2023-24

STUDENT HANDBOOK

M | BIOSTATISTICS

PLEASE VISIT THE HEIGHTS ON THE SCHOOL OF PUBLIC HEALTH WEBSITE TO ACCESS A DIGITAL VERSION OF THIS HANDBOOK -- AND THE DIRECT URL LINKS CONTAINED WITHIN -- BY SCANNING THE QR CODE ABOVE OR VISITING THE WEBSITE URL BELOW.

https://sph.umich.edu/the-heights/student-resources/departments/biostat/index.php

TABLE OF CONTENTS

The following information has been prepared to help acquaint you with details of the organization and procedures of the department and university. You may well have questions that are not answered here, and the staff will be glad to assist you.

About the Department

Biostatisticians develop and apply statistical design and analysis methods for biomedical research to turn data into knowledge. With the emergence of big data, biostatistics expertise is in greater demand than ever before. As we move towards a vision of modern data science as a community, we are grounded in classical and foundational principles of statistical theory and methods. The Biostatistics Graduate Program at the University of Michigan School of Public Health trains the next generation of quantitative scientists in both classical and modern theory, methods, and applications in biostatistics.

The Department of Biostatistics at the University of Michigan School of Public Health is rated one of the top biostatistics programs in the country by the US News and World Report Rankings. We bring biostatistical design and analysis expertise to a wide spectrum of health-related issues. At Michigan Biostatistics, you will learn how to develop and use statistical and computational methods in fields such as epidemiology, computational biology, genetics, imaging, cancer biology, endocrinology, transplantation, mobile health and electronic health records research. Our faculty, students, and staff work in important and diverse areas of current biostatistical research; including survival and event history analysis, statistical genetics and bioinformatics, clinical trials, causal inference, Bayesian methods, statistical computing, longitudinal data analysis, non-parametric and semi-parametric modeling, individualized/personalized health care and precision medicine, methods for missing data, and survey research. Our collaboration spans across public health, medicine, nursing, pharmacy, engineering, biological sciences, life sciences and liberal arts and sciences. We have strong ties with the University of Michigan Rogel Cancer Center, Institute of Social Research, Institute of Health Policy and Innovation and the Michigan Institute of Data Science.

Biostatisticians have a varied and stimulating career, with skills that are in high demand. Our graduates have great job opportunities in academia, government, industry, and at biomedical research institutions.

We value a diverse, inclusive and respectful environment in our department and uphold the Biostatistics Civility code (below) and broader SPH culture code. Our goal is to create and foster a diverse, inclusive, and welcoming department for all students, staff and faculty with which we learn and practice diversity, equity, inclusion (DEI) and respect for and with each other and in our scholarly work. Students, faculty and staff are expected to actively contribute to a welcoming and supportive climate within the department and to behave in a professional and courteous manner in email, online, and personal communications and interactions.

Biostatistics Civility Code

The University of Michigan Biostatistics Department is committed to the tenets of academic and research integrity, respect for all individuals, diligence in a collaborative and supportive environment, and a passion for the study of biostatistics. At Michigan Biostatistics, we embrace diversity, equity, inclusion, justice, and belonging. We treat one another in a professional manner with warmth, respect, and consideration through our communication and behavior. All students, staff, and faculty are expected to embody these values in all roles they serve at and on behalf of the University, including: in the classroom, internships, collaborations, and in all interactions with other members of the U-M community or field of biostatistics. We will support each other to uphold these values and we will have courage to speak up when needed.

Objective and Expectations of Student Handbook

The student handbook provides an overview of the MS, HDS MS, and PhD programs in the department of Biostatistics. Details from the website, the Heights, and beyond are summarized in this document to provide a comprehensive resource for students.

All students are expected to read the student handbook and refer to it throughout their time in the program. As part of the 2023 Biostatistics Orientation module on Canvas, all incoming students are required to sign and submit a form to acknowledge that they have read and agreed to the policies and expectations in this handbook. Incoming students are also expected to attend the Fall orientation session which introduces much of this material. The acknowledgement form and orientation details can be found in this Canvas course.

Academic and Professional Conduct Expectations

The faculty of the School of Public Health expect the conduct of a student registered or taking courses in the school to be consistent with that of a professional. Courtesy, honesty, and respect should be shown by students toward faculty, guest lecturers, administrative support staff, and fellow students. Similarly, students should expect faculty to treat them fairly, showing respect for their ideas and opinions, and striving to help them achieve maximum benefits from their experience in the school. All students are expected to complete the following: the School of Public Health's Academic Integrity module and all incoming students must complete the Biostatistics Academic Integrity Requirements for Orientation, which is in the 2023 Biostatistics Orientation module on Canvas. All students are expected to read and refer to the Rackham Academic and Professional Integrity Policy and the School of Public Health "Academic Integrity Resources" website.

Title IX and the Equity, Civil Rights, and Title IX Office (ECRT)

Title IX was passed in 1972 as part of the Education Amendments Act. The Act declares, "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance." Title IX applies to schools, local and state educational agencies, and other institutions that receive federal financial assistance from the U.S. Department of Education, such as the University of Michigan. A recipient institution that receives Department funds must operate its education program or activity in a nondiscriminatory manner free of discrimination based on sex, including sexual orientation and gender identity. More information about Title IX can be found on the U.S. Department of Education website.

The Equity, Civil Rights, and Title IX (ECRT) Office oversees, facilitates, and supports the University of Michigan's efforts to ensure equal opportunity for all persons regardless of race, color, national origin, age, marital status, sex, sexual orientation, gender identity, gender expression, disability, religion, height, weight, or veteran status in employment educational programs, activities, and admissions. Any person (e.g., faculty, staff, student, parent of a student, campus visitor, hospital patient, spouse of an employee, etc.) may report what they believe to be an act of discrimination or discriminatory harassment to the Equity, Civil Rights and Title IX Office. ECRT is not confidential, however, they are a private, resolution reporting resource.

If a report has been made to the ECRT Office, students can expect the following ECRT student process to be followed:

1. ECRT receives the initial report and preferms the initial assessment immediately due to potential health and safety concerns.
2. ECRT reaches out to the complainant (this is the person who has been allegedly harmed) within 24 business hours of report receipt.
3. ECRT meets with the complainant if the complainant is amenable to meeting.
4. Complainant requests one of the following:
    a. Investigative Resolution
        i. ECRT gathers information and this option includes a live hearing to determine whether policy was violated.
        ii. Expected timeline for the entire process (including appeals) is 180 days.
    b. Adaptable Resolution
        i. Voluntary, remedies based on resolution that seek to repair harm to the extent that is possible.
        ii. This option does not include formal discipline of the Respondent (i.e., the person who was accused of violating a policy).
        iii. Expected timeline is 90 days but varies based on party participation.
    c. Other Response
        i. This option includes, but is not limited to, educational conversations, training, other available educational interventions.
        ii. Expected timeline is 30 days.
    d. No Action

i. Parties may request that ECRT takes no action at all in response to their report.

5. Title IX Coordinator reviews requested resolution option identified by Complainant. Generally, the Title IX Coordinator seeks to honor requests made by the Complainant.

Concerns regarding Academic or Professional Conduct and/or Civil Rights

Concerns may be reported to U-M conflict resolution resources, such as the Office of Student Conflict Resolution (OSCR, https://oscr.umich.edu/), Graduate Employees' Organization (GEO, https://www.geo3550.org/), and/or the Equity, Civil Rights, Title IX Office (ECRT, https://ecrt.umich.edu/).

