

DEPARTMENT OF BIOMEDICAL ENGINEERING
THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

GRADUATE STUDENT HANDBOOK

AUGUST 2012



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1. INTRODUCTION

1.1 Welcome to the Department of Biomedical Engineering (BME)

Welcome to the Department of Biomedical Engineering (BME) at the University of Alabama at Birmingham. We are excited that you have chosen UAB to pursue your advanced degree. The mission of the BME Department is to prepare graduates to succeed in the evolving fields of biomedical engineering and biotechnology and to improve health care by making scientific discoveries, solving problems and advancing technology using quantitative methods. The faculty and staff of the BME Department look forward to working with you as you pursue your advanced degree. We hope this handbook will provide information that helps achieve your educational goals.

The Department of Biomedical Engineering was established at UAB in 1979 and the Master of Science degree was approved. The Ph.D. degree was approved in 1983. The B.S.B.M.E. degree was approved in 2001 and was accredited by the Accreditation Board for Engineering Technology in 2007. Today, the BME Department consists of 13 full-time primary faculty members, three dedicated staff members, 43 graduate students and 156 undergraduate students. BME is one of five engineering departments in the School of Engineering along with Civil, Construction and Environmental Engineering; Electrical and Computer Engineering; Materials Science and Engineering and Mechanical Engineering. BME is highly interdisciplinary with strong collaborations with faculty members in the School of Dentistry and the School of Medicine, both located on the UAB campus in Birmingham.

The BME faculty are committed to excellence in teaching, research service and mentorship. Faculty research focuses on biomaterials, biomechanics, biomedical imaging, biomedical implants & devices, cardiac electrophysiology, computational biology, biomedical optics, tissue engineering and regenerative medicine. The BME Department has organized its research and training programs into four focus areas: biomedical imaging, biomedical implants and devices, cardiac electrophysiology and tissue engineering and regenerative medicine. Annual research expenditures in the department exceed \$2 million. BME faculty members and students collaborate with engineers, scientists and clinicians in Dentistry, Engineering, Arts & Sciences, and Medicine as well as interdisciplinary centers including the BioMatrix Engineering and Regenerative Medicine Center, the Center for Metabolic Bone Diseases, the Center for Cardiovascular Biology, the Vision Sciences Research Center, the Comprehensive Cancer Center, Civitan International Research Center, and the Center of Nanoscale Materials and Biointegration. Currently, over 40 UAB scientists and engineers are working collaboratively with BME faculty and students to develop the next generation of biomedical engineering technologies, systems and devices. UAB has professional relationships with over 90 Alabama biomedical companies through the Biotechnology Association of Alabama. In some cases, these relationships provide opportunities for BME graduate students to work on projects of interest to industry through collaborations, internships, or partnerships. Research in the BME department has led to invention disclosures, patents and formation of several companies.

Since its inception in 1979, the BME Program has awarded 86 Ph.D. degrees, 278 M.S. degrees and 138 B.S.B.M.E. (started in 2001) degrees. BME graduates hold positions in biomedical device, imaging and technology companies, academic institutions, hospitals, professional practices, and governmental agencies. UAB BME graduates are involved in

research, product development, sales, health-care delivery, regulatory affairs, design, teaching and business development and entrepreneurship.

The Department of Biomedical Engineering is in an exciting growth phase. Since 2006, we have hired five new faculty members. Our recruiting has focused on biomaterials, biomechanics, computational biology, biomedical imaging, drug delivery and tissue engineering and regenerative medicine. Based on our departmental and institutional strengths, we will continue to provide an interdisciplinary and multidisciplinary research and educational program in collaboration with colleagues in Dentistry, Medicine, Engineering and the College of Arts & Sciences.

Graduate school is a place to expand the breadth and depth of your knowledge and enhance your research skills to the highest level. At UAB, you will work with talented students and faculty in state-of-the-art laboratories to develop research, administration and critical thinking skills necessary to achieve your goals. This is an exciting time. I encourage you to work hard and expand your knowledge, but most of all to have fun. You are ultimately responsible for the quality of your work, progress towards your degree and your career development. Our faculty, staff and students will offer guidance and support.

I wish you continued success in your education; I look forward to learning of your accomplishments. We welcome you as a colleague and a partner in the Department of Biomedical Engineering

Timothy M. Wick, Ph.D.
Professor and Chair
Department of Biomedical Engineering

1.2 General Information and Points of Contact

The purpose of this document is to outline the policies, procedures and milestones for the M.S.B.M.E. and Ph.D. degrees in Biomedical Engineering. This document should be used by students in the BME Graduate Program for guidance in their graduate studies, and by advisors in advising students on the various required milestones in each of the degree programs.

At UAB, the School of Engineering shares the same physical campus with the UAB Medical Center, which has world-wide recognition for its excellence in biomedical research and patient care. The BME Program at UAB has its home in the Department of Biomedical Engineering within the School of Engineering; however, faculty throughout the Medical Center and other parts of the university participate in the program and hold joint or adjunct faculty appointments in Biomedical Engineering. The UAB BME Program currently offers four broad areas of specialization: biomedical implants and devices, biomedical imaging, cardiac electrophysiology and tissue engineering and regenerative medicine. Each of these areas has particular requirements for the M.S.B.M.E. and Ph.D. degrees. Common to each is a core set of courses. Also each research specialty has its own courses. Students not only take specialty courses in BME, but they also take courses throughout the university that are appropriate to their Degree Plan. Your Research Advisor and the BME Graduate Program Committee will work with you to tailor an individualized Degree Plan for you based on your research project and career aspirations.

In addition to this handbook, the Graduate Program Director and the BME administrative staff members are available to provide assistance and guidance in day-to-day operation of the BME Department and the graduate program.

VLADIMIR FAST (Associate Professor and Graduate Program Director, Volker Hall B126, (205) 975-2119, vfast@uab.edu) works with the Graduate Studies Committee and the UAB Graduate School to develop and administer the graduate programs and policies of the BME Department. ***Dr. Fast will sign your forms, approve your Degree Plan, and provide other assistance as you reach the milestones toward your degree.***

Mindy Robbins (BME Graduate Program Administrator, Shelby 801, (205) 996-6936, minrob@uab.edu) is the administrative support person for the BME Graduate Program. ***The BME Program Administrator is your best contact for all questions related to the BME Graduate Program, including tuition and payroll questions.***

SHERYL BLACKWELL (Business Officer, Shelby 801, (205) 934-3947, sherylb@uab.edu) is the financial manager for BME. Sheryl administers the department finances, including the approval of processed orders and reimbursements. ***Sheryl is your best contact for assistance with purchasing and lab supply questions.***

TBD (Hoehn 361, (205) 975-4944) provides administrative assistance to the BME undergraduate program. He/she can assist with course registration through BANNER, including setting up courses for research credit hours, will schedule rooms for committee meetings and other activities in the Hoehn Building or the Business and Engineering Complex.

BRENDA DUDLEY (Office Associate II, Volker Hall B140, (205) 975-4710, wansersk@uab.edu) provides administrative assistance to the BME faculty and students in the Cardiac Rhythm Management Laboratory in Volker Hall. Brenda will schedule rooms for committee meetings and other activities in the Volker Hall.

Graduate Program Committee The BME Graduate Program Committee is responsible for administering the BME Graduate programs as envisioned by the BME faculty and consistent with policies and procedures in the UAB Graduate School and the School of Engineering. The committee recommends students for admission into the BME Graduate Program, approves Degree Plans and thesis committee memberships, and provides guidance to students in the program. The committee consists of the following members; any of who are available to assist you when questions arise:

- Dr. Vladimir G. Fast, Associate Professor, Graduate Program Director, Graduate Committee Chair
- Dr. Timothy M. Wick, Professor, Department Chair
- Dr. Allan C. Dobbins, Associate Professor
- Dr. Ho-Wook Jun, Associate Professor
- Dr. Yuhua Song, Associate Professor
- Dr. Xincheng Yao, Associate Professor

Other key personnel in the School of Engineering include:

TOMMY FOLEY (Director of Information Technology, Hoehn 351, (205) 934-8477, tfoley@uab.edu) provides IT and technical support for the School of Engineering and UAB computer systems, maintenance of computer labs, maintains security of computers in SOE, and distribution and installation of software licensed to UAB. Tommy is assisted by Gregory Myers (gmyers@uab.edu) and Tyran Kirkland (tkirkland@uab.edu). SOE computer support is best obtained by contacting the School of Engineering's Help Desk staff at <https://uabweb.ad.uab.edu/eng/HelpDeskNew/default.aspx>.

KAREN KING (Associate Director, Career and Professional Development Services and Liaison to the School of Engineering, Hill University Center 532, (205) 934-3426, kking@uab.edu) is a resource for career planning and advising. Karen is a resource for BME Graduate students seeking career advice and networking opportunities. Karen engages engineering students in the career development process of exploring career options, gaining experience in a chosen field, preparing for the job search, and succeeding in their career goals. Karen provides a comprehensive employment program to bring employers and students together and serve as a catalyst for campus recruiting.

1.3 Sources of Information

This Handbook is intended to assist graduate students in the Department of Biomedical Engineering at UAB and the information within is intended to be a supplement to the material in the UAB Graduate Catalog (<http://main.uab.edu/show.asp?durki=98842>), the UAB Graduate Student Handbook (<http://www.uab.edu/handbook/f-policies-procedures/f-grad-handbook>), UAB Graduate School Policies (<http://main.uab.edu/Sites/gradschool/>) and other relevant UAB Policies and Procedures (<http://www.uab.edu/handbook/f-policies-procedures>). The rules, regulations and policies covered in the UAB Graduate Catalog govern all graduate students at UAB. This guide covers matters of particular concern to students in the BME Graduate Program. ***All BME graduate students must carefully read the UAB Graduate Catalog, the Graduate School Handbook and the BME Graduate Program Handbook. Upon entering the program, each new graduate student will receive a copy of the Department of Biomedical Engineering Graduate Handbook. Each student must sign the form in Appendix D acknowledging receipt of the handbook and agreeing to abide by all Department, Graduate School and UAB policies.***

Other general sources of information include the following:

- 1) The BME Website (<http://www.uab.edu/bme>)
- 2) The Graduate School Website (<http://main.uab.edu/Sites/gradschool/>). General graduate information, guidelines, and regulations. Specific information includes:
 - a) Institute Policies and Procedures
 - b) Graduate Thesis/Dissertation Guidelines and Procedures
 - c) Thesis/Dissertation Submission forms (all forms are available online at <http://main.uab.edu/Sites/gradschool/students/current/theses/>).
 - d) Information and instructions for electronic submission of your thesis
- 3) Newly admitted student instructions (<http://www.uab.edu/graduate/area-3/newly-admitted-students>).
- 4) Information on UAB's Student Health Services (<http://www.uab.edu/studenthealth/>)

- 5) UAB Disability Support Services (<http://main.uab.edu/Sites/students/services/disability-support/>).
- 6) UAB Occupational Health and Safety (<http://www.healthsafe.uab.edu/>) General information on general health and safety, laboratory and chemical safety, biohazards, radiation safety.
- 7) Institutional Review Board for Human Use (IRB). If the student's research involves human subjects, approval from IRB must be documented before admission to candidacy can be approved and must be kept current until the research is completed. The student's name must appear on all IRB Approval Forms. For more information regarding IRB (human subjects) requirements, visit <http://main.uab.edu/show.asp?durki=30246>.
- 8) Institutional Animal Care and Use Committee (IACUC). If the student's research involves use of animal subjects, approval from IACUC must be documented before admission to candidacy can be approved and must be kept current until the research is completed. For more information regarding IACUC (animal subjects) requirements, visit <http://main.uab.edu/internal/show.asp?durki=34597>.

Familiarize yourself with UAB, Graduate School and BME Department policies and procedures early in your graduate career to facilitate a smooth and timely transition through graduate school.

If you have a question that neither the catalog nor this guide resolves, please contact:

Mindy Robbins
Program Administrator and Graduate Program Administrative Coordinator
Department of Biomedical Engineering
The University of Alabama at Birmingham
801-C Shelby Interdisciplinary Biomedical Research Bldg
1825 University Blvd
Birmingham AL 35294-2182
(205) 996-6936 (office)
(205) 975-4919 (fax)

Dr. Vladimir Fast (vfast@uab.edu)
Associate Professor & Graduate Program Director
Department of Biomedical Engineering

The University of Alabama at Birmingham
Volker Hall B126
1670 University Boulevard
Birmingham, AL 35294-0019
(205) 975-2119 (office)
(205) 975-4720 (fax)

NOTE: All required BME Program documentation and forms must be turned in to the Biomedical Engineering Graduate Program Office located in room 801-C of the Shelby Interdisciplinary Biomedical Research Building.

2. Student Activities, Financial Aid and Support

2.1 Biomedical Engineering Society (BMES) Student Chapter at UAB

The goal of the BMES student chapter is to introduce students to the profession of Biomedical Engineering. We provide an environment for social interaction and exchange of ideas between students and faculty. Activities include social events, intramural sports teams, participation in Engineering Open House, production of a student newsletter (the BMENews), and volunteer opportunities throughout greater Birmingham. Social interactions include outings to sporting and cultural events, charitable fundraising efforts, bowling nights, picnics and cook-offs, nature activities, and intramural sports. For professional development, the BMES student chapter provides an opportunity for BME students to network and meet with faculty and professionals from health care and related industries and health-care providers to learn about various opportunities in the field.

Faculty Advisors

Dale S. Feldman, Ph.D.
Phone: (205) 934-8426
email: dfeldman@uab.edu

Joel L. Berry, Ph.D.
Phone: (205) 996-9661
email: jlberry@uab.edu

Membership Criteria

Student membership is open to anyone pursuing a course of study in BME or a related science. Annual dues are \$25.00 with \$20.00 going to the national organization. Member benefits include free subscription to the quarterly BMES Bulletin, member rates on subscription to the Annals of Biomedical Engineering, discounts on registration fees at BMES meetings, subscription to the BMENews (the UAB BMES Newsletter), and invitations to social events.

Meeting Information

Executive Committee Meetings are held monthly as are member-wide Chapter Meetings (held in conjunction with BME Seminars). Notices for all meetings and events are posted on the BME Web Calendar, the BMES Web Page, and distributed via e-mail to all members.

Contact

Please contact us via e-mail at dfeldman@uab.edu. Applications are available in the BME Office (Hoehn 370). Additional information, calendar of events and job listings are posted on the BME website <http://uabbmes.googlepages.com/>.

2.2 Society for Biomaterials (SFB) Student Chapter at UAB

UAB was one of the founding members of the SFB national student organization, having one of the first local chapters in 1989, and supplied the first few presidents of the national organization. Although it is open to all majors, the goal of the organization is to provide both a social outlet and a means of disseminating professional information to those interested in biomaterials. The student chapter of SFB represents UAB at the annual meeting during the Society for Biomaterials conference.

Faculty Advisor

Dale S. Feldman, Ph.D.
Phone: (205) 934-8426
email: dfeldman@uab.edu

Membership Criteria

Student membership is open to anyone pursuing a course of study in BME or a related science.

Meeting Information

Notices for all meetings and events are posted on the BME Web Calendar, the BMES web page, and distributed via e-mail to all members.

