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# 2021-22

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## Graduate Program Handbook

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Department of Biomedical  
Engineering | UVA

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# 1. INTRODUCTION

## 1.1 WELCOME TO THE DEPARTMENT OF BIOMEDICAL ENGINEERING (BME)

We welcome you to the Department of Biomedical Engineering. Our mission is to develop intellectual leaders in the field of biomedical engineering. We hope that this student handbook will help you accomplish this goal, and make your time here both stimulating and rewarding.

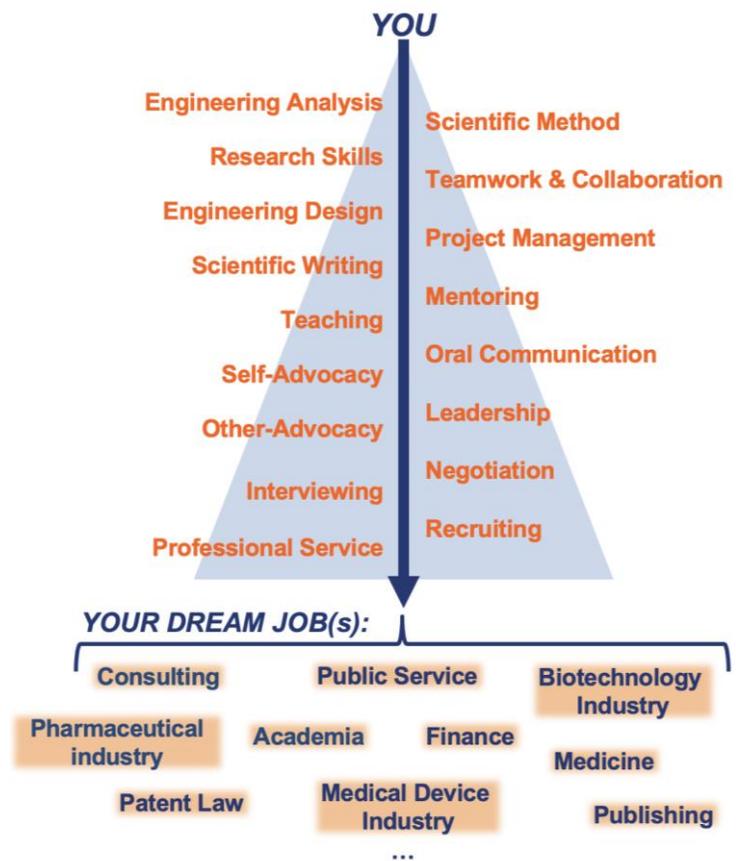
Our program has a long-standing commitment to teaching and research education. Faculty research focuses in cardiovascular bioengineering, biomedical & molecular imaging, cellular & molecular bioengineering, cancer engineering, tissue engineering & biomaterials, musculoskeletal bioengineering, and systems biology & computational bioengineering. This diversity highlights the field of biomedical engineering as an exciting multidisciplinary engineering profession.

The BME Department leads several partnerships between the Schools of Engineering and Medicine, the School of Data Science, and the College of Arts and Sciences. As an example, a number of faculty in the department collaborate closely with researchers in the Cardiovascular Research Center, Cancer Center, and Departments of Radiology, Surgery, Cardiology, Center for Public Health Genomics, and many other centers and departments across Grounds. The integration of a wide spectrum of engineering and medical research in the BME department provides the foundation for a leadership position in BME research and education at the University of Virginia and in the nation.

Graduate school is a place to explore the boundaries of the possible and develop your scholarship potential to the highest level. This is the time to develop your independent thinking, seize the opportunity to interact with a wide range of talented student and faculty colleagues, enjoy the riches of the university environment, and be creative in everything you do. We welcome you as a partner in learning and as a colleague in BME.

Frederick Epstein, Ph.D.  
Professor and Chair  
Department of Biomedical Engineering

Shayn Peirce-Cottler, Ph.D.  
Graduate Program Director  
Department of Biomedical Engineering



## 1.2 OVERVIEW OF HANDBOOK AND DEPARTMENT PERSONNEL

This handbook has been prepared to assist you to make the transition into our graduate program and to serve as a resource for you during your pursuit of a graduate degree. The Graduate Record of the University of Virginia provides a comprehensive guide of your rights and responsibilities as a graduate student and can be found at <http://records.ureg.virginia.edu/index.php>.

In addition to the handbook, there are a number of “people behind the scenes” who help the day-to-day work of the department go forward smoothly, and who are also able to serve as resources for you.

Name	Role	Duties
<a href="#">Tracy Burcin</a>	Lab Specialist /IT Assistant	Assist with laboratory equipment purchasing/troubleshooting/repair. Assist with IT equipment purchasing/troubleshooting/repair.
<a href="#">Henry Pritchard</a>	Information Technology	The department’s computer support technician
<a href="#">Kitter Bishop</a>	Undergrad Program Coordinator and Public Relations/Special Projects	Manages undergraduate program, Manages special events and handles department public relations/communications.
<a href="#">Connie Pace</a>	Pre-Award Grants Administrator	Assist faculty and students with grant proposals and submissions.
<a href="#">Ian Gercheck</a>	Post-Awards Grants Administrator	Assist faculty and students with grants management and budgeting.
<a href="#">Keisha Jones</a>	Executive Assistant to Chair	Chair’s Assistant; Room Reservations; office supplies; Seminar Speaker Schedules.
<a href="#">Crystal Lamm</a>	Unit Administrator /Human Resources	Manages BME Office Staff Human Resources contact for Faculty, PRS and Staff; Department Budget
<a href="#">Anita Dodds</a>	Senior Purchaser	Assists with purchases over \$10,000 and travel reimbursements for SoM accounts.
<a href="#">Cassandra Scruggs</a>	Senior Fiscal Tech	Assists with purchases less than \$10,000 and travel reimbursements for SEAS accounts.
<a href="#">Hannah Moore</a>	Coulter Translational Partnership Coordinator	Manages Coulter Program.
<a href="#">Kim Fitzhugh</a>	Graduate Program Manager	Manages BME Graduate Program/ BIMS Administrator

## 1.3 OVERVIEW OF DEGREE EXPECTATIONS

Biomedical Engineering represents an interface between engineering, medicine, and science. Consequently, it must draw on the full range of knowledge accumulated in the life sciences, medicine, the physical sciences and mathematics, and engineering. Technological development as well as the implementation of concepts, methods, and products in biomedical engineering requires competency in both the fields of engineering and medicine.

The ME, MS, and PhD degrees form the core of the BME graduate educational program. These degrees have the broad goal of educating students with the knowledge and skills needed to succeed in careers in research and development. Students intending to pursue a PhD in Biomedical Engineering are encouraged to apply to do so at the beginning of their studies at Virginia. *They may proceed directly to a PhD or earn a Master of Science degree along the way.* Successful completion of these degrees will require that a student meet the following expectations, in addition to the formal degree requirements:

- 1. Completion of original research and/or design project.** Students will complete a research project under direction of their faculty advisor. The end goal of this work should be experimental or simulation results, methods, and analysis which are of a level of quality sufficient for presentation in a refereed publication. To achieve this end, students will need to make a novel contribution to their respective fields. Students should always be aware that

research is not a job performed for the benefit of his or her faculty advisor, but rather is an integral part of graduate education. As such, students must take initiative and responsibility for the success of their research.

2. **An ability to think critically.** Successful students will be able to evaluate the validity of new results and ideas. They will be able to make precise statements about limitations of experimental methods and identify the weaknesses of new and existing hypotheses. They will be able to identify the next step in their research and design experiments to test their hypotheses and/or designs.

3. **Critical knowledge of the core literature in their field.** Students should know the central literature in their field. They should be aware of the important implications and possible limitations of existing knowledge.

4. **Excellent oral and written presentation skills.** Success in both academics and industry requires clear communication of ideas to technical and lay audiences. Students should use graduate school as an opportunity to hone presentation skills.

5. **Completion of formal course requirements.** Course work provides students with basic knowledge, abstract reasoning, and problem solving skills central to the field of Biomedical Engineering. In addition, advanced courses in the School of Engineering and Applied Science and in the School of Medicine offer knowledge and skills that can be applied to specialized areas of research.

### ***Course Expectations:***

All graduate students in the BME Department will complete their core course requirements and electives- chosen in consultation with advisors and/or committee- with a minimum of a 3.0 GPA.

- Graduate students will note that graduate level courses are designed around knowledge development. When this is successful, grades will follow. Any discussions with instructors will focus on course constructs rather than grades.
- Students having trouble in any given course are urged to discuss their difficulties in knowledge acquisition or comprehension with the instructor and advisor early on and as soon as difficulty is noted.
- No grade lower than a C in any class will count toward the requirements for this graduate degree. Hence, if a student earns a grade lower than a C, he/she/they must repeat the course and earn a C or better for that course to count toward their degree program.
- Undergraduate courses and courses taken on a Credit/No Credit basis may not be used to meet requirements for a graduate degree. Students who earned a grade of Credit (CR) under the UVA COVID-19 Credit/General Credit/No Credit grading option in Spring 2020, Fall 2020, J-Term 2021, and Spring 2021 that would have otherwise counted toward curricular, major, and graduation requirements will continue to do so, but such grades are not factored into a student's GPA.
- Note that if your cumulative GPA drops below 3.0 in one semester you will immediately be put on Academic Probation by the Engineering School.
- You will have only one additional semester to bring your cumulative GPA above 3.0, or you will be dismissed from your graduate program.

### ***Incomplete Grades:***

Incomplete grades are possible, and may be helpful in certain events. The following procedures must be followed:

- Prior to the last **week** of class, students must initiate the request for an IN and secure the instructor's approval in writing via email.
- The student must also secure permission from their advisor.
- Final permission must be requested of the Graduate Program Director/Committee.
- If an incomplete is approved, a timeline must be developed with the instructor and advisor which details work to completion for the course.
- This timeline will serve as a working guide, and must be forwarded to the Graduate Studies Director for final approval, and the Graduate Coordinator for documentation within the student's file.

- On-going communication between student and instructor is viewed as critical, and a core component in developing workforce skills. The timeline may be amended as needed and agreed upon by all parties involved.
- Failure to follow this agreed upon timeline, and *failure to communicate any difficulties faced* in following the agreed upon guide, will be considered a failure in completion of the course, and the grade earned to date will be entered.
- If the course is not completed by 200 days from the last day of when the course officially ended, the grade will automatically convert to an “F”, as per policies within the Engineering School and UVA.

**Research/TA Grades:**

Masters of Science and Pre-Comp PhD students will sign up for BME 8999 credits. Post-Comp PhD students will sign up for BME 9999 credits under their mentor’s supervision. Students who are performing TA duties- whether to satisfy academic requirements, or as service to the department- will sign up for 1 credit of BME 8900.

- Grades of S indicate the student has performed their research/TA duties satisfactorily for that term or session.
- A single semester with a “U” grade indicates that the student is lacking- whether in knowledge, effort or initiative- and should seek greater guidance from their advisor/supervisor.
- Sequential semesters with a “U” grade are an indicator that the student is failing to progress in the graduate program.
- Consequently, students should understand that two consecutive semesters with a “U” grade **may** release the advisor and the department from obligation to continue to fund the student.
- The graduate program director will be notified by faculty advisors of “U” grades.
- Grades of U **will not** satisfy the TA requirement for PhD students.

6. **Failure to progress through the degree program.** When a student fails to progress in their degree program, as determined by the Graduate Program Director or Department Ombudsman, the student will be dismissed from the graduate program.

- Failure to progress is defined by the student’ failure to progress in research, coursework, teaching (TAship), and/or a combination thereof.
- If a student fails to progress, this will be brought to the attention of the Graduate Program Director (or Department Ombudsman) by the student’s advisor and/or PhD or MS Committee member(s), and the specific points will be detailed to the student in writing.
- The Graduate Program Director (or Department Ombudsman) will meet with the student and their advisor to discuss the evidence of the student’s failure to progress, as well as the reasons why student has failed to progress.
- The Graduate Program Director (or Department Ombudsman) will decide if there is ample evidence to support that the student has failed to progress.
- In this event, the student must leave the program without a degree.
- Failing to progress may be evidenced by receiving a grade of “unsatisfactory” (U) in research and/or TAship.
- Decisions to discontinue funding or to release students from the department are made in consultation with the advising faculty member, program director, and department chair, but may also include core course instructors as well as others who might inform the decision.
- At the discretion of the advisor and the Graduate Program Director (or Department Ombudsman), if the student was in the PhD program, he/she/they may be given the option to write and defend a Masters Thesis and earn their MS degree, but having this option is not a guarantee.
- Additionally, if the student feels he/she/they can improve their progress by switching to another lab, the student may petition the Graduate Program Committee to stay in the program, but only if the student identifies a new advisor who is willing to support that student (e.g., financially, if the student is in the PhD program).