If you have a concern to report within the department, you may share via two ways. First, Chidimma Ozor Commer emails a wellness check-in survey bi-weekly and you can share your concern there. Alternatively, you can complete the confidential Biostatistics Student Concerns Reporting Form. Your concern will go to Chidimma Ozor Commer and Nicole Fenech, Academic Program Manager. Your concern will be investigated and you will be able to participate in the resolution process.

Curriculum

Students come to our program with undergraduate degrees in mathematics, statistics, biology, social sciences, and other majors. A bachelor's degree is required, along with 3 semesters of calculus, a course in matrix or linear algebra, and an introductory course in statistics or biostatistics. Courses in real analysis/advanced calculus and computing are helpful although not required. Students are expected to read the program requirements and course offerings below, with additional details on courses available on the Biostatistics website.

Master of Science (MS) in Biostatistics

The MS program is designed to be completed in four semesters (twenty months) with a total of 48 credits and can be a terminal degree or a step toward the PhD. The program includes core courses, an epidemiology requirement, a public health requirement, biostatistics electives, and open electives. A course planner application is available to help students plan courses throughout the program.

Core Courses (22 credit hours)

COURSES	CREDITS	TITLE	TERM
BIOSTAT 601	4	Probability and Distribution Theory	Fall, Year 1
BIOSTAT 602	4	Biostatistical Inference	Winter, Year 1
BIOSTAT 650	4	Applied Statistics I: Theory & Application of Linear Regression	Fall, Year 1
BIOSTAT 651	3	Applied Statistics II: Theory & Application of Generalized Linear Models	Winter, Year 1
BIOSTAT 653	3	Applied Statistics III: Theory & Application of Longitudinal Analysis	Fall, Year 2
BIOSTAT 699	4	Analysis of Biostatistical Investigations	Winter, Year 2

Note that these courses are to be taken in the order they are offered; 601 is a prerequisite for 602; 650 is a prerequisite for 651; 650 and 651 are prerequisites for 653; and 650, 651, and 653 are prerequisites for 699.

Epidemiology Requirement (3-7 credit hours)
The epidemiology requirement may be satisfied in any one of the following four ways:

1. Taking and passing the Public Health 512 exemption examination.
2. Completing Epidemiology 601 (4 credits) or Public Health 512 (3 credits).
3. Completing Epidemiology 516 and any necessary prerequisites to that course (3 or 7 credits).
4. Completing Epidemiology 621 (3 credits) (This option can only be used to satisfy requirements for students funded by the Training Program in Cancer Research).

Public Health Requirement (0 credit hours)
All MS students must complete Foundations of Public Health Practice, an online non-credit course covering 12 foundational learning objectives required by the Council on Education in Public Health (CEPH). Students must pass the course exam with a cumulative score of 80% or better to fulfill this degree requirement. Students with a prior undergraduate or master's degree from a CEPH-accredited program do not need to complete this course.

Biostatistics Electives (12 credit hours)
At least 12 credit hours of Biostatistics or Statistics courses are required in addition to the core courses. Each course must be ≥2 credit hours except for Biostat 607, and may be selected from Biostatistics at the 600/800 level or from Statistics at the 500/600 level, including special topic courses (BIOSTAT 664 or BIOSTAT 830). One-credit seminars and journal clubs (e.g.BIOSTAT 800 and BIOSTAT 803 etc…) do not count as Biostatistics Electives, nor does BIOSTAT 600 count as a Biostatistics Elective. Up to 3 credit hours of biostatistics elective may be taken as S/U.

Open Electives (the amount required to complete 48 credit hours, ~7-11 credit hours)
MS students will complete their required 48 credit hours with "open elective" courses, including additional electives in biostatistics (600+ level) and statistics (500+ level), Math 451, courses in public health or other areas to which biostatistics can be applied, and courses in computational methods. All approved courses are on a list maintained by the department and accessible to current Biostatistics students via Google Drive document.

Other courses may be appropriate for open electives. Students who wish to take University of Michigan courses not currently on the approved list are encouraged to request approval from the Curriculum Committee. To do so, please contact the Graduate Program Coordinator and provide the name, number, description, and syllabus for the course. (Courses far afield from biostatistics and public health are unlikely to be approved). Up to 6 credit hours of open electives may be taken as S/U.

Health Data Science Concentration (available for 2024 MS graduating class only)
The HDS concentration is offered under the umbrella of the Biostatistics MS degree program with the requirement of 48 credit hours. The purpose of this concentration is to address the rapidly growing needs of the marketplace for quantitative and computational skills in data analytics. This concentration expands and facilitates the professional training of computational skills and data analytic skills for students in the MS Program. It is especially intended for those who complete the MS program as a terminal degree and plan on pursuing a career in data science. Ongoing PhD students are able to complete this concentration. If they choose this route, some additional coursework is needed in order to meet the requirements of both the PhD and the HDS concentration.

There is no formal application procedure for the HDS concentration; all MS students are eligible and only need to declare their intention to complete the HDS concentration by notifying the Graduate Program Coordinator prior to July 31st after the end of their first year.

The HDS core courses are as follows (HDS-specific courses in bold):

COURSES	CREDITS	TITLE	TERM
BIOSTAT 601	4	Probability and Distribution Theory	Fall, Year 1
BIOSTAT 625	**3**	**Computing with Big Data**	**Fall, Year 1**
BIOSTAT 602	4	Biostatistical Inference	Winter, Year 1
BIOSTAT 620	**3**	**Introduction to Health Data Science**	**Winter, Year 1**
BIOSTAT 650	4	Applied Statistics I: Theory & Application of Linear Regression	Fall, Year 1
BIOSTAT 651	3	Applied Statistics II: Theory & Application of Generalized Linear Models	Winter, Year 1
BIOSTAT 629	**1**	**Case Studies in Health Big Data***	**Winter, Year 2**
BIOSTAT 699	4	Analysis of Biostatistical Investigations	Winter, Year 2

In addition to these core courses, HDS concentration students are encouraged to select their biostatistics or open electives from the following five courses:

COURSES	CREDITS	TITLE	USUAL TERM
BIOSTAT 607	1-3	Basic Computing for Data Analytics	Fall
BIOSTAT 615	3	Statistical Computing	Fall
BIOSTAT 617	3	Methods and Theory of Sample Design	Winter
BIOSTAT 619	3	Clinical Trials	Fall
BIOSTAT 626	3	Machine Learning for Health Sciences	Winter

In summary, the key HDS program-specific courses added to the regular MS curriculum include a computing course, a course on introduction to health data science, and a course on health data case studies. In addition to the existing core and elective courses in the MS program, the HDS concentration features three core courses and five elective courses, some of which are components of the current MS program courses and some of which are new courses designed specifically for the HDS concentration. The three core courses (BIOSTAT 625: Computing with Big Data, BIOSTAT 620, Introduction to Health Data Science and 629: Case Studies with Big Data) replace one required course for the traditional MS degree (BIOSTAT 653: Applied Statistics III – Longitudinal Data Analysis,). Because there are additional required courses for the HDS concentration, only 8 credit hours of biostatistics electives are required, which are encouraged (but not required) to be selected from the elective courses above. If students take HDS core courses in their first year but ultimately decide not to pursue this concentration, they can still apply those courses to their required Biostatistics Electives under the standard MS program (and they would need a total of 12 Biostatistics credits in that scenario instead of 8).The epidemiology, public health, and open elective requirements are unchanged.