Contact

Please contact us via e-mail at dfeldman@uab.edu

2.3 Biomedical Engineering Graduate Student (BMEGS) Organization

The Biomedical Engineering Graduate Student (BMEGS) Organization was developed from a shared interest among BME graduate students and BME faculty to provide graduate students a greater voice in all aspects of the BME Graduate Program. BMEGS was conceived and developed by a number of graduate students in 2009 and became an officially recognized UAB student organization in November of that year. The purpose of BMEGS is to facilitate cohesive communication between BME graduate students and faculty members and allow opportunities for the students to be active in management and development of the Biomedical Engineering Graduate Program through increased interdepartmental collaborations and external outreach programs. BMEGS is organized into committees for each of the organization's focus areas: professional development and networking, intramural/recreational sports, social activities, and community service/fundraising.

The 2012-13 BMEGS officers are:

President – Harsh Patel (hpatel11@uab.edu)
Vice President – Lauren Marshall (lemarsh@uab.edu)
Secretary – Marshall Mahoney (mmahone@uab.edu)
Treasurer – Anna Sorace (agsorace@uab.edu)

BMEGS is active in graduate student recruitment and new graduate student orientation. Their leadership and involvement in these activities have increased success in recruiting the best students into BME at UAB. Professional development activities include a BMEGS-run graduate student summer seminar series, tours of local biotechnology companies and hosting several seminar and department visitors. Ongoing projects within BMEGS include creating a curriculum for a new BioDesign course, developing an alumni network, and volunteering with Habitat for Humanity and local food shelters. BMEGS has also fielded competitive softball and soccer teams that compete in the UAB intramural sports program.

2.4 Financial Support

A Graduate Research Assistantship (GRA) funded through a faculty member's research grant or contract typically supports the graduate students in the BME Department. Ph.D. students on a GRA receive a competitive monthly stipend, plus tuition, fees and single-coverage health insurance in exchange for work on a research project, usually their thesis. The BME program will only pay for single coverage VIVA UAB health insurance. The research advisor usually funds a GRA from a research grant or contract. The BME Department has limited resources to fund GRAs, Graduate Teaching Assistantships (GTA) or Fellowships. Students on a GTA receive a monthly stipend, plus tuition and fees in exchange for assistance teaching a course or laboratory at UAB. Specific requirements and expectations are defined by the instructor with whom the student is working. At the discretion of the BME Graduate Program Committee and subject to funding from the UAB Graduate School, some first-year doctoral students are funded by a Graduate Assistant Fellowship Program (GAFP). These fellowships are not subject to Federal withholding tax. In addition, tuition is paid directly to the Student Accounting office for students appointed to GAFPs. The BME Department will not pay any late fees or fines so make sure you register for classes in a timely manner. All other forms of stipend support are taxable. For students funded from grants, the Principal Investigator, who is usually the student's thesis advisor, defines the requirements and expectations for a GRA. Research is the main component of graduate education, and thus students must put in the time necessary to make measured progress on their research project. Students are expected to spend a minimum of 40 hours per week on course work and research leading to the BME degree being pursued. Most students find that they put in more than the minimum number of hours per week to meet deadlines and graduate on time.

In order to be eligible for full financial support, a student must register for 27 semester credit hours each year (nine semester hours per term: Fall, Spring and Summer). This can be a combination of course work, BME seminar, and research credit hours. Tuition payments and assistantships are meant to pay for graduate classes, seminars and research hours directly related to the student's program of study in BME.

Students receiving stipends are expected to register only for courses that pertain to their degree.

The School of Engineering offers a limited number of Engineering Scholars awards based on academic achievements of incoming students. This award is used to supplement the financial support offered by the BME Department. Eligible students are nominated by the BME Graduate Committee and approved by the Dean of the School of Engineering. Only U.S. Citizens are eligible for the Engineering Scholars awards. Students are notified of an Engineering Scholar Award at the time of admission to the BME Graduate Program. Students cannot directly apply for these scholarships.

2.4.1 Fellowships

All graduate students are encouraged to apply for a graduate fellowship, assistantship, or scholarship to support their graduate studies. A number of government agencies, private foundations, and professional societies that have predoctoral (and postdoctoral) fellowships are listed in Appendix B and on the Graduate School website (<http://main.uab.edu/Sites/gradschool/funding/43720/>). Your Research Advisor and the BME Graduate Program Director are willing to help you prepare a competitive fellowship application. In addition, the UAB Graduate School offers financial incentives to students who apply for and are awarded individual fellowships to support their predoctoral studies. Details, eligibility criteria, as well as a partial list of fellowship opportunities are in Appendix B. Additional information can be obtained from the UAB Graduate School website (<http://main.uab.edu/Sites/gradschool/funding/41831/>).

2.4.2 Vacation Policy

In general, graduate research assistants and trainees are expected to be available in the periods between academic terms. Graduate research assistants and trainees are entitled to the following short-term leaves:

- a maximum of 15 calendar days (one-half month) paid leave of absence (vacation) per calendar year,
- 3 calendar days paid sick leave of absence per calendar year, and
- parental leave of absence (with pay) of 30 consecutive days per calendar year upon the birth or adoption of a child. Either or both parents are eligible for parental leave.

These leaves (vacation, sick, parental) do not accrue. *All leaves require notification of and approval by the mentor or Graduate Program Director* and may be extended, if necessary, with the permission of the Graduate Program Director. With the agreement of the mentor and Graduate Program Director, extended, unpaid, non-emergency absences from campus for periods up to a month may be approved. Extended absences (without pay) for non-academic purposes should be limited. Students should consult the Graduate School Policies and Procedures concerning leaves of absence. In emergencies, graduate research assistants and trainees should inform their mentors or program directors as soon as possible about the need for a leave of absence.

Please see <http://main.uab.edu/Sites/gradschool/programs/71957/> for more information.

3. Academic Programs

3.1 Statement on Academic Conduct and Academic Integrity

Academic misconduct undermines the purpose of education. Such behavior is a serious violation of the trust that must exist among faculty and students for a university to nurture intellectual growth and development. The BME faculty holds academic integrity as one of the highest characteristics necessary for success in graduate school. Students in BME are expected to abide by the UAB Academic Honor Code and at all times avoid engaging in behavior that is or that may be perceived as academic dishonesty. Academic dishonesty includes, but is not limited to the following categories of behavior:

ABETTING: Helping another student commit an act of academic dishonesty. Allowing others to copy your quiz answers, or use your work as their own are examples of abetting.

CHEATING: The use or attempted use of unauthorized materials, information, study aids, the answers of others, or computer-related information.

PLAGIARISM: Claiming as your own the ideas, words, data, computer programs, creative compositions, artwork, etc., done by someone else. Examples include improper citation of referenced works, use of commercially available scholarly papers, failure to cite sources, copying other's ideas, work or computer programs.

FABRICATION: Presenting as genuine falsified data, citations, or quotations.

MISREPRESENTATION: Falsification, alteration or misstatement of the contents of documents, academic work or other materials related to academic matters, including representing work substantially done for one class as work done for another without receiving prior approval from the instructor. Misrepresentation also includes misrepresenting schedules, prerequisites, transcripts, or other academic records.

Violations of the Academic Code of Conduct are punishable by a range of penalties from receiving a failing grade on an assignment or examination to failing the course. Any course grade of F for academic misconduct supersedes any other grade or notation for that class. Additional information is provided in the School of Engineering's Academic Policies Manual (<http://www.uab.edu/images/eng/Academic%20Policies%20manual%2006.htm#misconduct>) and the UAB Graduate School website (<http://main.uab.edu/Sites/gradschool/programs/71960/>).

3.2 Important Information All Students Must Know

1. Upon entry into the program each student will receive a user ID (called your Blazer ID), an official UAB e-mail address and computer account. Your UAB e-mail address will be used for all official correspondences from the department and the university. You are responsible for reading and responding to all UAB messages in a timely manner. You should not forward your UAB e-mail to another account (hotmail, gmail, etc.) *All students are expected to read their e-mail several times a week to receive announcements and notices from the BME Program.*

- To register for courses, please sign in to BlazerNET** (<http://www.uab.edu/adminsys/>). Access to BlazerNET requires a BlazerID and password. Once logged in to BlazerNET, click on the Student Resources tab. On the Student Resources tab, see a channel entitled "Registration Tools." All the tools you need to register are available as links within this area.

To look up the Course Reference Number for your course(s)

Click on the "Look Up Classes" link to search the available courses for the term. You may search for classes with several different criteria, but the only block that must be utilized is the *Subject* block. Once the classes are visible, register for the course(s) by clicking on the empty checkbox to the left of the CRN and clicking on the Register button at the bottom of the screen.

If you already know the CRN for your course(s)

Click on the "Add/Drop Classes" link in the "Registration Tools" channel. The Add/Drop worksheet will appear. There will be a row of empty blocks. Type in the five-digit CRN for your course in any of the blocks. If you are registering for more than one course, tab over to another block and enter in all of the courses at one time. (You do not need to type in the subject or number for the course, only the CRN is required!) Click on the *Register* button at the bottom of the screen when complete.

To verify that you have successfully registered

If you would like a Registration Confirmation, click Registration Confirmation in the "Registration Tools" channel. If you would like to see your classes in a schedule format, follow these steps: On the Student Resources tab, click on the link "Banner Self-Service." Click on *Student and Financial Aid*. Click on *Registration*. Click on *Student Detail Schedule* or *Week at a Glance*.

- Each student is expected to register for 27 semester hours each year (typically nine hours in fall, nine hours in spring and nine hours in summer) except where this requirement is superseded by Graduate School requirements. This can be a combination of course work, BME seminar and research credit hours. This requirement will not be waived for students receiving a stipend. Students receiving a stipend cannot accept outside employment. In rare instances where a student has completed all of the thesis or dissertation defense requirements and is not on campus, but must be registered in order to graduate in their final semester, the student may register for only one credit with the permission of the BME Graduate Program Director and the Graduate School Dean. This is a one-time only exception; there are no other exceptions to these policies.
- International graduate students (those who were required to take the TOEFL, IELTS, etc. exams) entering the BME Graduate Program are required to take an English Academic Language Assessment within the first two weeks at UAB. The UAB Graduate School's Professional Development Program administers the assessment. The purpose of the assessment is to identify your current level of academic English proficiency and to provide you with the appropriate language support for a successful experience at UAB. The two-part assessment consists of:
 - 1) A 20-minute, one-on-one structured interview that is recorded;
 - 2) A one-hour persuasive essay-writing sample.

Your English Language Assessment scores are sent to you and the BME Program Director for advising purposes. Based on these scores, one or more writing or spoken English courses may be recommended by the Graduate School to assist you in your graduate training and professional development. The academic writing and speaking courses do not count toward a BME graduate degree and do not count as part of the 27 semester hours

you are required to take each year. The cost of tuition for the academic writing and/or speaking course(s) is the responsibility of the student.

5. M.S. students are required to register for three semesters of graduate seminar (BME 601) in order to graduate. Ph.D. students are required to register for three or six semesters of graduate seminar (BME 701), depending on the Ph.D. program track. The seminar program features experts from industry, academia, and government who discuss innovative research, new technology development, regulatory requirements, and industry trends and perspectives that impact health care, biomedical engineering and biotechnology. Interacting with the speaker as well as BME faculty members, BME graduate students and other colleagues at the seminar is an important opportunity to participate in the BME community and expand your horizons. Graduate students are allowed to miss up to two seminars in a term without penalty to allow some flexibility for unanticipated research problems or opportunities, travel to a meeting or other research-related event or other unforeseen emergencies. All M.S., Ph.D., M.D./Ph.D. and D.M.D./Ph.D. students are expected to attend the seminars each semester, regardless of whether they are registered to take seminar for credit. Journal Club meetings are held in a number of biomedical engineering specialties. Ask your Program Advisor for an appropriate Journal Club to attend.
6. A BME faculty member will be assigned to each student as a Program Advisor. The Program Advisor will be different from the student's Research Advisor if the Research Advisor does not hold a primary appointment in the BME Department. The Program Advisor is usually a BME primary faculty member who agrees to serve on your thesis committee. If the Research Advisor holds a primary appointment in BME, this person will also serve as the Program Advisor.
7. All students are expected to submit a high-quality thesis or dissertation available to the public that excels technically and meets high standards for structure, grammar, and writing style. It is the responsibility of the research mentor and student to ensure that the thesis or dissertation is technically sound and that the grammar and style conform to the requirements of the UAB Format Manual for Theses and Dissertations (<http://www.uab.edu/graduate/format-manual-for-theses-and-dissertations>). In the event that the thesis or dissertation does not meet the quality standards established by the BME Department and Graduate School, the mentor or Graduate Program Director may require review by an external editor. The expense for editing is the responsibility of the student, although the mentor may support it from research funds at her or his discretion. The BME Graduate Program Director is required to review each student's thesis or dissertation before it is submitted to the Graduate School. To allow adequate time for review, you will have to turn in the final copy (approved by your thesis or dissertation committee) to the BME graduate office *at least one week* before it is due to the Graduate School.

The UAB Graduate School and the BME Department aspire to ensure that all graduate students can communicate effectively and prepare written reports (theses, dissertations, manuscripts, etc.) to the highest ethical standard. The UAB Graduate School has prepared instructional materials that define plagiarism and provide guidance to avoid incidences of plagiarism (<http://main.uab.edu/Sites/gradschool/students/orientation/7575/>). In addition, each thesis and dissertation will be submitted to Turnitin to check the documents for originality. The results of the originality report will be shared with the student who, along with the Research Advisor and Graduate Program Director, will determine whether any parts of

the thesis need to be rewritten to conform to the norms of good scientific writing and proper citation of source material.

8. It is the policy of the BME Graduate Program that each student is responsible for meeting the deadlines and submitting all required forms and documentation to the BME Graduate Program office and the UAB Graduate School for your degree program. If you are unsure about the milestones in your degree program, ask your advisor, the departmental Graduate Program Coordinator (Mark Crawford), or the BME Graduate Program Director, Dr. Fast. Deadline dates, forms and instructions are posted on the Graduate School Website (<http://www.uab.edu/graduate/deadline-dates>). Students are responsible for arranging all of their committee meetings. Thesis defense notification that includes a list of committee members (noting the committee chair), thesis title and abstract must be turned in to the BME Program Manager at least two weeks before the scheduled defense date. If this deadline is not met, the BME Graduate Program Director or Department Chair will postpone the defense to comply with this requirement.
9. Graduate course credits earned in other programs may be used to meet requirements for a UAB graduate degree provided that the course(s) were not counted towards another degree and with the permission from the BME Graduate Study Committee and the UAB Graduate School. It is UAB policy that a course can only be counted toward one degree.
10. Students must maintain an overall grade point average (GPA) of 3.2 to remain in good academic standing in the BME Graduate Program. If a student, who has been in good academic standing, but who, at the end of any semester, fails to meet the criteria to continue in good academic standing, will be placed on probation. Such a student must re-establish good academic standing within the next two semesters. Students who do not accomplish this level of performance will be dismissed from the Graduate Program.
11. Instructions for submitting your thesis or dissertation to the UAB Graduate School can be found here: <http://www.uab.edu/graduate/theses-and-dissertations-at-uab>. Note that the BME Department deadline above requires that you complete your thesis or dissertation well in advance of the Graduate School deadlines. Students are expected to pay for the copying of their dissertations, theses, reports, and other copying needs, although some assistance for thesis and dissertation copying may also be available through the Graduate Student Association or from your advisor. The bound copy should be given to the BME Program Manager. In addition, students are encouraged to present their research advisor with a bound copy of their thesis. Check with your parents; they often want a copy of your thesis (to brag about you!). Information on ordering bound copies of your thesis can be found here: <http://www.uab.edu/graduate/ordering-bound-copies> .

