee.
If using Master's degree coursework to meet part of the 48 hour requirement, list those courses on next page.

Year/Term	Department	Course #	Course Title	Hours	Grade

Please complete requirement statements on next page

Name: _____

List Coursework from Master's degree to fulfill part of requirement for doctoral degree.

Master's Institution Name: _____ Date Awarded: _____

Year/Term	Department	Course#	Course Title	Hours	Grade

Residence Requirement

List the two terms of full-time enrollment used to meet the residence requirement:

_____

* Residence is defined as a minimum of two consecutive terms of full-time enrollment. Individual programs may have additional residence requirements. If using 6+ hours enrollment per semester while holding a half-time graduate assistantship, attach a letter of appointment from the department.

Examination and Other Requirements

Comprehensive Examination Passed: _____
Date

Doctoral Language Examination in _____ was passed on _____
(if required) Language Date

Committee Approval and Endorsement

We certify that the above program, when successfully completed, meets all coursework requirements for this degree. We also certify that all University regulations regarding research compliances (use of human subjects, animal care, radiation, legend drugs, recombinant DNA, or handling of hazardous materials) have been appropriately approved prior to the initiation of the research if approval is relevant to the applicant's research.

(Print Name)	*(Department)*	*(Signature)*
_____ (Major Professor)	_____	X _____
_____ (Committee Member)	_____	X _____
_____ (Committee Member)	_____	X _____
_____ (Committee Member)	_____	X _____
_____ (Committee Member)	_____	X _____

X _____
Graduate Program Director Signature

Important: This form will not be accepted by the Graduate School without original signatures of the four committee members and the Graduate Program Director.

TO BE COMPLETED BY THE OFFICE OF THE UNIVERSITY REGISTRAR ONLY

Diploma Ordered: _____

Diploma Received: _____

GRADUATION APPLICATION FOR GRADUATE STUDENTS

The University of Tennessee
The Graduate School

Submit Form by Deadline to:
The Graduate School
111 Student Services Building
Knoxville, TN
37996-0211

STUDENT INFORMATION

NAME: _____ STUDENT ID #: _____
Last First Middle

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To assure your addresses are correct go to WWW.CPO.UTK.EDU. Your diploma will be mailed to the PERMANENT ADDRESS listed with the University (CPO).

PHONE: (____) _____ UNIVERSITY EMAIL*: _____
*Information in regards to your graduation status, deadlines, and commencement will be sent to your UTK email address

X _____ _____
Signature (Application must be signed and dated before it can be processed.) Date

DEGREE INFORMATION

TERM AND YEAR OF GRADUATION: FALL _____ (YEAR) SPRING _____ (YEAR) SUMMER _____ (YEAR)

DID YOU APPLY TO GRADUATE IN THE PREVIOUS TERM? ◯ YES ◯ NO

DEGREE NAME: _____ (Choose One) ◯ THESIS/DISSERTATION ◯ NON-THESIS
Examples: MA, MBA, MS, MSSW, MSN, MPH, EdS, PhD

MAJOR*: _____
*Please confirm your major/program by logging into CPO. YOU MUST BE ADMITTED TO YOUR PROGRAM BEFORE YOU CAN GRADUATE.

CONCENTRATION: _____

MINOR: _____

DIPLOMA INFORMATION

PLEASE PRINT YOUR NAME BELOW AS YOU WANT IT TO APPEAR ON YOUR DIPLOMA ONLY IF IT IS DIFFERENT THAN THE NAME ON YOUR OFFICIAL TRANSCRIPT.

_____

ADDITIONAL INFORMATION

Students cannot graduate with incomplete grades ("I") or NR on their transcripts.

A new Graduation Application must be submitted if you do NOT graduate in the term for which you have specified on this form.

Information about the Graduate Hooding Ceremony is available online at http://gradschool.utk.edu/hooding/hoodinginfo.shtml

The University of Tennessee
Graduate School

Application for Doctoral Language Examination

Submit completed form to:
Graduation Specialists
The Graduate School
111 Student Services Building
Knoxville, TN 37996-0211

Name:_____ Student ID#: _____
Last First Middle

Street:_____ E-mail address: _____

_____ Term exam will be taken:_____
City State Zip *(e.g. Summer 09, Fall 09)*

Student's Major:_____ Examination in:_____
Language

Departmental language representative must sign to schedule exam and submit reading passage to Department of Modern Foreign Languages and Literatures.