The HDS concentration has been structured as a terminal degree. Because the standard MS program is required for consideration of acceptance to the PhD program, MS students intending to go on to the PhD program should make sure they complete BIOSTAT 653 so that they have all core courses for the standard MS program.

- 1 Note that 629 will typically be offered in two sections with a separate credit for each. HDS students must take one of the sections; they may take both, using the second credit as a biostatistics or open elective.

Unfunded Masters Student Opportunities for Research

There are multiple ways for MS students to get involved with research. Students may join STATCOM to work on applied statistical projects from non-profit governmental and community organizations with faculty serving an advisory role. Students may register in the Fall or Winter for Biostat 610: Readings in Biostatistics, where faculty and students can decide on an individualized research plan for credit. Note that 610 can only be registered for 1 credit, is S/U and cannot be applied toward any degree requirements. Experiential learning opportunities are available via MIDAS. While GSRA positions are limited, many students find hourly positions within and outside of Biostatistics to work on short-term projects or may find a research position during the summer. Biostatistics faculty may send emails with available positions or positions may be searched for on SPH career links.

Master of Science (MS) in Health Data Science (HDS)

(available for 2025 and future MS graduating cohorts)

The Master of Science (MS) in Health Data Science (HDS) program is designed to be completed in four semesters (twenty months) with a total of 48 credits. Students who complete the MS program in HDS can enter the workforce as health data scientists, data analysts, and biostatisticians. A small proportion of the students may choose to continue their pursuit of a PhD degree in data science or biostatistics with their well-prepared quantitative and computational skills.

The program includes core courses, an epidemiology requirement, a public health requirement, biostatistics and computing/programing electives, and open electives.

Core Courses (27 credit hours)

COURSES	CREDITS	TITLE	TERM
BIOSTAT 601	4	Probability and Distribution Theory	Fall, Year 1
BIOSTAT 625	3	Computing with Big Data	Fall, Year 1 or 2
BIOSTAT 650	4	Applied Statistics I: Theory & Application of Linear Regression	Fall, Year 1
BIOSTAT 602	4	Biostatistical Inference	Winter, Year 1
BIOSTAT 620	3	Introduction to Health Data Science	Winter, Year 1
BIOSTAT 651	3	Applied Statistics II: Theory & Application of Generalized Linear Models	Winter, Year 1
BIOSTAT 626	3	Machine Learning for Health Sciences	Winter, Year 2
BIOSTAT 629	3	Case Studies in Health Big Data	Winter, Year 2

Note that these courses are to be taken in the order they are offered; 601 is a prerequisite for 602; 650 is a prerequisite for 651; and 602, 620, 625 and 651 are prerequisites for 629. Also, R programming (at the level of Biostat 607 R module) is a prerequisite for 625 and 620.

Epidemiology Requirement (3-7 credit hours or exempt)

The epidemiology requirement may be satisfied in any one of the following four ways:

1. Taking and passing the Public Health 512 exemption examination.
2. Completing Epidemiology 601 (4 credits) or Public Health 512 (3 credits).
3. Completing Epidemiology 516 and any necessary prerequisites to that course (3 or 7 credits).
4. Completing Epidemiology 621 (3 credits) (This option can only be used to satisfy requirements for students funded by the Training Program in Cancer Research).

Public Health Requirement (0 credit hours)
All MS students must complete Foundations of Public Health Practice, an online non-credit course covering 12 foundational learning objectives required by the Council on Education in Public Health (CEPH). Students must pass the course exam with a cumulative score of 80% or better to fulfill this degree requirement. Students with a prior undergraduate or master's degree from a CEPH-accredited program do not need to complete this course.

Elective Biostatistics Courses (at least 1 required)
- BIOS 617: Theory and Methods of Sample Design (3 credits)
- BIOS 619: Clinical Trials (3 credits)
- BIOS 653: Longitudinal Data Analysis (3 credits)
- BIOS 675: Survival Time Analysis (3 credits)
- BIOS 695: Analysis of Categorical Data (3 credits)

Elective Computing/Programming Courses (at least 1 required)
- BIOS 607: Computing for Data Analytics (3 credits). BIOS 607 consists of three 1-credit modules: R, Python and C++. Students can either take all 3 modules or waive some module(s) with a previous course or by passing an exemption exam, which will be offered during Orientation - more information can be found on the Orientation Canvas site. In case some module(s) are waived, this requirement is considered satisfied, but the student still needs to take other open elective courses to fulfill the total 48-credit degree requirement.
- BIOS 615: Statistical Computing (3 credits)

Open Electives (the amount required to complete 48 credit hours, ~8-15 credit hours)
MS students will complete their required 48 credit hours with "open elective" courses, including additional electives in biostatistics (600+ level) and statistics (500+ level), Math 451, courses in public health or other areas to which biostatistics can be applied, and courses in computational methods. All approved courses are on a list maintained by the department and accessible to current Biostatistics students via Google Drive document (goo.gl/GbbRw7).

Other courses may be appropriate for open electives. Students who wish to take University of Michigan courses not currently on the approved list are encouraged to request approval from the Curriculum Committee. To do so, please contact the Graduate Program Coordinator and provide the name, number, description, and syllabus for the course. (Courses far afield from biostatistics and public health are unlikely to be approved). Up to 6 credit hours of open electives may be taken as S/U.

MS in HDS students intending to go on to the Biostat PhD program should make sure they complete BIOSTAT 653 (as an Elective Biostatistics course or an Open Elective course) so that they have the necessary biostatistics knowledge.

Doctor of Philosophy (PhD)

Students pursuing the PhD must complete all of the requirements for the Biostatistics MS degree, including epidemiology requirements, public health requirements, and open electives. PhD students must also complete the core PhD courses,additional electives, and a cognate, as described below. In addition to coursework, students must pass a qualifying exam, form a dissertation committee, write and present a dissertation proposal, write a dissertation, and pass an oral defense of their dissertation.

It is anticipated that students entering with an MS degree in statistics or biostatistics will have at a minimum completed courses equivalent to BIOSTAT 601, 602, 650, as well as at least two graduate electives in statistics or biostatistics, allowing them to complete their required coursework in one or at most two years instead of three.

Core PhD Courses (10 credit hours)

COURSES	CREDITS	TITLE	USUAL TERM
BIOSTAT 801	3	Advanced Inference I	Fall
BIOSTAT 802	3	Advanced Inference II	Winter
BIOSTAT 680	3	Application of Stochastic Processes I	Fall
BIOSTAT 810	1	Approaches to the Responsible Practice of Biostatistics	Fall

Note that Math 451 (Advanced Calculus) is a prerequisite for BIOSTAT 801/802 and does not count toward open electives for PhD requirements.

PhD Biostatistics Electives (15 credit hours)
At least 15 additional credit hours of Biostatistics or Statistics courses are required beyond the core MS and PhD courses. At least 12 of these credit hours must be in formal courses (a graded course in a lecture format), and at least 9 of these credit hours must be at the 800 level of biostatistics or 600 level of statistics. For students completing the PhD degree after the Michigan Biostatistics MS degree, the MS electives will count toward the PhD electives, subject to the 800/600 level requirement.