3.3 The Program for the Master of Science in Biomedical Engineering (M.S.B.M.E.)

3.3.1 General Information for M.S.B.M.E. Students

The Graduate School recognizes two paths to a Master's degree, Plan I and Plan II:

- The Plan I (thesis-based) Master's requires the completion, in good academic standing, of at least 27 semester hours of graduate-level work, including 18 hours of appropriate graduate course work, 3 hours of BME seminar, and 6 hours of thesis research (BME 699) with the public presentation of an acceptable thesis embodying the results of original research work. A typical Plan I thesis contains an abstract, introduction, objective, hypotheses, methods, results, discussion, future work conclusion and a complete bibliography. Students should review the UAB Graduate School's instructions for thesis and dissertation preparation and guidelines (<http://www.uab.edu/graduate/theses-and-dissertations-at-uab>). All theses and dissertations must meet the format guidelines prescribed by the UAB Graduate School. Plan I is the required Master's thesis format for students planning to pursue a Ph.D. in BME after completing their M.S. work.
- In the event that the thesis research has resulted in one or more articles that have been published, accepted for publication, or submitted in an appropriate peer-reviewed journal, the thesis may be organized in the Preprint/Reprint format (i.e., journal articles that appear as chapters) described in the Format Manual: (<http://www.uab.edu/graduate/format-manual-for-theses-and-dissertations>). Students considering this option must first obtain the approval of their thesis committee and the BME Graduate Committee. Master's students are expected to be first author of at least one article; however, this is at the discretion of the department and/or the graduate committee and not dictated by the Graduate School. Doctoral students are typically expected to be first author on a minimum of three articles.
- With permission from the BME Graduate Program Director and the BME Graduate Studies Committee, a student may in rare instances be allowed to pursue the Plan II M.S. degree. A Plan II M.S. degree requires completion of 30 semester hours of appropriate graduate course work and a project. A project report is written and defended in lieu of a thesis preparation and defense. Submission of the project report to the Graduate School is not required.

The following are general guidelines for M.S.B.M.E. students:

1. Master's students are normally expected to complete their degree within 18 months - two years.
2. Each Plan I M.S. student is required to complete at least 27 credit hours of graduate-level work beyond the B.S. degree in order to qualify for the M.S.B.M.E. degree. This requirement includes 18 semester hours of graduate-level course work, 3 semester hours of BME seminar (BME 601), and 6 hours of thesis research (BME 699). All students are required to take BME 670 Quantitative Physiology, BME 517 Engineering Analysis or ME 661 Math Methods In Engineering (these courses are taught interchangeably depending on the year), and BST 621 Statistical Methods I, for a total of 9 course hours. The remaining 9 course hours should be a combination of life sciences,

biomedical engineering or elective courses that provide sufficient breadth and depth to gain the necessary graduate-level, interdisciplinary knowledge to complete your thesis research. Your course selection must include at least one life science course and one BME course. Up to three credit hours of bioengineering elective course work can be taken as directed independent study approved by the Graduate Program Committee. English speaking or writing proficiency courses for international students recommended as a result of the Graduate School assessment (described above) do not count as part of the 18 semester hours of graduate course work required for the M.S.B.M.E. degree.

3. The BME Graduate Program Committee or the BME Graduate Program Director must approve all substitutions. It is emphasized that 27 hours is a minimum requirement and most students complete more hours than this minimum while earning the M.S.B.M.E. degree. Additional course work requirements are based on the student's background and thesis topic and are developed on an individual basis in consultation with the Graduate Program Director and the student's research advisor. *The Degree Plan developed by the student and mentor should be submitted to the BME Graduate Studies Committee in the first semester in residency for approval.* Degree Plan forms as well as Degree Plan Guidelines can be downloaded from (<http://www.uab.edu/engineering/graduate-programs/bme-graduate-program-documents>). The Graduate School requires that a student must be admitted to candidacy before they can register for BME 699 (<http://main.uab.edu/Sites/gradschool/deadlines/#candidacy>). This means you cannot register for BME 699 and accrue the required number of thesis hours until you have completed your research proposal presentation. This is another reason why you must **not** wait until you are almost finished with your thesis or project to present your research proposal. NOTE: The Graduate School requires admission to candidacy take place at least one semester before the graduation date in the case of the M.S. degree. Present your proposal and achieve candidacy well in advance of your planned graduation date!
4. After you have completed most of your course work, you must present your thesis research proposal. You should normally present the proposal during the third semester after you begin taking core courses. Under no circumstances should your plan be presented less than one semester before your thesis defense. By giving you and your committee time to review your planned work, you will avoid last minute surprises. The format must be approved by the Graduate Program Director. Your written proposal should be handed out to your committee no later than two weeks prior to the proposal date. The BME Program Manager must be advised of any thesis proposal meetings so that the required announcements can be made. *You must provide your thesis title, committee members (indicating chair), abstract, proposal date and location.* Your advisor will give you details about what is expected of you during the thesis proposal presentation. You must download the BME M.S. Proposal Evaluation Form (<http://www.uab.edu/engineering/graduate-programs/bme-graduate-program-documents>) and pass it out to those in attendance at your proposal. Once your Master's Thesis Committee accepts your thesis proposal, you are accepted to candidacy upon completion of the required candidacy form. Complete the Admission to Candidacy form (<http://main.uab.edu/Sites/gradschool/forms/7265/>) and turn it in to the Graduate School by the deadline. Note the additional form/signatures needed if your research involves humans or animals. This is an important milestone, since it means the only remaining milestone is your thesis defense. The departmental deadline for Thesis Proposals is the last day of class the semester BEFORE candidacy.

5. A student must submit their thesis to their thesis committee at least two weeks in advance of the defense. All thesis defense presentations must be open to the public and widely announced in all of the usual UAB publications (Reporter, eReporter, BME website, Graduate School website, etc.) You must provide the BME Program Manager with your thesis title, committee members (noting the committee chair), a brief abstract and the date, time and location of your defense at least two weeks in advance of the thesis so that this requirement can be met. Check <http://main.uab.edu/Sites/gradschool/deadlines/> for Graduate School deadlines and <http://main.uab.edu/Sites/gradschool/students/current/theses/7289/> for instructions on submitting your thesis.

5. Failure to provide the BME Department with the details of your defense or your committee with the final draft of your thesis at least two weeks in advance of your defense will result in cancellation of your scheduled defense so that the two week announcement requirement can be met. The date of your defense must comply with the Graduate School deadlines (<http://main.uab.edu/Sites/gradschool/deadlines/>). Committee members are encouraged to read the student's thesis within one week of receiving the manuscript. If there are significant problems with the document, the student, in consultation with their Research Advisor, may elect to re-schedule the defense.

3.3.2 M.S.B.M.E. Milestones

The following are required milestones in the M.S.B.M.E. program.

1. Entering the program

Upon entering the graduate program, each student will be matched with a Research Advisor. If the Research Advisor holds a primary appointment in BME, this person will also serve as your Program Advisor. If the Research Advisor is not a primary BME faculty member, the student will also be assigned a Program Advisor who holds a primary appointment in BME. The Program Advisor is usually a BME primary faculty member who agrees to serve on your thesis committee. The Program Advisor serves as a resource to ensure that the student meets all of the requirements for the M.S.B.M.E. degree. Note that the Research Advisor and the Program Advisor will, in many cases, be the same person. Your Research Advisor, in conjunction with the Program Advisor, will review your Degree Plan to be sure the courses you will need are on your Degree Plan. Additionally, if your Research Advisor is not a primary BME faculty member, you will need to complete a Mentor Selection Form (<http://www.uab.edu/engineering/graduate-programs/bme-graduate-program-documents>) and turn it in to the BME Program Manager.

The Degree Plan lists all of the background, core and elective courses the student is expected to take for the degree. The BME Graduate Program Committee must approve the Degree Plan. You should keep a copy of the Degree Plan and use it as a guide for registering for courses. Changes in the Degree Plan will be made in consultation with the student's Research Advisor and Program Advisor, or in some cases with the student's Graduate Thesis Committee. The preliminary Degree Plan must be completed during the first semester of your program. Changes to the Degree Plan must be approved by the BME Graduate Program Committee.

2. Selecting your Graduate Thesis Committee

Once you have selected a Research Advisor and thesis project, you should choose your Graduate Thesis Committee. This should be done once you have part of your course work completed and have a good idea about your research topic. Your Research Advisor can help you in selecting candidate faculty members for your Committee. You should have a minimum of three persons on your Master's Thesis Committee, including your Research Advisor. At least one of your thesis committee members must have an appointment outside BME. It is preferred that the majority of the Graduate Thesis Committee be comprised of faculty with a primary appointment in BME: It is required that at least one (1) thesis committee member have a primary appointment in BME. Any Committee member who is not already appointed to the UAB Graduate Faculty must submit his/her vitae to the BME Graduate Program Director, where he/she will be recommended to the Dean of the Graduate School as an ad hoc member of your thesis committee (<http://main.uab.edu/Sites/gradschool/faculty/graduatefaculty/>). Additionally, a UAB faculty member with a primary appointment outside BME may be nominated for Graduate Faculty Status by his/her primary department chairman. It is up to you to contact each faculty member whom you select to serve on your Graduate Thesis Committee, and talk with them about serving on your Committee. Faculty members are not required to serve on a student's Committee, so it is up to the student to communicate with potential Graduate Thesis Committee members and explain to them the nature of the proposed research. Most faculty members will agree to serve on a Committee if they are not already over committed. The Graduate Thesis Committee should be selected during your second semester in the BME Program. The BME Program Manager must be advised of the names of the committee members and the times of all meetings. Additionally, you will need to complete a Graduate Study Committee Letter (<http://www.uab.edu/graduate/online-forms>) and turn in the completed form to the Graduate School. Also, if there is ever a change in your Graduate Study Committee, a Change of Graduate Study Committee form must be filled out and turned in to the Graduate School.

All M.S. students must have an initial meeting with their Graduate Thesis Committee before the end of their second semester in the M.S.B.M.E Program. The purpose of the first committee meeting is for the student to get to know the committee members and for the committee members to learn about the area of study for the thesis. The thesis committee wants to help the student make adequate progress, stay on track toward the degree and graduate in a timely manner. Often, the first committee meeting is a fairly informal discussion of the project outline and/or broad goals. The student is not expected to make a detailed or lengthy presentation. Rather, the student should provide the committee with a brief overview and outline to guide discussion during the meeting. Master's students are required to meet every term until graduation to ensure satisfactory progress toward your degree via timely communication among the student and members of the Committee. Typically, a student meets informally with the committee during the first spring semester, has a progress report meeting with the committee in the summer semester, proposes in the fall semester of the second year and defends the following spring semester. For each committee meeting, you must download the BME Graduate Student Committee Meeting Evaluation Form (<http://www.uab.edu/engineering/graduate-programs/bme-graduate-program-documents>) and pass it out to your committee members. At the conclusion of each meeting, a member of your committee will collect the forms and turn them in to the BME Program Manager. The BME Program Manager will forward you the score averages and committee comments.

3. Master's Progress Reviews

- a. The progress of each student enrolled in the Master's Program in Biomedical Engineering must be reviewed on at least an annual basis. The BME Program Manager must be notified of all committee meetings and the Graduate Student Committee Meeting Evaluation Form must be filled out by your committee members.
- b. The review format and timing of reviews are the prerogative of the student's thesis committee. Master's students must meet with their committee at least annually. The BME Department strongly recommends that you meet with your committee every six months.
- c. Written documentation (usually one page or less) of review group consensus regarding progress made and/or goals met since the previous review, as well as timelines for meeting specific goals during the next review period must be prepared and submitted to the BME Program Director.
- d. In the event that progress is considered to be unsatisfactory, or a student is nearing the five-year limit (master's) for completing his/her degree requirements, the student's thesis committee should implement a "Completion Plan." A "Completion Plan" should include specific goals and specific deadlines for meeting those goals, as well as prescribed consequences if the goals are not met within the proposed deadline time points. The plan should include a stipulation that the student will meet with his/her committee to review progress at each of the proposed deadline times. It is recommended that the time intervals between proposed committee meetings be no longer than three months. The plan should be incorporated into a written document, signed by the student, by his/her advisor, and by the program director. If it will be necessary to request an extension beyond the five-year limit for completion of degree requirements, the plan must be submitted (along with the extension request) to the Graduate School Dean for review and approval.

4. Submission of the Thesis Proposal

After you have completed most of your course work, you must present your thesis research proposal. You should normally present the proposal during the third semester after you begin taking core courses. Under no circumstances should your plan be presented less than one semester before your thesis defense. By giving you and your committee time to review your planned work, you will avoid last minute surprises. The proposal should follow the format used for the preparation of an NIH, NSF, or similar research proposal. Formats used by other funding agencies can also be considered. The format must be approved by the Graduate Program Director. The proposal must include hypothesis and specific aims (or goals and objectives), a comprehensive literature survey and a significance section, preliminary studies, experimental design and methodologies, and a list of references. Your written proposal should be handed out to your committee no later than two weeks prior to the proposal date. The BME Program Manager must be advised of any thesis proposal meetings so that the required announcements can be made. *You must provide your thesis title, committee members (indicating chair), abstract, proposal date and location.* Your advisor will give you details about what is expected of you during the thesis proposal presentation. You must download the BME M.S. Proposal Evaluation Form (<http://www.uab.edu/engineering/graduate-programs/bme-graduate-program-documents>) and pass it out to those in attendance at your proposal. After your proposal, a member of your committee will collect the forms and turn them in to the BME Program Manager in the BME Graduate Program Office. The BME Program Manager will forward you the score averages and committee comments. Once your Master's Thesis Committee accepts your thesis proposal, you are accepted to candidacy upon completion of the required candidacy form.

Complete the Admission to Candidacy form (<http://main.uab.edu/Sites/gradschool/forms/7265/>) and turn it in to the Graduate School by the deadline. Note the additional form/signatures needed if your research involves humans or animals. This is an important milestone, since it means the only remaining milestone is your thesis defense. A thesis proposal normally consists of a description of the problem/question or hypothesis being proposed, a description of the approach to analyzing or solving this problem/question, a survey of the literature in this area, presentation of preliminary data, and a discussion of potential problems anticipated and their solution. Other students and faculty members are allowed to be present for the public portion of the thesis proposal presentation. The departmental deadline for Thesis Proposals is the last day of class the semester BEFORE candidacy.

5. Presentation of Research Results at Scientific and Technical Symposia

All M.S. students should plan to submit the results of their research to at least one scientific or technical conference that publishes proceedings of the meeting. Abstract submission should be in consultation with your advisor. The submission and presentation should be made before the student completes the degree, and is still at UAB. All Master's students are required to make one scientific presentation (oral or poster) at a local, national or international scientific meeting, seminar or journal club prior to graduation. Please let the BME Program Manager know the details of your presentations in a timely manner.