- Note that a student can be asked to leave a lab even if they are progressing at a normal rate through the degree program (see §2.2.1 below).

In addition to the above outlined curriculum and guidelines, students at the University of Virginia are subject to the University's academic, financial, and non-academic rules and regulations.

<https://uvapolicy.virginia.edu/policy/PROV-001>

Students are also subject to the academic policies of the School for Engineering and Applied Sciences. The information contained herein and any other information conveyed to students is subject to change at any time by the authorities responsible for making these rules and regulations. The University reserves the right to suspend, enforce the withdrawal of, or expel a student who violates the University's Standards of Conduct or whose academic standing is, in its judgment, unsatisfactory. In addition, the University will automatically enforce the dismissal of a student certified by the Honor Committee to be guilty of a breach of the Honor System, and, where applicable, will consider revocation of a degree already conferred.

7. **Medical leave of absence.** It is possible at any point in their graduate training for a student to take a Medical Leave of Absence (typically 3-6 months), which is unpaid. The student must discuss this decision (but not the medical causes underpinning it) with their advisor and the Graduate Program Director before making this decision. There is no guarantee that when the student returns from Medical Leave funding will still be available to support the student. Therefore, in addition to obtaining approval from the Engineering School to return from Medical Leave, the student must also obtain approval from their faculty advisor and the BME Graduate Program Director in order to be able to return from Medical Leave.

## 2. EDUCATIONAL PROGRAMS AND REQUIREMENTS

### 2.1 PROGRAM ADMINISTRATION

Following is a list of committees designated to advise you on all aspects of BME graduate education. The committee members, your advisor, and the Department Chair are all available for consultation. A complete listing of committees and their members is included in Appendix III.

#### 2.1.1 GRADUATE ADMISSIONS COMMITTEES

- Recruits students to apply and evaluates admission applications.
- Recommends new graduate students for admission and financial support.
- Provides mentoring and guidance for newly admitted ME students

#### 2.1.2 GRADUATE PROGRAM COMMITTEE & GRADUATE PROGRAM DIRECTOR

- Sets the ME, MS, and PhD requirements and approves programs of study.
- Formulates and assesses the course requirements for the degrees of ME, MS, and PhD.
- Oversees the graduate curriculum (e.g., approves new courses)
- Nominates students for awards.
- Provides mentoring and guidance for newly admitted MS and PhD students and advises all PhD students (along with their MS Committee or PhD Committee) concerning the MS or PhD programs, including the announcement of the defense of the proposal and dissertation.
- Validates and approves results of all relevant examinations (qualifying exams, dissertation proposals, master's theses, and dissertation defenses).
- Processes administrative forms such as **Plan of Study** and **Doctoral Advisory Committee**.

- h. Decides when students are not progressing through the program and excuses students from the degree program when necessary.

## 2.2 MENTORING POLICY

### 2.2.1 FACULTY ADVISING FOR MS AND PHD STUDENTS

Faculty advisors (usually the research project advisor) provide guidance to students on structuring their programs of study, career goals, identifying learning opportunities, and carrying out research of mutual interest. It is expected that advisors and students meet regularly to discuss progress. Additionally, PhD are required to meet annually with their advisors to fill out and discuss the **Individual Development Plan** (see form in Appendix), and the deadline for doing this is Jan 31<sup>st</sup> of each year. An annual IDP is recommended, but not required, for MS students.

In the event that either the advisor or student (or both of them) feels that the student should no longer remain in the lab of the advisor, they each have the autonomy to make that decision in consultation with the Graduate Program Director or Departmental Ombudsman.

- This decision can be made by the advisor or student at any point in the student's graduate training.
- The Graduate Program Director or Departmental Ombudsman must approve the decision in order for it to be official.
- In the event that a student is asked by their advisor to leave the lab, in order for the student to remain in the degree program, the student must identify a new lab and mentor who is willing and able to financially support the student for the remainder of their time in the degree program.
- In the event that a student decides to leave the lab, in order for him/her/they to remain in the degree program, he/she/they must identify a new lab and mentor who is willing and able to support the student for the remainder of their time in the degree program (and provide financial support if the student is in the PhD Program).
- The student will be granted two weeks to identify a new lab and advisor after they are dismissed from or depart from the lab.
- At the end of that two week period, if the student has not found new advisor, he/she/they will be dismissed from the graduate program.
- If the student wants more time to identify a new advisor, he/she/they can petition the Graduate Program Committee accordingly.

*Note that it is possible for a student to be asked to leave a lab even if they are progressing at an adequate pace through their degree program.*

### 2.2.2 PHD DISSERTATION COMMITTEE AND MS THESIS COMMITTEE

The PhD Dissertation Committee and MS Thesis Committee provides broader scientific and academic advising for the student. The **committee should meet with the student at least once a year** to advise and evaluate progress towards graduation. The committee chair leads this committee and supports the student and the advisor through the process of meeting graduation requirements. The requirements for the PhD Dissertation Committee composition are found in §2.8.2 and the requirements for MS Thesis Committee are found in §2.7.1.

### 2.2.3 FACULTY ADVISOR FOR ME STUDENTS

The Director of the ME Program serves as the official faculty advisor to ME students. The advisor provides guidance to students on structuring their programs of study, career goals, identifying learning opportunities, and carrying out research projects. It is expected that the advisor and students meet regularly to discuss progress. The ME program is supported by a community of clinical, academic and industry mentors.

## **2.2.4 OMBUDSMAN**

Students are encouraged to express their comments and concerns regarding their experiences in the graduate program in Biomedical Engineering. In order to ensure that students have a point of contact for such concerns in addition to the Graduate Program Committee, students are also welcome to discuss concerns confidentially with the BME Graduate Program Ombudsman, Dr. Jason Papin. In addition, there is a university ombuds (Brad Holland) that can be reached at [ombuds@virginia.edu](mailto:ombuds@virginia.edu), with additional contact information here: <https://eocr.virginia.edu/ombuds/contactlocation>. The ombudsman should be considered by the students as individuals who are available for confidential discussion of concerns regarding their education. Any student can request a meeting with either the BME Graduate Program Ombudsman or the University Ombuds at any time. This site explains the purpose and limitations of ombudsman: <https://eocr.virginia.edu/ombuds-faqs>. Additional resources are provided here: <https://eocr.virginia.edu/ombuds/university-resources-students>.

## **2.3 ENGLISH LANGUAGE PROFICIENCY**

All new graduate students whose first language is not English are tested for English proficiency prior to their first semester at UVA. All non-native speakers of English take the Virginia English Language Proficiency Exam (UVELPE) and the SPEAK Test, which are administered by the Center for American English Language and Culture (CAELC). Students must take the SPEAK Test before commencing their BME Teaching Experience. CAELC provides a program of mandatory courses in preparation for success in our English language graduate programs at UVA.

## **2.4 GENERAL ACADEMIC REGULATIONS**

### **2.4.1 STUDENT STATUS AND RESIDENCY REQUIREMENTS**

Graduate degree Programs require a period of residency to fully engage in the UVA academic community and to actively contribute to intellectual discourse within the School. For students coming into a PhD program with a master's degree, at least two regular semesters beyond the master's degree one semester in full residence at UVA in Charlottesville. For students coming into a PhD program with a bachelor's degree, at least three regular semesters are required. For a master's degree program, at least one semester is required.

A student receiving financial support from the Biomedical Engineering Department, the School of Engineering and Applied Science, or the School of Medicine, must be registered full-time, defined as at least 12 credit hours of lecture/laboratory courses and/or research per semester during the academic year, and 6 credit hours of research only during the summer session. Students receiving School of Engineering and Applied Sciences funding, research grant based funding and/or graduate program funding are not permitted to have other employment without approval of their advisor, the BME Graduate Program Director, and the SEAS Office of Graduate Programs. For further information, refer to the Graduate Record.

<http://records.ureg.virginia.edu/content.php?catoid=53&navoid=4181>

### **2.4.2 TIME LIMIT FOR DEGREES**

The time limit for completion of the MS is five years after admission. The time limit for the ME and PhD degrees is seven years after admission.

### **2.4.3 TRANSFER OF CREDIT**

Master of Science candidates may transfer a maximum of 6 credits of approved graduate courses into the program. Master of Engineering candidates may transfer 12 hours of graduate credit. Doctor of Philosophy candidates' requests for transfer of courses from other schools of recognized standing must be submitted for approval *at the same time as* the program of study.

These graduate courses must have been completed at another school of recognized standing. They cannot have been used to satisfy requirements for another degree, and only courses with a grade of B or better may be transferred. All requests for the inclusion of transfer credit in the University of Virginia program of study are

subject to the approval of the candidate’s academic department and the Director of Graduate Education. Transfer credits should be submitted on the Request [Approval of Transfer Credits form](#).

#### 2.4.4 GRADUATE COURSE DROP DEADLINE

The last date for dropping a graduate course is posted in the UVA [academic calendar](#). Note that this date differs by school.

#### 2.4.5 INCOMPLETE GRADES

Incomplete grades are possible, and may be helpful in certain events. The following procedures must be followed:

- Prior to the last **week** of class, students must initiate the request for an IN and secure the instructor’s approval in writing via email.
- The student must also secure permission from their advisor.
- Final permission must be requested of the Graduate Program Director/Committee.
- If an incomplete is approved, a timeline must be developed with the instructor and advisor which details work to completion for the course.
- This timeline will serve as a working guide, and must be forwarded to the Graduate Studies Director for final approval, and the Graduate Coordinator for documentation within the student’s file.
- On-going communication between student and instructor is viewed as critical, and a core component in developing workforce skills. The timeline may be amended as needed and agreed upon by all parties involved.
- Failure to follow this agreed upon timeline, and *failure to communicate any difficulties faced* in following the agreed upon guide, will be considered a failure in completion of the course, and the grade earned to date will be entered.
- If the course is not completed by 200 days from the last day of when the course officially ended, the grade will automatically convert to an “F”, as per policies within the Engineering School and UVA.

#### 2.4.6 OUTCOME ASSESSMENT

The School of Engineering and Applied Science has instituted an outcome assessment program. A set of student learning outcomes and associated assessment forms has been defined for each graduate program. The level of achievement of each outcome will be evaluated for every student as the student proceeds through the program. More information about outcome assessment (and the associated forms) can be found <https://engineering.virginia.edu/current-students/current-graduate-students#accordion153167>  
<http://www.seas.virginia.edu/advising/allforms.php>

### 2.5 BME ACADEMIC REQUIREMENTS FOR ME, MS, PHD, AND MD/PHD DEGREES

	ME	MS	PhD	PhD (with prior MS)	PhD/MSTP <sup>5</sup>
<b>Coursework Requirements<sup>1</sup></b>					
Core Courses required:	BME 6101 and 6310	BME 6101, 6310, 6311			BME 6310 and 6311
Graded credit hours of coursework	35	24	24	12	18
Elective Educational Experiences	N/A	N/A	2	2	1
Research course hours <sup>2</sup>	BME 8995 3 credits	BME 8999 6 credits	BME 8999 (before comps), BME 9999 (after comps), 24 credits	BME 8999 (before comps), BME 9999 (after comps), 24 credits	BME 9999 24 credits
<b>Total overall credits</b>	<b>35</b>	<b>30</b>	<b>48</b>	<b>36</b>	<b>42</b>

<b>Other Requirements</b>					
Qualifying Exam (by beginning of 3 <sup>rd</sup> year)	N/A	N/A	required	required	required
Proposal of Research (by beginning of 4 <sup>th</sup> year)	N/A	Written <sup>3</sup>	Oral & Written	Oral & Written	Oral & Written
Final Oral Presentation	Required for ME Project	Thesis Defense	Dissertation Defense	Dissertation Defense	Dissertation Defense
Final Written Report	Required: ME Project	Required: MS Thesis	Required: PhD Dissertation	Required: PhD Dissertation	Required: PhD Dissertation
Outcome Assessments	required	required	required	required	required
Teaching Assistantship (TA) <sup>4</sup>	Not required	Not required	2 semesters required	2 semesters required	1 semester required
Attend BME Seminars	encouraged	required	required	required	required

Notes:

<sup>1</sup>[From §2.4.5]

<sup>2</sup>Research credit does not count towards graded course credit hour requirement.

<sup>3</sup>MS Students are expected to provide their committee with a written proposal prior to scheduling defense.