PhD Biostatistics Cognate Requirement
Rackham requires a 3-credit cognate (minor) requirement for Ph.D. students. This requirement can be met via the Epidemiology requirement by taking PH 512 (Principles of Epidemiology, 3 credits) or EPID 601 (Principles and Methods of Epidemiology, 4 credits), or by taking EPID 516 (Genetics in Epidemiology, 3 credits – note this requires EPID 515 as a prerequisite) or by taking EPID 621 (Cancer Epidemiology, 3 credits) if the student is funded by the Training Program in Cancer Research. Alternatively, students with sufficient background in epidemiology may fulfill the Epidemiology requirement by taking the Epidemiology Exemption Exam offered by the Epidemiology Department.

If, in the process of fulfilling the epidemiology requirement (including fulfilling it by use of the exemption exam), students do not receive 3 credits, they must make sure that they have at least a total of 3 credits from outside of biostatistics or statistics in order to achieve candidacy. This can be achieved by taking at least three credit hours of courses outside of biostatistics or statistics under the open electives requirement.

PhD Qualifying Exam
Students are expected to take the qualifying exam either just after completing 699 or the following year. Students are expected to discuss the timing of their exam with their advisor and the candidacy committee. The Qualifying Examination is administered in May of each year. Questions will be at the level of the final exams used in our required Biostatistics core courses (601, 602, 650, 651, and 699). PhD students will be asked to fill out a form to indicate which year they plan to take it.

The goals of the qualifying exam are to encourage the student to review and synthesize what they have learned in the program and to assess their general understanding of statistical concepts, ability to independently and creatively use statistical concepts in application, and ability to convey ideas and findings coherently. Each exam will be pass/fail, based

on the overall score achieved on the exam. Students must pass the exam to remain in the program. Students who fail an exam will be given the opportunity to retake the exam the following year.

There is a Google Drive location for shared exams. Please contact the Graduate Program Coordinator for access.

Applying for Candidacy
Students who have completed all required coursework and passed the qualifying exam should apply for candidacy by submitting the Candidacy Requirements form to the chair of the Candidacy Committee. The form can be found on the Heights Biostatistics Department Page under Student Resources. Contact the Graduate Program Coordinator for more details.

Candidacy Course Registration
Ph.D. candidates are registered in the fall and winter terms for 995, "Dissertation/candidate," which consists of 8 credit hours for a full term or 4 credit hours for a half term. No part-time enrollment is possible. A student who defends in the spring and/or summer half-term must register for 8 credit hours of 995 for the spring/summer full term.

Once candidacy is achieved, students usually should not take more than one course per semester, in order to concentrate on completing their thesis. Students wishing to take more than one class should obtain permission from their advisor: see Candidacy Requirements - Rackham Graduate School: University of Michigan.

A candidate who registers for a course must seek prior approval from the faculty advisor and also register for 995. A candidate may elect either one course per term, or more than one course for a total of no more than four credits, without paying additional tuition. Courses may be taken for credit or as a visit (audit). A candidate who does not elect a course during a term of 995 enrollment may, in the next term, either register for courses for no more than 8 credits or register for no more than two courses that total more than 8 credits without paying additional tuition. An additional course may not be taken in anticipation of taking none in a future term of 995 enrollment. A candidate who takes courses beyond this limit will be assessed tuition."

Dissertation Committee
The dissertation committee must have at least four members, with at least two from within and at least one from outside the Department of Biostatistics; the outside member is called the cognate member. The student may choose to have a single committee chair, who must be a member of the Biostatistics department faculty, or two co-chairs, at least one of whom must be a member of the Biostatistics department faculty. The committee directs and reviews the student's doctoral research, conducts the oral defense of the dissertation, and decides whether or not the dissertation is approved. Ph.D. candidates should form their dissertation committee within 12 months of reaching candidacy; it is recommended that meetings with the committee members take place every six to 12 months.

Dissertation Proposal
Dissertation Committees must be formed before proposals take place. The committee must be approved by Rackham. Please do so by completing this form and sending it to Nicole Fenech at fenechn@umich.edu. Nicole will submit the form to Rackham for processing.

To schedule and publicly advertise the proposal, students must use this mandatory form that is required for the department. The form can also be found on the Heights under Student Resources: Department Specific Resources for Biostatistics Forms for Current Biostatistics Students. This form requires information about your committee, the date and time of your proposal, and your proposal abstract. It is the responsibility of the student to ensure that the dissertation proposal is advertised within the department at least two weeks in advance of the scheduled proposal time. All the biostatistics faculty and students are welcome to attend the dissertation proposal meeting.

Doctoral candidates are expected to present their dissertation proposal within 24 months of achieving candidacy. The dissertation proposal should be presented at least 12 months before completion of the dissertation, so that the student may get feedback and comments from the dissertation committee, as well as review and improve the proposed direction

and content of the research. The proposal is intended to provide students the opportunity to present their research and receive constructive feedback to continue the research. This is a departmental milestone, and the committee members need to sign the dissertation proposal feedback form. There is no report to Rackham. After the proposal meeting, the dissertation committee chair or co-chair will submit the signed form to Nicole Fenech and will provide a copy of the form to the student.

Students are required to create a written document for the proposal and present orally to the dissertation committee. The proposal should address the overall aims of the thesis, contain a literature review of the research area, present a section on preliminary results, and provide a plan for additional research. The purpose of the proposal is to present the problems to be addressed; for some problems there will be a comprehensive body of work, while for others, only a partial solution or work in progress is sufficient. A detailed outline of solutions to all the problems is not required nor expected for the proposal. Since proposal requirements vary by advisor, please confirm with your advisor their specific expectations.

It is advised, but not required, to use the following format for the proposal document. The introduction chapter (chapter 1) may include an overall literature review with each chapter having an introduction that goes into more detail for that project. Subsequent chapters (e.g., chapters 2-4) are likely to be progressively sparse because details are not expected on all projects. Instead, later chapters should highlight overarching ideas for continued work. An overall conclusion chapter is not expected at the proposal stage. The length of the proposal will vary by the student and topics.

None of the chapters are required to be published or submitted before the proposal. The proposal meeting should be scheduled for two hours with the formal presentation around 45 minutes and the rest of the time available for questions and discussion. Drafts of the written proposal document should be provided two weeks in advance of the scheduled proposal to the committee for review.

Dissertation Content and Defense
Please visit the Rackham Dissertation Timeline website for a detailed list to follow leading up to your defense and graduation.

It is the responsibility of the student to see that the dissertation defense pre-review has been registered with Rackham at least three weeks before the oral defense. Additionally, the student must also ensure that the defense is advertised within the department at least two weeks in advance of the scheduled proposal time. To schedule and advertise the defense, this mandatory form (same as the proposal, but with more information) is required for the department. The form can also be found on the Heights under Student Resources- Department Specific Resources for Biostatistics Forms for Current Biostatistics Students.

The dissertation research must be a creative, significant, and original contribution to the field of biostatistics, involving the development and evaluation of biostatistical methodology that has application to important biomedical problems. The development of computational techniques and software for novel statistical methods is an important aspect of scholarly work. Various models for the structure of a dissertation have been used and are acceptable. Usually, the dissertation consists of three separate, often fairly loosely related, papers that are judged to be of publishable quality, together with introduction and conclusion/future directions chapters. An alternative, more traditional, but now less commonly used form of dissertation would be one that provides an in-depth treatise on a topic that may look at various facets of a problem and may not easily subdivide into a set number of separate publishable papers. For guidance, students may wish to review the collection of Ph.D. dissertations that have been written in the department and that are on display in the departmental library, or on-line in Deep Blue (https://deepblue.lib.umich.edu/handle/2027.42/39366).