6. Defense of the Thesis

After you have completed the thesis, you will present the results to your Master's Thesis Committee and others in a formal public presentation. It is strongly recommended that you attend a few of these events before you present your thesis research results, just to find out what will happen. The thesis must be handed out to committee members at least two weeks prior to the defense date. You must provide Mark Crawford with your thesis title, committee members (indicating chair), abstract, defense date and location so that the appropriate announcements can be distributed.

Also, you must fill out the Request for Thesis Approval Online Form through the Graduate School (<http://main.uab.edu/Sites/gradschool/forms/7267/>). Your thesis is expected to be of high-quality, excel technically and meet high standards for structure, grammar, and writing style. You will make a formal presentation, and afterward the committee and the attending public can ask you questions. You are expected to be able to field these questions in a professional and efficient manner. The non-committee members are then asked to leave the room; your Graduate Thesis Committee will ask you additional questions and then decide whether or not you pass the final examination, the defense of your work.

Additionally, at the beginning of your final semester, you will need to complete an Application for Degree form (<http://www.uab.edu/graduate/online-forms>) and turn it in to the Graduate School.

As part of the overall assessment of the BME Master's Program, your committee members and others who attend your master's defense will complete the Master's Thesis Defense Evaluation Form. You must download the form from the BME website (<http://www.uab.edu/engineering/graduate-programs/bme-graduate-program-documents>) and bring copies to your defense. After your defense, your Research Advisor will collect the forms and deliver them to the BME Program Manager in Shelby 801-C. The BME Program Manager will forward you the score averages and committee comments. The results of this evaluation are used by the BME Program to assess whether we are meeting Program Goals as required by

the Southern Association of Colleges and Schools (SACS) to maintain program accreditation. The results of this evaluation are not used to determine whether the student passed the master's thesis defense.

All students must schedule their thesis final examination in accordance with the Graduate Student policies (<http://main.uab.edu/Sites/gradschool/programs/71958/>). Notably:

Under Plan I, the final examination should take the form of a presentation and public defense of the thesis, followed by an examination of the candidate's comprehensive knowledge of the field. The time, date, and location of this examination is reported to the Graduate School via the online Request for Thesis or Dissertation Approval forms (submitted at least 10 days before the public defense) and allows for the attendance of the Graduate School Dean. The meeting must be appropriately announced on campus, must be open to all interested parties, and must take place at least 30 days before the expected date of graduation. Plan I candidates must be registered for at least three semester hours of graduate work in the semester during which degree requirements are completed.

The final approved version of the thesis must be submitted to the Graduate School as a single PDF for final review no later than two weeks (10 business days) following the public defense. Master's students must submit the Approval Form, signed by each committee member and the program director. The UAB Publication Agreement form is submitted online. Additional information concerning completing the final steps of the publication process is available online at <http://www.uab.edu/graduate/submitting-your-thesis-or-dissertation-to-the-graduate-school>.

Master's Thesis Defense Results

From the UAB Graduate School Requirements for a Master's Degree (<http://www.uab.edu/graduate/graduate-catalog/70-requirements-for-the-masters-degree>)

If, in the opinion of more than one member of the thesis committee, the student has failed the thesis defense, there is no consensus to pass. The chair of the committee shall advise the student that the thesis fails to meet the requirements of the program. The chair shall notify the student in writing about the reason(s) for failure. If the student resubmits or submits a new thesis for consideration by his/her graduate program at least two members of the new examining committee shall be drawn from the original committee. If the modified or new thesis fails to meet the requirements of the program, the student shall be dismissed from the graduate program.

In the event that only one of the three committee members dissent, that individual must submit a letter in which he/she outlines the reasons for their dissent to the student's advisor. The advisor and student may then prepare a rebuttal statement that is submitted, along with the letter of dissent, to the advisory or executive committee of the program for review. The advisory committee can then decide to accept or reject the rebuttal statement. If the rebuttal is accepted, the student is passed on his/her thesis defense. If the rebuttal is rejected, the advisory committee can recommend to the student or advisor potential steps necessary to remediate the thesis and potentially also the work therein, or the committee can recommend that the student be dismissed from the program.

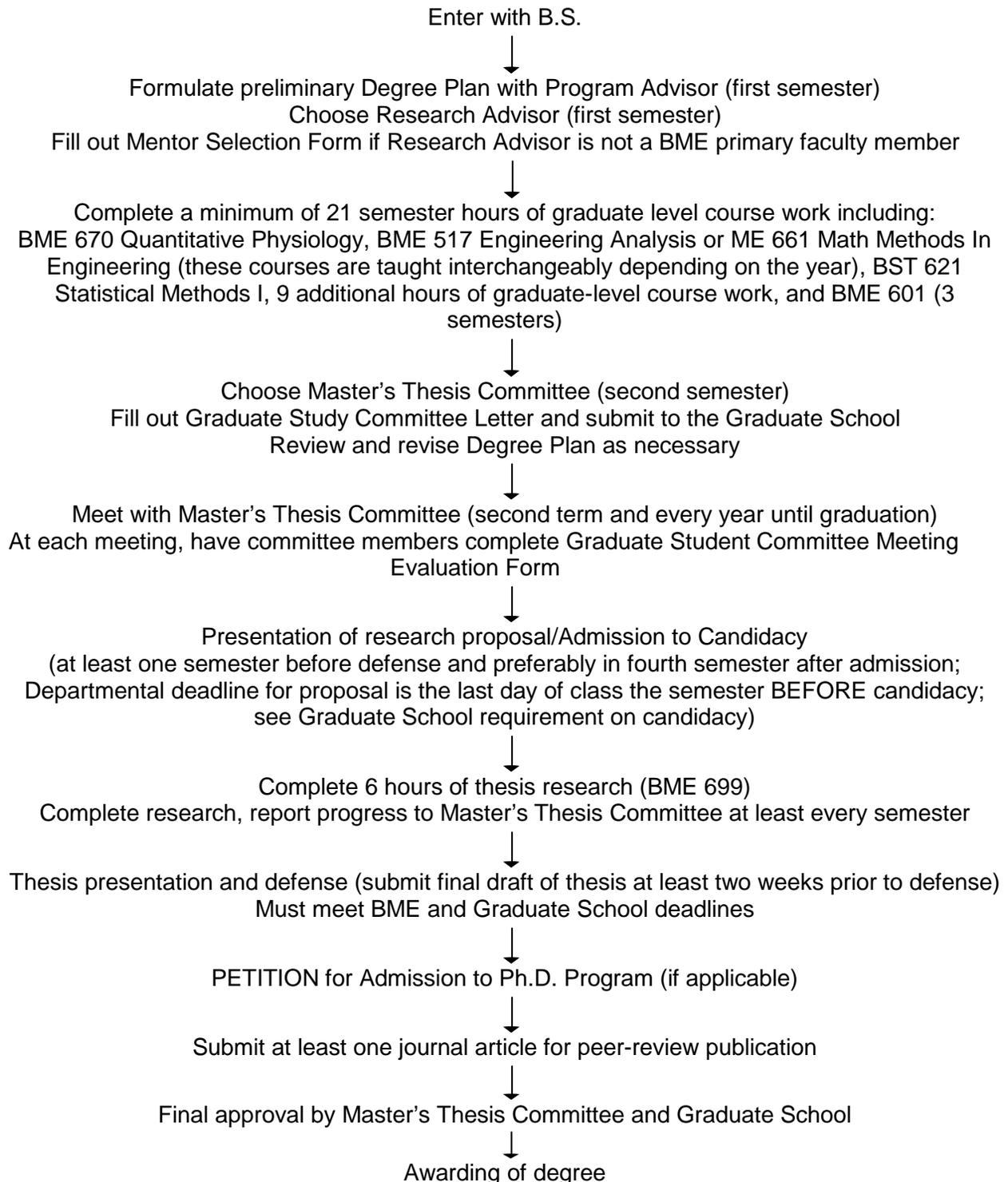
7. Publication Requirement

It is the policy of the Department of Biomedical Engineering that in addition to the above requirements, each Plan I Master's student must have submitted at least one manuscript for publication in an appropriate peer-reviewed archival journal before your degree petition will be signed by the Program Director. This manuscript should be based primarily on the student's work. It is expected that the student will be the first author (or the prominent author) on the required manuscript. The Graduate Program Director will not sign the student's degree petition without evidence that a manuscript has been submitted. Students who have manuscripts *accepted* for publication can organize their thesis in the Preprint/Reprint style described in <http://www.uab.edu/graduate/format-manual-for-theses-and-dissertations>. Please submit this information to the BME Program Manager in the Graduate Program Office.

8. Graduation

Plan to attend the graduation ceremony. This is a time-honored ceremony, and you have worked hard to earn this distinction for yourself. Take the time to enjoy one of the first fruits of your labor.

3.3.3 Flow Chart for the M.S.B.M.E. Degree



3.3.4 Milestone Summary for the M.S.B.M.E.

1. Complete your preliminary Degree Plan with your Program Advisor and submit to BME Graduate Program Committee (First Semester).
2. Choose Research Advisor (First Semester). Fill out Mentor Selection Form if Research Advisor is not a BME primary faculty member. Choose Graduate Thesis Committee (Second Semester). Fill out Graduate Study Committee Letter and submit to the Graduate School.
3. Meet with Master's Thesis Committee to informally discuss research scope, direction and significance (yearly, starting with the second semester in residence). At each meeting, have committee members complete Graduate Student Committee Meeting Evaluation Form.
4. Present the thesis proposal and be admitted to Candidacy. (Fourth Semester or not more than one semester before planned thesis defense). Hire editor if necessary. The departmental deadline for the proposal is the last day of class the semester BEFORE candidacy. Download BME M.S. Proposal Evaluation Form (<http://www.uab.edu/engineering/graduate-programs/bme-graduate-program-documents>) and pass it out to those in attendance at your proposal. Complete the Admission to Candidacy form (<http://main.uab.edu/Sites/gradschool/forms/7265/>) and turn it into the Graduate School by the deadline. Complete an Application for Degree form (<http://www.uab.edu/graduate/online-forms>) and turn it in to the Graduate School.
5. Schedule thesis defense (before the Graduate School deadline for that semester and in compliance with all BME and Graduate School deadlines). Fill out the Request for Thesis Approval Online Form through the Graduate School (<http://main.uab.edu/Sites/gradschool/forms/7267/>).
6. Make at least one scientific presentation (oral or poster) at a local, national or international scientific meeting, seminar or journal club prior to graduation.
7. Present Committee with copy of thesis (At least two weeks before the defense).
8. Present and defend the thesis in a well-publicized, public Final Examination. Bring Master's Thesis Defense Evaluation Form to your Thesis Defense.
9. Submit final, approved version of the thesis to the Graduate School for final review no later than two weeks (10 business days) following the public defense. Master's students must submit the Approval Form, signed by each committee member and the program director. Also submit the UAB Publication Agreement form online.
10. Petition for admission into the Ph.D. program (if applicable).
11. Submit results in peer-reviewed manuscript (before graduation and leaving UAB).
12. Graduate.

3.4 The Program for the Doctor of Philosophy (Ph.D.)

The Ph.D. degree is the highest degree awarded by academic institutions in the United States. By awarding the Ph.D. degree, a Doctoral Dissertation Committee certifies that an individual is capable of carrying out independent research. The Ph.D. program is designed to provide resources and mentoring of the student through the formulation and execution of a research question that has a size and importance to merit attention of the scientific and/or engineering discipline. Dissertation results must be published in refereed, reputable scientific or engineering journals. It is expected that dissertation work will result in peer-reviewed publications, written and submitted while a student is still in the Doctoral Program at UAB.

There are two paths to the Ph.D. Program, starting either with a B.S. degree, or continuing after completion of a M.S. degree in BME.

3.4.1 Admission into the Ph.D. Program with a B.S. degree

Students can be admitted to the Ph.D. Program with a B.S. degree in a field of biomedical engineering or closely-related discipline. Students with undergraduate degrees in the physical sciences, life sciences, or mathematics can also be considered for admission.

At least three peer-reviewed publications are required for completion of the Ph.D. in the Department of Biomedical Engineering.

Students entering the Ph.D. program with a B.S. are required to complete at least 54 semester hours of graduate work, including 36 semester hours of graduate course work, 6 hours of BME seminars (BME 701), and a minimum of 12 hours of Dissertation Research (BME 799) earned over at least two semesters. All students are required to take BME 770 Quantitative Physiology, BME 517 Engineering Analysis and BST 621 Statistical Methods I. The remaining course work should be a combination of life sciences, biomedical engineering or elective courses that provide sufficient breadth and depth to gain the necessary graduate-level, interdisciplinary knowledge to complete thesis research. The course selection should include at least two life sciences courses and two BME courses for your Ph.D. Degree Plan. Degree Plan forms as well as Degree Plan Guidelines can be downloaded from (<http://www.uab.edu/engineering/graduate-programs/bme-graduate-program-documents>). Up to three credit hours of bioengineering elective course work can be taken as directed independent study if approved by the Graduate Program Committee. It is emphasized that 54 hours is a minimum requirement and most students complete many more hours than this minimum while earning the Ph.D. degree.

Ph.D. students are normally expected to complete their degree within five to six years. Doctoral degree students who hold an assistantship for more than six years will be in jeopardy of losing their financial support.

3.4.2 Continuing into the Ph.D. Program at UAB with a M.S. degree

Students can be admitted to the Ph.D. Program following completion of a Master's Degree in BME or closely-related discipline and an endorsement from their Master's Thesis Committee. As a student completes a Master's thesis and prepares for a defense, he/she should indicate the desire to go on for the Ph.D. to the Research Advisor and the BME Graduate Program Director. All students in the M.S. program who wish to pursue the Ph.D. degree need only write a letter to the Chair to be considered by the Admissions Committee. A student is not required to re-apply to the Graduate School. The BME Graduate Program Committee evaluates all BME students who are required to complete the M.S. degree before entering the Ph.D. program before they proceed into the Ph.D. program. Admission into the Ph.D. Program requires publication of at least one peer-reviewed journal article (typically a first author publication) and strong endorsement by the student's Master's Thesis Committee. Admission to the Ph.D. program does not guarantee a specific research project or funding; the student should communicate with potential Ph.D. advisors to secure a project and funding around the time of the master's defense.

At least two peer-reviewed first-author publications beyond the M.S. degree are required for completion of the Ph.D. in the Department of Biomedical Engineering.

Students entering the Ph.D. program with a M.S. are required to complete at least 33 semester hours of graduate course work beyond the Master's degree, including 18 semester hours of graduate course work, three semesters of BME Seminar (BME 701), and a minimum of 12 hours of Dissertation Research (BME 799) earned over at least two semesters. All students are required to take BME 670/770 Quantitative Physiology, BME 517 Engineering Analysis, and BST 621 Statistical Methods I, if not taken as part of their master's program. The remaining course work should be a combination of life sciences, biomedical engineering or elective courses that provide sufficient breadth and depth to gain the necessary graduate-level, interdisciplinary knowledge to complete your thesis research. Your course selection should include at least one life science course and one BME course for your Ph.D. Degree Plan. Degree Plan forms as well as Degree Plan Guidelines can be downloaded from (<http://www.uab.edu/engineering/graduate-programs/bme-graduate-program-documents>). Up to three credit hours of bioengineering elective course work can be taken as directed independent study if approved by the Graduate Program Committee.