<sup>4</sup>Teaching is an integral part of graduate training in Biomedical Engineering. All PhD students must participate in BME teaching assistantships (TAs) in BME undergraduate or graduate courses as part of the requirement for the degree, regardless of their source of funding for the stipend or fellowship. More information about the TAs is provided in §2.8.8.

<sup>5</sup>See special note on MSTP students in §2.8.6.

## 2.6 ME PROGRAM

The Master of Engineering degree requires completion of the BME core course requirements, and has its own required sequence to support specialization in biomedical technology design and development. The same course cannot be used to satisfy more than one of the requirements. Students must meet the academic requirements described in §2.4.5.

### 2.6.1 COURSE SEQUENCE (35 CREDITS TOTAL)

#### Fall semester of first year:

3 credit BME 6101 Physiology I for Engineers

3 credit BME 6310 Computation and Modeling in Biomedical Engineering

3 credit BME 6550 Special Topics: Clinical Technology Continuum of Care

3 credit elective from SEAS, SoM or A&S upon approval of Program Director

2 credit BME 6056- Going Pro; Professional Development in Biomedical Engineering

#### Spring semester of first year:

3 credit BME 6550 Special Topics in Biomedical Data Science

3 credit BME 6060 Biomedical Innovation

3 credit elective from SEAS, SoM or A&S upon approval of Program Director

3 credit elective from SEAS, SoM or A&S upon approval of Program Director

#### Summer:

3 credit BME Design Practices course

#### Fall semester of second year (final semester):

3 credit BME 8995 Biomedical Engineering Design Project

3 credit technical elective from SEAS, SoM or A&S upon approval of Program Director

## 2.6.2 ME PROJECT

Students should register for the project (BME 8995) in the final semester. A two page (max) proposal will be approved by the ME Program Director to help the student focus on the intent and scope of the project. The project should exhibit individual thought and represent the culmination of effort from the prior year. It will incorporate best practices within the biomedical design industry, including verification and validation testing results, risk management and mitigation, regulatory pathway and intellectual property strategies, and a viable sustainable business model description. Each project must also contain a data science component. A written report describing the project is required. Presentations of projects to a Masters Committee including clinical, academic and industry mentors is required and will help form the basis of the final grade.

## 2.6.3 ME DEGREE ADMINISTRATIVE REQUIREMENTS

In order to conduct clinical observations within UVA Medical Centers, all ME students must comply with all requirements issued by the Medical Center to include required inoculations and titers, on-line learning modules, and completion of an Attestation of Criminal Background. ME students must file an ME Degree Plan of Study form by the end of the first term. ME students are expected to attend BME Departmental Seminars and Meet the Speaker events. ME students must complete Outcome Assessment Forms that are required by SEAS.

## 2.6.4 INTERNSHIPS

ME students are encouraged, but not required, to intern for eight weeks following their Spring semester with a biomedical company or non-profit organization.

## 2.7 MS PROGRAM

The Master of Science degree requires a minimum of 24 graded credit hours of course work, 6 credits of MS thesis research and satisfactory defense of a thesis. The same course *cannot* be used to satisfy more than one of the above requirements. In addition to these academic requirements and the requirements described in §2.4.5., certain administrative requirements must also be met.

MS students who wish to transition to the PhD Program in BME do not need to officially apply the same way that a new applicant would apply to the program, but he/she/they will need to petition the BME Graduate Admissions Committee with this request. The student must include the following components in their petition:

1. Petition from the student explaining the request, motivation, and anticipated timeline
2. Letter from the potential PhD Mentor indicating willingness to financially and academically support the student
3. Current unofficial UVA transcripts
4. Original grad school application (with help from the Graduate Program Coordinator)

The Graduate Admissions Committee, via the Graduate Program Director, will notify the student and potential mentor of the outcome. If voted in the affirmative, the Graduate Program Coordinator will assist the student in filing the proper petition with the SEAS Dean's Office.

### 2.7.1 MS COMMITTEE

The MS Committee must consist of at least three faculty members, including at least one primary BME faculty member and at least one member from outside the department. Adjunct faculty are acceptable outside members if they provide an objective and diverse viewpoint. The student should form this committee within six months from starting in the program. After forming a MS Committee, the student should file a **Master's Degree Plan of Study** form (within first year of matriculation). This form is available on the BME Grad Program Collab site and must be approved by the student's MS Committee and the Graduate Program Director.

## 2.7.2 MS THESIS DOCUMENT AND DEFENSE

With the approval of their MS Advisor, the student should write an MS Thesis and submit it to their MS Committee at least one week before the MS Thesis Defense. The student should also notify the Graduate Program Coordinator of the date selected for the MS Thesis Defense and provide the title and a short abstract of the work, so that an announcement of the defense may be sent out. **The public announcement of the oral presentation of the defense must be sent out by the student's Graduate Coordinator at least one week prior to the presentation.** Students should consult their Graduate Coordinator for the departmental announcement template and procedure.

The MS Thesis Defense is conducted orally and publicly in front of the MS Committee, previously approved by the Engineering Graduate Registrar's Office. The defense is designed to test the student's knowledge of their field of research. The first part of the MS Thesis Defense, which should last approximately 40 minutes, is an oral presentation of the thesis by the student, which is open to the public. This will be followed by a 1-2 hour oral defense before the MS Committee and any other interested faculty.

A student who does not perform satisfactorily in the defense may, with the recommendation of two-thirds majority of the MS Committee, be granted a future thesis defense after being given adequate time to prepare.

Upon successful passage of this oral thesis defense, the student's MS Committee should submit the **Report on Final Exam** and the **Thesis Outcome Assessment** to the Graduate Program Coordinator who will provide it to the SEAS Graduate Registrar's Office. The student must submit their approved final thesis, along with the Thesis/Dissertation Cover, and Approval Pages Form to Libra, the online archive of UVA by the date specified in the academic calendar. Paper bound copies are no longer required. Students should discuss any copyright/embargo issues with their mentors and chairs prior to the upload. For more information on LIBRA and instruction of how to upload, please visit: <http://pages.shanti.virginia.edu/libra/>  
<http://pages.shanti.virginia.edu/libra/>

## 2.8 PHD PROGRAM

The Doctor of Philosophy degree requires 24 graded credits of course work past the bachelor's degree (including any completed during a Master's program), plus two Elective Educational Experiences (see below). Students who enter the program already holding a Master's degree in an engineering discipline from a school other than the University of Virginia must take the core BME courses, completing at least 12 credit hours of graduate level coursework. The same course cannot be used to satisfy more than one of the requirements, and students must meet the academic requirements described in §2.4.5.

### 2.8.1 PHD ADMINISTRATIVE REQUIREMENTS

1. Select a PhD Advisor, and working with the advisor the student should identify committee members and invite them to serve on their PhD Dissertation. The student should fill out and file the Doctoral Advisory Committee Form with the Graduate Program Coordinator **no later** than July 1st after second semester of doctoral study.
2. File a **PhD Plan of Study** **no later** than May 1st in the second year of doctoral study. The form is available on the Grad Program Collab site and must be approved by your Advisory Committee and the BME Graduate Program Committee.
3. Students are required to complete an **Individual Development Plan (IDP)** form annually with their advisors.
4. Students are encouraged to meet with their PhD Dissertation Committee annually.

### 2.8.2 FORMATION OF THE PHD DISSERTATION COMMITTEE

Students should appoint their PhD Dissertation Committee in consultation with their PhD advisor and with their PhD advisor's approval. The PhD Dissertation Committee is a resource for the student as they pursue their graduate coursework, undertake their dissertation research, and participate in professional development and career planning. Students should consult with their PhD Dissertation Committee members – either in one-on-one

meetings or in a group meeting of the entire committee -- at least once per year throughout their PhD training experience to ensure that their research is progressing at a suitable pace and to get the advice, mentoring, and guidance of the committee members, which can be instrumental in shaping the dissertation as it progresses.

The membership of the PhD Dissertation Committee can grow and/or change over time, as the student's dissertation research develops/changes over time and as the student progresses through their graduate career. In other words, members of the PhD Dissertation Committee can be added and/or removed at any point in time, as long as the requirements stated below for each key milestone are met.

The committee is officially formed by filling out the **Appointment of Doctoral Advisory Committee Form**, which is reviewed and approved by the Graduate Program Director, and it is highly recommended that this form be filled out and submitted to the Graduate Program Coordinator **by July 1<sup>st</sup> after their second semester in the BME PhD program**. The table below lists the guidelines for the PhD Committee at each stage in the PhD training process.

**PhD Committee Composition Requirements at each Stage of the PhD Training Process:**

	Minimum Number of <b>total faculty</b> on the committee (including the PhD Advisor and the Committee Chair)	Minimum number of <b>BME faculty</b> <sup>%</sup> (i.e. faculty with primary appointments in BME)	Minimum number of <b>SEAS faculty</b> <sup>*</sup>	Minimum number of <b>outside faculty</b> <sup>†</sup>	Primary appointment of the <b>Committee Chair</b> <sup>°</sup> must be in the:
Membership of the PhD <b>Qualifying Exam</b> Committee	3	2	2	0	BME Dept.
Membership of the PhD Dissertation Committee for the <b>PhD Proposal</b>	4	2	3	1	BME Dept.
Membership of the PhD Dissertation Committee for the <b>PhD Dissertation Defense</b>	5	2	3	1	BME Dept.

<sup>%</sup> A “BME faculty” member must have 50% or more of his/her/their primary appointment in the BME Department.

<sup>\*</sup> Any faculty member who has a primary appointment in the BME Department, even if his/her/their official appointment in BME is through the School of Medicine, is considered “SEAS faculty” for the purposes of this requirement.

<sup>†</sup> The “outside faculty” member must 1) be on the UVA Faculty, and 2) have 25% or less of his/her/their primary appointment in the BME Department.

<sup>°</sup> The “Committee Chair” must not be the PhD Advisor.

**2.8.3 RECOMMENDED TIMELINE FOR PHD TRAINING EXPERIENCE**

In our PhD Program, the student has tremendous ownership over their own destiny and responsibility for progressing toward their graduation. Hence, the PhD student has the responsibility to manage the timing of their progression through the PhD training experience according to a timeline that is mutually agreeable with the PhD advisor and their PhD Committee. Therefore, it is incumbent on the PhD student to communicate with their advisor and PhD Committee at regular intervals to make sure that their progression through the program is following a timeline that is suitable to and in accordance with the expectations of the PhD advisor and PhD committee at each check-in. That said, the Graduate Program offers the following timeline as a recommend timeline for students to

progress through their PhD training experience in BME, but the Graduate Program Committee appreciates that each student is different and each PhD training experience is different so there will be students who do not follow this timeline, or only loosely follow the timeline. Every student should regularly (suggested every 3 months, or 4x per year) check in with their advisor and the members of their PhD Committee (suggested every 12 months, or once per year, at a minimum) to determine if he/she/they is progressing at a pace and according to a timeline that is leading to a successful and productive PhD training experience.

→ **During the early summer after their first year in the program**, students are advised to meet with their advisor (or co-advisors, if they are advised by more than one faculty member) to discuss who to invite to serve on their PhD Committee and who to invite to serve as the Chair of the PhD Committee. After the student and advisor have agreed who to invite, the student should send invitations by email to the prospective committee members. Once the committee members have agreed to serve, the student should make their committee official by filling out the **Appointment of Doctoral Advisory Committee Form**, which is reviewed and approved by the Graduate Program Director. It is highly recommended that this form be filled out and submitted to the Graduate Program Coordinator **by July 1<sup>st</sup> after the second semester in the BME PhD program**. During that summer or early fall as the student enters their second year in the program, they are advised to schedule a meeting with their committee members (either as a group or one-on-one meetings) to discuss the **PhD Plan of Study** (see §2.8.4), research goals and objectives, career goals, and professional development opportunities that can be undertaken during the PhD training experience. The **PhD Plan of Study** should be submitted to the Graduate Program Coordinator in the spring of the second year (before May 1<sup>st</sup>) – and please note that it is an Engineering School Requirement that this form be submitted before the student takes their PhD Qualifying Exam.

→ **During the spring of their second year in the program**, students should start planning to take their PhD Qualifying Exam. Note that students can take the PhD Qualifying Exam prior to this point in time, e.g., during the summer after their first year in the program, with permission of their PhD Advisor and the BME Graduate Program Director. The **PhD Plan of Study** should be filled out and submitted to the Graduate Student Coordinator **by May 1<sup>st</sup>** of the year that the student plans to take the PhD Qualifying Exam. At least three (3) members of the PhD Committee must be present for the PhD Qualifying Exam, but more than three members is allowable. More details about the composition of the PhD Qualifying Exam Committee are provided below in §2.8.7.

