Department of Biomedical Informatics

Student Handbook 2022-2023

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VANDERBILT UNIVERSITY

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Preface

The Student Handbook of the Vanderbilt University Department of Biomedical Informatics describes the purpose and goals of the program, academic standards, and other guidelines, policies, and resources that affect students.

The Graduate School governs the academic programs of the Department. The Student Handbook is intended to complement, but not replace, the Graduate School Catalog. For additional details about policies, please consult the Graduate School Catalog http://www.vanderbilt.edu/catalogs/grad/Grad01.html.

We encourage interested students to review the departmental website at https://www.vumc.org/dbmi/ and the departmental educational website at https://medschool.vanderbilt.edu/biomedical-informatics/research-ms-and-phd-program/ as additional resources.

We invite students to make suggestions regarding the content of this handbook by contacting the Program Manager or Director of Graduate Studies. If you have questions that are not answered in this handbook or in other available resources, please seek information from your mentor, your fellow students, the Program Manager, or the Director of Graduate Studies.

Department of Biomedical Informatics Overview

Definition of Biomedical Informatics

Biomedical Informatics encompasses the structure, acquisition, integration, management, and optimal use of biomedical knowledge in biological research, in clinical sciences, and in health care delivery. The field involves multidisciplinary research in developing applications to support practice, research, and administration in all aspects of health care delivery, biomedicine, and public health. Biomedical Informatics adopts, applies, evaluates, modifies, and expands results from a variety of disciplines including library and information science, biology, computer science, statistics, operations research, economics, basic and clinical health sciences, and many other fields.

Because Biomedical Informatics spans the spectrum from the theoretical to the applied, it has equally developed “basic science” and “clinical” components. In addition, there is a strong component of organizational theory as applied to health care systems and institutions. Biomedical Informatics extends beyond the narrow focus of biomedical computer systems. It offers theories and tools for analyzing, supporting, and improving practice, administration, and research in biomedicine and health care.

Department and Degree Program History

The 1991 appointment of Dr. William Stead as Associate Vice Chancellor for Health Affairs heralded the institution's new, substantial commitment to biomedical informatics. Since that time, Dr. Stead has functioned as Vanderbilt University Medical Center's chief information architect and has responsibility for all forms of information management within the health center complex. Unique among academic health centers at the time (during the 1990s), VUMC entrusted the Informatics Center, led by Dr. Stead, with the responsibility for essential services, including:

- Providing the essential information infrastructure for patient care, management, research and education;
- Supporting for informatics-related research and education in clinical informatics and the emerging field of bioinformatics (including new initiatives in genomics and proteomics);
- Fusing scholarly research in biomedical informatics with the dissemination of the resultant knowledge through its educational programs and through the infrastructure it provided for the operations of the Medical Center.

This period also saw the construction of a modern academic biomedical library; creation of a new academic unit, the Division (now Department) of Biomedical Informatics (DBMI), within the School of Medicine, and recruitment of Dr. Randolph Miller to Chair the Division; and the installation of a campus-wide fiberoptic network and upgrades/replacements of all major clinical systems. Formal, non-degree postdoctoral training in Biomedical Informatics began in 1994.

In the late 1990’s, a number of nationally known biomedical informatics academicians joined the faculty, which grew to number 15 in 2001. Under their leadership, Vanderbilt’s Degree Program in Biomedical Informatics (MS and PhD) was approved in 2001 and enrolled its first students in the fall. One year later, the Training Program was awarded an institutional training grant (T-15) from the NLM and more than doubled in size. The Training Program contin

attract more applicants each year and to admit top caliber students who engage in high quality research mentored by our faculty. As a result, DBMI students have achieved outstanding publication records, as well as numerous recognitions from national organizations, including several AMIA Annual Symposium paper awards and a Lindberg Research Fellowship from the Medical Library Association. The Summer Internship Program, supported in part by the NLM grant, has allowed the department to expand upon its tradition of early exposure of health sciences' students to the field of biomedical informatics and to utilize the Meharry-Vanderbilt Alliance to increase the diversity of the Training Program experience.

Since 2005, the Department of Biomedical Informatics was led by Dr. Daniel Masys, as Chairman; he continued to attract faculty expertise in key areas identified as essential to the research, education, and service missions of DBMI. Since then, new faculty members have been recruited in the areas of proteome informatics, technology evaluation, bioinformatics of comparative molecular evolution, biomathematics, informatics for clinical investigation and molecular analysis and visualization, and surgical informatics. In February of 2011, Dr. Masys announced his intention to step down as department Chair at the end of the academic year; Dr. Nancy Lorenzi, Assistant Vice Chancellor for Health Affairs and Professor of Biomedical Informatics, served as interim Chair until the end of 2011 when the new chair, Dr. Kevin Johnson, was named the department's new chair after an extensive national search. His appointment was effective January 1, 2012. After Dr. Johnson announced that he planned to leave Vanderbilt in fall 2021, a national search was conducted to identify a new chair for the department. Dr. Trent Rosenbloom, DBMI Vice Chair of Faculty Affairs, served as interim chair for December 2021. Dr. Peter Embi was appointed as the department's new chair, effective January 1, 2022.

Our People

A list of all current Primary, Secondary, and Adjunct Faculty of the Department of Biomedical Informatics, with links to their individual profiles can be found at:
https://www.vumc.org/dbmi/person/faculty

Further information on Primary and Secondary Faculty research interests can also be found at: https://www.vumc.org/dbmi/node/164

A list of all current Administrative Staff and Research Staff in DBMI can be found at:
https://www.vumc.org/dbmi/person/staff

A list of all current trainees in DBMI, including all MS/PhD in Biomedical Informatics students, can be found at:
https://www.vumc.org/dbmi/person/trainees

Departmental Committees Focused on the Degree Program

DBMI has several committees that students should be familiar with, as they are focused on educational programs. Composition of these committees, purposes of the committees, and functionality of the committees is governed by departmental policies.

Admissions Committee

The purpose of the Admissions Committee is to manage admissions to the degree program by reviewing degree program applications, interviewing candidates, and voting on student admissions. Additionally, the committee is responsible for feedback and guidance regarding admissions processes, and may participate in recruiting activities. Students are not allowed to serve on the Admissions Committee. However, students do participate in admissions-related activities, such as meeting with candidates to answer questions, having meals and discussions with candidates, and providing any feedback about candidates based on these interactions.

Academic Progress Committee (APC)

The purpose of the APC is to review and monitor trainee progress. Students and their advisors are required to complete documentation about their degree program progress each summer. The APC then meets to review all documentation submitted by students and advisors and to discuss areas where each student is excelling and any areas where additional work is needed, and to identify feedback for the student and advisor on next steps. The end result of this process for students is an annual letter from the chair of the APC, providing feedback on the APC's discussion. In some cases, this letter may describe detailed requirements regarding student progress. The annual APC letter should be carefully reviewed by the student and their advisor, and any questions about the letter can be directed to the DGS. In some cases, the APC may review students and provide guidance on a more frequent basis. Students are not allowed to serve as APC members.

Curriculum Committee

The purpose of the Curriculum Committee is to provide guidance, oversight, and approval of the curriculum of the research-based MS and PhD biomedical informatics degree program. The committee focuses on both coursework-related degree program requirements and non-coursework requirements. Although this committee has previously been designed as an ad hoc committee to address specific topics, it was reformed as a permanent standing committee in 2021 and moving forward will provide curricular guidance on a routine basis. Students are an important part of the Curriculum Committee. When possible, the past and current education chairs of the student group serve on the committee, as well as other members identified as by the student organization leadership team. Students are non-voting committee members, but provide important feedback and insight and also assist with gathering additional feedback from their peers.

Key Educational Program Administration Roles

Program Manager: Rischelle Jenkins

The Program Manager is a key resource and contact person for all degree program students. The Program Manager is responsible for replying to applicants interested in the program and works closely with the Admissions Committee in recruitment and acceptances of students to the program. Additionally, the Program Manager assists new students with their transition to Nashville and onboarding as a student. Students requiring assistance with class registration, tuition/fees, stipend, health insurance, conference travel, supply ordering, and scheduling meetings with the DGS or Vice Chair may contact the Program Manager.

Director of Graduate Studies: Kim Unertl, PhD, MS, FACMI

The Director of Graduate Studies (DGS) assists students in our degree program and serves as a connector between our degree program and the Graduate School. The DGS plays key roles in recruiting and admissions, as well as in orienting new students to the degree program and university. The DGS serves as the advisor for first-year students, providing guidance on first-year courses and assisting students with identifying and connecting with research rotation mentors. Additionally, the DGS is responsible for implementing the curriculum, providing guidance on curriculum changes and development, and monitoring student degree progress. As the liaison between the department and the Graduate School, the DGS communicates key information about the program, about student status, and other topics with the Graduate School and provides information to DBMI regarding Graduate School policies and requirements.

Vice Chair for Educational Affairs: Jessica Ancker, PhD, MPH, FACMI

The Vice Chair for Educational Affairs (VCEA) supervises and develops strategy for all of DBMI's educational programs, including the PhD and research/postdoc MS, the MS in Applied Clinical Informatics, the Clinical Informatics Fellowship, the summer research program, the non-degree postdoc programs, and DBMI's other formal and informal training programs in biomedical informatics. While the DGS typically serves as first point of contact for answering questions about PhD students, MS students, and T15 or VA postdocs, the VC fills this role for other non-degree postdoctoral fellows at DBMI.

Research MS/PhD in Biomedical Informatics
Training Program Overview

Mission of Training Program

The mission of the Vanderbilt Biomedical Informatics Graduate Degree Program is to educate the next generation of leaders in the field of Biomedical Informatics.

Goals of Training Program

Student Excellence: To attract highly qualified graduate students who will develop innovative research projects and catalyze research and service efforts in the existing biomedical informatics and bioinformatics projects and units on campus. An important prerequisite for this goal is attracting biomedical informatics training funds.

Research Excellence: To facilitate innovative, state-of-the art biomedical informatics research that has significant theoretical and applied impact, and to increase research collaboration among Vanderbilt University centers, programs, and individual faculty in the biomedical informatics arena.

Educational Excellence: To design and implement innovative curricula that will address important educational challenges. In particular curricula that (a) will make it worthwhile for students to postpone highly-compensated employment to pursue advanced academic education in today's highly competitive job market; (b) will provide education that through flexible adaptation to the students' needs and goals, can lead to success in diverse post-graduation pursuits as academics, R&D or scientific management in large corporations, or entrepreneurial endeavors, and (c) will instill students with not only the ability and confidence to achieve high-goals but also the ethical responsibility, social consciousness and compassion that must characterize professionals working in the healthcare field.

Training for the Profession

Skills to be developed through our training program include:

Critical review. Students will be able to read, interpret, and synthesize published literature, including critically assessing study design and data use and analysis. Students will be able to provide alternate methodological and data analysis suggestions to strengthen study design. Additionally, students will be knowledgeable about the history of biomedical informatics and discuss how new developments fit into this historical context.

Study design. Students will be capable at identifying gaps in existing knowledge to identify important new questions and areas of research in biomedical informatics. Students will be able to develop research questions and/or hypotheses to address these gaps. Students will develop skills in designing new studies to answer their research questions or test their hypotheses, including selection of appropriate rigorous methods (e.g., statistical approaches, qualitative methods, computational techniques) for their study aims. Students will be aware of different sampling strategies and be able to identify which strategies are appropriate to their research topic. Additionally, students will also be aware of major ethical and health equity issues related

to their proposed work. Students will be encouraged to develop advanced methodology skills through appropriate coursework in other disciplines, dependent on their research interests.

Study implementation. Students will develop strong skills in identifying appropriate data sources for their study, understanding the constraints of the data sources and necessary approaches for data cleaning and interpretation, and analyzing data through rigorously implemented approaches. Students will be proficient in data security, data management, documentation, and data sharing, including awareness of data sharing constraints appropriate for their data sources. Students will design and implement a research project.

Ethics, health equity, and responsible conduct of research. Through coursework, seminars/colloquia, and discussions with mentors, students will develop a strong understanding of the potential ethical and health equity impacts of biomedical informatics research. All students will complete required responsible conduct of research training and will integrate this knowledge into their research projects.

Content-area expertise. Students will develop a broad understanding of historical and current trends in biomedical informatics research and of biomedical informatics methods. Additionally, as they specialize in their own research topics, they will develop context-area expertise related to their topic.

Scientific communication. Students will be able to communicate their research through scholarly dissemination, including through publications and presentations. Students will also be exposed to topics related to communication of science with non-scholarly audiences, including policymakers.

Research Expectations

Whether pursuing an MS or PhD, biomedical informatics graduate students are expected to engage in research throughout their time in the degree program, including while taking courses and during the summer. All students are required to complete two research rotations with different mentors with either a primary or secondary appointment in DBMI (see information on BMIF 6341/6342 and Appendix 4: BMIF 6341 and BMIF 6342 Research Rotation Guidelines). In addition to engaging in research with their primary advisor, students are encouraged to develop collaborations with other biomedical informatics faculty, with clinical faculty, and with members of the broader VU and VUMC research communities. Typically, students will engage in 15-20 hours of research per week while taking courses (although this will vary depending on number of credit hours and coursework requirements) and 40 hours per week while not taking courses.

The degree program does not have specific requirements regarding publications. However, all students are encouraged to disseminate their research widely through conference submissions and journal publications. While some travel funding for conferences may be available through training grants and the department, students are encouraged to take advantage of additional conference travel funding opportunities through professional organizations and through the Graduate School.

Students are encouraged to pursue external funding through pre-doctoral training programs and dissertation grants, appropriate to their educational goals. Writing and submitting grants will be crucial skills for the careers of many of our trainees, and training grants provide important skills development opportunities, as well as major achievements when awarded.

Multiple resources are available within DBMI and in the School of Medicine to support grant writing and submission activities.

Curriculum

The curriculum is highly adapted to students' backgrounds and concentration areas. A minimum of 30 credit hours and a thesis are required for the Masters degree. A minimum of 72 credit hours are required for the Doctoral degree. All students pursuing the PhD must earn the MS degree in the Vanderbilt Research MS/PhD Degree Program in Biomedical Informatics or have the degree requirement waived (please discuss waiver possibilities with the DGS). Additionally, all students pursuing the PhD must pass a qualifying exam and successfully propose and defend a dissertation. All students pursuing the PhD are also required to complete a teaching practicum, or an alternative mentored non-research experience.

Biomedical Informatics Core Courses

The foundational course requirements for all degree program students include successful completion of the six **core Biomedical Informatics courses**:
BMIF 6300 Foundations of Biomedical Informatics
BMIF 6310 Foundations of Bioinformatics
BMIF 6315 Methodological Foundations of Biomedical Informatics
BMIF 6321/6322 Scientific Communication (2 semesters)
BMIF 6331/6332 Student Journal Club and Research Colloquium (2 semesters)
BMIF 6341/6342 Research Rotation in Biomedical Informatics (2 semesters)

Students should refer to Appendix 4: BMIF 6341 and BMIF 6342 Research Rotation Guidelines for more detail on requirements for BMIF 6341/6342.

A grade lower than B- for any core course will require the student to repeat the course. If a student has previously satisfactorily completed a course that is substantially similar to a core course, they should discuss potential waiver of the core course with the Director of Graduate Studies.

Biomedical Informatics Selectives

All students are required to take **Selectives**, which are typically courses offered in Biomedical informatics (BMIF courses), cross-listed in Biomedical Informatics, or in areas closely related to Biomedical Informatics. Masters degree students must complete two selectives, while Doctoral degree students must complete three selectives. Potential courses to fulfill the selectives requirement include:

BMIF 6390: Machine Learning and Natural Language Processing in Healthcare (cross-listed with CS)
BMIF 7320. Healthcare System and Informatics
BMIF 7340. Clinical Informatics
BMIF 7350. Technology and Society
BMIF 7370. Evaluation Methods in Biomedical Informatics
BMIF 7380. Data Privacy in Biomedicine

Courses offered under BMIF 7390 or BMIF 7391 Special Topics Seminar in Biomedical Informatics and under BMIF 7395 Directed Research/Independent Study are also eligible to

be counted as Selectives. Students should consult the course catalog for Special Topics courses offered each semester. Students must discuss any plans for BMIF 7395 with the Director of Graduate Studies well in advance of the semester.

A grade lower than B- for any selective course will require the student to successfully repeat that course or successfully complete a different selective course in its place (with grade B- or higher in either case).

Competency Areas

Additionally, all students must demonstrate advanced knowledge in **three competency areas: Computer Science and Informatics, Biological and Health Sciences, and Research Methods.** Students pursuing a non-terminal Masters degree (i.e., on the way to the PhD) must take at least two courses in at least two competency areas as part of their Masters degree requirements and must take at least two courses in all three competency areas as part of their Doctoral degree requirements. Students pursuing a terminal Masters degree must take two courses in each of the three competency areas as part of their Masters degree requirements.