It is emphasized that 33 hours is a minimum requirement and most students complete many more hours than this minimum while earning the Ph.D. degree. Students in the Dental Scientist and M.D./Ph.D. programs can enter the Ph.D. program without a M.S. degree and work directly toward the Ph.D.

Note that Ph.D. students in BME must complete a total of 36 semester hours of approved graduate course work. Thus, if you complete more than 18 semester hours of graduate course work in life sciences, biomedical engineering, mathematics and statistics during M.S. studies, the coursework requirements for the Ph.D. may be less than 18 semester hours.

Doctoral students are normally expected to complete their degree within three to four years beyond their M.S. degree. Doctoral degree students who hold an assistantship for more than four years will be in jeopardy of losing their financial support.

3.4.3 General requirements for Ph.D. students

1. At least one year of residency (two semesters on campus as a full-time student) is required by the Graduate School for all Ph.D. students. It is extremely difficult to obtain the Ph.D. degree unless the program is pursued on a full-time basis; consequently, *part-time Ph.D. programs are strongly discouraged* in BME. Thus, only full-time students will be admitted for Ph.D. studies. Students who obtain employment after entering the Ph.D. program must receive permission from their Graduate Dissertation Committee and the BME Graduate Studies Committee to continue in the Ph.D. program. Students must show continued progress to remain in the Ph.D. program.
2. All students who are accepted into the Ph.D. program should remember to register for 700 level courses and/or research hours each semester.
3. Note that you are required to submit certain paperwork to the Graduate School at several points in your program. It is very important that you notify the BME Program Manager well in advance of your meetings to present dissertation proposals or defenses. The BME Program Manager must also be notified regarding the selection of your Graduate Dissertation Committee members, or any time you change any member of your committee.
4. The Graduate School requires that a student must be admitted to candidacy before they can register for BME 799. This means you cannot register for these courses and accrue the required number of dissertation hours until you have completed the Comprehensive Exam and been admitted to candidacy. NOTE: The Graduate School requires that admission to candidacy take place at least two semesters before graduation. Be admitted to candidacy well in advance of your planned graduation date!
5. Dissertations must be presented at least two weeks in advance of the planned defense date (three weeks is recommended). Your dissertation defense date must comply with the Graduate School deadlines (<http://www.uab.edu/graduate/deadline-dates>). The Dissertation Committee members are encouraged to read the student's dissertation within two weeks of receiving the manuscript. If there are significant problems with the document, the student, in consultation with their Research Advisor, may elect to re-schedule the defense. Students are responsible for arranging all of their committee meetings. Thesis defense notification that includes a list of committee members (noting the committee chair), thesis title and abstract must be turned in to the BME Program Manager at least two weeks before the scheduled defense date. If this deadline is not met, the BME Graduate Program Director or Department Chair will postpone the defense to comply with this requirement.
6. It is the policy of the BME Graduate Program that each student is responsible for meeting the deadlines and submitting all required forms and documentation to the BME Graduate Program office and the UAB Graduate School for your degree program. If you are unsure about the milestones in your degree program, ask your advisor, the BME Program Manager, or the BME Graduate Program Director, Dr. Vladimir Fast. Deadline dates, forms and instructions are posted on the Graduate School Website (<http://www.uab.edu/graduate>).
7. Your Graduate Dissertation Committee is a group of experts in your field who are committed to helping you develop your abilities as an independent investigator. You should develop a good working relationship with your committee. Regular communication with your committee members (both formally and informally) is strongly encouraged. *You must meet with your committee as a group at least once a year.* These meetings may be in the form of

a formal update, proposal, or defense. The purpose of these meetings is to ensure satisfactory progress toward your degree via timely communication among the student and members of the committee.

8. Students are strongly encouraged to communicate regularly with members of their Graduate Dissertation Committee, either individually or collectively. Such meetings ensure that your committee has up-to-date information on the progress you are making toward completing your degree.

You are required to meet with your Dissertation Committee at least annually. You must notify the BME Program Manager of these meetings.

Please see (http://www.uab.edu/graduate/images/acrobat/forms/UAB_Grad_Handbook.pdf) for more information.

3.4.4 Ph.D. Milestones

The following are required milestones in the Ph.D. program.

1. Selecting the Research Advisor and Graduate Dissertation Committee

As in the M.S.B.M.E. program, it is your responsibility to choose a Research Advisor for your dissertation research. This person must agree to accept you as a student. Your Research Advisor and Graduate Dissertation Committee should be selected during the first semester after the student has been admitted to the Ph.D. program. Note that the Research Advisor and the Program Advisor will in many cases be the same person.

Your Research Advisor can help you in selecting candidate faculty members for your committee. You should have a minimum of five persons on your Graduate Dissertation Committee, including your Research Advisor. At least one Dissertation Committee member must hold a primary appointment in BME. Two committee members must have an appointment outside the Department of Biomedical Engineering. An external reviewer or Dissertation Committee member outside UAB is strongly recommended. Faculty members are not required to serve on a student's committee so it is up to you to contact potential committee members to discuss your proposed research. Most faculty members will agree to serve on a committee if they are not already over committed. Each committee member should be able to bring some relevant expertise to guide your research. You should submit your Dissertation Committee members to the Graduate Program Committee for approval. Upon approval, the Dissertation Committee membership recommendation is submitted to the Graduate School Dean. You will need to complete a Graduate Study Committee Letter (<http://www.uab.edu/graduate/online-forms>) and turn in the completed form to the Graduate School. Also, if there is ever a change in your Graduate Study Committee, a Change of Graduate Study Committee form must be filled out and turned in to the Graduate School. Graduate Study Committee appointments are made by the Graduate School Dean, who is an ex officio member of all graduate study committees. Any committee member who is not already appointed to the graduate faculty in Biomedical Engineering must submit his/her vitae to the Department, where he/she will be recommended to the Dean of the Graduate School as an ad hoc committee member. Additionally, if a committee member has a UAB primary appointment outside BME, the committee member's department chair may submit a request for Graduate Faculty Status to the Graduate School. Additionally, if your Research Advisor is not a primary BME faculty member, you will need to complete a

Mentor Selection Form (<http://www.uab.edu/engineering/graduate-programs/bme-graduate-program-documents>) and turn it in to the BME Program Manager. Once you have selected a Research Advisor and received his/her agreement to take you as a student, you should choose your Graduate Dissertation Committee. Remember to advise the BME Program Manager at each step of this process. This should be done no later than the time you have completed a part of your Degree Plan and have a good idea about your research topic.

In the event that the Research Advisor is not a primary BME faculty member, you will also be assigned a Program Advisor who holds a primary appointment in BME. The Program Advisor serves as a resource to ensure that you meet all of the requirements for the Ph.D. degree. You will meet with your Program Advisor to complete the Degree Plan. Your Research Advisor, in conjunction with the Program Advisor, will review your Degree Plan to be sure the courses you will need are on your Degree Plan. The Degree Plan lists all of the background, core and elective courses the student is expected to take for the degree. The BME Graduate Program Committee must approve the Degree Plan. You should keep a copy of the Degree Plan and use it as a guide for registering for courses. Changes in the Degree Plan will be made in conjunction with the student's Research Advisor and Program Advisor, or in some cases with the student's Graduate Thesis Committee. The preliminary Degree Plan must be completed during the first semester of your program. Changes to the Degree Plan must be approved by the BME Graduate Program Committee.

All Ph.D. students must meet with their committee as a group at least once a year. These meetings may be in the form of a formal update, proposal, or defense. The purpose of these meetings is to ensure satisfactory progress toward your degree via timely communication among the student and members of the committee. Please inform the BME Program Manager of all meetings well in advance of their scheduled date so that announcements can be distributed as required. For each committee meeting, you must download the BME Graduate Student Committee Meeting Evaluation Form (<http://www.uab.edu/engineering/graduate-programs/bme-graduate-program-documents>) and pass it out to your committee members. At the conclusion of each meeting, a member of your committee will collect the forms and turn them in to the BME Program Manager. The BME Program Manager will forward you the score averages and committee comments.

2. Ph.D. Progress Reviews

- a. The progress of each student enrolled in the Ph.D. Program in Biomedical Engineering must be reviewed on at least an annual basis.
- b. The review format and timing of reviews are the prerogative of the student's dissertation committee.
- c. Written documentation (usually one page or less) of review group consensus regarding progress made and/or goals met since the previous review, as well as timelines for meeting specific goals during the next review period must be prepared and submitted to the program director.
- d. In the event that progress is considered to be unsatisfactory, or a student is nearing the seven-year limit (Ph.D.) for completing his/her degree requirements, the student's thesis committee should implement a "Completion Plan." A "Completion Plan" should include specific goals and specific deadlines for meeting those goals, as well as prescribed consequences if the goals are not met within the proposed deadline time points. The plan should include a stipulation that the student will meet with his/her committee to review progress at each of the proposed deadline times. It is recommended that the time intervals between proposed committee meetings be no longer than three months.

The plan should be incorporated into a written document, signed by the student, by his/her advisor, and by the program director. If it will be necessary to request an extension beyond the seven-year limit for completion of degree requirements, the plan must be submitted (along with the extension request) to the Graduate School Dean for review and approval.

3. Planning the Dissertation Research

An important part of your training will be to learn by experience how to carry out research. Several of the faculty members have documentation on this subject. You will find that each faculty member has a slightly different style in advising students and approaching research problems. You should use this opportunity to observe these different processes, learn as much as you can about the different approaches, and most importantly, to find out which approaches are the most productive for you in carrying out independent research.

4. The Comprehensive Examination

The Comprehensive Examination is a very important milestone. Passing this exam means that you are admitted to candidacy. The Graduate School requires you to be admitted to candidacy at least two semesters before you plan to graduate. The Comprehensive Exam should be administered between 12 to 18 months after admission to the Ph.D. program. For students entering the BME program and who are also admitted to the Dental Scientist program, they should take the Comprehensive Exam in the second year of their program. M.D./Ph.D. students normally enter the Ph.D. phase of their studies in year three. These students should take the Comprehensive Exam by the end of year three. The deadline date for the Comprehensive Exam is the last day of classes for the semester BEFORE candidacy. Complete the Admission to Candidacy form (<http://main.uab.edu/Sites/gradschool/forms/7265/>) and turn it in to the Graduate School by the deadline. Note the additional form/signatures needed if your research involves humans or animals.

The Comprehensive Exam consists of the submission of a written research proposal and an oral defense of the proposal. The proposal should follow the format used for the preparation of an NIH, NSF, or similar research proposal. Formats used by other funding agencies can also be considered. The format must be approved by the Graduate Program Director. The proposal must include hypothesis and specific aims (or goals and objectives), a comprehensive literature survey and a significance section, preliminary studies, experimental design and methodologies, and a list of references. The proposal must be distributed to your committee two weeks prior to your oral defense. An oral defense of the proposal is required. During the oral examination, the committee will examine the proposal and the student's background for conducting the proposed studies. The oral defense of the proposal is open to the public. You must download the BME Ph.D. Proposal Evaluation Form (<http://www.uab.edu/engineering/graduate-programs/bme-graduate-program-documents>) and pass it out to those in attendance at your proposal. After your proposal, a member of your committee will collect the forms and turn them in to the BME Program Manager in the BME Graduate Program Office. The BME Program Manager will forward you the score averages and committee comments. After the student has completed the oral phase of the examination, the committee will meet in a closed session, ask the student additional questions and then decide the outcome of the comprehensive examination. Three outcomes are possible: 1) unconditional pass; 2) conditional pass (meaning the student must meet other conditions agreed upon by the committee such as passing specified courses,

rewriting portions of the proposal, re-defending the proposal, or re-examination on selected areas); or 3) fail. You must provide the BME Program Manager with your thesis title, committee members (noting the committee chair), abstract, defense date and location so that the appropriate announcements can be distributed. Failure to provide the required information in a timely manner may result in postponement of your Comprehensive Examination.

Additionally, at the beginning of your final semester, you will need to complete an Application for Degree form (<http://www.uab.edu/graduate/online-forms>) and turn it in to the Graduate School.

Admission to candidacy is an important step forward in the student's pursuit of the doctorate. By this step, the graduate committee indicates its confidence that the student is capable of completing the proposed research project and the doctoral program. Since the committee meeting at which candidacy is discussed is so important, it should be scheduled through the Graduate School to allow the dean to attend.

5. Publication Requirements

It is the policy of the Department of Biomedical Engineering that in addition to the above requirements, the student is expected to write and submit at least three manuscripts describing the dissertation research in peer-reviewed archival journals (two manuscripts if the student continued Ph.D. after plan-I M.S.B.M.E.). These manuscripts should be based primarily on the student's work. It is expected that the student is the first author (or the prominent author) on the required manuscripts. The Graduate Program Director will not sign the student's degree petition without evidence that the manuscripts were submitted. Students who have manuscripts *accepted* for publication can organize their thesis in the Preprint/Reprint style described here (<http://www.uab.edu/graduate/format-manual-for-theses-and-dissertations>). Please submit this information to Mark Crawford (mcra@uab.edu) in the Graduate Program Office.

6. Defense of the Dissertation

After you have completed your dissertation research, you will present the results to your Dissertation Committee and others at a public formal presentation. You should attend a few of these events before your time comes, just to find out what will happen. Your Dissertation must be handed out to the committee at least two weeks in advance of the defense (three weeks is recommended). You must provide the BME Program Manager your thesis title, committee members (noting your committee chair), a brief abstract and the date, time and location of your defense at least two weeks in advance of the defense so that this requirement can be met. Failure to provide the BME Department with the details of your defense or your committee with the final draft of your thesis at least two weeks in advance of your defense will result in cancellation of your scheduled defense so that the two week requirement can be met. The date of the defense must comply with the Graduate School deadlines (<http://www.uab.edu/graduate/deadline-dates>). Also, you *must* fill out the Request for Thesis Approval Online Form through the Graduate School. The form is found at (<http://www.uab.edu/graduate/request-thesis-or-dissertation-approval-forms>).

Your dissertation must be technically sound and meet high standards for structure, grammar and writing style. You will make a formal presentation, and afterward the committee and the attending public will ask you questions. You are expected to be able to field these questions in a knowledgeable, professional and efficient manner. The non-committee members are then

asked to leave the room, and your Graduate Thesis Committee will ask you additional questions and then decide whether or not you pass the final examination, the defense of your work.

The dissertation defense must be open to all interested parties and should be widely publicized on the UAB campus. Candidates must be registered for at least three semester hours of graduate work during the term in which the final examination is taken.

As part of the overall assessment of the BME Doctoral Program, your committee members and others who attend your doctoral defense will complete the Doctoral Dissertation Defense Evaluation Form. You must download the form from the BME website (<http://www.uab.edu/engineering/graduate-programs/bme-graduate-program-documents>) and bring copies to your defense. After your defense, your Research Advisor will collect the forms and deliver them to the BME Program Manager in Shelby 801-C. The BME Program Manager will forward you the score averages and committee comments. The results of this evaluation are used by the BME Program to assess whether we are meeting Program Goals as required by the Southern Association of Colleges and Schools (SACS) to maintain program accreditation. The results of this evaluation are not used to determine whether the student passed the Doctoral Dissertation defense.