→ **Sometime between the summer after their third year and half-way through their fourth year in the program**, students should do their PhD Dissertation Proposal. The PhD Dissertation Committee (or a sub-set thereof) will serve as the student's examining committee for the PhD Dissertation Proposal. At least four (4) members of your PhD Dissertation Committee must be present during the proposal, either virtually or in person. Additionally, one of the four members must be an "outside" committee member, which means that he/she/they must have 25% or less of their primary appointment within the BME department. The chairperson of the committee (who may **not** be the student's faculty advisor) **must** hold 50% or more of their primary appointment in the BME Department.

→ **Sometime during the fourth year (ideally prior to the start of the 5<sup>th</sup> year) in the program**, the student should hold a meeting with their PhD Dissertation Committee to discuss their research progress, career goals, and other planned professional development activities. At this point, the PhD Dissertation Committee should include a minimum of four members of the UVA faculty, including the student's faculty advisor, and adhering to the guidelines stated above and in the table.

→ **Sometime during the fifth year, typically about 6-months prior to the anticipated graduation date**, the student should hold a meeting with their PhD Dissertation Committee to discuss their research progress, career goals, and other planned professional development activities. At this time, it is encouraged that the PhD Dissertation Committee be comprised of the (at least 5) faculty who will be participating in the final PhD Dissertation Defense. This meeting is traditionally called the "Permission to Write" meeting, and while it is highly recommended, this meeting is not an official requirement of the PhD program. At this meeting, the student should present their work to date and discuss whether and when the planning and scheduling of the PhD Dissertation Defense will happen. The PhD Dissertation Committee composition for the PhD Dissertation Defense should adhere to the following Engineering School requirements:

- All Committee members must hold qualifications commensurate with that of a research faculty or equivalent rank.
- At least two members must be primary UVA BME faculty.
- One member should be an “outside faculty” committee member, which means that he/she/they must have 25% or less of his/her/their primary appointment within the BME department. This “outside faculty” member must be on the UVA Faculty. The purpose of the “outside faculty” member is to ensure consistency across the University, to help ensure fairness to the student, and to prevent conflict inside the department.
- The chairperson of the committee (who may **not** be the student’s faculty advisor) **must** hold 50% or more of their primary appointment in the BME Department.
- When the student’s advisor does not have a primary appointment in the BME Department, the committee chairperson will function as a co-advisor and department representative.
- To avoid conflicts of interest, no committee member can be employed by or receive compensation from another committee member to avoid conflicts of interest.
- One additional research professional from “outside UVA” may serve as a fifth voting committee member, provided his/her/their qualifications are commensurate with that of a research faculty or equivalent rank. Emeritus faculty are considered “outside UVA” for the purpose of PhD Dissertation Committees. For all “outside UVA” committee members, a CV or biography will be required and should be submitted to the SEAS Graduate Registrar for final approval by SEAS, and should include the highest degree attained, the year and institution, and any relevant experience or research which would enable that member to provide expertise to the student and committee.

#### 2.8.4 PHD PLAN OF STUDY AND COURSEWORK

In deciding the doctoral course work and finalizing the PhD plan of study, students should seek assistance from their advisor and Doctoral Advisory Committee members and must obtain their approval. Because this is a *plan* of study, not a contract, students should make every effort to complete and submit it as soon as possible. This will allow the maximum flexibility for any necessary revisions to be made without delaying the student’s progress to the PhD. The Plan of Study may be revised as necessary throughout the student’s graduate study. Preparation of the **PhD Plan of Study** is an appropriate time to schedule the initial meeting with your Doctoral Advisory Committee. Students, their advisors, and Doctoral Advisory Committee members are responsible to design a plan of study suitable for the individual and that meets the academic requirements of the BME PhD program. The plan of study may consist of more than the minimum required credits.

The Plan of Study should be submitted to the Graduate Program Coordinator *no later than the end of the summer after second semester of doctoral study* but preferably sooner. These forms may also be revised as necessary during the course of the PhD program, in consultation with the student’s Doctoral Advisory Committee. Students who have not submitted a Plan of Study *will not* be permitted to take the qualifying exam.

#### 2.8.5 ELECTIVE EDUCATIONAL EXPERIENCES

Elective Educational Experiences (EEEs) are intended to encourage students to begin the process of life-long learning essential to a career in Biomedical Engineering. EEEs are intended to cover new material and areas of study that the student has not already covered in previous coursework or research experience or to provide the student with additional depth in a particular area. The student should justify *why* he/she/they wants to take the EEE and *how* the EEE will broaden and/or deepen their knowledge base. We anticipate that students will often pursue EEEs later in the course of their PhD studies and select them based on their PhD research and future career plans. All EEEs must be approved by the student’s PhD Committee in advance. Specifically, students must submit to their PhD Committee a brief proposal stating the rationale for their EEE (how it fits with their individual plan of study and fills a knowledge gap not covered by their previous coursework and research experience), their goals for the EEE, and the metrics they will use to assess how well the EEE fulfilled those goals. There is a specific form for

**EEE Proposals** that should be filled out, approved by the PhD Committee, and submitted to the BME Graduate Program Coordinator. Both EEEs must be approved prior to the thesis proposal; however, students may participate in one or both EEEs after their proposal defense. At the completion of the EEE, students must submit a brief “EEE Summary Report” to their PhD Committee Chair assessing the EEE using the proposed metrics. There is a specific form for the **EEE Summary Report**, and the Summary Reports for both EEEs must be submitted to the PhD Committee Chair by the time the written dissertation is submitted to the PhD Committee (i.e., at least two weeks prior to the PhD Dissertation Defense). Students are also encouraged to include a slide on their EEEs in their PhD proposal and/or PhD defense presentations in order to share information on potentially valuable experiences with other students. An appropriate EEE is expected to involve roughly the time commitment of a typical graduate course. Possible examples include:

1. Taking an additional graduate course beyond the normal course requirements,
2. Taking an intensive 2-week “short course” to learn a series of specialized techniques,
3. Completing a summer internship at a biotechnology company.

### **2.8.6 MSTP (MD/PHD) STUDENTS**

Medical school physiology courses will be accepted in lieu of BME 6101. These courses may not have to be replaced with additional credits. MSTP students need to complete at least 18 graded credits. An EEE with a focus on developing computer programming skills should be completed before the end of the first semester after transitioning to the PhD program if the student does not have sufficient programming experience to succeed in the core graduate BME curriculum. In addition, a three to 6 credit independent study may be required to completely satisfy SEAS credit requirements. See the graduate program coordinator for details. MSTP students are only required to complete one Taship.

### **2.8.7 PHD QUALIFYING EXAMINATION**

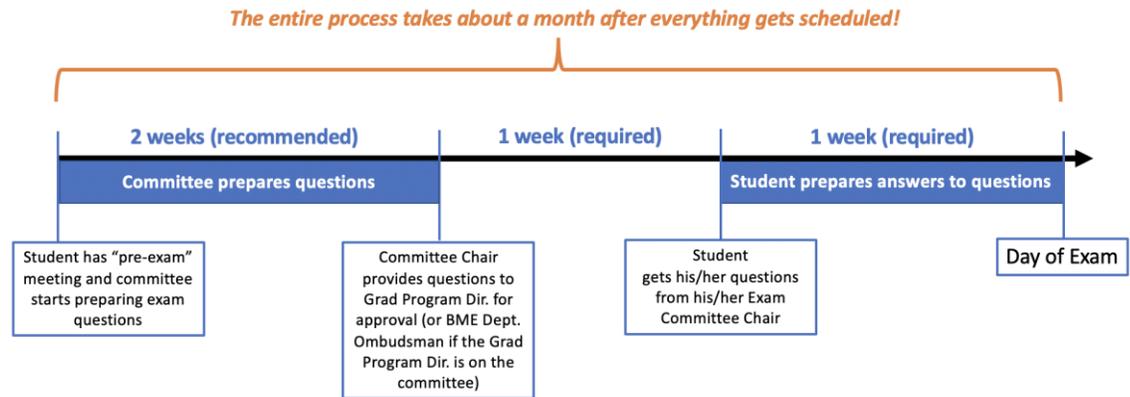
The Qualifying (or Comprehensive) Examination is required by the School of Engineering and Applied Science and all doctoral engineering students must take the exam (see UVA Graduate Record for general guidelines). Students intending to take the Qualifying Examination must complete the **PhD Plan of Study** and turn it in to the Graduate Student Coordinator **by May 1st** of the year that the student plans to take the PhD Qualifying Exam.

**Purpose:** To determine whether the student is able to comprehend and integrate a body of advanced knowledge, and is capable of conducting original research. The student’s ability to think, formulate, and present ideas is also evaluated.

**Timing:** All students should take the PhD Qualifying Examination before the end of the summer after the fourth semester of graduate study (i.e. after their 2<sup>nd</sup> year). Students may elect to take the PhD Qualifying Exam as early as after the second semester in the PhD program (i.e. after their 1<sup>st</sup> year). Delayed examination is subject to the approval of the student’s PhD Dissertation Committee. Passage of the PhD Qualifying Exam is required to continue the PhD program.

**Scheduling of and Preparation for the Exam:** Students should first obtain approval from their PhD Advisor to take the Qualifying Exam. Exams are generally scheduled between the third week of May and the end of June after the student's second year in the PhD program. The recommended timeline for setting up the required "Pre-Qualifying Exam Meeting" and the Qualifying Exam is shown in the figure.

## BME Qualifying Exam Timeline:



After the student has obtained approval from their advisor to take the exam, and prior to **May 1st**, the student should schedule a "Pre-Qualifying Exam Meeting" of their PhD Qualifying Exam Committee,

which should be comprised of their PhD Dissertation Committee, or a subset thereof. Requirements for the PhD Qualifying Exam Committee composition are provided below. This meeting should last approximately 45 minutes, during which the student should: 1) present and get approval for the **Plan of Study** so that it can be submitted to the Graduate Program Coordinator by May 1<sup>st</sup>, 2) present a 10 min. long informal oral presentation to acquaint the committee with the student's research to date and their anticipated future research directions so that the committee has sufficient information to be able to draft 3 exam questions for the student (see "Format of the Qualifying Exam" below). After that, the student should leave the meeting and the faculty on the committee should spend the remainder of the meeting drafting the exam questions for the student.

The student will need to work with their PhD Exam Committee to schedule a time and date for the 3-hour long exam and reserve a room (or schedule a Zoom meeting if required by circumstance) for the exam. Note that the timing between the "Pre-Qualifying Exam Meeting" and the PhD Qualifying Examination is approximately one month (see figure). Once the exam date, time, and location is set, the student needs to confirm with their PhD Qualifying Exam Committee *and* notify the Graduate Program Coordinator. The Graduate Program Coordinator will prepare the examination forms and have them ready for the Advisory Committee chair to pick up the day of the exam (or share electronically).

**Formation of the BME Qualifying Exam Committee:** The PhD Qualifying Exam will be administered by the student's Qualifying Exam Committee. At least three (3) members of the PhD Qualifying Exam Committee must be present for the PhD Qualifying Examination, but more than three members is allowable.

The formation of the PhD Qualifying Exam Committee should start with a conversation between the student and their advisor. The decision of who to invite to join the student's PhD Qualifying Examination Committee should be a joint decision made by the advisor and student together, and requires the approval of the PhD advisor and the BME Graduate Program Director.

- At least two of the PhD Qualifying Exam Committee members must be primary BME faculty.
- The Chair of the PhD Qualifying Exam Committee must be a primary BME faculty member who is not the PhD advisor.
- If the student's PhD advisor is BME primary faculty, he/she/they can serve as one of the BME faculty members on the PhD Qualifying Exam Committee.
- If the PhD advisor is not primary BME faculty, the PhD Qualifying Exam Committee still needs to have at least two primary BME faculty on it.

- All members of the PhD Qualifying Exam Committee can be primary BME faculty.
- All members of the PhD Qualifying Exam Committee must have a PhD and/or MD.
- After the student passes the PhD Qualifying Exam, the composition of their “PhD Dissertation Committee”, can differ from the composition of the PhD Qualifying Exam Committee.

**Format of the Qualifying Examination:** The PhD Qualifying Exam is an oral exam lasting approximately three hours, which is administered by the student’s PhD Qualifying Exam Committee. The Chair of the student’s Doctoral Advisory Committee will coordinate the preparation of three questions, with input from the entire Exam Committee. The oral examination will consist of a set of integrative questions (typically three) that have been prepared by the student’s Doctoral Advisory Committee and provided to the student one week in advance of the oral examination. The questions will be based upon the student’s program of study and topics relevant to their anticipated dissertation topic. The questions will:

- Assess the ability to integrate a body of advanced knowledge in biomedical engineering,
- Include experimental design and hypothesis testing, and
- Have a design or a quantitative analysis component.