Examples of topics and courses related to each competency area are described below, although these lists are not intended to be exhaustive:

Computer Science and Informatics: compilers and formal languages, complexity, computability, computer organization, data bases, data structures, design and analysis of algorithms, networks, operating systems, programming languages, software engineering, human-technology interaction, safety, ethics in computer science. Graduate level (5000 and above) courses in Computer Science (CS), including courses cross-listed in BMIF, can be used to fulfill this competency area. Students should confer with the DGS regarding specific course details graduate level (5000 and above) courses in degree programs other than CS.

Biological and Health Sciences: principles of cell, organism, and population biology; anatomy, physiology, and mechanisms of disease; nosology, diagnostics, and therapeutics; genetics and molecular medicine; functionality of healthcare delivery systems. Examples of courses that could be used to fulfill this competency area: PATH 8345 Human Biology and Disease; HGEN 8340 Human Genetics I; CANB 8347 Cancer Systems Biology; BMIF (permanent course number TBD) Clinical Observation. Other degree programs with graduate level (5000 and above) courses that may be a fit for this competency area include Medicine, Health, & Society (MHS) and Nursing (NURS), but students should confer with the DGS regarding specific course details.

Research Methods: mathematics for computer science (discrete mathematics, probability theory); mathematical statistics, applied statistics, biostatistics, and mathematics for statistics (linear algebra, sampling theory, statistical inference theory, probability); qualitative and quantitative research designs, epidemiology, methods of systems evaluation; principles of research study design. Examples of courses that could be used to fulfill this competency area: BIOS 6311 Principles of Modern Biostatistics; BIOS 6312 Modern Regression Analysis; BMIF 7370 Evaluation Methods in Biomedical Informatics; EDUC 8820 Methods of Educational Research: Qualitative; MATH 6630 Nonlinear Optimization; EPID 8311 Epidemiologic Theory and Methods I; EPID 8312 Epidemiology Theory and Methods II.

Some courses needed to fulfill competency area requirements may be taken prior to beginning the degree program. For example, a student with previous training in a medical field (e.g.,

nursing coursework, medical degree program coursework) may have their Biological and Health Sciences competency area course requirements waived based on this prior training. Students interested in pursuing substitution of courses taken prior to entering the program as meeting competency area requirements must complete the Academic Program Committee (APC) Course Waiver Form (see Department Intranet), provide a course description (required) and/or course syllabus (preferred), as well as a transcript showing a grade no lower than a B in the course. The APC will consider these courses in relation to the student's research focus and needs for advanced knowledge. Although some upper-level undergraduate courses may be acceptable, students will not be permitted to count more than one undergraduate course toward the competency requirement in each of the three competency areas.

Questions about demonstrating advanced knowledge in each of the three competency areas or about potential for counting prior courses towards competency requirements should be addressed to the Director of Graduate Studies.

Electives

Students are also required to complete **Electives**, which are typically courses outside of Biomedical Informatics that are relevant to a student's educational goals and research focus. MS students are required to complete one elective course, while PhD students are required to complete three elective courses. Options for elective courses are courses that explore topics that a student may be interested in learning more about to enhance their research focus. Students should discuss potential elective courses with their faculty mentor and the Director of Graduate Studies.

Other Degree Program Requirements

Biomedical Informatics Seminar Series. The Biomedical Informatics Seminar Series is held weekly on Wednesdays from 12-1pm Central Time during the academic year. Topics vary, but the seminar series is typically a venue for presentation of completed or near-completed research. All students are required to attend at least 75% of offered seminar sessions throughout their training. Students are responsible for logging their participation using methods defined by the Program Manager (current approach: CME tracking system). For clinicians, CME is available for attendance for most seminar sessions. The CME and attendance code is provided at the seminar, along with the number to text to log participation. If students are unable to attend the seminar series for a prolonged period of time due to a course conflict or clinical responsibilities, students must request a waiver of the requirement for a specific time period. Prior to the start of the anticipated attendance conflict, the student must complete the Seminar/Colloquium Attendance Waiver Form (See Department Intranet) and submit it to the Program Manager for approval by the DGS.

DBMI Research Colloquium Series. The DBMI Research Colloquium is held on Thursdays from 12-1pm Central Time during the academic year. While topics vary, the colloquium is typically used for presentations of research in progress, student presentations, and student-oriented topics. New for 2021: colloquium topics will also include several presentations specific to Responsible Conduct of Research. All students are required to attend at least 75% of offered colloquium sessions throughout their training. If students are unable to attend the colloquium series for a prolonged period of time due to a course conflict or clinical responsibilities, students must request a waiver of the requirement for a specific time period. Prior to the start of the anticipated attendance conflict, the student must complete the Seminar/Colloquium

Attendance Waiver Form (See Department Intranet) and submit it to the Program Manager for approval by the DGS.

Responsible Conduct of Research Training. All students must complete required training in the Responsible Conduct of Research (RCR) prior to graduation. The RCR Training Process has updated substantially beginning in 2021-2022. Refer to Appendix 5: RCR Training Guidelines for the Biomedical Informatics MS/PhD Degree Program for complete details.

Teaching Practicum. Completion of a teaching practicum is required for all students pursuing the PhD, but is optional for students pursuing a terminal Masters degree. The teaching practicum is typically completed by working with faculty for one of three core BMIF courses (6300, 6310, 6315), but additional course options may be available in some years. Typically, students complete their teaching practicum after completing their qualifying exams. Students pursuing a terminal Masters degree who are interested in a teaching practicum experience should talk with the DGS about opportunities. Each student should work with the DGS to schedule the teaching practicum. As an exception due to unique student circumstances, alternative approaches to the teaching practicum may be available, and should be discussed with the DGS. Students should refer to Appendix 6: Teaching Practicum Guidelines for Faculty and Trainees for guidelines regarding teaching practicum expectations.

Student Journal Club. All students take Journal Club for credit (BMIF 6331/6332) in their second year in the degree program. However, students are expected to participate in the Student Journal Club throughout their training, beginning in their first semester in the degree program.

Undergraduate Prerequisite Courses. Some students may need to take undergraduate prerequisite courses to gain the knowledge and skills necessary for degree program courses. Approval of the DGS is required. The NLM fellowships will pay for a maximum of three such courses per student. Undergraduate courses cannot contribute to the student's minimum number of credit hours for degree completion.

Requirements for the Master's Degree

All candidates for the MS Degree must complete a program of study that includes at least 30 credits of formal graduate-level course work and research rotations as specified in the curriculum (see Appendix 1: Program of Study Example). Up to 6 additional credits of Competency Area coursework may be required, depending on the student's background. In addition, all students must satisfactorily complete a master's thesis.

All requirements for the Master's degree must be completed within a six-year period calculated from the end of the student's first semester of enrollment in the Graduate School.

1. Course Work

The APC reviews the student's Academic Progress Report (APR) and determines which courses may be counted toward the requirements for the degree. On recommendation of the APC and approval by the Graduate School, up to six semester hours toward the master's degree may be transferred from graduate schools in accredited institutions or from other Schools of the University. If a student receives a grade lower than a B- in a course, the course will not count toward the degree.

2. MS Research and MS Thesis Process

Students working towards their Master's program are required to complete a research project under the supervision of a faculty committee and to submit and defend a written thesis. There are four major components in the MS research process: formation of a thesis committee, writing and defense of an MS thesis proposal, completion of MS research, and writing and defense of an MS thesis.

Thesis Committee Formation and Meetings

By the end of the summer semester concluding the first full year of study, each student should nominate three faculty members, at least two of whom are DBMI faculty, to serve as their thesis committee. The chair of the committee must be a DBMI faculty member. The student is required to submit the MS Committee Formation Form, available in the Trainee Downloads section on the DBMI Intranet, to Rischelle for DGS approval.

The thesis committee should meet in full a minimum of every 6 months throughout the student's thesis research, to assist students with making progress towards degree completion. Students are also strongly encouraged to meet with their committee prior to their MS thesis defense, to ensure all committee members are in agreement that the student is ready to defend. At each committee meeting, the chair of the committee should confer with committee members to complete the MS Committee Meeting Evaluation Form, which should be submitted to Rischelle for DGS review.

MS Thesis Proposal

The thesis committee determines the requirements for the written research proposal. The timing of the proposal, the style, the formality, the length, and the level of detail are established by the committee, and may vary from student to student. The committee hears the student's oral defense of the proposal, and the chair reports the results on the MS Thesis Proposal Evaluation, which should be submitted to Rischelle for DGS review.

MS Thesis and Defense

At the conclusion of their MS research, the student submits a written thesis to the committee and schedules an oral defense. MS oral defenses are typically scheduled for two hours. This includes a one-hour public session where the student presents their research and takes questions from audience members and a one-hour private thesis committee session. The private thesis committee session typically includes a discussion between the committee and student regarding the research and thesis and a committee-only discussion to determine the outcome of the defense. Upon approval of the thesis and defense, committee members sign the title page of the thesis. The student makes all corrections specified by the committee and submits the thesis to the Graduate School following the Graduate School Thesis and Dissertation Guidelines, described at https://gradschool.vanderbilt.edu/academics/theses/.

Per degree program policy, students are allowed to use a journal article format for the MS thesis. Students and their committee should refer to Appendix 3: Guidelines for PhD Dissertation and MS Thesis Using Journal Article Format for further information.

Graduation Information

Students completing their MS must complete the Intent to Graduate or Intra-Term Graduation Application. Students are encouraged to review term and intra-term deadlines for submission of all MS-related materials and to discuss any specific time goals or constraints with the Program Manager and DGS. Information on deadlines is available from the Graduate School at: https://gradschool.vanderbilt.edu/academics/intraterm-graduation.php. Information on required academic forms and submission processes is available from the Graduate School, at https://gradschool.vanderbilt.edu/academics/forms_timeline.php.

3. Required Biomedical Informatics Degree Program Forms

As described throughout this section, in addition to documentation required by the Graduate School and the annual progress review forms required by the APC, the Biomedical Informatics degree program requires documentation of several events and milestones throughout the student's MS thesis research. Documentation of these events provides a standardized process to monitor and assess research progress in compliance with expectations from our accreditation body, the Southern Association of Colleges and Schools. Completion of these forms is required.

All forms are available on the DBMI intranet, Trainee Downloads section. Completed forms should be sent to Rischelle Jenkins for review by the DGS:

- MS Committee Formation
- MS Committee Meeting Evaluation: complete for every full committee meeting
- MS Thesis Proposal Evaluation
- MS Thesis Defense Evaluation

Requirements for the Doctoral Degree

1. Academic Progress

Students admitted to the Master's Degree Program may apply for admission to the PhD program contingent upon satisfactory completion of the master's degree.

For students entering prior to Fall 2022: Students admitted directly to the PhD program must complete requirements for the MS degree in Biomedical Informatics, in addition to requirements specific to the PhD. The requirement for the MS degree as part of the doctoral degree requirements may be waived for students who have completed a research MS in biomedical informatics or a closely related field or who have completed and published one or more substantial biomedical informatics research projects. Waiver of this requirement is granted by and at the discretion of the Academic Program Committee (APC).

For students entering in Fall 2022 and onwards: Students admitted directly to the PhD program must complete Demonstration of Research Preparation, in addition to requirements specific to the PhD. Guidelines regarding the Demonstration of Research Preparation requirement are described in *Appendix 7: Demonstration of Research Preparation for Biomedical Informatics PhD Students Entering Fall 2022 and Onwards*.

To progress from doctoral student to doctoral candidate, the student must complete all course work required by the training program and pass a qualifying examination. The examination will be administered by the student's PhD committee, which will supervise subsequent work toward the degree. Upon satisfactory completion of the course requirements and the qualifying examination, the PhD committee will recommend to the Graduate School that the student be admitted to candidacy.

Within four years after admission to candidacy, the student must present an acceptable dissertation and must pass a final oral examination administered by the student's PhD committee, duly announced by the Graduate School in advance and open to the public. The dissertation defense results form, signed by the committee members and the Director of Graduate Studies for the program, is forwarded to the Graduate School.

2. Residence and Course Work

The PhD degree requires at least three academic years of graduate study. A student must complete 72 hours of graduate work for credit, including a minimum of 31 credits of formal course work, research rotations, and teaching practicum as specified by the curriculum. Additional credits may be required in Competency Areas, depending on the student's background. The Academic Program Committee reviews students' Plans of Study (PoS) and determines which courses may count toward the degree. The remainder of the 72 credits may be in dissertation research credits, in special independent studies, and in transfer credit if applicable.

All students working full time toward the PhD must register as a full time student each fall and spring semester. When the required 72 hours of course work is completed, registration for dissertation research without hourly credit applies; this reflects full-time effort on research and confers full-time student status. Students registers for 0 credit hours and the minimum tuition of $200 is charged.

3. Functions and Composition of the Doctoral Committee

The functions of the doctoral committee are:

- To develop and administer a qualifying examination
- To approve the dissertation subject and dissertation proposal
- To aid the student and monitor the progress of the dissertation
- To read and approve the dissertation
- To administer the final oral examination

The student selects members of the PhD committee in consultation with the dissertation advisor, seeking the range of expertise in content and methods to support the qualifying examination and the dissertation research.

Committee Composition

Per degree program policy, the doctoral committee shall consist of no fewer than 5 members, which is one more member than required by the Graduate School. At least 4 of the doctoral committee members must be members of Vanderbilt University's Graduate Faculty. At least 3 of the members, including the committee chair, must hold primary or secondary appointments in the Department of Biomedical Informatics. These individuals are designated as the "inside department" committee members. At least 1 member must hold an appointment in a different department, who is designated as the "outside department" committee member(s).

Additional persons who are not members of the Vanderbilt University's Graduate Faculty may be nominated to serve on a doctoral committee. Their service on the committee is contingent upon the approval of the APC, the DGS, and the Vice Chair for Educational Affairs. Their privilege of voting requires the specific approval of the Director of Graduate Studies (DGS) and the Vice Chair for Educational Affairs.

Faculty members with primary appointments in Vanderbilt University School of Medicine departments that is clinical or does not offer degrees through the Graduate School often are not members of the Graduate Faculty of Vanderbilt University. However, procedures are in place to support appointment of these individuals to doctoral committees. Some key points students should consider when composing committees include:

- If a clinical/non-Graduate School department faculty member does not have a secondary appointment in any department that offers degrees through the Graduate School, that faculty member falls into the category of additional committee members requiring approval of the APC and DGS for voting privileges. Approval requires the following supporting material: a) the faculty member's current CV and b) a brief explanation of the value of the faculty member to the student's committee.
- If a faculty member has a secondary appointment in DBMI and has a primary appointment in a basic science department or any department whose graduate degrees are awarded through the Graduate School, then that person could be either an "inside department" or "outside department" committee member per the rules above.
- If a faculty member holds a secondary appointment in DBMI and a primary appointment in a clinical department or other department that does not offer degrees through the Graduate School, then that person can only be considered an "inside department" committee member. Clinical faculty are not considered Graduate Faculty unless they have a secondary appointment in a department whose graduate degrees are awarded through the Graduate School.

- The chair of the doctoral committee is responsible for administrative oversight of the committee and of the student's progress. Although the chair role is most often filled by the student's research advisor, this is not a requirement. Circumstances that could support the latter arrangement include, but are not limited to, a dissertation advisor with a secondary appointment in DBMI or whose workload or scheduled sabbatical is inconsistent with assuming the chair's responsibilities.

Any questions regarding committee composition should be addressed to the DGS.

Required Committee Formation Approval Form

Official appointment of the doctoral committee requires completion of the Graduate School *Request to Appoint PhD Committee* form. This form requires DGS signature and is then forwarded to the Graduate School. If a non-Graduate Faculty member is included on the committee, supporting documentation described above must accompany this form. The student must provide the DGS with the completed *Request to Appoint PhD Committee* form and all supporting materials at least one month before qualifying exams are expected to occur. A copy is retained for the DBMI student file. When the Graduate School approves the committee, the DGS, committee members, and student will receive a letter confirming the committee is approved and the PhD Committee is officially constituted.

PhD Committee Changes

After appointment of the committee, if a committee member leaves Vanderbilt *even if they continue to have an Adjunct appointment to a university department (including DBMI)*, students should notify the DGS regarding the change in status of their committee member. The DGS will assist the student with identifying how the status change may affect their committee composition. The student should request the updated CV of the committee member with their new affiliation information, as this will be required by the Graduate School.

If the membership of the PhD committee needs to change after it has been formally constituted for any reason, a *Request to Change PhD Committee* form must be filed and approved by the DGS and the Graduate School.

4. The Qualifying Examination

Purpose The purpose of the qualifying examination is to test the student's knowledge of the field of specialization, to assess familiarity with the published research in the field, and to determine whether the student possesses those critical and analytic skills needed for a scholarly career.