No later than *two weeks* (10 business days) following the public defense, the completed, final version of the committee-approved dissertation must be submitted (as a single PDF) for final review to the Graduate School. Also submitted online are the UAB Publication Agreement, Survey of Earned Doctorates, and the Graduate School Exit Survey. One copy of the signed approval form is submitted to the Graduate School office. Additional information concerning completing graduation requirements and the dissertation submission and publication process is available online at <http://www.uab.edu/graduate/theses-anddissertations-at-uab>.

In the event that only one of the five committee members dissent, that individual must submit a letter in which he/she outlines the reasons for their dissent to the student's advisor. The advisor and student may then prepare a rebuttal statement that is submitted, along with the letter of dissent, to the advisory or executive committee of the program for review. The advisory committee can then decide to accept or reject the rebuttal statement. If the rebuttal is accepted, the student is passed on his/her dissertation defense. If the rebuttal is rejected, the advisory committee can recommend to the student or advisor potential steps necessary to remediate the dissertation and potentially also the work therein, or the committee can recommend that the student be dismissed from the program.

7. Seminar Requirement

All Ph.D. students are required to present their research progress in a Department of Biomedical Engineering Seminar. This seminar will typically occur within one or two semesters before graduation. You must communicate with the BME seminar coordinator (Dr. Joel Berry, 996-9661; jiberry@uab.edu) to schedule your seminar presentation. You should contact Dr. Berry as soon as you know which semester you want to present your research to ensure that the schedule is not filled. The BME seminar is attended by faculty, students (graduate and undergraduate), clinicians, practicing professionals and others from the UAB community. As part of the overall assessment of the BME Doctoral Program required by the Southern Association of Colleges and Schools (SACS) to maintain program accreditation, your committee members and others who attend your seminar presentation will complete the *Ph.D. Seminar*

Evaluation Form. You must download the form from the BME website (<http://www.uab.edu/engineering/graduate-programs/bme-graduate-program-documents>) and bring copies to your seminar presentation. After your defense, your Research Advisor or another faculty member will collect the forms and deliver them to the BME Program Manager in Shelby 801-C. The BME Program Manager will forward you the score averages and committee comments. The results of this evaluation are used by the BME Program to assess whether we are meeting Program Goals as required by SACS.

8. Graduation and Award of the Ph.D.

Attend the graduation ceremony and experience the hooding ceremony for the Ph.D. candidate. You will be "hooded" by your Research Advisor. This is a time-honored ceremony, and you have worked hard to earn this distinction for yourself. Take the time to enjoy one of the first fruits of your labor.

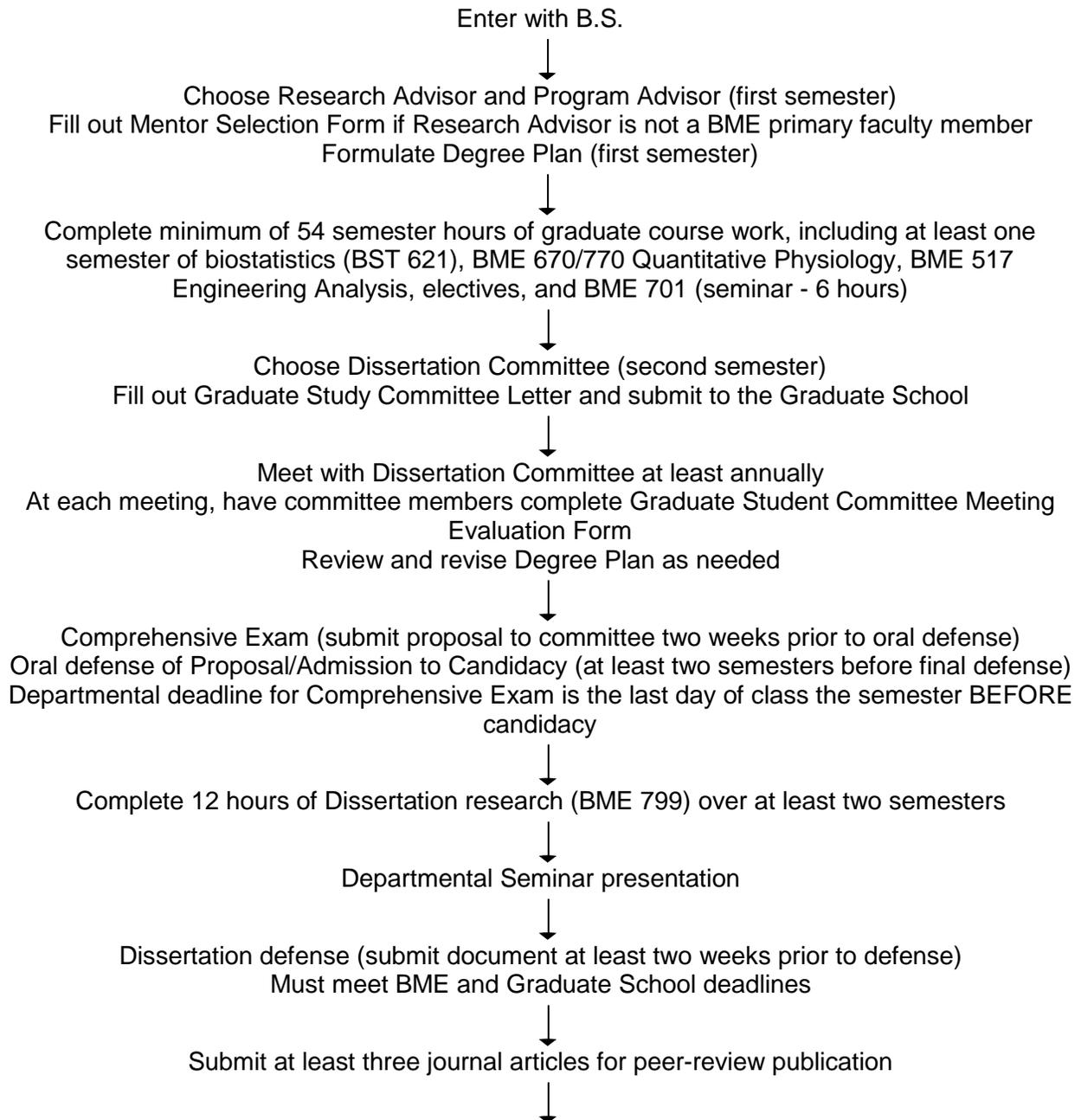
3.4.5 Milestone Summary for Ph.D. Program

1. Choose your Research Advisor and Program Advisor (First Semester).
2. Complete your preliminary Degree Plan with your Research and Program Advisors and submit to BME Graduate Program Committee (First Semester).
3. Choose Thesis Dissertation Committee (Second Semester).
4. Meet with your Dissertation Committee to present and discuss your research progress (at least once a year).
5. Complete Comprehensive Exam and be admitted to Candidacy (12-18 months after being admitted to the program, but not less than three semesters before your planned graduation). The deadline date for the Comprehensive Exam is the last day of classes for the semester BEFORE candidacy.
6. Submit at least three manuscripts (two manuscripts of continuing after M.S.B.M.E.) to peer-reviewed journals for publication (before graduation and leaving UAB).
7. Present research progress in BME Department Seminar. Bring copies of the Ph.D. Seminar Evaluation Form to the seminar.
8. Schedule dissertation defense (before the Graduate School deadline for that semester and in compliance with all BME and Graduate School deadlines).
9. Present Dissertation Committee with a copy of the dissertation (at least *two weeks* before the defense).
10. Present and defend dissertation in a well-publicized, public Final Examination (before the Graduate School deadline for the semester you plan to graduate). Bring copies of the Doctoral Dissertation Defense Evaluation Form to the defense.
11. Submit the completed, final version of the committee-approved dissertation to the Graduate School no later than two weeks (10 business days) following the public defense. Also

submitted online are the UAB Publication Agreement, Survey of Earned Doctorates, and the Graduate School Exit Survey.

12. Graduate.

Flowchart for Ph.D. Degree after B.S.



Final approval by Committee and Graduate School



Awarding of degree

Flowchart for Ph.D. Degree after M.S.

Enter with M.S./D.D.S./D.M.D. or equivalent professional degree



Choose Research Advisor and Program Advisor (first semester)
Fill out Mentor Selection Form if Research Advisor is not a BME primary faculty member
Formulate Degree Plan (first semester)



Complete minimum of 33 semester hours of graduate course work beyond the Master's degree including at least one semester of biostatistics (BST 621/622 - two are strongly recommended) and any of the following not completed as part of your Master's: BME 670/770 Quantitative Physiology, BME 517 Engineering Analysis, 9 additional hours of graduate-level course work, BME 701 (seminar, 3 hours)



Choose Dissertation Committee (second semester)
Fill out Graduate Study Committee Letter and submit to the Graduate School
Meet with Dissertation Committee at least annually
At each meeting, have committee members complete Graduate Student Committee Meeting Evaluation Form
Review and revise Degree Plan as needed



Comprehensive Exam (submit proposal to committee two weeks prior to oral defense)
Oral defense of Proposal/Admission to Candidacy (at least two semesters before final defense)
Departmental deadline for Comprehensive Exam is the last day of class the semester BEFORE candidacy



Complete 12 hours of Dissertation research (BME 799) over at least two semesters



Departmental Seminar presentation



Dissertation defense (Submit document at least two weeks prior to defense)
Must meet BME and Graduate School deadlines



Submit at least two journal articles for peer-review publication



Final approval by Committee and Graduate School



Awarding of degree

4. Additional Policies and Guidelines

4.1 Guidelines on Dissertation and Thesis Research

Students frequently ask what constitutes a dissertation or a thesis. There is no direct answer to this question; however the following suggestions might be used as a guideline.

A Ph.D. dissertation:

- provides a substantial increment of knowledge or basic understanding
- has publishable results in reputable, refereed journals
- provides a significant and novel device, instrument, analysis, or process in biomedicine
- contains significant engineering content that brings a unique approach to the solution of the problem that is not available from other disciplines
- contains a suitable increment of originality and uniqueness
- independent, free-thinking approach by student
- NOTE: *Quantity* of work does not substitute for the above requirements!

A M.S. thesis:

- has components of the above, but can be more closely directed by the faculty member.

4.2 Peer-reviewed Dissertation and Thesis Guidelines

A thesis or dissertation may consist of a number of accepted or published papers that are bound together with an introductory and conclusion chapter to form the thesis or dissertation document. The following guidelines are to be followed for this format. The journals selected for manuscript submission must include some biomedical engineering or engineering journals, they should be respected in the field of research, and they should be truly peer-reviewed by the blind referee process. The Dissertation Committee reserves the right to require additional documentation in the dissertation or thesis document in excess of the material presented in the papers. The Dissertation Committee also has the responsibility of judging the quality and suitability of the journals chosen for manuscript submission. Additional information is found in the UAB Format Manual for Theses and Dissertations (<http://www.uab.edu/graduate/format-manual-for-theses-and-dissertations>).

The Committee will use particular care in reviewing material in manuscripts that have not been accepted for publication, but are included as part of the peer-reviewed document. Finally, the format of the thesis or dissertation must ultimately meet the requirements of the Graduate School.

For the peer-reviewed format for the M.S. thesis, all of the above applies, except at least one manuscript is required to have been submitted at the time of thesis defense. Other comments pertaining to the peer-reviewed dissertation format apply.

4.3 Notice to Graduate Students about Required ESL Assessments

The UAB Graduate School has developed an assessment program for all international students, to assess proficiency in spoken and written English. The purpose is to identify each student's precise level of proficiency and to identify "English as a Second Language" (ESL) courses to improve your communication skills. The assessment consists of a 20-minute one-on-one structured interview that will be recorded, and a one-hour writing sample. The interview and writing assessments will be conducted and rated by trained ESL professionals to determine whether you would benefit from additional speaking or writing instruction. The assessment occurs early in the fall, after your arrival to UAB. You will be notified of the exact dates during new graduate student orientation. For more information see <http://main.uab.edu/Sites/gradschool/programs/professional/64594/>.

Your UAB Graduate School ESL Assessment scores will be sent to your department for advising purposes. Based on these scores, one or more ESL courses may be recommended or required by your departmental program, to assist you in your graduate training. Our goal is to provide you with the tools necessary for a successful academic experience at UAB. Examples of the UAB Graduate School Academic English for Internationals classes are in Appendix C.

4.4 Thesis and Dissertation Development, Edit and Review Policy

All students are expected to submit a high-quality thesis or dissertation available to the public that excels technically and meets high standards for structure, grammar, and writing style. It is the responsibility of the research mentor and student to ensure that the thesis or dissertation is technically sound and that the grammar and style conform to the UAB Graduate School requirements (<http://www.uab.edu/graduate/theses-and-dissertations-at-uab>). In the event that the thesis or dissertation does not meet the quality standards established by the BME Department and Graduate School, the mentor or Graduate Program Director may require review by an external editor. The expense for editing is the responsibility of the student, although the mentor may support it from research funds at her or his discretion. The following policies were formulated by the School of Engineering Graduate Program Directors and Department Chairs to ensure that each thesis or dissertation submitted meets Graduate School and School of Engineering requirements for technical excellence and readability.

1. The student works under the direction of the Research Advisor to develop the thesis. When the Research Advisor is satisfied with the content, the thesis is given a 'heavy' edit by an outside reader.
2. The student brings the 'edited' copy of the thesis to the Research Advisor and obtains the Advisors approval to distribute the thesis to the Thesis or Dissertation Committee and the Graduate Program Director.
3. The thesis or dissertation is reviewed by the Thesis or Dissertation Committee and Graduate Program Director, who provide feedback to the Research Advisor on technical content and readability (grammar, etc.).
4. At the Defense, the Thesis or Dissertation Committee members will not sign to approve the thesis or dissertation until they have reviewed it and are satisfied that all needed corrections have been made.
5. After the defense the student works under the direction of the Research Advisor to revise the thesis as necessary. The Thesis or Dissertation Committee members do not sign to approve the thesis or dissertation until they have reviewed it and are satisfied that all needed corrections have been made.

6. The Advisor forwards the revised thesis or dissertation to the Graduate Program Director for signature. The Graduate Program Director reviews the *Final* version of the Dissertation to ensure that it excels technically and meets high standards for structure, grammar, and writing style. The Graduate Program Director either signs to approve or meets with the Research Advisor to discuss any needed corrections.

4.5 Laboratory Safety

The School of Engineering and Department of Biomedical Engineering are strongly committed to laboratory safety. All incoming graduate students are required to complete safety training prior to beginning work in their respective laboratory. Students must read the BME Safety Manual and submit a completed copy of Appendix A to the BME Safety Officer, Dr. Joel Berry (jlberry@uab.edu) prior to being allowed to use laboratory facilities. General safety information is also available at the UAB Occupational Health and Safety (OHS) website (<http://www.healthsafe.uab.edu/default.html>).