The dissertation oral defense should be advertised using the thesis abstract at least two weeks in advance of the scheduled defense time. The written dissertation should be supplied to both the dissertation committee and the student coordinator at least two weeks in advance of the scheduled defense time for review to any faculty member or student in the department prior to the defense. For the oral defense, the dissertation committee chair will call on the candidate for presentation of the dissertation, typically for a 50-minute presentation. The defense is public; therefore, examination of the candidate by committee members and others should take place with all who are interested present. The defense will conclude with

'closed door' deliberation of the dissertation committee.

Dual Degree

If you are planning to pursue a dual degree, you should check with a Graduate Program Coordinator and your Academic Advisor to ensure that you are planning adequately to complete your degree. The SPH Registrar may also provide guidance around academic requirements and forms.

PhD Admission Process

Because a number of our MS students apply to the PhD program, we discuss some of the details of the PhD admission process in this document (noting that many of these comments apply to the MS admission process as well).

Our approach to admissions is holistic; we generally have no specific criteria for admission or financial support. We do expect a clear fit with our program, strong and relevant academic background, and demonstrated strength in mathematics and the English language.

Specific areas of focus for applicant review:

1. Undergraduate and graduate education: universities, courses, grades.
2. Mathematics preparation: universities, courses, grades. We expect mostly As in these courses.
3. Statement of purpose/personal statement. We look for a logical fit with our biostatistics graduate program and evidence of clear thinking and writing.
4. Letters of recommendation. We have a strong preference for academic or research letters with other letters largely discounted. Particularly valuable are evaluative letters from referees who clearly know the applicant well. We look for strong support and a lack of red flags. For internal Masters to PhD applicants, we prefer internal letters.
5. Other important information: diversity relevance, computing skills, research experience, teaching experience. This information can be particularly important for funding decisions.
6. For non-native English speakers: TOEFL. A score <100 is likely disqualifying and a higher score is much preferred. This is the only specific numerical threshold to which we pay attention.

Registration

To register for Biostatistics courses, to see the current course times and instructors, and to find courses in other Schools/Colleges visit Wolverine Access (wolverineaccess.umich.edu).
Full Time Study. Master's and Ph.D. pre-candidates must register for a minimum of 9 credit hours to be considered full-time. An exception is that MS tuition scholarship students generally are expected to register for a minimum of 12 credit hours per semester.

PhD Registration. PhD candidates should register for at least 8 credit hours in BIOSTAT 995 each semester. If this credit is split between multiple advisors, students need to inform and contact the Graduate Program Coordinator. If a PhD candidate is taking other courses, credit hours can be modified subject to approval of the dissertation advisor.

PhD students must be registered each Fall and Winter term (continuously enrolled) to remain in good standing. Students may apply to take Leave of Absence or Extramural Study, which allows them to remain in good standing without registration. PhD students have year-round eligibility for University services even during summers when they may not be registered.

PhD students defending during Spring/Summer term must enroll and register for that semester, contact the student coordinator for a waiver if a late fee is incurred.

Late Registration. If you are not registered before the first day of class, a $50 late registration fee will be assessed to your account.

Drop/Add. Students may add, drop, or modify a course via Wolverine Access through the end of the third week of classes in

a full term. After the third full week in a full term students must obtain instructor approval to drop, add, or modify a course via Wolverine Access. A drop/add form is sometimes required when changes are not allowed using the online system (e.g., when converting enrollment to audit) and can be obtained from the Graduate Program Coordinator. Once the form has all signatures, the student will need to take the form to the central Registrar's Office, along with their picture ID.

Any class dropped after the third week will result in a grade of "W" for that course unless special arrangements can be made with the instructor. Courses cannot be dropped or added after the last day of classes. A student who wants to drop the only course for which they are registered must follow the term withdrawal procedures: see https://rackham.umich.edu/navigating-your-degree/term-withdrawal/. A "W" is not included when calculating GPA.

Independent Study. There are three independent study courses offered by Biostatistics:

BIOSTAT 610: Readings in Biostatistics. Primarily intended for MS students. Independent study in a special topic under the guidance of a faculty member. (1 credit, S/U and cannot be applied towards any degree requirement).

BIOSTAT820: Readings in Biostatistics. Primarily intended for Ph.D. students. Students assigned special topics for literature study under guidance of individual faculty members. (1-4 credits).

BIOSTAT 990: Dissertation/Pre-Candidacy. For dissertation work by a doctoral student not yet admitted to status as a candidate, (1-8 Full term, 1-4 Half term).

These courses do not count toward any program requirements (elective, open elective, or cognate).

Course waivers and course credits

Course waivers
Some students will have previously (i.e. prior to entry in the Biostatistics MS/HDS MS/PhD program) successfully completed graduate coursework that is equivalent to one or more required core courses and may wish to waive the corresponding requirement. To request a core course waiver, students should enter the relevant information in the Biostatistics Course Waiver Request Form (login required).

Students considering whether to request a waiver should note the following:

1. A course waiver is not equivalent to course credit. Students who receive course waivers for specific core courses must still complete the required number of credit hours to graduate (e.g. 48 credit hours for MS students). Information on double counting or transferring or double-counting credit hours can be found further below in this section.
2. Undergraduate coursework is generally not considered to be equivalent to any core course in the MS program. Waivers will be considered in some exceptional circumstances.
3. A grade of B or higher in the relevant prior coursework is typically necessary to successfully waive a course. Waivers will be considered in some exceptional circumstances.
4. The Biostatistics Curriculum Committee has final say as to the approval or disapproval of any requested course waivers.

Transferring credit (MS)

For students in the MS program, up to six credit hours required for a degree program may be transferred to a student's record from inside and/or outside of the University of Michigan. The transfer from within the University appears on the SPH academic record and the associated grade(s) received for the credit(s) also appear and will be computed in the student's cumulative GPA. Credits transferred from an outside institution will not be computed as part of the student's cumulative GPA.

Courses cannot be transferred for credit if they were already applied toward another degree, taken more than five years prior to entering the present SPH program, or if a grade below a "B" was earned. Complete details on transferring credits within Rackham degree programs can be found here: https://rackham.umich.edu/navigating-your-degree/transfer-of-credit-information/

Transferring credit (PhD)

Transfer of credit is not allowed in the PhD program. However, PhD students may waive elective requirements based on previous coursework at other institutions. The course must be equivalent to an elective offered at Michigan (in biostat or stat for biostat electives, or possibly elsewhere for open electives). A request must be submitted to the Graduate Program Coordinator for review by the Curriculum Committee.

Double-counting courses for dual degree programs

Students pursuing a dual degree program – two graduate U-M degrees simultaneously – may be eligible to double-count a limited number of credit hours towards both degrees. Details on dual degree programs can be found here: https://rackham.umich.edu/academic-policies/section6/. Students interested in pursuing a dual degree program should contact the Graduate Program Coordinator to start the process.