The Chair of the student’s Doctoral Advisory Committee should submit a copy of the oral exam questions to the Graduate Program Director for approval at least 14 days before the scheduled exam date using the **PhD Qualifying Exam Questions Form**. (Note that if the Graduate Program Director is a member of the PhD Qualifying Exam Committee, the exam questions should instead be submitted to the Department Ombuds for approval.) The Chair of the PhD Qualifying Exam Committee will deliver the approved exam questions to the student and to the Graduate Program Coordinator (by hard copy or by e-mail) seven (7) days prior to the scheduled exam date.

During the week leading up to the oral exam, the student may research the questions to develop his or her answers using textbooks, published literature, class notes, software, etc. However, the student may not enlist the help of other individuals in preparing answers - to do so will be considered a violation of the honor code. During the oral exam, the student will provide their answers to the questions orally and by hand-drawing schematics, outlines, bullets, notes, graphs, equations, etc. on the whiteboard to communicate their answers in an organized and visual fashion, as well. The student may not use PowerPoint slides or the overhead projector to present a formal slide deck. The objective is to convey your approach to solving the problems and your solutions to the problems concisely and convincingly – as if the student were teaching a mini-lecture. At the start of the exam, *if* the Chair of the PhD Qualifying Exam Committee has given the student permission, the student may give photocopied hand-outs to the PhD Qualifying Exam Committee, particularly if they are useful to convey plotted data, complicated schematics that would take too long to hand-draw on the board, pieces of computer code, derivations, etc. However, the student may not hand out extensive background literature or lengthy appendices– and it is not in their best interest to do so because it will be distracting for the committee. As the student presents their answers, they should be prepared to be interrupted by questions from the PhD Qualifying Exam Committee. If deemed appropriate by the PhD Qualifying Exam Committee, the student may also be questioned on any material germane to their completed coursework. Successful completion of the PhD Qualifying Examination will be determined by the PhD Qualifying Exam Committee, and students must pass the oral examination to continue in the PhD Program. At the discretion of the PhD Qualifying Exam Committee, a student may be allowed at most two attempts to pass the PhD Qualifying Examination.

### **2.8.8 TEACHING ASSISTANTSHIP (TASHIP)**

All PhD students must participate in BME teaching assistantships (TAship) for BME undergraduate or graduate courses as part of the requirement for the PhD degree, regardless of their source of funding for the stipend or fellowship. The TAship experiences will normally be performed in the second and third years of doctoral study. When possible, students will be assigned to TA for one “lecture-focused” and one “lab/project-focused” course to give students diverse experiences in their teaching experiences as a TA. Prior to the start of each semester, graduate students who are eligible to TA will be contacted by the Graduate Program Director and asked to rank

order the courses that they would like to TA for that semester. The Graduate Program Director will assign TAships based on students' interests to the extent possible and also based on the Department's TA needs in a given semester. When students are assigned a TAship they must register on SIS for their TAship, and at the end of the semester of TAing they will be assigned a grade of either "satisfactory" or "unsatisfactory" by the instructor of the course for which they are serving as TA. All PhD students are excepted are expected to TA for two courses and receive grades of "satisfactory" for both TAships. However, there are exceptions: 1) MSTP students only TA for one class, and 2) students who transferred from another PhD program where they TAd (once or twice) may be granted special exception from BME Graduate Program Committee to TA for less than 2 classes at UVA, but they need to submit a written petition to the Graduate Program Committee to ask for approval. Note that participating in the "SEAS Teaching Fellowship Program" does not fulfill a TA requirement.

### 2.8.9 GOING PRO

Biomedical Engineering PhD graduates are well-positioned to be leaders in industry. Going Pro is a unique opportunity for professional development, a significant deficiency in many graduate programs across the nation. Through the curriculum, mentoring programs, and department-sponsored internship, alums of this program will be well-positioned to lead in the biomedical engineering industry. There are three key elements of the Going Pro:

**Industry Internship:** Participants in Going Pro will be supported, if funds are available (e.g., from the PhD advisor, company, BME Dept., or elsewhere), to participate in a two-month industry internship approved by the BME graduate program committee.

**Mentoring:** Students will be paired up with an alum of the department and required to meet throughout their training.

**Course:** Going Pro participants will take a 1-credit course in the fall semester focused on professional development and BME industry.

**Application Process:** Students that have completed their 2nd year of the PhD program and successfully passed their PhD Qualifying Exam are invited to apply. Please contact Shayn Peirce-Cottler, Graduate Program Director, with any questions.

### 2.8.10 PHD PROPOSAL DEFENSE

1. **Purpose:** The student's Doctoral Advisory Committee will assess the quality of the student's research plan (including hypotheses to be tested, experimental design and methodology, etc.).
2. **Timing:** The PhD Committee composition needs to be approved by filling out the appropriate form and having the Graduate Program Director's signature on it prior to scheduling the Proposal Defense. This will then be forwarded to SEAS for final approval. ***SEAS approval must be completed by two weeks prior to any proposal.*** The student is responsible for working with their Advisor and their PhD Committee to schedule a date for the defense and reserve a room for the defense. Upon selecting a date and location, the student is then responsible for notifying the Graduate Program Coordinator ***at least 2 weeks prior to defense*** so the defense can be advertised publicly at ***least one week before the defense***. The written dissertation proposal must be submitted to the PhD Committee ***one week before*** the scheduled oral dissertation proposal defense, which consists of a public oral presentation (approximately 45-50 min. long) during which the student highlights the existing knowledge and the proposed new study. This will be followed by a private question and answer period with the PhD Committee. Other members of the UVA faculty, beyond the PhD Committee, are allowed to attend the private question and answer period. The total duration of the dissertation proposal defense is typically three (3) hours, at the discretion of the student's PhD Committee.
3. **Defense Committee Composition:** At least four (4) members of the Doctoral Advisory Committee must be present for the proposal defense in accordance with SEAS guidelines, including two (2) primary BME faculty and one "outside" SEAS faculty member (see table in §2.8.2 for more details).

4. **Proposal Format:** The written proposal should follow the general format of an NIH grant proposal, and include the following sections:

- Specific Aims (1-page limit)
- Significance (typically 1-1.5 pages)
- Innovation (typically 0.5-0.75 pages)
- Approach (typically 5-7 pages) – should include “Expected Outcomes and Alternative Methods”
- Bibliography (no limit on the number of citations)

Figures can be embedded in the text.

Formatting guidelines can be found at: [http://grants.nih.gov/grants/grant\\_basics.htm](http://grants.nih.gov/grants/grant_basics.htm). Note that 11-point Arial font with 5” margins on all sides (left, right, top, bottom) is the most common format. While the Specific Aims page should not exceed one page in length, the page limits for the rest of the proposal (Significance, Innovation, and Approach) are more flexible and different faculty have different expectations (ranging from 7-12 pages, generally speaking). Therefore, the student should talk with their PhD advisor and PhD Committee Chair to clarify expectations for the page-length of the PhD Proposal.

### 2.8.11 PHD DISSERTATION DEFENSE

The doctoral dissertation should be typed according to the format of the School of Engineering and Applied Science.

1. **Purpose:** To demonstrate competence in the field of the dissertation research and the quality of the dissertation for publication in scientific journals.
2. **Timing:** As the PhD student enters their 5<sup>th</sup> year in the PhD program, if not sooner, the PhD student and their advisor should discuss and come to agreement about the timeline (and any associated expectations) for the student to write and defend their dissertation. The members of the student’s PhD Committee should also be informed about the student’s plan, expectations, and timeline, particularly if there is disagreement between the student and the PhD advisor about the timing, plan and/or expectations for scheduling the dissertation defense. If there is disagreement between the PhD Committee and/or the PhD advisor and/or the student, the student and/or advisor and/or members of the PhD Committee are encouraged to talk to the BME Graduate Program Director or BME Dept. Ombudsman, who can serve as a mediator in these decisions. At completion of writing an approved dissertation. The properly formatted draft with all the figures should be submitted to the Doctoral Advisory Committee **at least two weeks** before the examination. Using the [Final Examination Committee](#) form, inform the Graduate Program Coordinator of the date selected for your defense, provide the title and a short abstract of the work, so that an announcement of the defense may be sent out. Public announcement of the dissertation defense **must be made one week prior** to the scheduled examination date. Failure to do so will result in the rescheduling of the dissertation defense.
3. **Formatting and Approval of the PhD Dissertation Document:** The PhD Dissertation is a unique and individualized document that represents the student’s own scientific and engineering interpretation/thinking about the research and design accomplishments they have made during their time in the BME PhD training program. The PhD student should take *tremendous pride* in their accomplishments and embrace their individuality as a scientist and engineer when assembling and summarizing the body of work from their PhD training experience. Being at a point where a student is writing their dissertation signifies that he/she/they has truly become an expert in a specific body of knowledge and this expertise should shine through the document, demonstrating mastery, intellectual ownership, and tremendous accomplishment!

Because the PhD is a mentored experience, the student’s ideas and work products will (and should be), influenced by the PhD advisor and other faculty, students, and collaborators that the student has worked with during their time in the PhD training program. Hence, it is common for students to include data, figures, and

/or schematics from lab-mates and other collaborators in the Dissertation, and this is allowable as long as these items are given proper attribution to their respective authors, as indicated in the figure caption.

Students and their advisors may choose to present all of the work products of the student's PhD experience or a sub-set of work products – and the decision of what specific content should be included/excluded from the Dissertation should be made by the student in consultation with the PhD advisor. For example, sometimes (but not always) students and advisors elect to include “negative data” or “unpublished results” or “failed engineering designs” in the Dissertation because they deem them to be an important component of the PhD experience that more fully represents the body of work that the student has produced. Dissertations are considered “publicly available” documents once they are defended, and there are several options for limiting access or placing an embargo on publishing dissertations online. For more information about this, please see: <https://www.library.virginia.edu/libra/etds/authors-rights-embargoes>. Completed dissertations are submitted online to Libra after the defense. Please refer to the [SEAS website](https://engineering.virginia.edu/current-students/current-graduate-students#accordion1531612) (<https://engineering.virginia.edu/current-students/current-graduate-students#accordion1531612>) for more information about this, and pay close attention to guidelines about copyright concerns (<https://copyright.library.virginia.edu/copyright-resources/essentials/>) if you are including text or figures from previously published papers or books.

When the student embarks on writing their dissertation, they should first meet with their advisor to discuss an outline of the chapters – and an outline for each individual chapter. Example bound PhD dissertations from past PhD students of the BME program are available for viewing in the BME Library on the 2<sup>nd</sup> floor of MR5, and students are encouraged to peruse them to get ideas for structure, organization, composition, and formatting. Students are also *highly encouraged* to talk with prior graduates of their own lab to get example digital versions that can be utilized as examples or templates for formatting.

All PhD dissertations should include:

- A title page
- Acknowledgements section
- Table of Contents
- List of Figures, Schematics, Tables
- Abstract (that summarizes all of the research/design described in the Dissertation)
- Overarching Introduction Chapter (that summarizes the motivation for the research/design described in the Dissertation and any necessary background information needed for a reader to understand what will be presented in the subsequent chapters)
- Chapters that describe the background, methods, results, and conclusions from the PhD research/design activities undertaken during the PhD training experience. Typically students who have published papers make each of their papers a stand-alone chapter of their dissertation.
- Overarching Conclusion/Discussion/Future Work Chapter(s), which should include: 1) an overarching summary of the research/design presented in the Dissertation, 2) a discussion of the limitations of the research/design presented in the Dissertation, 3) statement of the real-world impact of the body of work and scholarship presented in the Dissertation, and 4) a comprehensive and thorough discussion of future work.
- Bibliography. The dissertation is expected to be thoroughly referenced with the most pertinent literature, including current/recent papers, as well as historical papers in the field of research. Note that sometimes when students have published multiple papers and each paper is presented as a stand-alone chapter of the Dissertation, the bibliography for each chapter is self-contained within the chapter, and this is allowable;

however, a bibliography for the remaining chapters (e.g., Introduction and Conclusion) should also be provided somewhere as part of the Dissertation.

- **Figures/Tables/Schematics.** These may be displayed one per page with corresponding captions underneath, or formatted in-line with the main body text with caption boxes also embedded within the main text body. These may be presented at the point in the body of the text where they are referred to, or at the end of the Dissertation document in a comprehensive collection. These are stylistic choices that that student can make in consultation with their PhD advisor, but it is important to make it clear to the reader where these items can be found in the document – e.g., by including a list of Figures, Schematics, Tables after the Table of Contents.