Prerequisites: Before the qualifying examination is administered, the student must have completed at least 34 hours of graduate work (to include all coursework required for the degree). In addition, the student must have completed all requirements for the master's degree. A minimum of two weeks must elapse between the official approval and constitution of the PhD committee by the Graduate School and the date of the examination.

Time limits: Students admitted directly to the doctoral program in Biomedical Informatics must take the qualifying examination no later than 8 semesters in the program (including time spent

completing requirements for the master's degree). Students who enter the PhD program after completion of the master's program must take the qualifying examination by the end of their first calendar year in the PhD program. The student must complete the written and oral portions of the examination within four weeks of receiving the questions from the committee.

Administration: The PhD committee determines the content and the format of the examination. The committee notifies the Director of Graduate Studies of the time and place of the oral examination at least three weeks before the scheduled exam date. The DGS must inform the Graduate School at least two weeks before the scheduled date. The oral examination is not public, and voice or video recordings are not permitted. The student is allowed only two opportunities to pass the examination. The qualifying examination results forms, signed by the committee members and the Director of Graduate Studies, will be forwarded to the Graduate School immediately after the examination.

Admission to Candidacy: When the student has passed the qualifying examination, the PhD committee shall recommend to the Graduate School that the student be admitted to candidacy for the degree.

5. The Dissertation

Topic

The candidate secures the approval of the PhD committee for the topic and scope of the dissertation research.

Proposal

The candidate prepares a formal, written research proposal and submits it to the PhD committee at least two weeks prior to the scheduled oral defense of the proposal. The PhD committee has the responsibility and the authority to determine the requirements for content and format of the proposal. Typically, a proposal includes the following chapters:

- An introduction that includes the problem statement, the research questions or hypotheses, and the specific aims. Prior research on which the current proposal is founded may be summarized here.
- A review of the literature that integrates the development of knowledge in the area and describes the gaps that the proposed research will fill.
- The methods of the experiment, if any, the sources of data, and the instruments and procedures for collecting and/or analyzing the data

Oral Defense of the Proposal

The candidate meets with the PhD committee to defend the proposal. The committee may accept the proposal, reject the proposal, or require modifications to the proposal. If the proposal is rejected or if there is a requirement for modifications, the committee shall set a due date for the new or revised proposal. When the proposal has been approved, all PhD committee members sign the Dissertation Proposal Approval form and return it to the Director of Graduate Studies.

The Written Dissertation

The dissertation provides a comprehensive report of the research. It includes the chapters of the dissertation proposal, brought up to date, as well as chapters for Results and Discussion. Per degree program policy, students are allowed to use a journal article format for the doctoral dissertation. Students and their committee should refer to Appendix 3: Guidelines for PhD Dissertation and MS Thesis Using Journal Article Format for further information.

Time Limits

The dissertation must be completed and successfully defended within four years after a student has been admitted to candidacy for the degree. Upon petition to the Graduate School, a one-year extension of candidacy may be granted. If such a period has expired without successful completion of the dissertation, the student will be removed from the rolls of the Graduate School. Readmission to the Graduate School, and to candidacy, requires application to the Graduate School, with approval of the program faculty. In such cases the student may be required, by the Graduate School or by the PhD committee, to demonstrate competence for readmission by taking a qualifying examination or additional course work.

The student provides each member of the dissertation committee a complete copy of the dissertation in final, polished form at least one month before the intended date of the defense. At the same time, the chair of the PhD committee or student notifies the Program Manager of the time and place of the oral defense no later than three weeks before the event. The Program Manager informs the Graduate School of the time and place no later than two weeks before the scheduled date.

The final steps in completing the PhD are the oral defense and approval of the written dissertation. Approval of the written dissertation may not occur on the day of the oral defense because of corrections suggested by the doctoral committee that need to be made prior to final approval. However, this should not delay forwarding to the Graduate School the decision on the outcome of the oral defense, which is documented with the *Results of Dissertation Defense* form, after the defense has concluded.

Students are encouraged to review term and intra-term deadlines for submission of all PhD-related materials, including the *Intent to Graduate* form, and to discuss any specific time goals or constraints with the Program Manager and DGS. Because committees usually require at least minor revisions to the dissertation, candidates are strongly advised to set the oral defense well before the deadlines for graduation. If the student passes the defense but does not meet the deadlines, the degree will be conferred at the subsequent graduation.

Information on deadlines for term and inter-term degree completion is available from the Graduate School at: https://gradschool.vanderbilt.edu/academics/intraterm-graduation.php.

Information on required academic forms and submission processes is available from the Graduate School at https://gradschool.vanderbilt.edu/academics/forms_timeline.php.

The oral defense of the dissertation

The final oral examination is administered by the student's PhD committee and is on the dissertation and significant related material. The student is expected to demonstrate an

understanding of the larger context in which the dissertation lies. The public is invited to attend the final examination, which is announced in advance by the Graduate School. The oral defense may be waived only on the written approval of the department, the PhD committee, and the Graduate School.

The PhD committee determines the agenda and manner of administration of the final oral examination. Some common features of these examinations include:

- A 40-50 minute presentation by the candidate of the main points of the research, possibly including an overview in lay language for visitors
- A question-and-answer period for the audience
- Dismissal of the audience for questions and discussions between the committee and the candidate
- Dismissal of the candidate for deliberations and decisions by the committee
- Return of the candidate to hear the decisions of the committee and the requirements, if any, for revisions to the dissertation
- Announcement of the result to any members of the audience who may have waited.

6. Required Biomedical Informatics Degree Program Forms

As described throughout this section, in addition to documentation required by the Graduate School and the annual progress review forms required by the APC, the Biomedical Informatics degree program requires documentation of several events and milestones throughout the student's doctoral research. Documentation of these events provides a standardized process to monitor and assess research progress in compliance with expectations from our accreditation body, the Southern Association of Colleges and Schools. Completion of these forms is required.

All forms are available on the DBMI intranet, Trainee Downloads section. Completed forms should be sent to Rischelle Jenkins for review by the DGS:

- PhD Committee Meeting Evaluation: complete for every full committee meeting
- PhD Qualifying Examination Evaluation
- PhD Dissertation Proposal Evaluation
- PhD Dissertation Defense Evaluation

Requirements for the Non-Degree Postdoctoral Fellowship

The Department of Biomedical Informatics postdoctoral fellow trainee positions are for qualified doctorally-trained researchers/clinicians who have a good background in the biomedical informatics field and wish to focus on in-depth research while being mentored by faculty. For clinicians with a less formal biomedical informatics background, the MS/PhD route should be an option to consider, because there is time for formal didactic training. If an individual has substantial programming experience, the program takes this into account and the student can broaden his/her experience with more advanced classes from other fields. Also, from a career perspective the MS/PhD option may provide better credentials than the fellowship alone.

Applicants interested in pursuing a non-degree research trainee fellowship should NOT complete the same online application as degree program applicants. They should send the Program Manager the following materials in electronic form: CV, transcripts from graduate degrees (unofficial is fine), personal statement, and 3 letters of reference. The Admissions Committee will review and determine acceptance, when training grant funding will be used for the postdoctoral fellow, engaging potential mentors and additional faculty as appropriate.

The research advisor and the Vice Chair for Educational Affairs shall assist each non-degree-seeking postdoctoral fellow with planning a program of course work and research consistent with the trainee's goals and research focus upon the approval of the APC. Some core and cognate courses may not be required because they are not closely tied to the fellow's objectives. The usual expectation is that non-degree fellows will take no more than one course each semester. Non-degree postdoctoral fellows must complete and submit an Individual Development Plan https://medschool.vanderbilt.edu/postdoc/individual-development-plan-idp-for-postdoctoral-fellows/) within six months of their initial appointment and at the time of annual reappointment (or every six months).

Some students may need to take undergraduate pre-requisite courses to gain the knowledge and skills necessary for participating in the core courses or the cognate courses. The NLM fellowships will pay for a maximum of three such courses per student.

Non-degree postdoctoral fellows will be reviewed annually coinciding with the submission of the updated Individualized Development Plan. The reviews will be administered by the APC.

Vanderbilt University Academic Requirements and Policies

NOTE: Students should consult the Graduate School Catalog for complete and official Vanderbilt University policies and procedures. However, a subset of policies and procedures are described here as a starting point for students.

Grading System

The grading system in the Graduate School includes the letter grades A, B, C, D, and F. A student will not be granted graduate credit for any course in which a grade of less than C is received. The letter "I" may be used at the discretion of the instructor in those cases in which the student is not able to complete work in the normal time. The notation "W" is entered onto the transcript when a student withdraws from a course or from the Graduate School. A grade point average of 3.0, or a B average, on all courses taken for credit is required for graduation. Letter grades are assigned grade point values as follows:

A = 4.0	C = 2.0
A- = 3.7	C- = 1.7
B+ = 3.3	D+ = 1.3
B = 3.0	D = 1.0
B- = 2.7	D- = 0.7
C+ = 2.3	F = 0.0

Students receive grades in all courses except those approved for non-credit, audits, and some seminars. If an "I" (Incomplete grade) is not replaced by a letter grade within one year it is changed to the grade "F" at the discretion of the instructor; otherwise, the "I" (incomplete grade) automatically becomes permanent and remains on the transcript as such. *S/U* grades are given every semester for all research courses (7999, 8999, and 9999), regardless of the number of hours registered.

The exam schedule for each semester is at http://registrar.vanderbilt.edu/.

Academic Performance & Probation

The terms for academic probation are established by the university. A grade point average of 3.0 is necessary for graduation. Students who fall below an average of 3.0 are placed on probation for one semester. If the student's performance does not improve during that semester, the Graduate School and the appropriate department chair will decide whether to dismiss the student or to allow the continuation of probation. If at the end of the second semester the grade point average is still below 3.0, the student may be advised to withdraw or face dismissal. Students who earn a grade point average of 2.0 or less during their first semester of residence are subject to dismissal at the end of that semester. Accumulation of three *U* grades in research courses can lead to dismissal.

In the Biomedical Informatics Department, the Academic Program Committee (APC) oversees the students' academic work and progress. The APC can have additional or more stringent requirements than the university to assess satisfactory student progress. Accordingly, the APC requires a grade of B- or better in each Core and Selective course in the curriculum. Students who earn lower grades will be placed on departmental academic probation. These students are required to maintain an overall average of B or above and to repeat successfully the course

in which they obtained an unsatisfactory grade the next time it is offered, or otherwise be subject to dismissal.

Leave of Absence

The Graduate School requires continuous registration. Students who want to interrupt their graduate study must apply to the Dean and receive an authorized leave of absence. Leave of absence is granted for a maximum of one year. Those without authorized leave who do not register are dropped from the rolls of the Graduate School and are not considered students. If they want to resume graduate study at Vanderbilt, they must apply for reinstatement.

Candidates who have passed the qualifying examinations or completed 72 or more hours of credit toward the Doctor of Philosophy degree are not usually granted a leave of absence, except in special circumstances (e.g., parental or medical leave).

Parental Leave

All students enrolled full-time in the Graduate School and supported by funding from either internal or external sources are covered by this policy. This includes students with funding through stipends, such as training grants or service-free fellowships, and students compensated for services, such as teaching or research assistants. Prior to and/or following childbirth or adoption of an infant, the primary caregiver (whether mother or father) will be allowed to take six weeks of parental leave. During this period, the student's current stipend, and, if applicable, funding for health insurance and tuition, will be continued without interruption. The student's enrollment status will be continued during this period as well.

Withdrawal

Students who intend to withdraw from the University should inform the DGS in writing. The DGS will inform the Graduate School. Improper notification may result in academic and financial penalties.

Definition of Full-Time Status

At Vanderbilt University's Graduate School, a full-time student is one registered for 9 to 12 hours per semester during the academic year and 6 to 9 hours in the summer. BMIF 7999 (Master's Thesis Research) may be used to bring master's degree students up to full time status when they are taking fewer than 9 hours of course work.

PhD students may register for Dissertation Research (BMIF 9999) for credit as needed to fulfill 72 credits required for the PhD and to achieve full time status during both Fall and Spring Semesters. Once 72 credits in fulfillment of curriculum requirements have been taken, PhD students may register for BMIF 9999 for zero (0) credits, which will continue to maintain their full time status.

Tuition Benefits for Full-time Staff

Employees of Vanderbilt University or Vanderbilt University Medical Center should consult their human resources departments for information regarding tuition benefits for full-time staff.

Transcripts

Students needing copies of their transcripts should refer to the University Registrar website for more information: https://registrar.vanderbilt.edu/transcripts/

Health Insurance Waiver Process

Vanderbilt University requires that all graduate and professional students designated as maintaining full-time enrollment are required to have health insurance coverage that meets certain criteria. Students will be automatically enrolled in and billed for the Vanderbilt Student Health Insurance Plan (SHIP).. Students wishing to waive SHIP must complete an online waiver form prior to the start of each academic year, typically by an August 1 deadline. Refer to information from the Graduate School regarding SHIP for annual deadlines and further details. More information is also available at the Graduate School website for current students at https://gradschool.vanderbilt.edu/current_students/.

Student Accounts

Every month all students are sent an electronic statement reflecting any outstanding charges, which is accessible through YES. Please carefully review all charges. For students on the T15 training grant, the grant is responsible for tuition, insurance, and activity fees. Library fines, student health visits, or other charges are the responsibility of the student. For students on the training grant, the Office of Biomedical Research and Training, BRET, is responsible for processing the payment of tuition, activity fees, and health insurance. Students should notify Rischelle Jenkins if they encounter any situations of concern with their student accounts.

Student Complaint and Grievance Procedures

The Department of Biomedical Informatics and the Biomedical Informatics MS/PhD Program, like all of Vanderbilt University, is committed to encouraging and sustaining a learning and work community that is free from prohibited discrimination, harassment, and retaliation. We follow all applicable Vanderbilt University policies and requirements on this topic. For further information, including how to report an incident and investigation processes, students should refer to Chapter 8: Student Discrimination of the Vanderbilt Student Handbook, located at: https://www.vanderbilt.edu/student_handbook/student-discrimination/. Students may also find it helpful to refer to the Complaint and Grievance Procedure section of the Graduate School Resource Guide for information. This resource is located at: https://gradschool.vanderbilt.edu/documents/students/GradSchool_Resource_Guide_Rev_2-2019.pdf

Additional Vanderbilt University Policies and Resources for Graduate Students

Anti-Harassment Policy:
https://hr.vanderbilt.edu/policies/anti-harassment.php

Relationships in the Workplace:
https://hr.vanderbilt.edu/policies/relationships-in-workplace.php

Resources for Graduate Student Academic and Personal Concerns:
https://gradschool.vanderbilt.edu/students/concern_flowchart.php

Research MS/PhD in Biomedical Informatics
Policies and Procedures

Orientation

All incoming students should plan to attend the orientation for graduate students held by the Graduate School, typically held the Monday before classes begin. The Graduate School will distribute information regarding this orientation, typically via email.

The Research MS/PhD Degree Program in Biomedical Informatics holds an additional orientation, which incoming students are also required to attend. The orientation covers degree program requirements and policies, introduces key people in the department, and discusses resources available to graduate students.

Research Policies

Patient Privacy and HIPAA Training

Research and educational activities conducted in the VUMC environment can bring you into contact with private patient data. HIPAA (Health Insurance Portability and Accountability Act of 1996) is legislation that, among other purposes, protects the integrity, availability, and confidentiality of patient data and defines penalties for violations. All incoming biomedical informatics graduate students who have not recently received HIPAA training related to clinical responsibilities must complete HIPAA training as part of their onboarding.

There are two steps for HIPAA compliance with this requirement – please use these links:

1) Complete the HIPAA Basic Training tutorial for non-VUMC personnel, take the online HIPAA Test at the end of the tutorial and provide a copy of the test to give to Rischelle Jenkins for your student file.
https://www.mc.vanderbilt.edu/root/ppt/hipaa/hipaa091206.ppt

2) Complete and sign the Confidentiality Agreement and provide a copy to Rischelle Jenkins for your student file.
https://www.vumc.org/InfoPrivacySecurity/21566 (VUMC login required)

Humans Subjects Research Training

All incoming DBMI graduate students must complete Humans Subjects Research training as part of their onboarding, through the Web-based Collaborative IRB Training Initiative (CITI) Course. Proof of this training will also be required for any subsequent IRB application for proposed research that involves human subjects. After you logon to the CITI course webpage https://www.vumc.org/irb/citi, you will need to follow the instructions carefully. The default course for all DBMI graduate students is “Group I – Biomedical”. If you are going to be using qualitative research methods, you may also need to take the “Group II – Social/Behavioral” course. Your faculty mentor can advise you on this question. Take the appropriate modules and send a copy of the verification of completion certificate to Rischelle Jenkins for your student file.

Protection of Human Subjects

All students in the Department of Biomedical Informatics are required to obtain appropriate approval from the Institutional Review Board (IRB) before beginning their research.