The following rules apply to all BME Laboratory spaces:

- All graduate students must attend the School of Engineering Safety Seminar every year. The seminar is held in the fall semester. You will be notified about the time and location of the seminar via e-mail well in advance of the seminar.
- Safety glasses are to be worn at all times unless other eye protection is in use (such as a hood sash, face shield, glove box, etc.).
- Additional personal protective equipment (gloves, lab coats, face shields, etc.) should be used as appropriate for the task being performed.
- Shorts or short skirts are prohibited, garments should reach below the knee. Loose clothing is not recommended particularly in areas with moving equipment.
- No food or drink is allowed in any lab. No eating, drinking, chewing gum or applying makeup.
- Footwear must be of sturdy construction. It must completely enclose the toes.
- Do not run, jump, throw objects or otherwise engage in inappropriate behavior.
- Desk areas within a lab space are considered part of the lab for all rules unless separated from the lab by a partition.
- Lab doors should be closed at all times.

Most students will be required to take additional training depending on their area of research and the type of research performed by others in the same lab space. Use of chemicals, animals, radioactive agents, biologics, human blood or organs and human subjects all require additional training available on the Occupational Health and Safety (OHS) website (<http://www.healthsafe.uab.edu/pages/home/manuals.html>). The guidelines and requirements

for using animals or human subjects in research are particularly involved and can be accessed at the following links (<http://main.uab.edu/Sites/gradschool/research/7875/>).

[Animal Subjects in Graduate Research](http://main.uab.edu/internal/show.asp?durki=34597) (<http://main.uab.edu/internal/show.asp?durki=34597>)
[Human Subjects in Graduate Research](http://main.uab.edu/show.asp?durki=30246) (<http://main.uab.edu/show.asp?durki=30246>)

If you have any questions or concerns please do not hesitate to contact the BME Safety Officer, Dr. Joel Berry via e-mail at jlberry@uab.edu or (205) 996-9661.

4.6 Purchasing, Pay and Other Financial Considerations

Purchases

The University has very specific procedures for purchasing and procurement, and is required to meet numerous state and federal standards. For that reason, there are procedures in place for obtaining bids from vendors, entering into contracts, tracking equipment, surplus warehousing, transfer, and disposal of equipment, etc.

In most instances you will use a purchase order to an approved vendor, or a check request issued in advance of the purchase, to secure supplies, equipment, etc. There are procedures in place for reimbursement of expenses when there is a need for the immediate purchase of items using personal funds. Non-employees, however, are not allowed to make purchases using personal funds and will not be reimbursed! You will best obtain needed items with a purchase order, so plan ahead. The process requires appropriate account information and approvals and takes time. Do not wait until the last minute to place orders! There are also specific requirements for travel for the purpose of training and development. Again, the process must be approved in advance, budgeted and takes time, so plan ahead. You can get information about making purchases from your Program Advisor or Research Advisor, and from BME administrative staff.

Pay Guidelines

Students in the BME Graduate Program are funded in a number of ways and from a number of sources. You should schedule a meeting with the BME Program Manager to complete the required paperwork to be set up for pay and direct deposit. The process for international students requires additional steps, and should be started as soon as you arrive in the Birmingham area. Not allowing enough time to process the paperwork may result in your pay being delayed by a month or more.

As a Trainee receiving a stipend or an Assistant receiving a salary, you will need to complete the appropriate tax forms in ORACLE Self-Service. If you need help, you should seek assistance from your tax professional. International students receiving a salary should schedule an appointment with Daizy Walia in International Scholars and Student Services (ISSS) <http://students.uab.edu/services/show.asp?durki=4224> for assistance with required tax forms.

Additionally, UAB Payroll Services (934-4523; payhelp2@uab.edu; <http://financialaffairs.uab.edu/content.asp?id=144343>) can assist you.

Any student who does not complete the required forms will be taxed at the highest rate.

Tuition payment

Students who receive a tuition scholarship will have their tuition and fees paid by the BME Program Manager. If any changes are made in your schedule after you have received notification that your tuition has been paid, you should contact Mark to make sure there are no changes in your total tuition bill. Late payment of tuition and fees may result in your being dropped from classes and/or charged late fees. The University does not waive late fees, and BME will not be responsible for late fees if you do not notify the BME staff of any changes in a timely manner.

4.7 Miscellaneous Policies

Registering for courses/Academic Advising

Students must complete the courses in the Degree Plan in a timely manner. To register for courses, you will receive a Registration Access Code (RAC) number from the BME Program Manager. The RAC number is sent to the student via e-mail. Please keep this RAC number until the semester is finished. The student should follow the procedures for registration, and register for each term during the dates specified in the *UAB Class Schedule* <http://students.uab.edu/academics/show.asp?durki=5306>.

Students can register their research hours online. If you don't see the advisor listed for research hours, contact the BME Program Manager to add the advisor information to the system.

Computer facilities and computer use policies

Information about computer use at UAB can be found by visiting the Information Technology web page at <http://www.uab.edu/it/policies/index.html>. This site contains numerous policies addressing security, use of cellular phones, software, Internet use, disclosure and confidentiality. Students should pay particular attention to the Acceptable Use Policy <http://main.uab.edu/show.asp?durki=38524>.

Procedures for keys, Blazer ID, key card access to buildings and labs, etc. Key return policy.

Your **CampusCard** is a valuable accessory at UAB, so carry it at all times. It guarantees free or reduced admission charges to special events, allows you to check out books from the UAB libraries, and is required for access to the Campus Recreation Center. You will be given instructions during orientation to set your CampusCard, keys, and key card access to buildings and labs.

Keys and key cards are issued to a particular person, so it is important for you to be responsible for any issued to you. The key card access system monitors and records all card transactions presented to the card readers on the UAB complex. Keys and key cards must be returned when you no longer need that particular key or key card access, or when you leave the university. Duplication is not allowed. If lost, you will be charged for replacement of lost keys and key cards. For additional information, see (<http://main.uab.edu/Sites/PhysicalSecurity/>). For questions please see the BME Program Manager.

Oracle Self-Service is a website that allows you to update your Personal Information, Direct Deposit Information, tax forms, home address, etc. You may find more information on Oracle at http://www.uab.edu/adminsystems/hr_fin_index.php.

A **BlazerID** is a computer login name that is used across campus. For procedures for getting a BlazerID go to <https://blazernet.uab.edu/cp/home/displaylogin>.

Parking information for students is found at <http://www.uab.edu/parking/parking/students>.

Parking is assigned on a first-come, first-serve basis. After-hours parking is available for certain areas. After-hours is defined as 5 p.m. - 6 a.m. weekdays, and all day weekends. This access is free for any graduate student with a deck permit. For those in commuter or resident student facilities, a \$30 per semester charge applies. Current after-hours locations are:

- University Boulevard Deck
 - 5th Avenue Deck
 - Lot 16A (Underneath Education Building)
- Graduate students also have access to the UAB Escort Service (5 p.m. – dawn) and Campus Ride (<http://www.uab.edu/parking/campus-ride-a-escort>)

Appeals and Grievances

The Graduate School Appeals Board policy is in the Graduate Student Handbook. See <http://main.uab.edu/Sites/gradschool/students/publications/>.

BME Primary Faculty

Timothy M. Wick

Professor and Department Chair

Research interests: Tissue engineering and regenerative medicine

Joel L. Berry

Associate Professor

Research interests: Medical device design, cardiovascular biomechanics, cardiovascular and orthopedic tissue engineering, medical device entrepreneurship

Allan C. Dobbins

Associate Professor

Research interests: Functional architecture of the visual system in human and nonhuman primates

Alan E. Eberhardt

Professor and Associate Dean

Research interests: Biomechanics of injury to the pelvis and lower extremities

Vladimir G. Fast

Associate Professor and Graduate Program Director

Research interests: Mechanisms of defibrillation and shock-induced arrhythmias

Dale S. Feldman

Associate Professor

Research interests: Biomaterials enhanced regeneration, tissue engineering, and wound healing enhancement

Ho-Wook Jun

Associate Professor

Research interests: Biomimetic nanotechnology

Jack E. Lemons

Professor, School of Dentistry

Research interests: Biocompatibility profiles of surgical implant devices

Andrew E. Pollard

Professor

Research interests: Cardiac electrophysiology, computer modeling of action potential propagation and experimental techniques for measurement of cardiac electrograms

Jack M. Rogers

Professor and Undergraduate Program Director

Research interests: cardiac electrophysiology including the study of the mechanisms of cardiac arrhythmias

Yuhua Song

Associate Professor

Research interests: Multiscale modeling of biological systems

Rina Tannenbaum

Professor

Research interests: Soft condensed matter, nanoscale self-assembly, chemistry at interfaces

Xincheng Yao

Associate Professor

Research interests: Developing optics based instrumentations for biomedical imaging

APPENDICES

Appendix A: Courses Acceptable for BME Degree Plans

The Degree Plan lists the course work a student intends to take to fulfill the degree requirements. Courses must provide advanced training in interdisciplinary skills necessary to address multidisciplinary biomedical engineering research topics. Courses should complement and augment skills developed in thesis research. Courses are divided into Engineering Mathematics, Biostatistics, Quantitative Physiology, Biomedical Engineering, Physiology and Life Sciences. Biomedical engineering and life sciences courses are intended to provide intellectual depth. Engineering Mathematics and Quantitative Physiology provide a quantitative bridge between biomedical engineering and biosciences. Biomedical engineering and elective courses should extend and integrate the fundamental knowledge to address interdisciplinary biomedical engineering problems.

For the Master's Degree, a student must complete a minimum of 18 semester hours of graduate work (beyond the B.S. degree), three semester hours of BME Seminar, and six semester hours of BME 699 Thesis Research. M.S. students must complete BME 517 Engineering Analysis or ME 661 Math Methods In Engineering (these courses are taught interchangeably depending on the year), BME 670 Quantitative Physiology, and BST 621 Statistical Methods I. The additional nine semester hours should be a combination of life sciences, biomedical engineering or elective courses that provide sufficient breadth and depth to gain the necessary graduate-level, interdisciplinary knowledge to complete the thesis research. **Note that at least three semester hours of BME elective courses and at least three semester hours of Life Sciences courses are required.**

Students directly admitted to the Ph.D. program must complete 36 semester hours of graduate-level course work beyond the B.S. degree, six semester hours of BME Seminar, and a minimum of 12 semester hours of BME 799 Dissertation Research. Ph.D. students must complete BME 517 or ME 661 (these courses are taught interchangeably depending on the year), BME 770 and BST 621. The additional 27 semester hours should be a combination of Life Sciences, Biomedical Engineering or elective courses that provide sufficient breadth and depth to gain the necessary graduate-level, interdisciplinary knowledge to complete the thesis research. **Note that at least six semester hours of BME elective courses and at least six semester hours of Life Sciences courses are required.**

Students who have completed a M.S.B.M.E. at UAB and enter the Ph.D. program must complete 18 semester hours of graduate-level course work beyond the Master's (including BME 517 or ME 661 - these courses are taught interchangeably depending on the year, BME 770 and BST 621 if these courses have not already been completed), three semester hours of BME Seminar, and a minimum of 12 semester hours of BME 799 Dissertation Research. Additional semester hours of course work should be a combination of Life Sciences, Biomedical Engineering or elective courses that provide sufficient breadth and depth to gain the necessary graduate-level, interdisciplinary knowledge to complete the thesis research. **Note that at least three semester hours of BME elective courses and at least three semester hours of Life Sciences courses are required.**

A *brief* memorandum describing the rationale for the selected courses signed by the research advisor *must* accompany the Degree Plan. The student should indicate how the selected courses support the student's research and academic goals. The Graduate Program Committee evaluates the proposed course work with regard to depth, breadth, relevance to

research objectives, and academic rigor. The course work for the M.S. and Ph.D. degree must be at the graduate level (e.g. 500 level or above). UAB does not allow courses below the 500 level for either M.S. or Ph.D. degrees. Except in unusual circumstances, Independent Study or Special Topics courses cannot be used to fulfill coursework requirements. A list of pre-approved life sciences courses can be found at (<http://www.uab.edu/engineering/graduate-programs/bme-graduate-program-documents>). All courses appearing on the Degree Plan must be taken for a letter grade. A grade of 'C' or better must be earned in each course. Students must maintain an overall GPA of 3.2 to remain in good academic standing in the Biomedical Engineering Department.

Under some circumstances, courses taken for a M.S. degree (at UAB or another institution) may be approved by the Graduate Program Committee for the Ph.D. Degree Plan. These courses must be at the graduate level and substantially similar in breadth, depth and rigor to courses offered at UAB. The student must have earned a grade of 'B' or higher in each course. The student should submit a course syllabus or detailed course description and an academic transcript for each graduate-level transfer course appearing on the Ph.D. Degree Plan. Only courses earned in pursuit of a graduate degree at another institution may be considered for inclusion on the BME Degree Plan.

The Degree Plan must be submitted to the Graduate Program Committee in the student's first semester in the BME M.S. or Ph.D. program. The degree plan should be submitted to the BME Program Manager.

A.1 ONLINE GRADUATE CATALOG

<http://www.uab.edu/graduate/graduate-catalog>

Appendix B: UAB Graduate School Fellowship Incentive Program and Sources of Graduate Student Fellowships

Rationale and Goal: Relative to similar institutions which have vigorous research programs and generous external funding, UAB has a number of graduate students who have applied for and secured an individual fellowship to support their pre-doctoral education. We believe that many of our graduate students would be competitive for individual awards. Accordingly, the Graduate School has established an incentive plan designed to encourage more students to apply for individual fellowships.

Plan Description:

1. The Graduate School will provide a monetary incentive for students to APPLY FOR individual fellowships funded by extramural agencies or foundations. Graduate students who apply for an individual fellowship (e.g. NSF Individual, NIH NRSA, or other) will be awarded \$250 from the Graduate School through the UAB Financial Aid office as a reward for submitting the application. To qualify for this award, the application must be reviewed prior to submission by the student's program director or mentor, who must provide a written verification to the Graduate School that the application is considered to be competitive. After submission of the grant application, the student will provide a PDF of the application to the Graduate School and the incentive reward will be authorized when the student provides evidence that the application has been received by the granting agency.
2. If a student's application is funded, the student will receive an additional financial reward.

- a. For an NIH NRSA or other grant that provides less than the base stipend currently being offered to all students in that student's program, the student will receive supplementation of the fellowship stipend to an amount equal to the base stipend plus \$1,000 per year for the term that the grant is funded. If the stipend amount of the external award is equal to or greater than the equivalent of \$1,000 more than the current base stipend in the student's program, the student is entitled to receive the full amount of the stipend.
- b. If a student receives an NSF predoctoral fellowship, he/she will receive no supplement to his/her stipend during the three-year term of the NSF fellowship. This stipulation is necessary because the NSF stipend of \$30,000 exceeds the current maximum stipend allowed by the Graduate School. After the NSF grant terminates, the student's advisor will be responsible for providing the current base stipend in that student's program and the Graduate School will provide the \$1,000 supplement until the student completes his/her degree requirements.

Eligibility: This plan is available to students in any graduate program discipline in which extramural individual fellowship funding is available. To be eligible for both the reward for submitting the application and the supplement to a student's stipend, the award must provide more than half the current base stipend in the student's program. Applications for and receipt of travel and other small grants will not be eligible for an incentive award under this program.