Importantly, **there are no specific formatting requirements** (e.g., total page length, font types or sizes, line spacing, margins) for the PhD dissertation; therefore, each student should embrace their individuality and contemplate their own preferences and personal style and let that shine through in their dissertation formatting decisions. However, there are some guidelines and templates available online that you may find helpful when getting started:

- [Columbia University Guidelines and Template](#)
- [Harvard University Guidelines](#)
- [Northwestern Guidelines](#)

The student should draft the PhD dissertation on their own and share it with their PhD advisor (and any other collaborators whose work is included) for their approval prior to sharing it with their PhD Committee. Because PhD Dissertations tend to be lengthy documents, it is suggested that the student provide a complete draft to the PhD advisor (and collaborators) at least 2 weeks prior to when they need to provide it to their PhD Committee, so that the advisor (and collaborators) has sufficient time to read, edit, and the student can make changes accordingly before providing the final version to the PhD Committee. The properly formatted complete draft (including all the figures and references) should be submitted (electronically or paper copies if so requested by committee members) to the PhD Committee **at least two weeks** before the PhD Dissertation Defense.

4. **Defense Committee Composition:** The Examining Committee for the dissertation defense is the student's PhD Dissertation Committee (see §2.8.2 and §2.8.3 for specific requirements for the committee composition). All members of the committee must be present during the defense—either virtually (online) or in person.
5. **Subject:** Defense of dissertation and questions about subject areas related to research field or arising from discussion of thesis work.
6. **Format of the Oral Defense:** The first part (40-50 minutes) is an oral presentation of the thesis, which is open to the public. It is followed by a 1-2 hour oral defense question and answer period with Doctoral Advisory Committee and any other interested UVA faculty.
7. **Failure of the PhD Dissertation Defense:** While exceedingly rare, it is possible for the student to fail the PhD Dissertation Defense. The possibility for re-examination is determined by the PhD Committee. The best way for the student to avoid failure is to have clear and frequent communication with their PhD advisor and PhD Committee throughout the PhD training experience about everyone's expectations and whether or not expectations have been met; so there should be no surprises when it comes to the PhD Dissertation Defense.

## 2.8.12 PUBLICATION OF PHD DISSERTATION

Students will upload their thesis or dissertation to LIBRA upon approval of the Exam Committee (after final exam forms have been submitted). Paper bound copies are no longer required. Students should discuss any copyright/embargo issues with their mentors and chairs prior to the upload. For more information on LIBRA and instruction of how to upload, please visit: <http://pages.shanti.virginia.edu/libra/>. Although the final version of the dissertation will be published electronically online by the UVA Library free of charge, students

may wish to order bound paper copies, and there are services that do this (approximately \$100 per bound copy), such as: <https://phdbookbinding.com/>.

### **2.8.13 PHD GRADUATE EXIT INTERVIEW**

Following the successful completion of a PhD Dissertation Defense, students will be invited to participate in a 30-minute long Exit Interview with the Graduate Program Director. The purpose of the interview is to obtain feedback from graduates about their experiences in the PhD program so that it can inform the Graduate Program Committee about ways they can improve the graduate experiences for future students. Graduates will be provided with the interview questions in advance, and they will be invited to edit the documentation of their responses, which will only be shared with the Graduate Program Committee in a de-identified manner.

## **3. STUDENT ACTIVITIES, FINANCIAL AID, and SUPPORT**

### **3.1 GRADUATE BIOMEDICAL ENGINEERING SOCIETY (GBMES) CHAPTER AT UVA**

The University of Virginia student chapter of the Biomedical Engineering Society (BMES) plays several roles within the department. Primarily, the chapter works to promote the exchange of ideas among students and faculty. We coordinate various educational and professional development, social, sporting, and service events throughout the year while reaching out to students who are interested in the application of science and engineering principles to medicine. Our chapter is comprised of undergraduate and graduate students within the BME department as well as students from other university departments who have an interest in BME. Our chapter has a strong record of service within the UVa and central Virginia communities and has been recognized by the National Biomedical Engineering Society several times.

Our BMES student chapter is dedicated to promoting the personal and professional development of its members and enhancing the community of scholarship within the department and the university. Our core values include:

1. Fostering a welcoming environment for our diverse student body and the development of our members via participation in BMES general body meetings and attendance at national conferences, departmental symposia, and university-wide colloquia.
2. Enhancing the sense of community within the department, the university, and the central Virginia area via service events, orientation events for incoming students, jointly sponsored guest lectures with other student societies, sponsoring student-student and student-faculty interactions both within and outside of the classroom.
3. Increasing the chapter's visibility on the national scale via attendance and participation at national and international conferences, recruiting guest speakers from national corporations, and enhancing communication with the BMES national chapter through the president and vice president of graduate and national affairs. BMES typically has funds available to provide travel awards for students to help achieve this goal.

We are dedicated to improving understanding of the field of biomedical engineering, fulfilling the intellectual needs of our students, and assisting in their preparation for careers in biomedical engineering. BMES focuses much of its energy on identifying and reconciling the needs of its students and the larger community.

The Biomedical Engineering Society is devoted to fostering a collegial and collaborative environment between undergraduate students, graduate students, and faculty. To build a strong community we sponsor intramural sports teams, organize wine tasting tours, picnics, happy hours and bar nights, and other organized social activities. In addition to student activities, we help to coordinate and organize a faculty-student fall picnic and holiday party.

Our chapter holds approximately six meetings throughout the year that are open to undergraduate BME students, graduate BME students, and other non-BME students interested in the field. Example meeting agendas include

grant writing and alumni panels. We invite you to browse through our website at <https://engineering.virginia.edu/departments/biomedical-engineering/academics/bmes>.

Our chapter has a strong record of excellence. We hope to continue this tradition and look forward to you joining us! There are several officer positions available for interested graduate students and a number of opportunities to help and contribute to BMES. Any questions, ideas, or suggestions regarding BMES can be directed to either the Graduate BMES President or Vice President (current list in appendix II).

### 3.2 FINANCIAL SUPPORT AND FELLOWSHIPS

Graduate PhD students in the Department of Biomedical Engineering are typically supported through a combination of Graduate Research Assistantships (GRAs), Graduate Teaching Assistantships (GTAs), appointments on training grants, and Fellowships. Students on GTAs receive partial tuition and stipend support in return for their effort in assisting with education in specific courses at the University. Specific requirements and expectations will be defined by the instructor with whom the student is working. All doctoral students are required to participate as teaching assistants in BME courses as part of the degree program.

Students on GRAs receive tuition and stipend support in return for their contribution to a specific research laboratory in the Department. Since these funds originate from individual faculty research grants, requirements and expectations are determined by the Principal Investigator, usually the student's research advisor. Students are expected to contribute at least 20 hours per week during the academic year and 40 hours per week in summer.

The 12-month base salary for GRAs and GTAs is \$32,500 for PhD students. Students receiving financial support **are not allowed** to work outside the University without prior approval from the mentor, BME Graduate Program Committee, and the SEAS Office of Graduate Programs. There are periodic adjustments to the base stipend level to reflect cost-of-living-increases. Health and dental insurance are provided as part of a PhD students' annual support. Enrollment occurs in July of each year and you will receive notices from student health directing you to the online enrollment site.

In order to be eligible for full financial support, students must register for 12 hours in each semester (6 research hours in the summer). The hours may be any combination of course credits and research credits, or may be research only if all course requirements have been completed.

Students are encouraged to seek fellowship opportunities available to them from foundations, national societies, and the government, with the help of the faculty. All BME graduate students are members of the "BME Grad Studies" site on Collab which serves as a repository of information on graduate awards, fellowships, and scholarships.

The University offers free tax help to US and Permanent Resident students each year between February and April. You will receive a flyer via email when the services become available each year. Appointments can be made online at: [www.cvilletaxaid.org](http://www.cvilletaxaid.org). International students should begin any inquiries with Logan Hobbs <https://issp.virginia.edu/taxes>.

See pay chart/schedules in appendix.

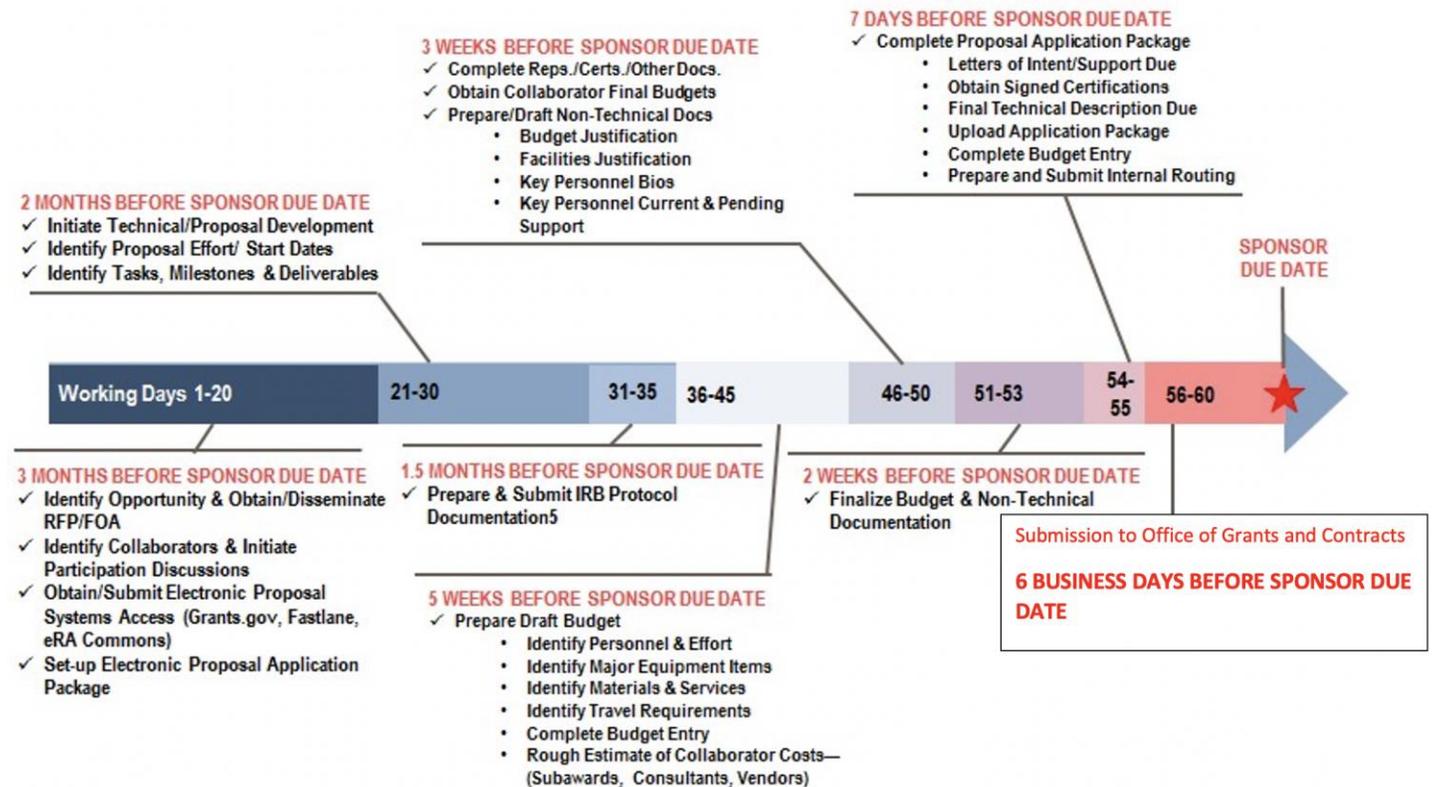
A partial list of the internal and external fellowships is available below. Students are encouraged *to discuss with their faculty advisor for nominations well in advance of the application deadlines, and please note the timing requirements for submitting external grant/fellowship applications below*. Also, note that some PIs have their appointments in the School of Medicine and some PIs have their appointments in the School of Engineering, so before you even think about submitting a fellowship application, please ask your PI which school they have their faculty appointment in because this will dictate who helps you with your fellowship/grant submission, as follows:

- if you are mentored by a PI who has their faculty appointment in the School of Medicine (SOM), you will work with Connie Pace to submit your fellowship/grant application.
- if you are mentored by a PI who has their faculty appointment in the School of Engineering and Applied Science (SEAS), you will work with someone in the SEAS Pre-award office to submit your fellowship/grant application, and your PI will be able to connect you to that person directly.