Established in accordance with federal regulation 45 CFR 46, the IRB is charged to review research proposals and progress reports and to assure the protection of human subjects. At Vanderbilt, the IRB has four different committees: Health Sciences Committee #1, #2, #3, and the Behavioral Sciences Committee.

There are three types of IRB Review:

- *Full Board (Standard Review):* Review of proposed research at a convened meeting where a valid quorum of IRB members is present.

- *Expedited Review:* Review of proposed research by the IRB Chair or a designated voting member or group of voting members, rather than by the entire IRB Committee. Federal rules permit expedited review for certain kinds of research involving no more than minimal risk and for minor changes in approved research.

- *Exemption:* A specific research project may be exempted from the requirement for IRB approval when it is determined that the research does not involve human subjects as defined in federal regulation 10 CFR 745 and/or the only involvement of human subjects is in one of the categories listed under 45 CFR 46 Section 101(b)(1)-(6). Human subjects' regulations do not apply to exempt projects. Even if the research project is thought to be exempt, if it involves human subjects or data about human subjects, it must be submitted to the IRB for determination of exempt status.

For more information about IRB, please see https://www.vumc.org/irb/.

Access to Production Systems for Research Purposes

Access to production systems is on an as-needed basis and not routinely granted to our graduate students. A faculty member must support a student's access request. If you wish to request access to VUMC production systems containing patient data, see Belinda Ballard for the necessary form and process. She should also receive copies of the HIPAA Test and the signed Confidentiality Agreement which she will retain with documentation of your access request.

Responsible Conduct of Research (RCR)

Research integrity is fundamental to good research and crosses all disciplines and areas of focus. Students will receive training and mentoring related to Responsible Conduct of Research (RCR) throughout their time in the training program. Successful completion of all requirements related to RCR training is required for graduation. Further details on the degree program's approach to RCR training, which was updated in 2021, are covered in Appendix 5: RCR Training Guidelines for the Biomedical Informatics MS/PhD Degree Program

NIH Requirements Regarding Publications Arising from NIH Supported Work

Students funded on the T15 training grant, or on other federal grants, should be aware of and familiar with the NIH requirements for publications arising from NIH supported work. A detailed FAQ about the NIH Public Access Policy is available at https://publicaccess.nih.gov/faq.htm. Students should also be certain to acknowledge their funding sources on all presentations and publications.

Academic Advising

Soon after joining the degree program, new students will meet with the DGS for initial advising, covering topics including class registration, identifying research rotation mentors and projects, and other topics relevant to their educational plans. After students complete their two research rotations in their first year in the degree program, students should select their research mentor, who typically also takes responsibility for academic advising. The DGS will continue to support students and their advisors on all training issues throughout their time in the training program, including providing input on academic coursework, research plans, professional development, and career planning.

Registration

Prior to registering for classes for each semester, students should discuss and have approved their plan of study for each semester with their academic or research advisor and the Director of Graduate Studies. After the plan of study for the semester is approved, students can register for courses online via the Vanderbilt's Online Course Registration System YES (Your Enrollment Services). The link is http://yes.vanderbilt.edu/. Your VUnet ID and password are required for login. Each semester, students are required to complete the Online Registration Data Form. For courses in some departments outside of DBMI, students are required to obtain additional permission to register. Students should notify Rischelle Jenkins if they encounter this situation.
All students MUST register every fall and spring semester until they graduate if they receive a stipend. If their pay status changes to salary, where deductions are withheld, students must also enroll during the summer.

Computer Network Credentials

With some limited exceptions, all degree program students will be provided with both VU and VUMC computer network credentials on starting the program. To activate their VU student account, students should go to https://it.vanderbilt.edu/services/identity/user/. This will give students access to the majority of Vanderbilt University systems available to students. To active their VUMC network credentials, students should follow instructions provided in email after DBMI enters your credential information. This will give students access to the VUMC DBMI Microsoft Teams application and is required for accessing some computational resources in 2525 West End Avenue. Students should be aware that VU and VUMC have separate IT Support departments, and when IT help is needed, should consult the appropriate IT group for the specific account. In addition, students are responsible for checking both their VU and VUMC email accounts, and making sure the security of both accounts is carefully maintained.

Travel Policy

Each student traveler who anticipates being reimbursed by DBMI-Vanderbilt for travel is required to review the Student Travel Policy before making any travel arrangements (see Appendix 2: Student Travel Policy). It is the responsibility of the student to be familiar with and in compliance with the travel policy. Failure to follow both university and DBMI travel policies may result in travel expenses not being reimbursed.

Conference Posters

Students who prepare poster presentations for conferences should use the departmental poster format, as shown in the DBMI Poster Template available on the DBMI Intranet. The educational programs budget will cover expenses incurred for the printing of posters if the student is first author and the poster relates to the student's research. It is acceptable to use cloth poster printing services, if costs are comparable to printing paper posters.

Open Access Publication Fees

Currently, the educational programs budget does not cover open access publication fees for student publications in general. Students should consult with the Vanderbilt University Library for updated information regarding open access publication memberships that the university might provide.

Remote Learning Policy

Effective Fall 2022, the degree program has implemented a new remote learning policy. Refer to Appendix 8: Remote Learning Policy for details regarding the expectations and requirements of this policy.

National Library of Medicine
Biomedical Informatics Fellowships

Trainee Appointment

Since the Fall 2009, the National Institutes of Health (NIH) requires that the use of xTrain Commons module to prepare and submit appointment forms and other related documents. The Grants Manager will process annual appointments electronically via eRA Commons. When appointments are initiated, students receive an email requesting them to create an account. eRA Commons notifies the student, the principal investigator, program manager and Grants Manager when the account is activated.
Trainee appointments are usually made in 12-month increments. A trainee who is appointed on or after July 1, 2009 may receive up to 5 years of aggregate NLM support at the predoctoral level or up to 3 years of support at the postdoctoral level. Any extension of the total duration of trainee support at either the predoctoral or postdoctoral level is highly unusual and requires approval by NLM.

Stipends

NLM training awards provide funds in the form of stipends to graduate students and postdoctoral trainees. A stipend is provided as a subsistence allowance to help trainees defray living expenses during the research training experience. It is not provided as a condition of employment with either the Federal Government or the awarding institution. Trainees are required to follow the NLM training grant directives (e.g., not having other concurrent federal grant support). Stipends must be paid to all trainees at the levels stipulated by NLM stipend schedules.

As of July 1, 2009, predoctoral stipends are irrespective of educational degrees earned and years of experience. Postdoctoral stipend levels continue to depend on the trainee's years of professional experience. Stipend levels are requested by DBMI and determined by NLM. After the initial level of the NLM stipend is determined, the student may receive annual increases set forth by the NLM. However, the initial stipend level does not change. Students are eligible for annual adjustments after the completion of 12 months in the program.

Vanderbilt does not report stipend payments on a 1099. However, this does not mean the stipend is not taxable. It is the responsibility of the student to verify their tax status and whether taxes are payable to the Internal Revenue Service.

Tax Liability

Internal Revenue Code Section 117 applies to the tax treatment of all scholarships and fellowships. Under that section, non-degree candidates are required to report as gross income all stipends and any monies paid on their behalf for course tuition and fees required for attendance. Degree candidates may exclude from gross income (for tax purposes) any amount used for tuition and related expenses such as fees, books, supplies, and equipment required for courses of instruction at a qualified educational organization. The taxability of stipends, however, in no way alters the relationship between NLM trainees and institutions. NLM stipends are not considered salaries. In addition, trainees supported by NLM are not considered to be in an employee-employer relationship with NLM or the awarding institution. It must be emphasized that the interpretation and implementation of the tax laws are the

domain of the Internal Revenue Service (IRS) and the courts. DBMI and Public Health Service (PHS) take no position on what the status may be for a particular taxpayer, and it does not have the authority to dispense tax advice. Individuals should consult their local IRS office about the applicability of the law to their situation and for information on their tax obligations.
Details on National Institute of Health (NIH) policies on administering stipends, on stipend supplementation, on other compensation, on educational loans, on concurrent awards and on advice on the tax liability of stipends are available from National Research Service Award Guidelines. http://grants.nih.gov/training/nrsa.htm

Health Insurance

Health Insurance (self-only or family) are allowable trainee related expenses only if such charges are applied consistently to all individuals in a similar training status at the organization, without regard to their source of support. Health insurance can include coverage for costs such as vision and/or dental care if consistent with organizational policy. All Graduate School students who are registered for four or more credit hours, or who are actively enrolled in research courses that are designated as full-time enrollment, are required to be covered by adequate health insurance. Students must be covered by either (a) the Vanderbilt Student Injury and Sickness Insurance Plan or (b) a policy of the student's choice that provides comparable coverage. If the student already has comparable health coverage for the coming year, he/she must request a waiver from the Vanderbilt insurance plan no later than August 1st by going to https://finance.vanderbilt.edu/stuaccts/graduate/health-insurance.php. The student will receive a confirmation by e-mail upon submitting the online waiver form. Please print and retain this confirmation number, as it is the only documentation that the form was successfully submitted. If the student successfully waives coverage, the fee for Vanderbilt's insurance program will be deleted from student's account.

Postdoctoral trainees who are appointed as a research fellow trainee (non-employee postdoc) are eligible to enroll in the Garnett-Powers Postdoctoral Benefits Package. The Postdoc Benefits Program is an all-in-one program consisting of health insurance, dental insurance, life and AD&D insurance, long-term disability insurance and a vision discount plan for non-employee postdoctoral trainees at Vanderbilt. For information about the package, please go to the website www.garnett-powers.com/vanderbilt/.

Activity Fees

University activity fees are covered by the training grant and department funds.

Travel and Annual Meetings

Funding for trainee travel is provided for attendance at scientific meetings that the institution determines to be of importance to the individual's research training. The Department of Biomedical Informatics requires that NLM-funded trainees attend the annual NLM Training Conference, usually held each June, and recommends that they attend the annual American Medical Informatics Association (AMIA) meeting, usually held in November of each year. Other national conferences related to the field of Biomedical Informatics may be substituted for AMIA, with approval of the student's advisor and the DGS.
Students are strongly encouraged to have a membership with AMIA. Membership and registration to attend AMIA may be done simultaneously.

The Student Approval Form must be signed by the Director of Graduate Studies (DGS) before making any travel arrangements. Traveler should seek approval at least one month prior to the trip. Please review the Student Travel Policy (see Appendix 2: Student Travel Policy).

Students receive an annual discretionary spending allowance of $2,200, which is funded from the NLM Training Grant and department funds:

- NLM Training Grant Meeting: $1,000 is restricted to funding your attendance at the mandatory annual "NLM Training Conference" meeting and cannot be used for any other purposes.
- Other Travel Expenses paid by the NLM grant: $1,000 may be used for other travel, such as attending the AMIA Symposium and may not be used for any other purpose.
- Discretionary expenses paid by NLM grant: $200 can be used for other items (such as books and software).
- Funds are available for students to purchase business cards from the DBMI Educational Program budget.

Funds requested for books, software, and business cards must be approved by the DGS. For conferences in high-cost areas, additional funds may be available dependent on the educational programs budget. Funds and availability of funds are subject to change.

Outside Employment – Student Compensation

NIH/NLM recognizes that trainees as students may seek part-time employment coincidental to their training program to further offset their expenses. Compensation may not be paid from a research grant that supports the same research that is part of the trainee's planned training experience. Under no circumstances may the conditions of services provided for compensation interfere with, detract from, or prolong the trainee's approved training program. **The DGS must approve all instances of employment in writing in advance.** Generally, requests for approval for part-time employment exceeding the equivalent of 1 day per week will not be approved. Specific limitations may be imposed on the part-time employment, such as limiting to specific times of year or requiring completion of specific activities before approval.

Part-Time Training

While NLM fellowship awardees are required to pursue training full time, normally defined as 40 hours per week, under unusual and pressing personal circumstances, a fellow may submit a written request to permit less than full-time training. Such requests will be considered on a case-by-case basis. They must be approved by the degree program and NLM Program staff for each budget period. The nature of the circumstances requiring the part-time training might include medical conditions, disability, or pressing personal or family situations such as child or elder care. Permission for part-time training will not be approved to accommodate other sources of funding, job opportunities, clinical practice, clinical training, or for other responsibilities associated with the fellow's position at the institution. All inquiries should be directed to the DGS.

Infrastructure

Communication When Out of Office

Regardless of funding source or degree program status, if a trainee plans to be away from the office and/or out of email contact for a week or more, they must notify Rischelle Jenkins in advance so we can accurately account for your whereabouts in case of an emergency. In case of an unanticipated/emergency absence from email contact of a week or more, please notify Rischelle Jenkins as circumstances allow.

Leave Policies

Vacation and Sick Leave Policy

For trainees funded on the NLM T15: Trainees receiving stipends from the T15 will follow the current leave policy for graduate students and postdocs within VUMC departments, which is to grant 3 weeks (15 work days) vacation leave, plus Vanderbilt holidays https://hr.vanderbilt.edu/holiday-calendar.php), as well as 12 work days of sick leave annually. Vacation and sick leave days are accrued on a fiscal year, from July 1 through June 30. Days not used in a fiscal years *do not* roll over to the next year and a period of terminal leave is not permitted. This leave allocation will be on an honor system where the graduate student or postdoc should determine with their respective mentors the accumulation, accounting and use of these leaves. No vacation request form is required. The DGS is available for any questions related to vacation or sick leave.

For trainees funded through the VA Fellowship: please consult the VA Fellowship Program Director regarding the applicable vacation and sick leave policy, and any required accounting procedure.

For trainees funded through research grants: please consult the PI of the research grant regarding the applicable vacation and sick leave policy, and any required accounting procedure. Postdoctoral scholars may also want to refer to the Leave and Time Off Policies from the Office of Postdoctoral Affairs: https://www.vanderbilt.edu/postdoc/hr-leave-policies/

For trainees on other funding mechanisms beyond the ones already covered: please consult the adminstrator responsible for the funding mechanism regarding the applicable vacation and sick leave policies, and any required account procedure. In case of questions regarding who to consult, please refer questions to Rischelle Jenkins and/or the DGS.

Parental Leave Policy

All students enrolled full-time in the Graduate School and supported by internal or external sources are covered by the Graduate School Parental Leave Policy, described at: https://gradschool.vanderbilt.edu/current_students/parental_leave.php. Students should refer to the policy for additional details. Students should discuss plans to take parental leave well in advance with the DGS and are required by policy to make the request in writing to the DGS at least three months in advance of the start date of leave or, in the case of adoption, as soon as the adoption is confirmed.

Leave of Absence.

All students, regardless of funding source, are expected to be registered continuously, not including the summer session. Students receiving stipends are expected to be away from their studies no more than the times specified in these leave policies. Students who want to interrupt their graduate studies must apply to the Graduate School and receive an authorized leave of absence. Leave of absence is granted for a maximum of one year. Those without authorized leave who do not register are dropped from the rolls of the Graduate School and are not considered students. If they want to resume graduate study at Vanderbilt, they must apply for reinstatement.

Software Requests

The DGS will review all allowable requests in consideration of available funds in the budget. Subsequently, the student will then be informed as to the status of their request. Students must receive prior approval. Please do not make purchases and then request reimbursement. Software installed on departmental computers must be appropriately licensed. Most software purchases are offered through the Department of Information Technology Services. Their web site is http://its.vanderbilt.edu/.

Computer Equipment

Newly Issued Computer Equipment

Each new full-time trainee – a degree-seeking student or non-degree-seeking postdoc who receive a stipend from the NLM T15 funds – will also be provided a laptop or desktop computer and support software from the same funding source, for use throughout his/her training period. The Training Program does not supply computer equipment for part-time students and postdocs other than postdocs funded on the NLM T15. Short-term trainees (e.g., summer interns, visiting fellows) are usually provided the use of existing DBMI computers. Students are not allowed to upgrade Vanderbilt-owned computer equipment from their personal funds.

IT Computer Support personnel will set up the computer, install software, and test network configurations. All new computer equipment will be inventoried by the DBMI Budget/Accounting Analyst. All students who are issued mobile computer equipment (e.g., laptop) are required to sign a DBMI Computer Use Agreement, which states that reasonable care will be taken of the equipment assigned to the student, that the student will abide by all Vanderbilt University and Vanderbilt University Medical Center (VUMC) regulations regarding computer use, and that student will return all equipment to DBMI in good working order at the end of their training period.

If a student needs additional/upgraded hardware or software to support specific coursework or research, they should make a request to the DGS, providing a description, estimated cost, and justification for the purchase. In most cases, such requests will be approved and costs charged to the training grant. In the unlikely event that a student's computer is at least 3 years old and has become obsolete relative to the demands of the student's research, s/he may request a replacement. The DGS, in consultation with the student's research advisor, will take such requests under advisement.

Computer Equipment and Software Maintenance

Computer issues should be directed to the Help Desk according to the ownership of the laptop. If the equipment is owned by VUMC, contact, https://pegasus.vumc.org/. If the equipment is owned by VU, contact https://it.vanderbilt.edu/support/help/university.php.