Predocutorial Fellowship Awards in the Biomedical Sciences

These pages are from the UAB Graduate School website. Live links can be accessed from <http://www.uab.edu/graduate/> and from

GENERAL FUNDING AND FELLOWSHIP PREPARATION RESOURCES

[Community of Science](#)

[ScienceCareers.Org](#)

[GrantDoctor](#)

[Career Development: Grants and Grant Writing](#)

[UAB Graduate School Professional Development Workshops](#)

(<http://www.uab.edu/graduate/programs/professional-development-program>)

Grants and Fellowships 101

Writing Fellowships

[UAB Office of Sponsored Programs](#) – UAB processing and forms

[UAB Financial Affairs](#) – Tax information regarding Fellowships and Scholarships

FEDERAL FUNDING SOURCES

National Institutes of Health

- **[NIH Research Training Opportunities: Extramural Training Mechanisms](#)**

[NIH NRSA \(National Research Service Award\) Individual Predoctoral Fellowships](#)

[Individual Predoctoral Kirschstein - National Research Service Awards For M.D./Ph.D. Fellowships \(F30\)](#)

[Individual Predoctoral Kirschstein - NRSA Fellowships \(F31\)](#)

[Individual Predoctoral Kirschstein – NRSA Fellowships to Promote Diversity in Health-Related Research](#)

IMPORTANT: Note that not all NIH Institutes offer Individual Predoctoral NRSA Fellowships.

Also, recipients must be US citizens or permanent residents.

See below for Institute-specific NRSA Fellowship information:

[National Institute of Allergy and Infectious Diseases \(NIAID\)](#)

[National Institute of Biomedical Imaging and Biomedical Engineering \(NIBIB\)](#)

[National Institute on Drug Abuse \(NIDA\)](#)

[National Institute of Neurological Disorders and Stroke \(NINDS\)](#)

[Funding for all NRSA Fellowships and Training Grants by Specific NIH Institutes](#)

NRSA Stipend Levels (*note that the NRSA fellowship stipend is supplemented as required with additional funds to meet current UAB stipend levels*)

[FY 2012](http://grants.nih.gov/grants/guide/notice-files/NOT-OD-12-033.html) (<http://grants.nih.gov/grants/guide/notice-files/NOT-OD-12-033.html>)

[NRSA Funding Policy concerning Tuition and Benefits](#)

NIH Dissertation Awards (R36)

[Aging Research Dissertation Awards to Increase Diversity \(R36\)](#)

[AHRQ Grants for Health Services Research Dissertation \(R36\)](#)

[NIDA Drug Abuse Dissertation Research: Epidemiology, Prevention, Treatment, Services, and Women and Sex/Gender Differences \(R36\)](#)

[NIMH Mental Health Dissertation Research Grants to Increase Diversity in the Mental Health Research Arena \(R36\)](#)

And for the Future – a sample of NIH *Postdoctoral* Funding Opportunities

[Individual Kirschstein Postdoctoral Fellowships \(F32\)](#) (offered by ALL NIH Institutes)
[NIH Pathway to Independence \(PI\) Award](#) (offered by all NIH Institutes)
[NIH Research Supplements to Promote Diversity in Health-Related Research](#)

NIH Resources

[NIH Forms and Applications](#)

[Individual NRSA Forms and Instructions](#) (PHS 416-1)

[Individual NRSA Progress Report for Continuation Support Forms](#) (PHS 419-9)

National Science Foundation

[NSF Graduate Research Fellowship Program](#)

[NSF Doctoral Dissertation Improvement Grants](#)

[Specialized Information for Graduate Students](#)

Department of Defense (<http://www.defense.gov/>)

Department of Homeland Security (<http://www.dhs.gov/>)

PRIVATE ORGANIZATION SOURCES

[American Association of University Women*](#)

[American College of Rheumatology Medical and Graduate Student Achievement Award](#)

American Heart Association (<http://www.heart.org/HEARTORG/>)

[American Lung Association](#) (<http://www.lung.org/>)

[American Medical Association Foundation Seed Grants](#) (M.D./Ph.D. student interest)

[American Physiological Society:](#) (minority fellowships, travel awards - <http://the-aps.org/>)

American Society for Microbiology (<http://www.asm.org/>)

[APA Predoctoral Fellowships in the Neurosciences](#) (<http://www.apa.org/pi/mfp/index.aspx>)

[Cystic Fibrosis Foundation](#) (summer or supplement awards)

[Crohn's and Colitis Foundation of America*](#) (summer or supplement awards -

<http://www.ccfa.org/>)

[The Epilepsy Foundation](#)

[Lupus Foundation of America*](#) (summer or supplemental awards)

[PHRMA Fellowship Awards in Pharmacology](#) (one predoctoral application allowed per institution)

[PHRMA Fellowships in Health Outcomes Research](#)

** Denotes awards that are not restricted by US citizenship eligibility requirement*

UAB FUNDING SOURCES

The Graduate School resources guide (<http://www.uab.edu/graduate/area-3/current-students/90-funding-information-for-graduate-students>)

[Howard Hughes Medical Institute-funded UAB Hughes Med Into Grad Fellowship Program](#)

Funding Resources to Enhance Diversity in Biomedical Research

FEDERAL SOURCES

[Agency for Healthcare Research and Quality](#)

[Individual Predoctoral Kirschstein – NRSA Fellowships to Promote Diversity in Health-Related Research](#)

[NIH Research Supplements to Promote Diversity in Health-Related Research](#)

[NIH NCI Opportunities for Training and Career Development for Minority Individuals](#)

[NIH NRSA Institutional Training Grants: Minority Supplements for NCI-Supported NRSA](#)

[NIH NAID Biodefense Research Training and Career Development Opportunities](#)

[NSF Graduate Student Travel Award](#) (for visiting prospective postdoctoral sponsors)

PROFESSIONAL SOCIETY SOURCES

[AACR Minority Scholar Awards in Cancer Research \(travel award\)](#)

[American Physiological Society:](#)* (minority fellowships, travel awards - <http://the-aps.org/>)

American Society for Cell Biology (<http://ascb.org/>)

[American Society for Microbiology](#) (<http://www.asm.org/>)

[FASEB/MARC Programs](#)

[FASEB MARC Travel Awards](#)

[Ford Foundation](#) (<http://www.fordfoundation.org/>)

[Graduate Women in Science Fellowships](#) (<http://gwis.org/>)

[Society for Neuroscience Scholars Program](#)

[UNCF/Merck Science Initiative](#)

Special Interest Training

[AAAS Mass Media Science and Engineering Fellowship](#)

[Grass Fellowships in Neuroscience at the Marine Biological Laboratory](#) (14 week summer research program)

[The National Academies: Internship Program in Science Policy](#)

Appendix C: UAB Graduate School Professional Development Courses

Courses offered are described below. Additional information is available on the Graduate School website: www.uab.edu/profdev.

Academic Writing

GRD 726 Introduction to Research Writing. Designed for international students and researchers who want to write and publish in English-language journals. Offers small-group instruction, research writing practice, peer review, instructor feedback, and techniques in self-editing. Spring, Summer and Fall. Pass/No Pass.

GRD 727 Writing and Reviewing Research. Designed for individuals writing research and review papers. Offers instruction in strategies and techniques, practice, peer review, and instructor feedback. Instructor approval required for second-language writers. Note: Self motivated? Working from home? Take GRD 727 online. Spring, Summer and Fall. Pass/No Pass.

GRD 728 Professional Writing and Publishing. Designed for researchers seeking to write and publish professionally. Includes writing in field, peer review, self-editing, and coaching. Instructor approval required for second-language writers. Spring and Fall. Pass/No Pass.

GRD 729 Writing a Journal Article in 12 Weeks. For students and scholars with a working paper to revise and target for article publication.

GRD 737 Successful Dissertation Writing. This semester-long workshop for dissertation writers encourages efficient writing progress according to the writers' stated goals. Building on strategies from GRD 736, writers set short-, mid-, and long-term goals, and then assess their writing progress. Writers meet in class to learn specific dissertation writing practices, to develop effective peer-editing skills, and to provide support for their own practice and for that of their classmates. Writers will send drafts regularly to the professor for writing coaching and will meet individually with her once a month to discuss and to support progress.

Research Writing Workshops

GRD 709 Fellowship Writing. This hands-on workshop deals with issues related to locating funding sources. The three meetings address, in order, using the [Community of Science](#) database to locate funding sources (group meeting, Lister Hill Library Room G40), completing application materials (group meeting, HUC Room TBA), and revising and submitting (individual meetings, HUC 511).

GRD 736 Dissertation Strategies. Designed for graduate students who are preparing to start a dissertation within the next year. Topics include creating a dissertation committee, crafting a proposal, outlining the text, and managing the writing and reviewing process. Designed to help doctoral students map out a strategic plan for managing the dissertation writing process.

Spring, Summer and Fall. GRD 736 is the prerequisite for GRD 737 Successful Dissertation Process (offered spring semester).

GRD 708 Writing Successfully. Overview and exercises in approaches to writing.

Oral Communication

GRD 720 Navigating Academia.

Speaking and listening course for international graduate students, post doctoral fellows, and employees seeking to develop the English language skills needed to excel in a sometimes confusing U.S. academic environment - and beyond. Students will discover strategies for communicating effectively with instructors and advisors, classmates and colleagues, in the classroom or meetings, by telephone or e-mail. Students will explore the language needed to take advantage of campus and off-campus services. Online course components will promote the development of speaking skills, grammatical accuracy, and pronunciation. Recommended for all entering international graduate students and others who wish to improve their spoken English both in an academic setting and in the wider community. Intermediate through advanced. Spring, Summer and Fall. Pass/No Pass.

GRD 721 Academic Interactions.

Speaking and listening course for international graduate students, post doctoral fellows, and employees seeking to develop and further refine the English language skills necessary to interact effectively and confidently when speaking to one person or to a group. Students will discover strategies for handling speaking tasks of increasing complexity, ranging from face-to-face conversations, to small group discussions, to professional presentations. Students will also develop skills for handling challenging interactions, including expressing an opinion, agreeing and disagreeing, and adapting to high stakes situations such as job interviews. Online course components will further promote the development of vocabulary, grammatical accuracy, and pronunciation. Prerequisite: Advanced-level placement, successful completion of GRD 720, or permission of instructor. Spring, Summer and Fall. Pass/No Pass.

GRD 730 Developing Your Professional Image.

Build communication skills and learning strategies while exploring cultural values. Through small-group interaction, students learn to effectively discuss their opinions, organize effective talks, and analyze complex problems. This Level 3 course prepares students for the kinds of communication expected in graduate school —participating in academic discussions; debating scholarly projects with colleagues; and delivering formal talks at professional meetings.

Prerequisite: Advanced-level placement, successful completion of GRD 721 or permission of instructor. Spring, Summer and Fall. Pass/No Pass.

GRD 711 Advanced Conversation. Polish your conversation skills while discussing an array of contemporary issues and timeless themes. Summer. Pass/No Pass.

Appendix D: Plagiarism

What is plagiarism?

Using other people's work (in a variety of forms) in part or in whole and representing it as your own.

What is documentation?

A systematic way of indicating the original source of the material or information used in your own work.

Examples of two types of documentation format:

1. Author-Date:

In-text citation

- According to Linden (1986). . . .
- Kanzi, a bilingual bonobo, has been instrumental in renewing interest in animal intelligence (Linden, 1986).

Reference list:

Linden, E. (1986). Silent partners: The legacy of the ape language experiments. New York: Times.

2. Citation-Sequence:

In-text citation:

- According to Linden¹¹
- Kanzi, a bilingual bonobo, has been instrumental in renewing interest in animal intelligence.¹¹

Reference list:

¹¹Linden E. 1986. The legacy of the ape language experiments. New York: Times.

What format style should be used for documentation?

- A style presented in a style manual commonly used by professionals in your discipline
- A style used by journals in your field
- A style presented in a style guide published by a professional organization in your field

What are style manuals?

Style manuals are handbooks that give reference, layout format, and, in most cases, grammar and punctuation rules.

Three of the most commonly used style guides are

- *Publication Manual of the American Psychological Association (APA)*
- *Scientific Style and Format: The CBE Manual for Authors, Editors, and Publishers (now the Council of Science Editors--formerly Council of Biology Editors)*
- *American Medical Association Manual of Style*

If I'm using a journal's style format, where do I find that?

Academic journals have a "Guide for Authors" or "Instructions for Authors," available either in the print journal or on their web site. You also should look at articles in the most recent issues of the journal.

What needs to be documented?

- Another person's idea or opinion
- Anything published, including web materials
- Your own published work
- Interpretations
- Drawings or photographs
- Charts and graphs
- Lab results
- Lecture notes
- Professional presentations
- Techniques and procedures
- Surveys and test instruments

What does *not* need to be documented?

Common knowledge

What is “common knowledge”?

- “Bare-bone” facts from a dictionary or other basic reference books
- Dates, titles of principal works or studies, proper names
- Scientific and technical terms
- Example of common knowledge:
 “Watson and Crick proposed a spiral model of DNA, the double helix.”

How can you effectively and appropriately use secondary source material in your writing?

- Direct quotation
- Copies the exact words of a source
- Is used sparingly in graduate-level writing
- Paraphrase
- Restates source information in your own words
- Assimilates research into a single style of writing to avoid awkward sentence structure, choppiness, or both
- Summary
- Condenses an entire article, chapter, book, or web source
- Is much shorter than the original
- Re-presentation
- Draws on original source material to create tables,

How can I effectively (and ethically) paraphrase?

1. Read *and understand* the original source.
2. Use a highlighter pen *only* if you are going to write notes also.
3. Write the bibliographic information down carefully and completely.
4. Make notes using words, phrases, or a short string of words. Do NOT copy full sentences or long sections of text.
5. Leave the material for a period of time, at the very least several hours but preferably several days.
6. When you write *your* paper, use only the notes that you've taken.
7. *Never* write your paper while looking directly at the original text.
8. *Absolutely never* write your paper with photocopies of original texts in which sentences have been highlighted spread around you.
9. Place appropriate citations in your text to indicate sources.

10. After writing a complete section such as the background, verify details included in your paper by using the original text.

11. Add details or make other adjustments if what you have written misrepresents the original text.

Be prepared—Plan ahead!

Effective (and ethical) writing takes time.

From <http://main.uab.edu/Sites/gradschool/students/orientation/7575/>

Appendix D: BME Graduate School Handbook Acknowledgement of Receipt

ACKNOWLEDGEMENT OF RECEIPT

I do hereby acknowledge that on the date noted below I received a copy of the Department of Biomedical Engineering Graduate Student Handbook August 2012 which contains important information on requirements, policies and procedures. I understand that I am responsible for familiarizing myself with the information in this handbook, and I agree to comply with and to abide by all BME Department, Graduate School and UAB policies. I understand that the BME Graduate Program at UAB reserves the right to make changes to its requirements, policies and procedures, and this handbook, at any time at its discretion. I further understand that the BME Graduate Program at UAB reserves the right to interpret its policies or to vary its procedures, as it deems necessary or appropriate. The BME Graduate Program at UAB will issue to providers any amendments made to this handbook when necessary.

By signing below, I am signifying that I have received the Handbook and agree to abide by all BME Department, Graduate School and UAB policies.

Name

Date