Grading and Evaluation

Letter grade coursework (A, B, C, D, or E) are converted into numbers, or points, as follows: A+/A = 4.0, A-= 3.7, B+ = 3.3, B = 3.0, B- = 2.7, C+ = 2.3, C = 2.0, C- = 1.7, D+ = 1.3, D = 1.0, D- = 0.7, E = 0. A grade of C- or better is required to obtain credit for a course. To maintain satisfactory academic standing, a graduate student must make satisfactory progress toward their degree and have a minimum Rackham cumulative grade point average (GPA) of B (3.0). Students who fall below the GPA requirement of their program or Rackham are placed on academic probation, and cannot graduate until their probationary status is removed.

Students may elect courses without letter grades, either as a visit (audit) or for Satisfactory/Unsatisfactory (S/U) grading. A visit/audit does not count for credit, but a grade of S does. However, non-letter grade courses do not count toward any program requirements (elective, open elective, or cognate).

A student may receive a grade of Incomplete ("I") if there is a limited amount of coursework remaining to be done by the end of the semester and the instructor approves an extension for completing the unfinished work. The instructor must agree to this arrangement and determine a deadline for finishing the assigned work before a grade is assigned. For MS and PhD students who do not convert an incomplete will have it remain an I. Students with 8 or more accumulated incomplete credit hours will be placed on academic probation.

At the end of every Winter Semester students will receive a formal evaluation from the Department Chair based on faculty review and discussion. This letter will summarize current GPA and department standing, highlight student successes during the past year, and make recommendations for improvement.

Study Groups

To support our students, help integrate them into the department, and build their academic cohort at a time when many classes and most interactions outside of class were virtual, our department offered new students the opportunity to take part in facilitated virtual study groups for Biostatistics 601/602/650/651 in the 2020-2021 academic year. These study groups were useful and successful, so they will continue as we return to the classroom. These groups are for Biostatistics students only.

Each of the study groups includes one facilitator and about eight students. Facilitators are senior students appointed and supported by the department. Students can sign up for study groups for either 601 (602) or 650 (651) or both at the start of the semester. Nicole Fenech or Lacey Hoffman will send an email with a survey asking for sign ups before the Fall semester. The groups meet with the facilitator for one session per week. Groups are free to meet more often without the

facilitator if they wish.

Study group facilitator roles and expectations are outlined in the handbook, which can be found on The Heights. While some of the duties overlap with that of a GSI, facilitators do not need to answer course material-related questions outside of study group meeting hours or grade homeworks.

Faculty Advising and Mentoring

Advising. The department assigns individual advisors to provide general academic advising and more specific support for all incoming Masters and Ph.D. students. In addition, each student receives overall academic advising from the Curriculum Committee Chair (Tim Johnson for 2023-2024) at orientation and on an as needed basis. For Masters or Ph.D. students funded as a graduate student research assistant, the advisor will usually be their GSRA supervisor. For Masters or Ph.D. students funded as a graduate student instructor, the professor of the first course which they are instructing will usually be their advisor. For Ph.D. students working on their dissertation, their dissertation advisor may be considered their advisor. All other students are initially paired with an academic advisor based on interests expressed in the admissions application and admissions questionnaire sent prior to the Fall semester.

Individual academic advisors, supplemented by the Curriculum Committee Chair, will help students navigate the curriculum and requirements, support them through any academic difficulties, and provide signatures and approvals on forms pertaining to the curriculum. Students should meet with their academic advisor during orientation and before the start of every semester thereafter, and be proactive in seeking out the advisors' assistance when needed.

If a student's initial advising match is not a good fit, the student should discuss their concerns with the Graduate Program Coordinator (Nicole Fenech or Fatma Nedjari) and/or the Associate Chair for Academic Affairs (Kelley Kidwell).

Masters and PhD Degree Individual Advising Expectations
The individual faculty advisor serves as the main source of support for academic and career advice and connecting students to SPH/University resources for issues outside of academic performance, including mental health, obtaining internships, cultural integration, and writing assistance. The individual advisor is available by appointment if requested to discuss issues related to navigating the program in and out of the classroom. Students and their advisor should meet on a semester basis. Resources are available for formal mentoring plans based on program and funding status prepared by Rackham's Faculty Committee on Mentoring, Mentoring Others Results in Excellence (MORE).
Curriculum Chair Academic Advising Expectations

The Curriculum Committee Chair serves as an academic advisor to provide general guidance related to courses, coursework, career planning, and University of Michigan/SPH navigation during the Master's program.

The Curriculum Committee Chair will hold a large group information session during Fall orientation. The chair will be prepared to help with general questions about the department and its graduate programs, degree requirements, available courses for each semester, and registration deadlines. Any degree requirement questions the chair cannot answer should be directed to the Graduate Program Coordinator (Nicole Fenech or Fatma Nedjari).

The Curriculum Committee Chair is available by email or appointment to meet and discuss issues related to navigating the program, but the majority of advising questions should first be directed to the student's individual advisor.

Student Expectations

Students are expected to attend meetings with their advisors at least once per semester and more often, if desired. The student is expected to regularly communicate with their advisors about academic progress, and to initiate contact with an advisor if needing assistance. Students are strongly encouraged to contact their advisors for information regarding SPH/ University resources for issues outside of academic performance, including mental health, obtaining internships, cultural integration, and writing assistance.

Remember, your advisor is very busy and has many things on their plate, so use the subject line of your email to catch their attention (e.g. Advising appointment request- your name). If the advisor does not respond within one week, try sending your email again. If you still have not heard back from your advisor, contact Nicole Fenech or Fatma Nedjari to see if they can help locate your advisor or find someone else who can help you temporarily. When you do meet with your advisor, show up for your meeting on time, be prepared, and ask clarifying questions during the meeting.

Initiating and attending meetings with an advisor may be intimidating, so the following suggestions are adapted from a Brown University resource to help ease the process. Students should be proactive and not afraid to reach out. Take the lead to schedule meetings, discuss your concerns and ways in which your advisor and the department can be supportive during your time in our program. In your email to advisors, suggest several available dates and times that you can meet, a tentative agenda or brief narrative of what you would like to discuss. Potential agenda items or discussion include:

- Progress: What classes are you taking? How are you doing in those classes? How prepared have you felt? Is there a way you could be better supported in those courses?
- Goals: What are your goals during graduate school? What are your career aspirations? For example, are you seeking funding, research opportunities, internships, teaching experience, etc.? Discuss how your advisor may help you in achieving these goals.
- Specific help and feedback: What specific input and feedback do you need, by when and in what format? For example, do you have a question about elective courses, PhD application process, or where to find mental health resources?
- Trouble points and challenges: Can your advisor help or find resources for you. For example, would you like to be connected to study groups, peer mentors, STATCOM, other Biostat or SPH committees or ways to obtain an internship?
- Expectations and next steps for the next meeting: Clarify expectations between you and your advisor in the frequency of meetings, depth of advice, and what each of you can do before you meet again.

Considering your discussion topics, ask your advisor for a 30-60 minute meeting. Most likely, the shorter the meeting, the easier to schedule, but make sure that you have enough time to discuss your topics and feel supported by your advisor. Contact your advisor as soon as you can and if you are comfortable, share any personal circumstances that may be affecting or could affect your academic milestones. It is best to be preventative or provide early notification than to wait until it is too late to troubleshoot an issue. At the end of each meeting, aim to summarize your discussion and any next steps to ensure you and your advisor agree. It is often helpful to take hand-written or digital notes during the meeting for future reference.

Faculty Mentoring. A mentor is someone who you connect with on a personal and professional level, who might help you explore career trajectories, provide connections for you, and with whom you might maintain a relationship throughout your career. In addition to your advisor, a mentoring relationship can be found through your GSRA/GSI assignment if you have one, internships or job, or with other faculty members in the department and School. We encourage you to be proactive in finding multiple mentors, to augment the guidance of your academic advisors.