Disposition of Surplus Computer Equipment

When computer equipment that was purchased with training grant or department funds, is identified as surplus (e.g., when a student graduates or otherwise leaves or when equipment becomes obsolete for a specific purpose), it will be identified, re-inventoried, and reassigned within the appropriate scope (most typically, training grant-supported users and department-supported users). Reassignment will be based on documented need (e.g., to replace broken equipment or for short-term trainee use).

Office Space

Trainees are assigned cubicle space in various DBMI office areas in 2525 West End Avenue. As trainees progress through the degree program, they may be reassigned to cubicles closer to their research advisors. If a trainee is working with a research advisor who has office space in another location, the program will typically request that the research advisor provide cubicle space for the student. Hoteling space for temporary use when in 2525 West End Avenue is available for trainees with primary office space elsewhere, in two cubicles located in Suite 1475 of 2525 West End Avenue. Please consult Rischelle Jenkins with questions regarding office space.

If long distance phone calls or faxes are required related to departmental projects/assignments, then the Program Manager can provide current information on how to charge to the appropriate account.

Parking and Vehicle Registration

Graduate students are not allowed to park at Kensington Parking Garage across from the 2525 Parking Garage. Students needing parking must contact the VUMC Parking and Transportation Services. Please inform the Parking Office that you are a graduate student in the Department of Biomedical Informatics located at 2525 West End. They should assign you parking in the surface shuttle/N lot, located across from the football practice fields and a short walk from 2525 West End Avenue.

Campus Resources

Office of Biomedical Research Education & Training (BRET)

The BRET Office provides support for graduate education in the biomedical sciences, and provides multiple services that biomedical informatics students might be interested in. Students can consult the BRET Office website (https://medschool.vanderbilt.edu/bret/) for full details on their services and programs. The BRET Office of Career Development (https://medschool.vanderbilt.edu/career-development/) provides career and professional development enrichment activities for Vanderbilt University and Vanderbilt University Medical Center graduate students and postdoctoral fellows. Services include a bi-weekly newsletter on career planning events and activities, individual assessments of CVs/resumes, a series of job search seminars, and a variety of seminars on career planning topics.

Vanderbilt University Writing Studio

The Writing Studio offers specific services for graduate students, including individual consultation sessions, weekly graduate writing groups, retreats for dissertation writers, and a variety of workshops. More information on available services for graduate students is available at https://www.vanderbilt.edu/writing/about/grad-overview/

Graduate and Postdoc Academic Success (GPAS) Program

The GPAS program (https://gradschool.vanderbilt.edu/gpas/) assists Graduate School students and postdoctoral scholars in their academic and professional development during their time at Vanderbilt. Services include individual coaching and group programming around effective time and stress management, resilience, conflict resolution, navigating academic relationships, and juggling work/life responsibilities. A helpful chart on navigating resources available for graduate student academic and personal concerns is available here: https://gradschool.vanderbilt.edu/students/concern_flowchart.php

Vanderbilt University Counseling Center

The University Counseling Center (UCC) is a broad-based service center providing services to students including short-term individual psychotherapy, urgent care counseling, short-term psychiatric services, trauma-informed care, LD/ADHD assessment, alcohol and other drugs assessment and consultation, group therapy, drop-in consultations, and workshops and affinity groups. The UCC also handles referral services in tandem with the Office of Student Care Coordination (OSCC). Further details about UCC services, current hours, and other information are available at https://www.vanderbilt.edu/ucc/

First-time appointments with the UCC are handled through the OSCC, via the form available on the OSCC website https://www.vanderbilt.edu/carecoordination/

Biomedical informatics students have specialized graduate student access to UCC mental health services through a partnership between the BRET Office and the UCC. Students interested in an assessment of their mental health needs to initiate mental health services, should access the UCC Student Portal and schedule a “BRET TH NEW” appointment. Further details on the BRET-UCC partnership, including a list of the specific BRET UCC providers, is available at https://medschool.vanderbilt.edu/bret/health-and-wellness/

Additionally, urgent care counseling is available by calling the UCC at 615-322-2571 and asking to speak with a clinician. If calling after hours, calls will be transferred to an answering service with mental health providers on call. For an urgent situation, outside of UCC hours, students should go to the Vanderbilt Psychiatric Hospital or the VUMC emergency room for acute assessment and support. **Students should also be aware of the National Suicide Prevention Lifeline, which can be reached at 1-800-273-8255.**

Student Health Center

The Vanderbilt Zerfoss Student Health Center is a student-oriented facility that serves the primary care needs of the Vanderbilt student community, including routine and acute care services. There are no office co-pays for most routine visits, although students should be aware that some lab tests, medications, and other services may incur additional fees. All registered students are eligible for care through the Student Health Center regardless of insurance coverage. Students should consult the Student Health Center website (https://www.vumc.org/student-health/) for more information on scheduling appointments and available services.

Campus Resources Focused on Safe and Equitable Learning

There are multiple resources on campus related to ensuring a safe, welcoming, equitable, and inclusive learning and work environment. Students should familiarize themselves with these resources, including:

The Office of Equity, Diversity, and Inclusion, which offers resources and initiatives to ensure Vanderbilt is a welcoming and inclusive space for all members of our community: https://www.vanderbilt.edu/diversity/

Provost's Office for Inclusive Excellence, which advances Vanderbilt's efforts to build and sustain a culture of inclusion and belonging and includes several specific Identity Centers, Identity Initiatives, and other special initiatives focused on inclusion: https://www.vanderbilt.edu/inclusive-excellence/

Student Access Services, which assists with reasonable accommodations requests and accessibility issues: https://www.vanderbilt.edu/student-access/

Equal Opportunity and Access, which monitors compliance with equal opportunity and affirmative action laws and regulations, provides religious accommodations, reviews complaints, and provides education and training regarding a range of topics: https://www.vanderbilt.edu/eoa/

The Title IX Office, which manages University policies related to sexual misconduct, including sexual harassment and sexual assault and responses to reports of such misconduct: https://www.vanderbilt.edu/title-ix/

The Project Safe Center, which provides information, support, referrals, and education about gender and sexual harassment and sexual and intimate partner violence, as well as assistance with navigating the University's resource and support network: https://www.vanderbilt.edu/projectsafe/

Academic Integrity: The Vanderbilt Honor System

Statement of the Vanderbilt Honor Code

Vanderbilt University students pursue all academic endeavors with integrity. They conduct themselves honorably, professionally, and respectfully in all realms of their studies in order to promote and secure an atmosphere of dignity and trust. The keystone of our honor system is self regulation, which requires cooperation and support from each member of the University community.

Overview of the Vanderbilt Honor System

From the Graduate School Catalog: All Vanderbilt students are bound by the Honor System inaugurated in 1875. Fundamental responsibility for the preservation of the system inevitably falls on the individual student. It is assumed that students will demand of themselves and their fellow students complete respect for the Honor System. All work submitted as a part of course requirements is presumed to be the product of the student submitting it unless credit is given by the student in the manner prescribed by the course instructor. Cheating, plagiarizing, or otherwise falsifying results of study are specifically prohibited under the Honor System. The system applies not only to examinations but also to written work and computer programs submitted to instructors. The student, by registration, acknowledges the authority of the Graduate Honor Council.

Students are responsible for familiarizing themselves with the Vanderbilt Honor System and what constitutes violation of the Honor Code. More information on the Honor Code can be found at: https://www.vanderbilt.edu/student_handbook/the-honor-system/

Graduate Honor Council

From the Graduate Honor Council Rules: The Honor Code at Vanderbilt represents a compact of mutual trust between each student and the members of the faculty. Every student is honor bound not to present as his/her own, the work of another student. Faculty members, in turn, do not question the integrity of the students. The purpose of the Graduate Honor Council is to preserve and perpetuate this feeling of mutual trust. It is therefore an organization of graduate students for their own protection. It seeks to protect the honor of all graduate students by vindicating those falsely suspected of dishonesty and penalizing those guilty of dishonest acts, according to the procedures set forth in this document.

More information regarding representatives of the Graduate Honor Council and the rules of the Graduate Honor Council are available at: https://studentorg.vanderbilt.edu/gsc/honor-council/

Biomedical Informatics Students and the Honor System

(Content of this section has been adapted from the Vanderbilt University School of Nursing MSN, Post-Master's Certificate, and DNP Student Handbook.)

Overview

Students in the Biomedical Informatics MS/PhD degree program are subject to the jurisdiction of the Graduate Honor Council. **Students have the responsibility to obtain explanation and clarification from instructors regarding degrees of collaboration allowed in coursework and in the use of outside sources to complete assignments.** This includes topics such as:

- Use of the student's own work prepared and submitted for a previous course;
- Amount of discussion and collaboration allowed among students regarding assignments;
- Expectations regarding submission of assignments;
- Use of materials from previous sections of the class;
- Allowed use and expectations regarding proper citation of sources, such as journal articles, websites, and other resources;
- Limitations related to take-home examinations, such as use of course materials or discussion with classmates.

The Honor Code applies to all work handed in, including drafts, as well as to exams. Work in all courses, including those involving online learning, is subject to the Honor Code. The Honor Code also applies to any act that is fraudulent or intended to mislead the instructor, including falsifying records of attendance, misrepresenting collaboration or discussion, providing false information regarding methods or data, or failing to cite resources that were consulted when preparing work. Cheating, plagiarizing, or otherwise falsifying results of study is prohibited. Any student who is uncertain about appropriate citation practices should consult the instructor. Plagiarizing out of ignorance of citation practices is still a violation of the Honor Code.

In the event that the student does not obtain a clear explanation of the application of the Honor Code from an instructor in any class, the student must assume that the Graduate Honor Council will follow the strictest interpretation of the Honor Code with respect to that class. **Ignorance of the Honor Code is not a valid excuse for violating it.**

Faculty have the option to issue a personal warning to a student if they suspect an Honor Code violation. However, a warning option is only available to the faculty member in the event of minor suspicion or if sufficient evidence of misconduct is not available. The flagrancy of the violation determines which course of action the faculty member must follow.

Application of the Honor Code to Collaboration and Group Work

Some faculty and courses allow collaboration on assignments or other forms of group work. **Students have the responsibility to ensure that they have a clear understanding of allowed boundaries and other guidelines for collaboration on all assignments**. When collaborating with another student, the contributions of each student to the work should be clearly described. When working in a group, all members of the group are responsible for the work that is turned in. Copying the work of another student is not a valid form of collaboration. Providing your work to another student who then copies that work is also not an acceptable form of collaboration. **If students have any questions regarding collaboration, they should discuss with the instructor before proceeding.**

Tips for Success

1. Carefully read over course syllabi and follow all guidelines, policies, or instructions in the syllabi.
2. Ask questions of instructors for any guidelines or expectations that are unclear.
3. Make sure you understand any expectations regarding assignment-specific guidelines or restrictions, particularly with respect to collaboration and resources that you can consult.
4. Ask the instructor before collaborating with a classmate on an assignment, unless the collaboration boundaries are already clearly defined for the assignment.
5. Ask the instructor whether it is acceptable to share your work with a classmate.
6. If you are unsure about whether you should cite a source/resource, cite it.
7. Seek permission from the instructor before turning in work from a previous course.
8. If you cannot say with complete certainty that specific conduct is permitted, ask the course instructor if it is allowed.
9. Keep copies of your original data used for assignments, whether individual or collaborative.
10. When you have any questions or doubts, ask the instructor.

Responsibilities of Every Student

The Vanderbilt Honor System is student-directed and student-led. While faculty play key roles in the System, students also play key roles in ensuring academic integrity at Vanderbilt. First, students are responsible for insisting on the highest levels of academic integrity for their own work. Second, students have the responsibility to extend that expectation of academic integrity to their peers. **Students have the obligation to take action if they suspect a violation of the Honor Code.**

If an Honor Code violation is suspected, biomedical informatics students must take one of these actions, depending on the flagrancy of and evidence about the violation:

1. Issue a personal warning to the suspected student.
2. Inform the instructor of the course regarding the suspicion and identity of the suspected student.
3. Report to the incident to the Director of Graduate Studies for Biomedical Informatics.

Biomedical Informatics Student Involvement Opportunities

Students in DBMI have multiple avenues to get involved in the university and the department. A partial list of these opportunities includes: the Biomedical Informatics Student Leadership Committee (SLC), the NLM Training Conference Representative, DBMI Retreat Planning Representative, Vanderbilt Biomedical Informatics Summer Program (VBISP) Graduate Assistant, and Graduate Student Council.

Celebrating Significant Life Events (SLE)

DBMI students wishing to celebrate an SLE (e.g., new baby) may submit an SLE Submission Form to the current Social Chair. The SLE Submission Form may be provided by the student celebrating the SLE or another student on their behalf. Forms should be submitted at least 14 days in advance of proposed celebration date.

Students may select one of two options for the SLE celebration:

Option 1: Gift Card
DBMI will purchase a $70 gift card for the student. DBMI may also purchase a greeting card that students, staff (admin and IC), and faculty can sign. The Program Manager will be the point person for this.

Option 2: Gathering/Party
Alternatively, students may organize a gathering/party for the DBMI community and the student's immediate family/SO. This party should be open to DBMI students, staff (admin and IC), and faculty who know/work/interact with the SLE student. The students will distribute invitations. Mass mailing to all-inclusive DBMI email lists is prohibited. No alcohol is permitted. DBMI will provide the 2525 Centennial Perk space, if available, and contribute $70 toward party supplies and food. Alternative room reservations may be arranged through the Program Manager. Attendees may independently arrange to give gifts or collect gift funds.

Biomedical Informatics Student Leadership Committee

The Department of Biomedical Informatics encourages close collaboration between students and the DGS to continually improve the learning environment. Each year, four students serve in the following leadership roles: *chair*, *academic chair*, *social chair*, and *outreach chair.* These roles collectively comprise the student leadership committee (SLC).

<u>How to get involved in the SLC</u>

Typically, the SLC will put out a call for volunteers for SLC roles in May of each year, with the transition between SLC members occurring in July/August. In cases where multiple students are interested in a specific role in a year, the SLC will discuss with the DGS and the interested students to identify a resolution.

<u>SLC Chair</u>

The student leadership chair is responsible for organizing the activities of the SLC, as well as supporting the DGS and other faculty by being a point of contact with the student body.

Duties:

- Attend faculty meetings and report any student concerns
- Bring up topics for discussion during DGS meetings, take notes, and keep on top of action items for the leadership committee
- Select and contact student-invited speaker(s)
- Assist DGS and faculty in other capacities that need student input
- Help DGS prepare for student body meetings by soliciting questions and/or preparing material to present
- Be available to the student body for discussing concerns and needs
- Be a point of contact for the wider Graduate Student Council within Vanderbilt

Time commitment:
- 1 hour/month SLC meetings with DGS
- 1 hour/month student body meeting with DGS
- 1 hour/month faculty meeting
- 1-2 hours/week administrative duties
- 5-10 hours/academic year arranging student-invited speaker(s)

Academic Chair

The academic chair is responsible for working with the DGS and faculty to ensure students are supported in meeting academic responsibilities.

Duties:
- Select additional student members of the curriculum committee
- Attend curriculum committee meetings and forward student feedback
- Coordinate with the program manager to include incoming academic chair on curriculum committee meetings
- Assist DGS in modifications to student academic responsibilities
- Encourage student body to participate in academic opportunities
- Assist president and social chair as needed

Time commitment:
- 1 hour/month SLC meetings with DGS
- 1 hour/month student body meeting with DGS
- 1 hour/quarter curriculum committee meeting
- <=1 hour/week administrative duties

Social Chair

The social chair is responsible for organizing student social events.

Duties:
- Organize social events for trainees, which may additionally include faculty, staff, or summer program students
- Assist DGS in organizing events involving students
- Assist president and academic chair as needed

Time commitment:

- 1 hour/month SLC meetings with DGS
- 1 hour/month student body meeting with DGS
- ~1 hour/week planning or conducting events

Outreach Chair

The outreach chair is a new role for AY22-23. Duties and time commitment will be established in this initial year and will be further described in the student handbook for AY23-24.

NLM Informatics Training Conference Scientific Program Committee

Each year, the organizing institution for the NLM Informatics Training Conference (NLMITC) requests a student representative for the Scientific Program Committee (SPC) for the event from each NLM training program. Specific responsibilities vary from year to year, but typically the student contributes to planning event programming for the conference and facilitates communication between DBMI and the SPC.

Duties:

- Attending SPC meetings
- (Sometimes) organizing events for NLMITC
- (Sometimes) assigning papers to sessions for NLMITC
- Serving as a point of contact between Vanderbilt DBMI and the programming committee

Time commitment:

- 1-2 hours/month programming committee meetings (~February-May)
- 2-3 hours/month other planning activities (April-June)
- 2 days/year attendance at NLMITC itself (June)

How to get involved:
Once the NLMITC host has been identified for each year, the DGS will request a volunteer for this role among trainees who are funded through the NLM T15.