**BME and UVA-specific Fellowships:**

- UVA Award for Excellence in Graduate Diversity
- Robert R. Wagner Fellowship
- Mary and Otis Updike Professional Development Award in BME
- John McGaughey Award
- Jill E. Hungerford Award
- Peach Fellowship Award
- Micron Fellowship
- Sture G Olsson Fellowship
- ARCS Fellowship
- L. William Ballard Jr. Fellowship
- Virginia Engineering Foundation
- James G Simmonds (Applied mechanics/mathematics)
- Volkswagen Group of North America Fellowship

**External Fellowships (note timing requirements below):**



- NSF Graduate Research Fellowship
- Ruth L. Kirschstein National Research Service Awards for Individual Predoctoral Fellows
- American Heart Association Predoctoral Fellowship
- Ford Foundation Fellowship
- RWJF Health Policy Research Fellowship
- P.D. Soros Fellowship for New Americans
- SREB Doctoral Scholars Program Fellowship
- Graduate Women in Science National Fellowship
- UNCF/Merck Graduate Science Research Dissertation Fellowships
- American Association of University Women American Fellowship
- Office of Navajo Nation Scholarship & Financial Assistance Scholarship
- American Indian Graduate Center Fellowships

NASA Harriett G. Jenkins Predoctoral Fellowship Project  
NDSEG Graduate Fellowship  
DoD SMART Fellowship  
Merck Graduate Science Research Fellowships  
Society for Women Engineers (SWE) Scholarships  
Schlumberger Foundation Faculty for the Future Fellowship  
Golden Key Fellowships  
Microsoft PhD Fellowship  
Women Techmakers Scholars Program  
American Society for Microbiology Graduate Research Fellowship  
ARCS Award: Achievement Rewards for College Scientists

The VPR's office provides access to two searchable grant data bases- Pivot and Grant Forward. You may search by field, and set up alerts as applications open and deadlines approach.

<https://researchdevelopment.vpr.virginia.edu/search-funding-pivot-and-grantforward>

### **3.3 ROTATION PROGRAM AND FELLOWSHIPS**

Students supported by fellowships receive tuition and stipend as described under the conditions of the specific fellowship. In many situations, fellowships are meant to support a student's general education and do not entail specific time or task requirements. Departmental and training fellowships awarded to first-year students may require completion of a rotation program in the first semester of study. The rotation program is designed to broaden the perspective of students in biomedical engineering research and to help them to make an informed choice of laboratory for their thesis work. Students typically rotate in two to three laboratories identified during the interview and admissions process. It is expected that students will spend six weeks working in each lab during the fall semester. Activities in the laboratory will consist of literature reading, participation in designated experiments, learning the specific aims and rationale of the faculty member's research, attending lab or journal club meetings, and preparing a summary of their experiences in each lab.

### **3.4 BME DEPARTMENT SEMINARS AND STUDENT RESEARCH SYMPOSIA**

During the academic year, BME holds a weekly Seminar Series, a weekly event that brings together faculty, students, and clinicians across disciplines from the University and Medical Center to learn about new research and technologies in the biomedical sciences and engineering. Research presentations are given by prominent speakers from within the university community and nationally recognized biomedical engineers, cell and molecular biologists and clinicians in academia and industry. There are also special seminars presented throughout the year such as: a BMES student chapter sponsored speaker, BME Graduate Student Research Symposium, and the BME Distinguished Speaker Seminar Series. The Distinguished Speaker series is a great opportunity for all of us to hear from a prominent and internationally recognized leader in the field of biomedical science and engineering. These may include department chairs, national academy members, and industrial leaders in biotechnology.

All students and faculty are expected to attend each weekly Friday seminar. A "Meet the Speaker" session is open for all graduate students following the seminar presentation, and provides a unique opportunity for students to engage with seminar speakers in a more informal manner.

### **3.5 STUDENT TRAVEL**

All students, particularly those in the PhD program, are encouraged to attend national, and where possible, international conferences with their laboratory group. Attendance at such meetings gives students opportunities to meet and interact with researchers with a broad range of interests. These experiences are instrumental in assisting students to develop, formulate, and modify their Master's and PhD projects and career plans. Also, excellent Career Fairs or networking opportunities exist at most major meetings.

Some student fellowships and traineeships have specific allotments for travel and other related purposes, which is returned to the funders if unused in the allotted timeframe. Students working on research projects can sometimes arrange to have special expenses paid by a research grant. Consult your project director or faculty advisor.

In exceptional circumstances, students seeking travel and other funds for paper presentation who have exhausted other possibilities for funding their travel should submit a request accompanied by the research paper to the department Chair. Prior approval is required. Students should also be familiar with state regulations governing, for example, receipts to justify the expenditures, the use of state cars and the limits on lodging and meal costs. Students are responsible for making their own travel arrangements in compliance with University requirements regarding travel.

### **3.6 OFFICE SPACE ASSIGNMENT**

Students may use desks in their advisor's laboratory or office space. Other spaces in the department are available upon request for student meetings or activities. The BME Department also has a small collection of books and journals in the Library (Rm. 2019). This is a reading/reference library and journals and books should not be removed from the room.

### **3.7 USE OF COMPUTER EQUIPMENT, LIBRARY, AND EXTERNAL FACILITIES**

BME Students are welcome to use the department's computer lab, network printers, and other technology resources for academic purposes. Laboratory computers and research equipment should only be used with permission from the responsible laboratory director.

University computing accounts are managed by the Information Technology Services (ITS) group and are used by BME to access network resources. ITS also provides limited network file storage at no cost to users. Please contact BME IT Support with questions.

Computers and other tangibles purchased with University funds, research grant funds, or Fellowship money but purchased through the University, become the property of the University and must be surrendered prior to graduation.

### **3.8 GRADUATE DIVERSITY ACTION COMMITTEE**

The committee consists of graduate student volunteers with the goal of recruiting students from diverse backgrounds and ensuring that the department remains a welcoming environment for all. This committee promotes access to UVA resources for underrepresented minorities, women, families, LGBT, and nontraditional students. For more information or to get involved contact the chair of the Diversity Action Committee (see Appendix).

### **3.9 FORMS**

A listing of all SEAS required forms can be found at: <https://engineering.virginia.edu/current-students/current-graduate-students#accordion88012>

In addition to the forms published on the SEAS website, there are several forms that BME requires that are not available on the SEAS website. These include the Plan of Study forms for all of the degree plans and the Educational Elective Forms for the PhD plan. The forms can be accessed via the BME Graduate Program Collab site: <https://collab.itc.virginia.edu/portal>. You will be subscribed to this Collab site once you have activated your UVA email account.

## **CHECKLIST FOR MASTERS (ME and MS) PROGRAMS**

- \_\_\_ Request an advisor. Due no later than the end of the 1st semester
- \_\_\_ ME and MS Plans --Meet with your advisor and prepare a **Plan of Study** form. Due no later than end of 1<sup>st</sup> year
- \_\_\_ ME Plan--Submit Plan of Study to advisor by the end of your first term. Project completion timeline TBD by advisor and student, but expected to be completed within 15 months.
- \_\_\_ MS Plan --written draft of thesis proposal to advisor and committee. Ideally by the end of your first year.
- \_\_\_ MS Plan--Schedule Final Defense of Thesis. No later than 5<sup>th</sup> year.

This examination is public and announcement of it must be distributed at least 7 days in advance.

Two forms must be prepared in advance of the scheduled defense: **Report on Final Examination** and **Thesis Outcome Assessment**. Your Graduate Program Coordinator will prepare these using the information you submit for the public announcement – Date, Time, Location, Committee Members Names, Title and Abstract.

There are specific deadlines set by the Registrar's Office and the SEAS Deans Office that must be met in order to complete your degree requirements to have your degree conferred during the applied term. Once you apply for your degree you will receive the notification emails with those specific dates. You **MUST** adhere to those dates or you will be removed from the degree candidate list.

- \_\_\_ ME Plan – Complete 3 program assessments and submit to The Graduate Student Coordinator.
- \_\_\_ Apply for your degree in the Student Information System (SIS). **Dependent on defense date.**

Graduation application DUE DATES – October 1 for January graduation, February 1 for May graduation, and June 1 for august graduation.

- \_\_\_ Upload your dissertation to LIBRA.

Due date – refer to date published by the SEAS Graduate Office for the term you have applied for graduation.

## **CHECKLIST FOR PHD PROGRAM**

- \_\_\_ Request an advisor. Due no later than end of 1<sup>st</sup> semester, unless special permission has been granted by the BME Graduate Program Director
- \_\_\_ Appoint your PhD Committee (the composition can change over time as you progress through the program)
- \_\_\_ Submit a **Plan of Study** form → MUST BE COMPLETED PRIOR TO SCHEDULING PhD QUALIFYING EXAM
- \_\_\_ Schedule and take the Ph.D. Qualifying Exam
- \_\_\_ Complete TAsip requirement
- \_\_\_ Propose EEEs (fill out one “EEE proposal form” for each EEE, and your PhD Committee needs to sign them)
- \_\_\_ Submit written draft of PhD Proposal to advisor and then, if approved by him/her/they, to your PhD Committee
- \_\_\_ Schedule and do your PhD Dissertation Defense with PhD Committee
- \_\_\_ Complete EEEs (fill out one “EEE summary form” for each EEE, and your PhD Committee needs to sign them)
- \_\_\_ Schedule and do your PhD “Permission to Write” meeting (this is optional, but strongly encouraged)
- \_\_\_ Schedule and do your PhD Dissertation Defense with PhD Committee. This examination is public and announcement of it must be distributed at least 7 days in advance.

Two forms must be prepared in advance of the scheduled defense: **Report on Final Examination** and **Dissertation Outcome Assessment**. Your Graduate Program Coordinator will prepare these using the information you submit for the public announcement – Date, Time, Location, Committee Members Names, Title and Abstract.

There are specific deadlines set by the Registrar’s Office and the SEAS Deans Office that must be met in order to complete your degree requirements to have your degree conferred during the applied term. Once you apply for your degree you will receive the notification emails with those specific dates. You **MUST** adhere to those dates or you will be removed from the degree candidate list.

- \_\_\_ Apply for your degree in the Student Information System (SIS). **Dependent on defense date.** TERM DUE DATES – by October 1 for January graduation, February 1 for May graduation, and June 1 for August graduation.
- \_\_\_ Upload your dissertation to LIBRA. Due date – refer to date published by seas grad office for term you have applied for graduation.
- \_\_\_ Submit Survey of Earned Doctorates. Print completion certificate, scan and email to Barbara Graves, bag2y@virginia.edu, SEAS Graduate Engineering Registrar. Due date – refer to date published by SEAS Graduate Programs Office for term you have applied for graduation.
- \_\_\_ Schedule and do your Exit Interview with the BME Graduate Program Director

## APPENDIX I: DEPARTMENTAL COMMITTEES AND DIRECTORS

### **UNDERGRADUATE PROGRAM DIRECTOR:**

Shannon Barker

Email: sb3xk@virginia.edu

### **GRADUATE PROGRAM DIRECTOR:**

Shayn Peirce-Cottler

Email: smp6p@virginia.edu

### **GRADUATE PROGRAM COMMITTEE:**

Chair: [Shayn Peirce-Cottler](#)

Members: Silvia Blemker, Don Griffin, Gustavo Rohde, Eli Zunder, Mohammad Fallahi-Sichani, [Jonathan Rosen](#), Jason Papin (ad hoc, ombuds)

### **MS AND PHD GRADUATE RECRUITMENT AND ADMISSIONS COMMITTEE (2021-2022):**

Chair: [Kevin Janes](#)

### **ME GRADUATE RECRUITMENT AND ADMISSIONS COMMITTEE (2021-2022):**

Chair: [Jonathan Rosen](#)

### **SEMINAR COMMITTEE:**

Chair: [Silvia Blemker](#)

### **DIVERSITY COMMITTEE:**

Chair: [Metecivelek](#)

## APPENDIX II: Graduate BMES (GBMES) Student Chapter Officers

**President:** Julie Leonard-Duke

**Outreach Chairs:** Remziye Erdogan and Joe Ficarrota

**Diversity, Equity, and Inclusion Chairs:** Juliana Trujillo, Leilani Astrab, and Mark Schwartz

**Recruitment Chairs:** Mackenzie Grubb and Reagan Portelance

**Professional Development Chairs:** Tor Breza and Delaney Fisher

**Seminar and Symposium Chairs:** Sydney Shriver and Sam Crowl

**International Students Chair:** Alice Luanpaisanon

**Social Chairs:** Anna Debski and Jack Echols

**Sustainability Chair:** Noah Perry

**ME Chair:** Pallavi Swarup

## APPENDIX III: IMPORTANT AND USEFUL STUDENT LIFE RESOURCES

### **General UVA information:**

BME home page: <http://www.bme.virginia.edu>

BIMS home page: <http://www.bims.virginia.edu>

UVA Graduate Guide: <http://www.virginia.edu/graduateguide/>

UVA Health System home page: <http://www.med.virginia.edu/>

School of Engineering: <http://www.seas.virginia.edu/index.php>

School of Medicine: <http://www.healthsystem.virginia.edu/education-research/medschl.cfm>