_____ _____
Departmental Language Representative (Signature) Date

_____ _____
Departmental Language Representative (Please Print) Campus Address of Representative

---

FOR GRADUATE SCHOOL OFFICE USE ONLY:

_____
Results of the Examination Date Dean of the Graduate School

SCHEDULING DEFENSE OF DISSERTATION

The University of Tennessee
The Graduate School

Submit completed form to:
Graduation Specialists
The Graduate School
111 Student Services Building
Knoxville, TN 37996-0211
Fax: (865)946-1090

So that arrangements can be made for the defense of dissertation, please submit the completed form to the Graduate School at least one week before the date of the defense.

Last Name _____ First Name _____ Middle _____ Student ID Number _____

Street Address _____ Email Address _____

City _____ State _____ Zip _____ Phone Number _____

Major _____ Term Graduating (Semester / Year) _____

DEFENSE

Date/Time _____ Building / Room Number _____

Dissertation Title: _____

_____

List Defense Committee:
(NO SIGNATURES ARE REQUIRED.)

Name (Major Professor) _____ Department _____

Name _____ Department _____

Name _____ Department _____

Name _____ Department _____

Name _____ Department _____

UNIVERSITY OF TENNESSEE GRADUATE SCHOOL THESIS AND DISSERTATION APPROVAL FORM

Students submitting a thesis or dissertation must do so electronically. Complete instructions are located on the ETD website (http://web.utk.edu/~thesis/). This form must be signed by your committee and turned in to the office of the Thesis/Dissertation Consultant at 111 Student Services Building, Knoxville TN 37996-0211. Forms sent via fax will not be accepted.

STUDENT INFORMATION

Please write student name exactly as it appears in student records.

First Name _____ Middle Name _____ Last Name _____

Student ID Number _____ Email Address _____

In Partial Fulfillment of the requirements of the degree of _____

In _____

Title: (Note -- This title will appear on your transcript exactly as it is written here .)

REVIEW AND ACCEPTANCE – REQUIRED SIGNATURES

As major professor for the student named above, I certify by signing below that I have read this student's defended thesis or dissertation, have approved changes required by the final examiners, and recommend the thesis or dissertation to the Graduate School for acceptance.

Major Professor's Name **Signature** **Date**

The undersigned certify that they have examined the final electronic copy of this ETD for form and content and recommend that it be accepted by the graduate school in partial fulfillment of the requirements for the degree of _____ with a major in _____

Committee Member's Name **Signature** **Date**

Committee Member's Name **Signature** **Date**

Committee Member's Name **Signature** **Date**

Committee Member's Name **Signature** **Date**

GRAD SCHOOL ONLY

ACCEPTED BY____(INITIALS) ON_____(DATE) FOR_____(Month/Year of Graduation)

UNIVERSITY of TENNESSEE KNOXVILLE — GRADUATE SCHOOL

Second Deadline Graduation Application

Submit the completed form to gradschool@utk.edu

Name:

Student ID #: UTK NET ID:

Email: Telephone:

Major: Degree:

I am applying for the second deadline of ____ **semester (spring, summer or fall),** ____ **(year).**

For Graduate School Use Only

Approved ___Yes ___No

Decision Date_____

Instructions for Student: Please complete this PDF form by filling all the data fields and clicking the SAVE button. Email the completed (your section) form to gradschool@utk.edu. Student must turn in the form between the first submission deadline and the last day of classes. Please save a copy of this form for your own records.

To meet the second deadline, I realize I must already:

☐ Have enrolled in at least 3 credit hours of 500 or 600 for the current semester.

☐ Have applied to graduate for the current semester.

☐ Have applied to graduate for the next semester.

☐ Made sure I am within time limits for degree (as I will officially graduate NEXT SEMESTER).

☐ Admitted to candidacy by first deadline (see Deadline Dates).

☐ Defended by second defense deadline date (see Deadline Dates)

If I am approved for second deadline, I must also submit ETD, signed approval form and signed pass/fail form by the second deadline final submission date.

I understand that if I have/will fulfill these requirements by the given deadlines, I will be a candidate for second deadline. I understand that this means I will officially graduate NEXT SEMESTER, but I will not have to register for at least 3 thesis/dissertation (500 or 600) hours during that semester. If I am an international student I have contacted the Center for International Education to discuss what this will mean for my visa.

Submitted by:_____ **Date:**_____

(Typing name above implies that all information provided is true and I understand the conditions of second deadline.)

Save Form