DBMI Retreat Planning Student Representative

Student representatives to the annual retreat planning committee play an integral role in choosing and organizing the activities and presentations during the department's annual retreat. It's a good opportunity to get to know department faculty and staff in an informal setting, as well as plan fun and informative events for the retreat.

Duties:

- Attend monthly retreat planning meetings beginning in April-May
- Propose, discuss, and select activities and speakers for the retreat
- May assist with getting supplies, contacting speakers, or arranging activity awards for the retreat
- Assist with logistics the day of the retreat (managing supplies, setting up rooms, timekeeping for activities)

Time commitment:

- 1 hour/month committee planning meetings (April-July)
- 2-3 hours/month offline planning and discussion of events (May-July)
- (Potentially) 1-2 hours/month managing retreat logistics - supplies, etcetera (July-August)
- All-day (8 hours) attendance at the retreat (August)

How to get involved:
Once the faculty chair of the retreat planning committee is identified, the SLC will request a student volunteer for the retreat planning committee.

Vanderbilt Biomedical Informatics Summer Program Graduate Assistant

Each summer, DBMI hosts an intensive ~10-week research immersion program for high school through graduate school students, the Vanderbilt Biomedical Informatics Summer Program (VBISP). For the last several years, 1-2 DBMI students have served as graduate assistants for this program each summer

Duties:
- Conduct a welcome session via Zoom for participants (May)
- Assist with planning program components (orientation, professional development) (April-May)
- Identify group design challenge topic for the summer (April-May)
- Coordinate group design challenge activities (late May-July)
- Contribute to orientation activities in the first week of the program, as well as weekly professional development sessions (late May-early August)
- Hold weekly office hours for participants (late May-early August) and have mid-program check-in meetings with all students (late June-early July)

Time commitment:
- 1 hour/week meetings with VBISP Director (April-August)
- 1 hour/week office hours (late May-early August)
- 1-2 hours/week group design challenge activities (late May-late July)
- ~10 hours of welcome and orientation activities (May-early June)

How to get involved:
Discuss your interest in getting involved as a graduate assistant with the director of VBISP.

Graduate Student Council Opportunities

All students seeking a graduate degree within DBMI are eligible and encouraged to participate within the Vanderbilt Graduate Student Council (GSC), the governing body for all graduate school departments. Examples of student opportunities include leadership positions within the GSC or serving on GSC committees, with varying duties and time commitments. Further information can be obtained by attending a monthly GSC meeting. Typically, the SLC Chair serves as the DBMI student representative to the GSC and can provide information about GSC events to interested students.

Graduate Students Survival Guide

Adapted from:
"Wanda Pratt's Graduate School Survival Guide"
in
Biomedical and Health Informatics Training Handbook
University of Washington

The following information is taken from the University of Washington Biomedical and Health Informatics Training Handbook under the section "Wanda Pratt's Graduate School Survival Guide."

This guide provides concise suggestions for:
- Getting the most out of the relationship with your research advisor
- Getting the most out of what you read
- Making continual progress on your research
- Finding a thesis topic or formulating a research plan
- Characteristics to look for in a good advisor, mentor, or committee member
- Avoiding the research blues

Getting the most out of the relationship with your Research Advisor:

Meet regularly – Insist on meeting weekly or biweekly. This gives you motivation to make regular progress and it keeps your advisor aware of your work.

Prepare for your meetings – Come to each meeting with:

- List of topics to discuss
- Plan for what you hope to get out of the meeting
- Summary of completed tasks since last meeting
- List of upcoming deadlines
- Minutes from last meeting

Email your advisor a brief summary of every meeting. This helps avoid misunderstandings and provides a great record of your research progress. Include where applicable:
- Time and agenda for next meeting
- Summarize periodically task to be completed
- Maintain a personal "to do" list
- Maintain an advisor "to do" list
- Maintain a list of related readings
- Maintain a list of major topics discussed
- An agreed upon list
- List of advice you may not follow

Show your advisor the results of your work as soon as possible - This will help your advisor understand your research and identify potential points of conflict early in the process. Be sure to show them:
- Summaries of related work
- All of your research writings
- Experimental results

Communicate clearly – If you disagree with your advisor, state your objections or concerns clearly and calmly. If you feel something about your relationship is not working well, discuss it. Whenever possible, suggest steps they could take to address your concerns.
Take the initiative – You do not need to clear every activity with your advisor since he/she has a lot of work to do too. You must be responsible for your own research ideas and progress.

Getting the most out of what you read

- Be organized
- Be efficient
- Take notes on every paper you find worth reading
- Summarize what you have read on each topic
- Read PhD theses

Make continual progress on your research

- Keep a journal of your ideas
- Set some reasonable goals with deadlines
- Keep a to do list
- Continually update your:
- Problem statement
- Goals
- Approach (or a list of possible approaches)
- One-minute version of your research (aka the elevator ride summary)
- Five-minute version of your research
- Discuss your research with anyone who will listen – use your fellow students, friends, family, etc. to practice discussing your research on various levels. They may have useful insights or you may find that verbalizing your ideas clarifies them for yourself.
- Write about your work
- Avoid distractions
- Confront your fears and weaknesses
- Balance reading, thinking, writing and hacking

Finding a thesis topic or formulating a research plan

- Pick something you find interesting – If you work on something solely because your advisor wants you to, it will be difficult to stay motivated.
- Pick something your advisor finds interesting – If your advisor doesn't find it interesting, he/she is unlikely to devote much time to your research. He/she will be even more motivated to help you if your project is on their critical path (although this has down sides too!).
- Pick something the research community will find interesting – If you want to make yourself marketable.
- Make sure it addresses a real problem.
- Remember that your topic will evolve as you work on it.
- Pick something that is narrow enough that it can be done in a reasonable time frame.
- Have realistic expectations.
- Don't worry that you will be stuck in this area for the rest of your career. It is very likely that you will be doing very different research after you graduate.

Characteristics to look for in a good advisor, mentor, or committee member

It is unreasonable to expect one person to have all the qualities you desire. You should choose thesis committee members who are strong in the areas where your advisor is weak. Look for an advisor that:

- Is willing to meet with you regularly (about one hour weekly or biweekly)
- You can trust him/her to
- Give you credit for the work you do
- Defend your work when you are not around
- Speak well of you and your capabilities
- Tell you when your work is or is not good enough
- Help you graduate in a reasonable time frame
- Look out for you professionally and personally
- Is interested in your topic
- Has good personal communication skills
- Has good technical skills
- Will be around until you finish
- Is well respected in his/her field
- Has good connections for the type of job you would want when you graduate.
- Is willing and able to provide financial and computing support

Avoid the research blues

- When you meet your goals, reward yourself
- Don't compare yourself to senior researchers who have many more years of work and publications
- Don't be afraid to leave part of your research problem for future work
- Exercise
- Use the student counseling services
- Occasionally, do something fun without feeling guilty

Other resources:

Getting What You Came For by Robert L. Peters: This book contains a lot of helpful advice on getting the most out of the PhD process. The sections on writing and giving presentations are particularly helpful.

The Now Habit: A Strategic Program for Overcoming Procrastination and Enjoying Guilt-Free Play by Neil Fiore: Since one of the biggest problems in finishing a PhD is procrastination, this book should be helpful to those of you who actually get around to reading it.

Appendices

Appendix 1: Program of Study Example

Year I			Year II		
Summer	Fall	Spring	Summer	Fall	Spring
	BMIF 6300: Foundations of Biomedical Informatics (3cr)	BMIF 6315: Methodological Foundations of Biomedical Informatics (3cr)		Elective (3cr)	Optional Elective (0cr)
	BMIF 6310: Foundations of Bioinformatics (3cr)	Selective (3cr)		Selective (3cr)	
	Competency course (3cr)	Competency course (3cr)		Competency course (3cr)	Competency course (3cr)
First Research Exposure	Research Rotation (1cr)	Research Rotation (1cr)	Master's Research	Master's Research	Master's Research
	BMIF 6321: Scientific Communication (1cr)	BMIF 6322: Scientific Communication (1cr)		BMIF 6331: Student Journal Club (1cr)	BMIF 6332: Student Journal Club (1cr)
			Master's Proposal		**Master's Defense**
Didactic Credits	10	10		10	4

PhD					
Year III			Year IV		
Summer	Fall	Spring	Summer	Fall	Spring
	Elective (3cr)	Elective (3cr)			
	Selective (3cr)				
	Competency course (3cr)	Competency course (3cr)		Teaching Practicum (0cr)	
Dissertation Research	Dissertation Research	Dissertation Research (3cr)	Dissertation Research	Dissertation Research (9cr)	Dissertation Research (8cr)
		PhD Qualifying Exam			**PhD Defense**
Didactic Credits	9	6			

Competency areas include biomedical sciences, computer science / information systems, and research methods (e.g. statistics, mathematics, or qualitative methods). For students pursuing the MS on the way to the PhD, the MS requires four courses in two competency areas. The PhD requires six courses in three competency areas. Prior coursework may be substituted.	***Selectives*** currently include: BMIF 7320: Healthcare Organization and Management BMIF 7340: Clinical Informatics BMIF 7350: Technology and Society BMIF 7370 Evaluation Methods in Biomedical Informatics BMIF 7380: Data Privacy in Biomedicine BMIF 7391: Special Topics in Biomedical Informatics (varies)

Appendix 2: Student Travel Policy

The following is a summary excerpt of Vanderbilt University travel policies; some adjustments have been made to support general purchasing policies and procedures of the Department.

1. Student Travel Request and Release of Liability Forms

Travel is a privilege and must be approved in advance by the Director of Graduate Studies (DGS). To request approval for travel students must complete:

- Student Approval Form

Traveler should seek approval at least one month prior to the trip and before making any travel arrangements.

2. Transportation

Commercial Air Travel

Commercial air travel expense is reimbursed based on actual cost incurred by the traveler using normally traveled routes. The lowest-priced, non-stop (if available) coach class airfare will be booked. Reservations should be made as soon as travel has been authorized (see Program Manager for details). In addition to the cost of plane tickets, Vanderbilt will reimburse travelers for reasonable and prudent baggage fees, premium fly date surcharges, early-bird check-in/seat reservation fees, and ticket change fees. Receipts associated with any baggage fees, premium fly date surcharges, early-bird check-in/seat reservation fees, and ticket change fees must be submitted as part of the reimbursement. Vanderbilt will not reimburse travelers for airline travel insurance premiums or for the cost of airfare if frequent flyer miles are used to purchase the ticket.

If the traveler chooses to fly from another location other than Nashville, the student traveler must provide a comparison flight showing the cost of the flight from the other departing city versus Nashville. The same applies if the traveler needs to return to another city other than Nashville. The Department of Finance will reimburse the lowest airfare.

Personal Automobile Travel

Reimbursement will not exceed the total cost of a round-trip coach airfare to and from the nearest commercial airport serving the destination, plus the reasonable costs of other appropriate local transportation at the destination. If mileage to the destination exceeds 600 miles, documentation of the cost of round-trip coach airfare must be attached to the Travel Expense Report. For travel less than 600 miles to the destination, travel by automobile is deemed to be the least expensive option and no further cost justification documentation is needed. DBMI will reimburse students at current maximum allowable rate for the year as set by the Internal Revenue Service. The current rate at which Vanderbilt reimburses mileage expenses is intended to cover all transportation and vehicle operating costs, including auto insurance. No reimbursement is made for the cost of repairs to the vehicle or other such costs whether they result from the traveler's acts or the actions of others. Reasonable and necessary parking and tolls will be reimbursed. The traveler cannot be reimbursed for both gasoline and mileage. Please submit with your reimbursement a copy of the Total Estimated Distance from Google Maps.

Automobile Rental

Travelers may rent automobiles when other transportation is not available or when such use is the most reasonable and economical mode of travel under the circumstances. Automobile rental requires prior approval from the DGS. In order to minimize costs, travelers are encouraged to choose standard class cars or lower whenever possible. The cost of a GPS may be reimbursed if deemed necessary for safety reasons; however, this cost is not allowable for travel supported by federal funds. The costs of other upgrades or accessories (e.g., satellite radio) will not be reimbursed. Receipts for car rental and associated gasoline purchases greater than $25 must be included with your reimbursement.

Bus

The cost of commercial bus fare not to exceed the cost of coach airfare will be reimbursed. (Comparison to coach air fare is dependent upon the availability of commercial flights to the destination). If applicable, the cost of coach airfare should be documented and included with your reimbursement. Original ticket receipts are required and should be included with your reimbursement.

Local Transportation

Vanderbilt will reimburse reasonable official travel costs for public transportation, airport shuttles, taxis, limos and car services for transportation to and from airports and railroad stations, between appointments, and between hotels and meeting locations. Travelers should select the most cost effective mode of transportation. Receipts for any local transportation must accompany your reimbursement.

3. Food

Original itemized cash register or credit card receipts for all meals must accompany your reimbursement. No alcohol will be reimbursed for Vanderbilt related business trips. When dining as a group, each party should request separate checks. Vanderbilt's per diem rate is $51 a day. The per diem rate includes all meals, snacks, room service, and tips for an entire day while traveling for Vanderbilt business purposes. No reimbursement will be made for gratuity over 20%.

4. Lodging

Hotels selected should be moderate in price. Many hotels offer discounted rates for educational institutions. Such rates should be requested upon registration. To defray cost, students are requested to identify a roommate. In order to process reimbursement to the traveler, an original itemized hotel invoice with your name and a $0.00 balance should be submitted with your reimbursement.

5. Spouse or Other Dependent Expense

No travel expenses (transportation, lodging, meals, or registration fees, etc.) for spouses or other persons accompanying student on business travel will be reimbursed.

6. Travel Expenses

Effective January 1, 2018, Vanderbilt University implemented a financial system called SkyVU, https://www.vanderbilt.edu/skyvu/, by logging in with your VUNet ID and password. This

system allows Vanderbilt students to complete their own travel reimbursements or any approved reimbursements. Current students have received training by the Program Manager and new students will receive training as they begin to travel

Airfare is purchased in Concur, https://finance.vanderbilt.edu/travel/, by logging in with your VUNet ID and password. After the flight is confirmed, proof of receipt may be uploaded in SkyVU for reimbursement.

Payment for conference registration may be reimbursed after payment in SkyVU. After returning from a conference, all receipts are uploaded into SkyVU for reimbursement. **Please always submit the approval form to the Program Manager for the DGS approval before submitting any reimbursement. When the approval form is returned, it will include the appropriate project or center number to process the reimbursement.**

7. Additional Important Notes

Please review the Student Travel Policy before traveling; the department reserves the right to refuse reimbursement of expenses that are not in compliance with this policy.

Vanderbilt University travel policies may change in response to current events. Students are responsible for ensuring that they are following current guidelines. When in doubt, please discuss your travel plans with the Program Manager prior to booking.

Vanderbilt University will only reimburse expenses within one year of the expense being incurred. **Students are responsible for timely completion of all required reimbursement documentation and for monitoring for any issues with reimbursement in SkyVU.**

Beginning in Fall 2022, resources may be available in the BRET office to assist with advance payment for conference registration, flights, and hotel. Students should consult with the Program Manager for further information on this topic.

Appendix 3: Guidelines for PhD Dissertation and MS Thesis Using Journal Article Format

Biomedical Informatics Degree Program Policy
Ver. 2, Approved 1/4/07, revised 10/21/13

Biomedical Informatics PhD Degree Program: PhD Dissertation Using Journal Article Format

Candidates for PhD degrees are required to submit dissertations to their committees as part of meeting the requirements for degree. It is permissible, but not a requirement, for a dissertation to contain as chapters or components peer-reviewed publications describing work done by the student on the dissertation project and on which the student is first author. The body of a journal article format dissertation will be composed of an introduction, a committee-approved number of published or publication-ready manuscripts with a coherent theme, a critical review of the literature (if not included among the manuscripts), and a conclusion summarizing and integrating the major findings of all of the manuscripts. A simple collection of unrelated works is not acceptable. Only papers arising from research performed while enrolled at Vanderbilt can be considered for inclusion in the dissertation. The role played by the student in co-authored articles or manuscripts must be specified in writing, and attached as an appendix to the dissertation.

The PhD committee is responsible for setting the scope and ensuring the quality of the dissertation. The committee must judge, independently of other circumstances including co-authorship on a manuscript embedded in the dissertation, whether the material submitted in the final dissertation document meets the quality criteria for a dissertation in this degree program. Any number of peer-reviewed publications, accepted manuscripts, and/or submitted manuscripts, from any publication source, *may* be embedded in a submitted dissertation, so long as the authorship and content quality criteria above are met.

The PhD committee may require revisions to all or portions of embedded papers – including peer-reviewed publications and accepted manuscripts, in which case the revised/augmented material would replace the publications in the final dissertation document (giving proper citation to the earlier publication where appropriate). Where differences in editorial opinion regarding authorship or content quality occur within the PhD committee, consensus is the goal; final resolution rests with the dissertation advisor.