**Academic information:**

Academic Calendar: <http://www.virginia.edu/registrar/calendar.html>  
Course Offering Directory: <http://www.virginia.edu/registrar/> -- click on Course Offering Directory link  
Registrar's Office: <http://www.virginia.edu/registrar/>  
Summer Session Office: <http://www.virginia.edu/summer>

**Library and Computing Facilities:**

Claude Moore Health Sciences Library: <https://guides.hsl.virginia.edu/home>  
PubMed: <https://www.ncbi.nlm.nih.gov/pubmed?otool=uvirlib>  
ITC Web: <http://www.itc.virginia.edu>  
[OVID](#) Medline  
UVA Research Computing: <https://www.rc.virginia.edu/>  
UVA Library Research Data Services + Sciences: <https://data.library.virginia.edu/>

**Career Planning and Development:**

Office of Career Planning and Placement: <http://www.career.virginia.edu/>  
SEAS Office of Engineering Career Services: <http://www.seas.virginia.edu/careerdevelopment/>  
SEAS Professional Development: <https://engineering.virginia.edu/future-grads/professional-and-career-development-graduate-students>  
Handshake: <https://career.virginia.edu/handshake>  
UVA PhD Plus: <https://phdplus.virginia.edu/>  
Tomorrow's Professor Today: <https://cte.virginia.edu/programs-grants>  
BME's Going Pro: <https://engineering.virginia.edu/departments/biomedical-engineering/academics/graduate-program/professional-development/bme-going-pro>

**Resources for Underrepresented Minority Students and Women in Science:**

Graduate and Postdoctoral Diversity Programs: <https://graddiversity.virginia.edu/>  
Center for Diversity in Engineering: <http://www.seas.virginia.edu/admin/diversity/>  
Black Graduate and Professional Student Organization (BGPSO): <https://www.facebook.com/bgpso/>  
Graduate Student LatinX Organization (gradLatinX): <https://www.facebook.com/groups/UVAGradLatinX/>  
Society for Women Engineers (SWE): <https://www.facebook.com/groups/UVAGradSWE>  
Women in Math and Science (WIMS): <http://wimsuva.wixsite.com/wims-uva>  
LGBTQ Center: <https://lgbtq.virginia.edu/>  
Nursing Mother Room Locations: <http://www.hr.virginia.edu/news-events/news/nursing-mothers>  
Maternity Leave Policy: <http://uvapolicy.virginia.edu/policy/PROV-028>  
Report a Barrier: <https://reportabARRIER.virginia.edu/>  
UVA Title IX: <https://eocr.virginia.edu/title-ix>  
Office of African American Affairs: <https://oaaa.virginia.edu/>  
Diversity at UVA: <https://vpdiversity.virginia.edu/>  
President's Commission on Slavery and the University: <https://slavery.virginia.edu/>

**Housing Resources:**

International Center Temporary Student Lodging: <https://internationalcenter.virginia.edu/lodgings>  
On-grounds graduate housing: <https://housing.virginia.edu/graduate-students>  
Off-grounds housing: <https://offgroundshousing.student.virginia.edu/>  
Housing Division: <http://www.virginia.edu/housing/>

**Confidential Resources:**

Counseling and Psychological Services: <https://www.studenthealth.virginia.edu/caps>  
Faculty Employee Assistance Program: <https://uvafeap.com/>  
Maxine Platzer Lynn Center: <http://womenscenter.virginia.edu/>

UVA Medical Center, including the Emergency Department\* (434) 924-2231

Student Health: Gynecology\* (434) 924-2773

Student Health: Psychologists in the Student Disability Access Center (SDAC): (434) 243-3915

<https://www.studenthealth.virginia.edu/student-disability-access-center/accommodation-services>

UVA Teen and Young Adult Health Center\*\*: (434) 982-0090 <https://childrens.uvahealth.com/services/teen-health>

\* The University's Medical Center Emergency Department and the Elson Student Health Center Gynecology Department are the only local facilities with nurses who are specially trained to collect evidence for victims of sexual assault; that evidence collection must occur within 120 hours of the assault. According to the Virginia Department of Forensic Science, some types of forensic evidence may be collected for up to 120 hours after a sexual assault; however, the sooner the care is received the more options are available for evidence collection and/or medical treatment. The UVA Emergency Department is open 24 hours a day, 365 days a year. The Elson Student Health Center is open Weekdays from 8:00 AM - 5:00 PM and available after hours at (434) 297-4261.

\*\* Provides health care for ages 12 to 26.

### **Other useful information:**

UVA Collab: <https://collab.itc.virginia.edu/portal> - BME Grad Studies

Athletics: <http://virginiaspports.com/>

International Studies Office: <http://www.virginia.edu/iso/>

Intramural/Recreational Sports: <http://www.virginia.edu/ims/>

Parking and Transportation: <http://www.virginia.edu/parking/>

Real Time UVA Bus locator: <https://uva.transloc.com/>

Student Health: <http://www.virginia.edu/studenthealth/>

UVA ADA Coordinator: <https://eocr.virginia.edu/ada-coordinator>

UVA News: <https://news.virginia.edu/>

Report a Barrier: <https://reportabARRIER.virginia.edu/>

EOCR Office for Equal Opportunity and Civil Rights: <https://eocr.virginia.edu/>

Resources for a Resilient UVA: <https://eocr.virginia.edu/resilient>

Emergency Alert Sign-up page: [https://uvaemergency.virginia.edu/uva\\_alerts](https://uvaemergency.virginia.edu/uva_alerts)

Respect UVA: <https://hr.virginia.edu/employee-relations/respect-uva>

If you are having trouble making ends meet, the University has the following resources:

<https://sfs.virginia.edu/emergencyloans>

### **Lee Emergency Loan**

The Lee Emergency Loan is a short-term, interest-free loan available to undergraduate students for up to \$500 and graduate students for up to \$750 per semester. The loan is due on the last day of the month after it is taken out (e.g. a loan taken out any day in February will be due March 31). As long as it is paid on time, there is no fee or interest. If it is paid late, there is a one-time late fee of \$10+.

To apply for the loan, come to the Student Financial Services desk in Carruthers Hall with your UVA ID card. The last day for Spring graduates to obtain a Lee Loan is March 31. The last day for Fall graduates to obtain a Lee Loan is October 31. Lee Loans are only available to Summer Session students if they are enrolled in the ensuing Fall term. Past due balances must be paid prior to obtaining a Lee Loan.

### **Honor Loan Fund**

The Honor Loan is a short-term, interest-free loan available to full-time graduate and undergraduate students. This loan is administered by the Office of the Dean of Students. For more information, please visit ODOS in Peabody Hall or call (434) 924-7133 to make an appointment.

## APPENDIX IV: RESOURCES FOR INTERACTING WITH BME OFFICE STAFF

### Travel Reimbursement Logistics:

- **START BY...**UVA uses two systems for reimbursement so you need to figure out which one you use: “Voucher system” or “Chrome River”. The simplest way to figure this out is if you have access to Chrome River then they do it there. It is self-service. If not, fill out a “Non-Employee Reimbursement form” (which you can get from Anita or Cassandra in the BME Main Office), and bring their receipts to either Anita or Cassandra, along with a PTAO (which you get from your advisor or whoever is paying for your travel).
- **PLANE TICKETS:** For plane tickets you are more than welcome to use one of the department p-cards, **but you are not allowed to physically take the p-card, so you should bring a laptop with you to Cassandra or Anita’s desk in the Main BME Office.** Alternatively, you can ask Cassandra or Anita for the contact information for one of our approved travel agency contacts, where they have these p-cards on file and can easily make their travel arrangements and then those will automatically be charged to the p-card.
- **CONFERENCE REGISTRATION:** For conference registrations it is highly recommended to use a p-card (follow same instructions as stated above for plane tickets).
- **HOTEL ACCOMMODATIONS:** For accommodation p-card is not available as they cannot pay for accommodation in advance. (Also, Air Bnb’s not allowed on p-cards.). So you must pay for your hotel/AirBnB yourself. You will get reimbursed when you show your receipt to Anita/Cassandra **after your trip.**
- **GETTING REIMBURSED:** You have 30 days from the last day of your trip to submit your receipts, otherwise it becomes taxable income. The time it will take for you to get reimbursed depends on how long it will take for each process to go through approvals, but it should normally **not take longer than a week** unless there are circumstances, such as the PI not approving the expense on Chrome River on time.

### Instructions for Reserving Meeting Rooms and Classrooms:

- 1) If you want to reserve these rooms, you need to email Keisha ([kj3e@virginia.edu](mailto:kj3e@virginia.edu)) in the Main BME Office **at least 2 weeks in advance of your meeting:**

MR5 1041 (BME Classroom)  
MR5 2019 (BME Library)  
MR5 2012 (BME Small Conference Room inside the BME office)

For any equipment issues or support please contact BME IT (Henry Pritchard: [hep6n@virginia.edu](mailto:hep6n@virginia.edu))

- 2) If you want to reserve these rooms, you need to go to this link and make your reservation: <http://rs.med.virginia.edu/rsrequest/login.asp>

MR5 2005 (before 1:00pm Monday- Thursday and all day Friday’s)  
MR6 G501  
MR6 2502  
MR6 3501  
MR6 3502  
Pinn Hall 1005  
Pinn Hall 1014  
Pinn Hall 1017

- 3) If you want to reserve these rooms, you need to email the people indicated here:

MR5 1005 (Megan Payne: mlp9df)  
MR5 1019 - CVRC Library (Megan Payne: mlp9df)  
MR5 2005 after 1:00pm (Lucille Bland: LTM3E)  
MR5 3005 (Susan Bywaters: SAB6J)  
MR6 2501 (Glenn Glover: GMG6N)  
Pinn Hall Conference Rooms and Auditorium (Sibyl Hale: SDH9T)

# 2021-2022 GRA GTA & FELLOWSHIP Schedule

University of Virginia - School of Engineering

## GRA/ GTA Wages Fall 2021 (before Taxes)

Pay Period (10) payments		Pay Dates
2-Aug	1	15-Aug
16-Aug	2	29-Aug
30-Aug	3	12-Sep
13-Sep	4	26-Sep
27-Sep	5	10-Oct
11-Oct	6	24-Oct
25-Oct	7	7-Nov
8-Nov	8	21-Nov
22-Nov	9	5-Dec
6-Dec	10	19-Dec
		<b>\$ -</b>

## Fall Fellowships 2021 (before taxes)

Month	Pay Date
September	23-Aug
October	23-Sep
November	23-Oct
December	23-Nov
January	23-Dec
The fellowship stipends are created on the 23rd of each month. It is mailed or deposited a few days later, with the goal of arriving by the first of the month.	
<b>\$ -</b>	

Grand Total

## GRA/ GTA Wages Spring 2022 (before Taxes)

Pay Period (10) payments		Pay Date
20-Dec	11	2-Jan
3-Jan	12	16-Jan
17-Jan	13	30-Jan
31-Jan	14	13-Feb
14-Feb	15	27-Feb
28-Feb	16	13-Mar
14-Mar	17	27-Mar
28-Mar	18	10-Apr
11-Apr	19	24-Apr
25-Apr	20	8-May
		<b>\$ -</b>

## Spring Fellowships 2022(before taxes)

Month	Pay Date
January	23-Dec
February	23-Jan
March	23-Feb
April	23-Mar
May	23-Apr
The fellowship stipends are created on the 23rd of each month. It is mailed or deposited a few days later.	
<b>\$ -</b>	

Grand Total

## GRA Wages Summer 2022 (before Taxes)

Pay Period (6) payments		Pay Date
9-May	21	22-May
23-May	22	5-Jun
6-Jun	23	19-Jun
20-Jun	24	3-Jul
4-Jul	25	17-Jul
18-Jul	26	31-Jul
		<b>\$ -</b>

## Summer Fellowships 2022 (before taxes)

Month	Pay Date
June	23-May
July	23-Jun
August	23-Jul
The fellowship stipends are created on the 23rd of each month. It is mailed or deposited a few days later.	
<b>\$ -</b>	

Grand Total

GRA/ GTA pays on the date listed above are transmitted via direct deposit or pick-up at the UVa Payroll Office)

Fellow ships stipends are transmitted by Direct Deposit or mailed to the local address located in SIS.

BME standard for PhD students is \$32500 annually.  
 Bi-weekly wages are \$1250 before taxes.  
 Monthly stipends are \$2708.34.