Peer Mentoring

The Peer Mentoring Committee provides support and resources to students by connecting incoming student mentees with student mentors and improving accessibility to information relevant to student life. Our goal is to provide personalized, one-on-one student-led advising to help new students better navigate their academic, career, and student life. The Peer Mentoring Committee also develops resources to guide students through their program. One such resource is the Peer Mentoring student handbook which is written by students, for students. This handbook has information on department student representation, academic, career, and mental health resources, finances, healthcare, and many other topics. The handbook can also be found on The Heights under Biostatistics, Department Resources.

Becoming a Mentor: To become a peer mentor you must be at least a second year student. The Peer Mentoring Committee will send out an email at the end of the academic year recruiting peer mentors for the incoming cohort. Simply express interest in becoming a peer mentor by completing a Google form sent from the Peer Mentoring Committee and you will be assigned a mentee for the academic year.

Becoming a Mentee: All incoming students are assigned a peer mentor, however we encourage incoming students to fill out a Google Form sent from the Peer Mentoring Committee before the Fall semester about their background, traits, and ideal peer mentor in order to provide a better mentoring experience and match students with the best peer mentor possible. Matches are made each academic year.

Responsibilities: Deciding to take part in peer mentoring can be a fulfilling experience, but it does come with responsibilities. Specifically, mentors are required to check-in with their mentee before classes start and throughout their first academic year as well as respond to their mentees' questions/requests in a timely manner. Mentees are encouraged to contact their mentor if they have any questions or concerns or just need support.

Student Conduct & Responsibilities

Students are responsible for upholding the department's Civility Code and the School and University standards of academic conduct and should be aware of all policies and procedures. We highlight a few student conduct matters and responsibilities below:

No plagiarism or cheating. While study groups and other collaborative behaviors are appropriate and very much encouraged, all work turned in for grading should only be that of the student, or, in the case of group projects, only that of the students working together on the project. Copying of homework or exam results or collaboration on an exam, or use of material such as notes, books, or the internet unless expressly allowed in exams, are examples of cheating and are expressly forbidden. Cheating can result in grade reductions and can result in loss of funding, removal from consideration for future funding opportunities, or dismissal from the program.

Respectful behavior toward other students and faculty. Sexual harassment, threats of violence, or other highly disruptive behaviors are not tolerated and can result in dismissal from the program. Details of the policies as well as procedures to be followed if there are claims of violations can be found here.

For an overview of student rights and responsibilities at the University of Michigan, see https://oscr.umich.edu/statement.

Academic Probation and Dismissal. Biostatistics students are primarily placed on academic probation for the following reasons: (1) overall GPA below 3.0 (3.3 if a funded student) or PhD candidates receiving an unsatisfactory grade in their candidacy course (BIO 995), and/or (2) unsatisfactory performance in a GSI or GSRA role, and/or (3) acts of professional misconduct. Students receiving funding retain their funding for the semester they are on probation. Students on academic probation will be notified by email with an attached letter from the Department Chair and/or advisor. After the probationary semester, the student's status will be reviewed by the student's advisor, the Graduate Program Director, and Associate Chair for Academic Affairs (or a third member of the faculty chosen by the Department Chair if two of these people are the same). If the student's academic performance and/or their GSRA/GSI/other work requirements has not improved to an acceptable level, they will be, with rare exceptions, dismissed from the program. Students placed on academic probation within two months of the end of the Winter semester, or during Spring/Summer terms, will not have their probationary semester start until the Fall Semester following; similarly students placed on probation within two months of the end of the Fall Semester will not have their probationary semester start until the Winter semester following. Students who obtain a leave of absence or withdraw from the program will not have such time count as a probation semester.

The student may request an appeal from dismissal. The Department Chair will convene a committee of three other faculty not involved in the original decision who will review the student's appeal. The committee may overturn the original decision or uphold it; if they uphold it, they will provide a detailed response to the student's appeal within 60 days of the appeal request.

Student Financial Support and Employment

Every year, the Department of Biostatistics faculty work hard to create as many funded positions as possible for departmental students. Fully-funded positions come with full payment of tuition, health insurance coverage, registration fees, and a monthly stipend; total cost for a faculty member to support an out-of-state student ranges from $65,000 to $90,000 per year. All students admitted to our PhD program receive full funding, and all students admitted to our MS and HDS MS programs are considered for financial support.

There are five types of financial support provided to our students: (1) Graduate Student Instructor (GSI), (2) Graduate Student Research Assistant (GSRA), (3) Training Grants and Fellowships, (4) Tuition Scholarships, and (5) Temporary-Hourly Employment. GSI, GSRA, training grant and fellowship positions are fully funded; tuition scholarships and temporary hourly employment are not.

Graduate Student Instructor (GSI). Graduate Student Instructors are appointed at 50% effort, which involves working twenty hours per week. GSI's are appointed to help with the instruction of Biostatistics courses, most often service courses offered to students from other School of Public Health departments, but also some courses for our own students. The duties of a GSI typically include preparing and teaching lab sessions, holding office hours, and grading homeworks and exams.

Graduate Student Research Assistant (GSRA). A full GSRA appointment is at 50% effort, which involves working twenty hours per week. GSRAs generally work closely with a faculty member who is a principal investigator or co-investigator on a research project. The duties of a GSRA can involve analysis of biomedical research data, statistical methods research, or both. Most GSRA appointments are full (50%), although partial GSRA appointments (e.g. 25% effort) occasionally are made with proportionate responsibilities and benefits, but still covering full tuition. A more detailed discussion of responsibilities and best practices for GSRAs and their faculty advisors can be found at the end of this document.

Training Grants and Fellowships. Some students are supported through training grants or fellowships. Training grants and fellowships may or may not require a specific work product, but typically do require participation in relevant coursework, research, and/or seminars. Currently the Department is home to two NIH-funded training grants, in Cancer Biostatistics and Genome Science (https://sph.umich.edu/csg/gstp.html).

Tuition Scholarships and Awards. Tuition scholarships are granted without a work obligation. These philanthropy-based awards are usually made on the basis of academic merit and expected contribution to the field and to promote diversity and inclusion by funding students who represent a broad array of life experiences and perspectives.

Temporary-Hourly Employment. Temporary-hourly positions pay an hourly wage, and usually provide research and/or teaching experience, but do not pay tuition or benefits. The Department hires graders and occasionally tutors for several biostatistics courses; hours vary week to week and are accrued on an as-needed basis according to demand during the semester. In addition, Department faculty occasionally seek students for temporary-hourly research positions; in filling such positions, faculty speak directly with students they know from class or other activities, and/or after reviewing student files, so it is useful for students interested in such funding to keep their files up to date (see below). The Department occasionally receives information from individuals outside the Department on temporary-hourly positions; information about these positions is shared with students by email. The number of students funded on temporary-hourly positions typically is small.

Other Employment. The U-M Student Employment Office website posts work-study and non-work-study jobs for which U-M students are eligible to apply. You can also set up your account on the SPH Jobs site "Career Connection" to alert you to relevant job and internship postings, both on and off campus. If you are interested in applying for Graduate Student Appointments outside the Department of Biostatistics, you should check the U-M Jobs website. These positions are highly competitive and there are not many available; we recommend you search early and apply to several positions if you are interested. There are a large number of research centers and initiatives at U-M SPH and across campus that hire students. You may wish to reach out to centers in your areas of interest directly to see if there is a good fit for employment.