Dissertations and theses that follow the optional journal article format must comply with all applicable copyright laws and journal publication policies.

Format:
The front matter should include only one table of contents, list of tables, list of figures, and list of abbreviations/nomenclature. Tables and figures should be placed appropriately within the text throughout the manuscripts, not at the end as is customary in journal articles submitted for publication. Organization of the articles into “chapters” (as outlined in these guidelines) is required. Each chapter may contain its own bibliography or list of references and appendices, or those items may be combined at the end of the manuscript. Each chapter should consist of well-defined subheadings, such as introduction, methods, results, and discussion.

An overall summary, which integrates the major findings of the individual papers, and conclusions and suggestions for further research are expected as a final section. Appendices that tabulate complete

data, detailed derivations, detailed discussions of methods and equipment may be required at the discretion of the committee. A discussion of these items should appear in the body of the dissertation.

The following is a sample outline of the dissertation:

- Signed Title Page
- Signed Abstract
- Table of Contents, List of Figures, List of Tables

Chapters

- Introduction (including objectives, specific aims and identification of appendices)
- Background (unless included among the manuscripts)
- Manuscript 1
- Manuscript …
- Manuscript n
- Summary (integration, overall conclusions, recommendations)

- Appendix 1: Role of the student in the manuscripts
- Appendix 2-n: As necessary

Biomedical Informatics MS Degree Program: MS Degree Thesis Using Journal Article Format

Candidates for MS degrees are required to submit theses to their committees as part of meeting the requirements for degree. It is permissible, but not a requirement, for a thesis to contain as chapters or components peer-reviewed publications describing work done by the student on the thesis project and on which the student is first author. All guidelines above are applicable, foremost being that the thesis committee is responsible for setting the scope and ensuring the quality of the thesis.

Resources:

1) From the Vanderbilt Graduate School Thesis Guide, p. 7.
http://gradschool.vanderbilt.edu/documents/Format_Guidelines_rev.pdf: Multi-Part and Journal Article Format

A multi-part presentation format may be used for combining research that has been conducted in two or more related or non-related areas, or for presentation of combined journal articles (published or submitted for publication). Organization of the parts or articles into chapters (as outlined in these guidelines) is recommended. Each "chapter" may contain its own bibliography or list of references and appendices, or those items may be combined at the end of the manuscript. Each manuscript should include the appropriate front matter (preliminary pages), an introduction presenting the general theme of the research and literature review, and a conclusion summarizing and integrating the major findings. Each "chapter" should consist of well-defined "subheadings," such as introduction, methods, results, and discussion. The front matter should include only one table of contents, list of tables, list of figures, and list of abbreviations/nomenclature. Tables and figures should be placed appropriately within the text throughout the manuscript, not at the end as is customary in journal articles submitted for publication.

2) Biomedical Engineering PhD Program Guidelines (communication from Bob Roselli 2/06)

Appendix 4: BMIF 6341 and BMIF 6342 Research Rotation Guidelines

APPROVAL FORM AND RESEARCH DISCUSSION FOR BMIF 6341 and BMIF 6342
Research Rotation in Biomedical Informatics
** Due to the DGS no later than the 6th day of classes **

Research Rotation Guidelines

Research Rotation in Biomedical Informatics: BMIF 6341 and BMIF 6342 form a 2-semester sequence of 1-credit research rotations. Students will perform research under the direction of a rotation advisor chosen from DBMI faculty. Two research rotations with different faculty are required to be completed in the first year of graduate study for all MS and PhD Biomedical Informatics Degree Program students.

Choosing a research rotation advisor and project: For BMIF 6341, students are encouraged to meet with a wide variety of faculty members during August to learn about potential research project opportunities. In consultation with the Director of Graduate Studies (DGS), a student will use the information learned from these meetings to select a rotation advisor (and tentative project) for the first research rotation, to be taken in the Fall Semester. For BMIF 6342, a rotation advisor and project may be determined anytime during the Fall Semester. Rotation advisor consent and approval of the DGS is required using this form.

List of faculty and research interests: https://www.vumc.org/dbmi/node/164

Advice on choosing a research mentor:
http://www.sciencemag.org/careers/2002/08/choosing-graduate-or-postdoc-advisor

Registration: The final DGS approval and registration for an appropriate section of BMIF 6341 or BMIF 6342 must occur no later than the sixth day of classes in each semester.

Duration of rotation: 12 weeks to begin during the second week of each semester and end no later than the last day classes of each semester. It is imperative that rotations end on time to allow student to focus on final exams at the end of the semester, provide a solid basis for evaluation of the student's performance for grading purposes, and to facilitate the student's clean transition to a second rotation or the next phase of their research endeavors.

Scope and effort of rotation project: A minimum of 5 hours per week will be devoted to research rotations. Students may elect to spend more time conducting this research project, but the scope of the project should be compatible with completion in 60 hours. Students should consider submission of their work to the AMIA Annual Symposium or another relevant conference or journal. This is NOT A REQUIREMENT, but should be considered when scoping the project. See the Mentor-Mentee Research Discussion section for discussion questions to help scope your project.

Requirements: For each rotation, a written proposal must be submitted to the mentor and the DGS (minimum 1 page) no later than the 3rd week of classes. A final report must be submitted to the mentor and the DGS (minimum 5 pages) no later than the last day of classes for the semester.

Evaluation of performance: Course grading will be a letter grade reflective of the rotation advisor's assessment of the student's knowledge of the project, including mastery of project-related literature, relevant research methods, and the skills required for the project. These skills include communication, collaboration, and professionalism within a research environment.

1) Student's Name:

2) Research Rotation Mentor's Name:

3) Research Rotation course: FALL (BMIF 6341) or SPRING (BMIF 6342)
    i) Are you registered for a section of this course w/ your mentor? YES or NO

4) Tentative project name and brief description (2-3 sentences):

** Note that a 1-page proposal is due to the mentor and DGS no later than the 3rd week of classes**

Mentor-Mentee Research Discussion

General Expectations

1. What are the mentor's expectations of the student for the semester?

2. What does the student expect of the semester?

Specific Lab and Project Details

1. How should I keep track of and document my work activities?

2. What do I do when I'm having research-related problems or questions? Who should I talk to when I have questions or problems in between scheduled meetings? What if my mentor is not available to talk to and something urgent comes up?

3. Are there laboratory or project group meetings that I need to attend or be aware of?

Mentoring Logistics

1. What is the best way to contact my mentor?

2. How often will I meet with my faculty mentor? Who is responsible for scheduling these meetings? What will the meeting format be (one-on-one, group, other)?

Future Directions

1. If there are eventually publications related to this work, what can I expect regarding authorship? What level of participation is needed for me to be considered for authorship?

2. How will my mentor decide if they would be willing to write a recommendation letter for me in the future? Does my mentor have any rules or preferences around writing recommendation letters?

Learning Activities

1. What programming languages, skills, or tools does my mentor want me to focus on learning how to use for my project?

What other questions or concerns does the student or mentor have? How will we resolve these questions or concerns?

Please sign and date below to indicate that the student and the research mentor have discussed the above items and that both the student and the mentor agree on the content of this document. Return the form with student and research mentor signatures to Rischelle Jenkins no later than the 6th day of classes.

PI/Mentor Name (Printed)	Student Name (Printed)
PI/Mentor Signature and Date	Student Signature and Date

DGS Signature: _____

Signature Date: _____

Appendix 5: RCR Training Guidelines for the Biomedical Informatics MS/PhD Degree Program

DBMI Responsible Conduct of Research requirements for trainees

Both Vanderbilt School of Medicine and the National Institutes of Health require that all graduate students and postdocs receive training in Responsible Conduct in Research (RCR). At DBMI, we take responsible and ethical conduct of research very seriously and expect all faculty, staff, and students to uphold the highest principles of integrity.

TOPICS

According to NIH policy (https://grants.nih.gov/grants/guide/notice-files/not-od-10-019.html), trainees must receive a minimum of 8 contact hours of training in:

1. conflict of interest – personal, professional, and financial
2. policies regarding human subjects, live vertebrate animal subjects in research, and safe laboratory practices
3. mentor/mentee responsibilities and relationships
4. collaborative research including collaborations with industry
5. peer review
6. data acquisition and laboratory tools; management, sharing and ownership
7. research misconduct and policies for handling misconduct
8. responsible authorship and publication
9. the scientist as a responsible member of society, contemporary ethical issues in biomedical research, and the environmental and societal impacts of scientific research

MINIMUM REQUIREMENTS FOR DBMI TRAINEES

1. **CITI training on responsible conduct of research**
   All DBMI students are required to complete the *Responsible Conduct of Research – Basic* course offered online by CITI Program. Students must submit their certificate of completion to the Program Manager by November 1 of their first year in the program: https://about.citiprogram.org/en/course/responsible-conduct-of-research-basic/. The RCR course is expected to take approximately 4 hours to complete and does not need to be completed in a single session.

2. **CITI training on human subjects research protections**
   DBMI trainees are also required to complete the CITI *Biomedical - Basic* course on human subjects research protections, and submit the certificate of completion to the Program Manager. https://about.citiprogram.org/en/course/biomedical-biomed-basic/ This course is expected to require approximately 3 hours to complete and does not need to be completed in a single session.

3. **Research Colloquium – RCR series**
   Over the course of the academic year, at least 6 Research Colloquium sessions will be designated as RCR sessions. Trainees are required to attend a minimum of 5 of these each year. Students will be required to sign up for BMIF 6200 RCR for Biomedical Informatics, a 0-credit hour course linked to the Research Colloquium RCR sessions, a minimum of one time during their training, preferably in their first semester of training.

4. **Self-paced learning**
   Trainees are expected to continue learning and discussing these issues over the course of their time at DBMI. Every year, as part of their academic progress tracking, trainees

will submit a self-tracking worksheet explaining their engagement with each of the 9 RCR topics over the past year.

Examples of acceptable self-paced learning activities:

- Discussions with research mentors;
- Conducting peer review;
- Discussions in journal club or classes;
- Writing/submitting conference abstracts or posters on one or more of these topics;
    - Identifying external speakers to invite to speak on these topics;
- Seeking additional training, e.g., through resources available here: https://oir.nih.gov/sourcebook/ethical-conduct/responsible-conduct-research-training/resources-training-directors
- Attending seminars and talks on relevant topics. These Vanderbilt resources frequently offer relevant content:
    - Center for Genetic Privacy and Identity in Community Settings – Dr. Brad Malin https://www.vumc.org/getprecise/welcome
    - Vanderbilt Center for Biomedical Ethics and Society https://www.vumc.org/cbmes/center-biomedical-ethics-and-society-vanderbilt

5. RCR Tracking Form

Beginning with the fall 2022 semester, at the end of each semester, students should complete the DBMI RCR REDCap tracking form by briefly describing activities conducted relevant to the 9 topics. Examples include:

1. *Conflict of interest – Attended a seminar 9/21 explaining Vanderbilt's conflict of interest policies.*
2. *Policies regarding human subjects, live vertebrate animal subjects in research, and safe laboratory practices – Completed the CITI Human Subjects module 10/1.*
3. *Mentor/mentee responsibilities and relationships – Had an initial meeting with a potential mentor; discussed mutual interests and responsibilities.*
4. *Collaborative research including collaborations with industry – No relevant training.*
5. *Peer review – In journal club, analyzed peer review comments on an informatics manuscript.*
6. *Data acquisition and laboratory tools; management, sharing and ownership – Attended an AOU presentation about data collection and sharing.*
7. *Research misconduct and policies for handling misconduct – No relevant training.*
8. *Responsible authorship and publication – Collaborated on first abstract for submission to AMIA; discussed authorship criteria, order, and responsibilities.*
9. *The scientist as a responsible member of society, contemporary ethical issues in biomedical research, and the environmental and societal impacts of scientific research – Attended seminar on health equity and informatics.*

Appendix 6: Teaching Practicum Guidelines for Faculty and Trainees

Overview: Some form of teaching is likely to be an important part of the career of most research informaticists, even those who do not enter academe. The DBMI teaching practicum is designed to give students opportunities to develop as teachers through practical experience, while also providing support to faculty instructors. Faculty of DBMI BMIF courses can request assistance through the Director of Graduate Studies; core courses receive priority for teaching practicum placement before other courses.

Teaching Practicum Requirements

- Each PhD trainee is required to complete one unpaid, 0-credit teaching practicum by assisting with a course offered by the Department of Biomedical Informatics;
- The practicum must meet a minimum of 1 learning objective, as specified in Learning Objectives below.
- The practicum may include further expectations to support the course, as specified in Common Practicum Expectations below.
- The student and course director must agree upon practicum expectations before the start of the course. In cases where there are disagreements regarding expectations, the student and course director should request assistance from the DGS.
- PhD students are eligible to start the teaching practicum upon completion of coursework and qualifying exam. The DGS will discuss practicum pairings with students and faculty prior to assigning a student to a specific course.
- Completion of the teaching practicum will be reported to the Academic Program Committee and reviewed as part of the review of progress toward degree.
- Waiver of the requirement or approval of an alternate activity is at the discretion of the Director of Graduate Studies with approval of the Academic Program Committee chair.
- After completion of their required teaching practicum, opportunities for students to serve as a Teaching Assistant for a BMIF course may be available but require approval of their research mentor.
- For students who are not required to complete a teaching practicum (e.g., students pursuing only an MS degree), opportunities to complete a teaching practicum in a BMIF course may be available but an interest in a teaching practicum should be discussed with the DGS and requires approval of their research mentor.

Learning objectives

Each trainee may have different priorities for which teaching skills they are most interested in. As a result, we offer several possible learning objectives and suggestions to meet them; the trainee and the course director should work together to select a minimum of 1.

By the end of the teaching practicum, the trainee should be able to EITHER:

1. Research, develop, and deliver a lecture on conceptual knowledge in informatics (for example, by taking ownership of one class lecture, from conceptualization to delivery, under the mentorship of the course director); or,
2. Teach one or more procedural skills in informatics (for example, by developing and running laboratory sessions on using software or informatics tools, statistical methods, or case-based learning discussions); or,
3. Develop a student learning activity (for example, by researching and writing one or more homework assignments, problem sets, projects, or exams, and developing the grading rubric for it); or,
4. Write a syllabus for an existing course (by applying syllabus design guidance); or,

5. Provide substantive input into a course refresh (for example, by working with the faculty course director to update necessary informatics conceptual knowledge, learning materials, or procedural skills, and by applying course design principles).

Common practicum expectations

The course director is expected to:

- Help the trainee pursue the selected learning objective(s);
- Meet with the trainee before the semester begins to develop clear expectations about the course;
- Provide a grading rubric and guidance on grading expectations for any assignments the trainee is expected to grade;
- Give the trainee a minimum of 1 week advance notice before requesting pilot testing assistance with assignments (for example, before asking the trainee to try out a newly developed homework assignment or exam to provide feedback on appropriateness, difficulty, duration, etc.);
- Provide guidance and constructive feedback on the trainee's performance;
- Provide clear guidance to the trainee regarding expectations related to the Vanderbilt Honor Code and how it is applied in the course.

The trainee completing the teaching practicum is expected to:

- Familiarize themselves with the Vanderbilt Honor Code and how it is applied in the course;
- Attend class, unless excused by the course director for competing obligations from research or other courses;
- Grade homework assignments or problem sets;
- Upload course materials and manage content on Brightspace;
- Handle some routine correspondence with students and guest lecturers.

Evaluation

At the conclusion of the teaching practicum, the trainee is required to submit a brief 1-2 paragraph summary explaining which learning objective(s) they selected, how they fulfilled the learning objective(s), and an overview of what they learned through the teaching practicum experience. The trainee should submit the summary to the course director, the DGS, and the program manager by the final class session for the semester. The course director should provide constructive feedback in writing to the student, copying the DGS, regarding the teaching practicum and any suggestions for future professional development by the date grades are due for the semester. The course director may consult with students taking the course as part of preparing feedback for the trainee.

Conflicts of interest: A conflict of interest in education is a situation in which a teacher's responsibility to the student is compromised by other priorities that could unintentionally influence the teacher's judgment. Conflicts of interest may arise, for example, if the trainee and a student taking the course have a close professional collaboration, a current or former personal relationship, or a financial relationship. It is considered good practice to avoid even the appearance of a conflict of interest to maintain others' trust in the integrity of the system. If a trainee believes they face a conflict of interest or the appearance of a conflict of interest in assigning grades to a student, they should discuss the issue with their course director.

Appendix 7: Demonstration of Research Preparation for Biomedical Informatics PhD Students Entering Fall 2022 and Onwards

Requirement: Beginning with students entering the PhD program in Fall 2022, students seeking the PhD degree in the Biomedical Informatics MS/PhD Program will be required to prepare and present a first-author publication-quality research paper **OR** complete the formal Vanderbilt University MS Thesis requirements prior to being eligible to complete their Qualifying Exam. PhD students must complete this requirement within 3 years of entering the degree program.

Guidelines:

For the purpose of this degree program requirement, requirements related to the first-author publication-quality research paper include:

1. The student must have formally appointed their doctoral committee, following both degree program and Graduate School requirements, prior to being able to complete this requirement.
2. The student must be the first author of the publication and must not share first authorship with another individual. The student is expected to have played a significant role in the study design, data collection, and data analysis, as well as the writing of the manuscript.
3. The manuscript must be based on research conducted during the student's time in the degree program, although the work may have started before the student formally begins the degree program.
4. The manuscript must have an informatics research focus.
5. The manuscript must be either be:
    a. Accepted at a peer-reviewed journal or as a paper submission at an approved peer-reviewed conference, presented at DBMI Research Colloquium, and approved by their doctoral committee OR
    b. Submitted in written format to their doctoral committee for thorough peer-review, presented at a DBMI Research Colloquium for discussion, and approved by their doctoral committee.
6. Satisfaction of the demonstration of research preparation requirement will be reviewed by the Academic Program Committee as part of the review of progress toward degree.
7. Students admitted only to the MS degree program or who do not continue on to the PhD will continue to be required to complete an MS thesis as part of their MS degree.

Additional Guidance:

- Students may include the research paper, whether published or defended, as part of their dissertation with the agreement of their doctoral committee.
- Only full research papers in peer-reviewed journals or at peer-reviewed conferences or the alternative committee review process will fulfill the requirement. Systematic reviews following the full PRISMA guidelines may be eligible to meet this requirement but should be discussed with the student's committee and the DGS. Posters, podium abstracts, panels, abstracts, and talks at the NLM Training Conference or DBMI Research Forum are <u>not</u> sufficient to fulfill this requirement. Viewpoint/opinion articles, scoping reviews, and other types of manuscripts besides original research articles are not eligible to fulfill this requirement.
- Work accepted to the AMIA Annual Symposium in the Paper or Student Paper category is eligible to fulfill this requirement. Students should seek approval for papers accepted to other conferences to meet this requirement. Generally, to be considered for this requirement, conferences must have a rigorous peer-review process and be indexed in Medline, the ACM Digital Library, or IEEE Xplore.

- Approval of alternatives to fulfill the demonstration of research preparation requirement is at the discretion of the Director of Graduate Studies (DGS), with approval of the Academic Program Committee chair.

Appendix 8: Remote Learning Policy

Overview: The Biomedical Informatics Research MS/PhD Training Program is an in-person educational and training program. Coursework for the Biomedical Informatics Research MS/PhD Training Program is conducted in person, with limited exceptions. However, remote work preferences are evolving. Students may also face emergency personal needs. While the degree program strongly advises students to be resident in Nashville (i.e., within commuting distance of Nashville) throughout the duration of their training, this policy provides guidance on eligibility for requesting a remote learning option, provides a process for requesting this option, and describes the expectations of students if remote learning approval is granted.

Eligibility for Requesting Remote Learning Options

- Only students who have completed **all** didactic coursework requirements are eligible to request a remote learning option.
- Only requests for durations longer than 3 months should be made through this process. Questions regarding durations of less than 3 months should be directed to the DGS.
- The student's most recent annual Academic Progress Committee (APC) review must have included no significant concerns regarding progress towards degree.
- Students may request remote learning approval before completing the teaching practicum, but will be required to be in residence in the Nashville area during the teaching practicum.

Process for Requesting Remote Learning Options

1. **As soon as the student is aware of their need for remote learning, preferably at least two months in advance of the planned remote learning**, the student should discuss the potential for remote learning with their research mentor and the Director of Graduate Studies (DGS). Exceptions to this timing may be approved in case of personal emergency. A remote learning request can be approved for a maximum of 12 months and will always conclude on June 30. A new application must be submitted for each 12-month period.
2. If the research mentor and DGS are both supportive of proceeding, the student should submit a brief (e.g., one paragraph) rationale for the remote learning request and a timeline for the requested remote learning, including start date and end date, to their research mentor and the DGS. The research mentor must confirm their support for the proposed remote learning experience to the DGS.
3. Once the DGS has received all materials from the student and an email of support from the research mentor, the DGS will review the request with the chair of the Academic Program Committee. Any concerns with the request will be discussed with the student and their research mentor, allowing the student to respond to any concerns.
4. **For students funded on an NIH training grant (e.g., NLM T15)**, if the DGS and APC chair are both supportive of proceeding the request materials will be forwarded to the NIH for approval. The student must respond promptly to any requests for further information or clarification. **The NIH must approve any requests for remote learning options for any student on an NIH training grant.** If the NIH approves, the DGS will email the student and their research mentor to inform them that the request is approved.
5. **For students not funded on an NIH training grant**, if the DGS and APC chair are both supportive of proceeding, the DGS will email the student and their research mentor to inform them if the request is approved.

Demonstrating Engagement with the Degree Program
Students must demonstrate engagement with the degree program throughout their remote learning time. **The program reserves the option to rescind permission for remote learning at any point if students are not demonstrating engagement with degree program activities**, as described below. Students will be provided with **one warning** about issues prior to revoking permission.

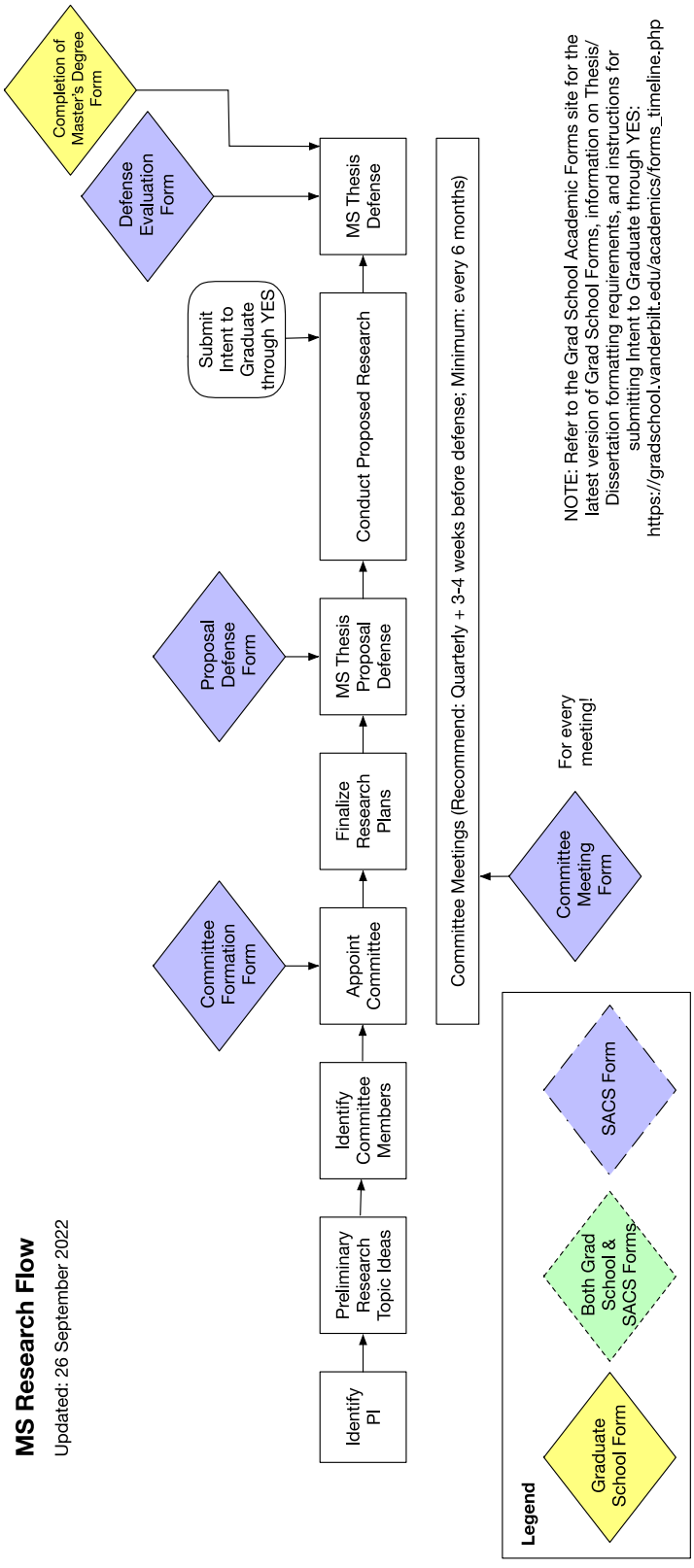
Students are expected to:

- Virtually attend all required degree program activities including DBMI Seminars and DBMI Research Colloquium.
- Virtually attend monthly meetings with the DGS and quarterly meetings with the Chair.
- Virtually participate in Journal Club.
- Attend the annual DBMI departmental retreat, in person.
- If funded on the T15, attend the annual NLM Training Meeting and present if requested.
- Register in a timely fashion for each semester.
- Respond to email requests from the Program Manager and the DGS in a timely fashion.
- Meet with their doctoral committee on a quarterly basis.
- Meet on a routine basis with their research advisor.
- Complete all required documentation (e.g., APC reviews, expense reports) in a timely fashion.

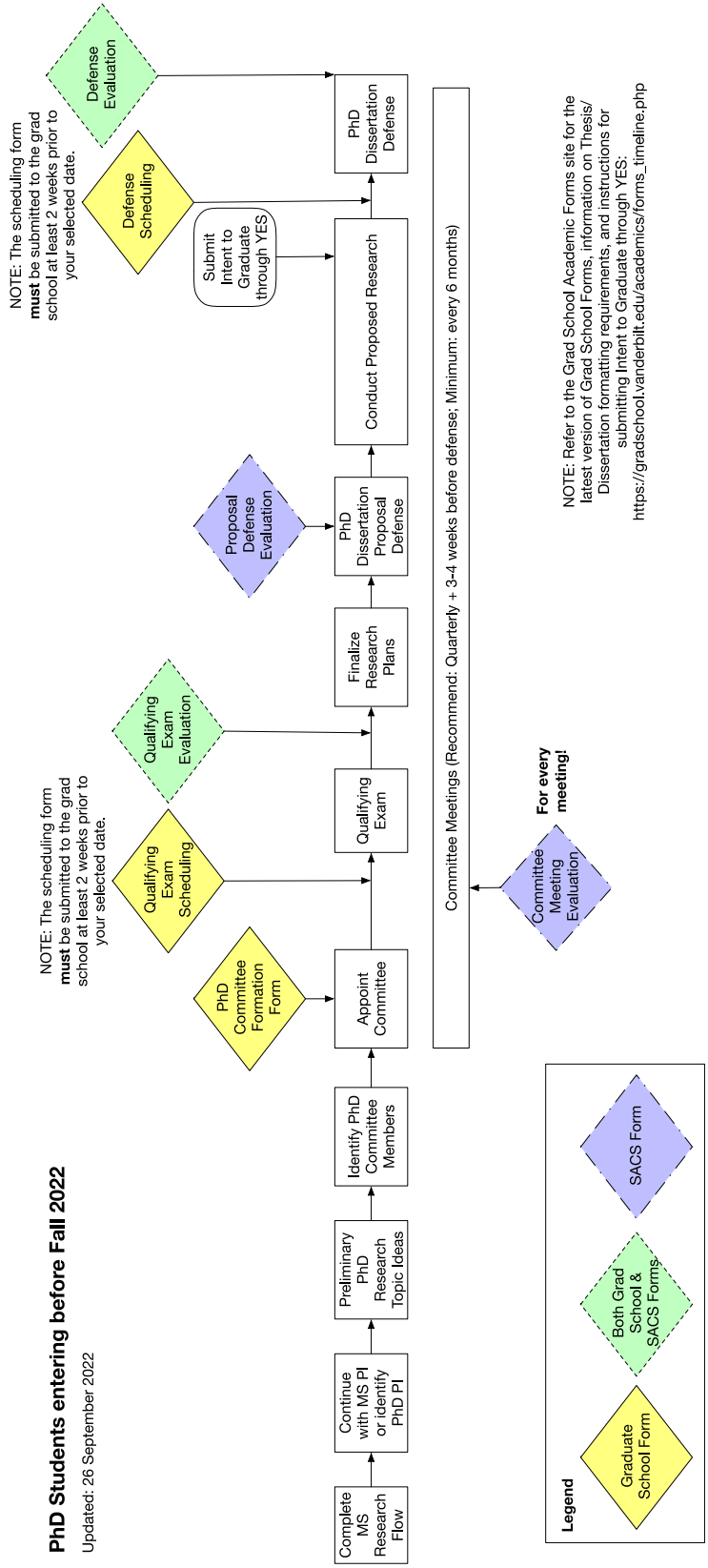
Resource Availability
During the planned remote learning experience, students will continue to have access to Vanderbilt University resources, including the library system, the University Counseling Center, the Graduate Academic Life Coach, and other resources. Students should utilize these resources as needed.

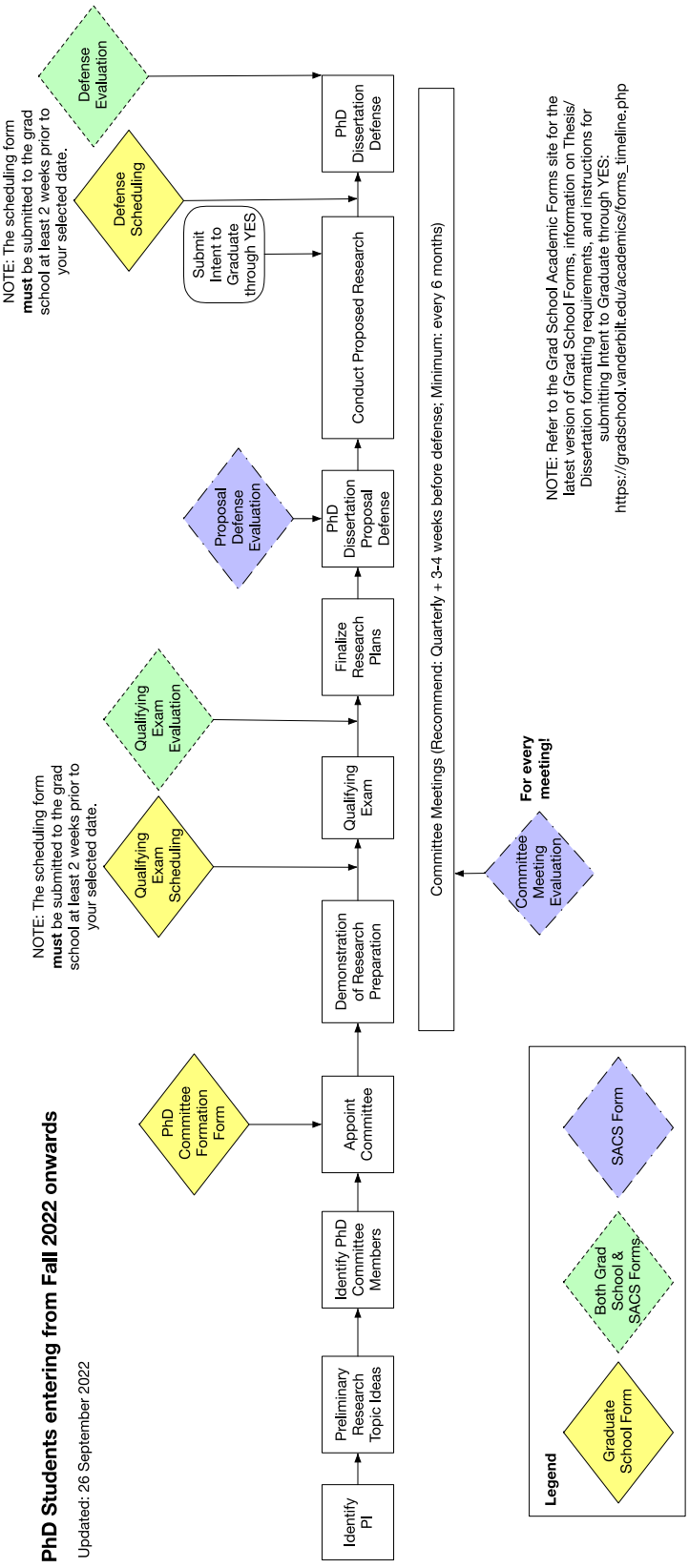
Appendix 9: Research Flows & Documentation Requirements

MS Flow Overview



PhD Flow Overview, for students entering <u>before Fall 2022</u>



NOTE: Refer to the Grad School Academic Forms site for the latest version of Grad School Forms, information on Thesis/ Dissertation formatting requirements, and instructions for submitting Intent to Graduate through YES: https://gradschool.vanderbilt.edu/academics/forms_timeline.php

PhD Flow Overview, for students entering <u>from Fall 2022 onwards</u>