Expectations for Fully-Funded Students

Fully-funded (full payment of tuition, health insurance coverage, registration fees, monthly stipend) Biostatistics graduate students are expected to commit full-time effort to their academic coursework, scientific research, and professional development. Fully-funded students may not seek additional employment in any position where regularly scheduled work commitments are expected beyond their GSRA, GSI, fellowship, or training grant commitments. Grading and tutoring are not considered regular employment but, if undertaken, should not interfere with the student's education and research and should only be undertaken with the prior approval of the GSI/GSRA/fellowship/training grant supervisor and academic advisor. Given that summer work is often required for GSRA appointees, students must receive permission from their GSRA advisor to take an internship. Fully-funded students are expected to maintain a grade average better than B+. Should the GPA drop below a 3.3 cumulative GPA, a probationary period of one semester will be given. See details given above under Academic Probation and Dismissal for more details.

Students with concerns about their GSRA, GSI, training grant, or fellowship position are encouraged to speak with their faculty supervisor and/or advisor about those concerns. If you are uncomfortable with speaking with your advisor, students may seek out another faculty member, Chidimma Ozor Commer, or another staff member with whom they are comfortable. In addition, these concerns can be included on the biweekly wellness check in surveys sent by Chidimma. Students may also use U-M conflict resolution resources, such as the Office of Student Conflict Resolution (OSCR, https://oscr.umich.edu/), Graduate Employees' Organization (GEO, https://www.geo3550.org/), and the Equity, Civil Rights, Title IX Office (ECRT, https://ecrt.umich.edu/).

Matching Fully-Funded Students to Positions

Students with a full funding commitment (full payment of tuition, health insurance coverage, registration fees, monthly stipend) from the Department are matched to positions using a centralized matching system. Newly admitted students who accept the Department's offer of admission and support in April are asked to complete a questionnaire in which they indicate their funding preferences. Continuing students to whom full funding is committed and for whom a new position may be needed are also asked to complete the questionnaire. Matching is then done through the Admissions Committee, taking into consideration faculty and student preferences, relevant coursework and experience, and other relevant student credentials in the departmental student file. Students should not reach out directly to individual Biostatistics or other faculty for GSRA funding requests outside of the centralized system.

Allocating Full Funding to Initially Unfunded Students

In some but not all years, after positions have been allocated to all students to whom full funding has been promised, additional fully-funded positions (GSI or GSRA, some for one semester, others longer term) may remain or become available. When this happens, often in late spring or summer but potentially at any time, unfunded Masters students with grade averages better than B+ (the minimum grade average for funded students) are informed that there may be positions available, and asked to fill out the matching questionnaire. Matching is done through the centralized matching system in the same fashion as for students with funding commitments; for students already in the Department, student performance in Department classes, involvement in Department activities, and previous interactions between faculty and students often are important in funding decisions. Students should not reach out directly to individual Biostatistics faculty for GSRA funding requests outside of the centralized system.

Students May Provide Additional Information for Funding Matches

To ensure fully informed consideration for any positions that become available, students will each semester be offered the opportunity to add materials to be provided to potential faculty funders beyond their original graduate school application and current Michigan transcript. These materials might include an updated cv/resume, a brief research statement, descriptions of additional research activities or job experiences, or any other documents the student thinks would be helpful.

Questions about the funding process may be directed to the Graduate Program Coordinator or the Admissions Committee Chair.

Financial Aid

Students who do not obtain funding or employment, or who need additional support beyond these sources, may apply for financial aid through the University of Michigan's Office of Financial Aid. This office requires applicants for any and all types of financial aid to complete the Free Application for Federal Student AID (FAFSA) provided by the American College Testing Center (ACTC). A FAFSA will be sent to you directly if you indicate your interest in financial assistance on the admission application form. FAFSAs are available from the School of Public Health Office for Student Engagement and Practice, and at www.fafsa.ed.gov.

Masters Student Opportunities for Research

There are multiple ways for MS students to get involved with research. Students may join STATCOM to work on applied statistical projects from non-profit governmental and community organizations with faculty serving an advisory role. Students may register for Biostat 610: Readings in Biostatistics, where faculty and students can decide on an individualized research plan for credit. Note that 610 can only be registered for 1 credit, is S/U and cannot be applied toward any degree requirements. Experiential learning opportunities are available via MIDAS. While GSRA positions are limited, many students find hourly positions within and outside of Biostatistics to work on short-term projects or may find a research position during the summer. Biostatistics faculty may send emails with available positions or positions may be searched for on SPH career links.

STATCOM

Statistics in the Community (STATCOM) is a student-led volunteer organization providing pro-bono (free) statistical consulting to government organizations, non-profit agencies, and other groups providing public health or related services. All biostatistics students are eligible to participate, and STATCOM teams with students from Statistics, Survey Methodology, and other departments, as well as with the Michigan Institute for Data Science (MIDAS), which provides office and meeting space on the 6th floor of Weisner Hall. STATCOM is a particularly useful way for masters' students who do not have a funded position to obtain applied research and consulting experience. Projects range from one-time consulting on, for example, data collection design, to larger projects that involve design, analysis, and reporting. STATCOM project scheduling is designed to work around classroom and employment demands. Students interested in participating in STATCOM should contact the STATCOM student leadership team, the faculty advisors (Jean Morrison, Cathie Spino, and Matt Zawistowski) or email statcom-um@umich.edu. Note these are applied projects where the goal is giving back to the community, not to engage in methodological research.

Student Participation in Departmental Committees

In response to the 2018 suggestions to build a better biostatistics department and increase transparency, we have added student members to many of the departmental committees. Each summer, a Biostatistics administrative staff member sends a Google form for students to express their interest in participating in departmental committees. The department chair, associate chairs, and administration does their best to assign students to one of their top choices. Each committee may have up to 4 or 5 students involved. If there is overwhelming interest, additional assignments may be made with priority to residential students and the incoming cohort. Expectations of student membership will vary by the committees, but generally include that the students are integral members who attend committee meetings, contribute to discussion, and may be tasked with additional responsibilities to carry out goals of the committee. Committee membership is for one academic year.

Computing Resources

The Department of Biostatistics has several computing options available to students.

The Biostatistics Student Computing Laboratory (BSCL) is located in room M4048A SPH II. This lab contains both Windows and Mac workstations as well as printing resources. This lab is exclusively available to Biostatistics graduate students (MS, HDS MS, and PhD) and students taking Biostatistics classes. The computers in this lab are maintained by SPH Instructional & Computing Services (sph.help@umich.edu) while the printers are maintained by the ITS MPrint team (4help@umich.edu).

Campus Computing Sites (https://its.umich.edu/computing/computers-software/campus-computing-sites) offer public-access workstations with university-licensed software across the UM-Ann Arbor campus. More than 2,000 Windows and Mac computers are located in 17 locations on Central Campus, 4 locations on North Campus, and in 100+ cyberstation locations in study lounges, dining areas, and collaboration and study spaces. All Campus Computing Sites (excluding cyber stations) have black and white laser printers, and several provide color or large format printing, scanners, and instructional and training materials.

The Biostatistics High-Performance Computing Cluster (The Cluster) is available for faculty, students and researchers in the Department of Biostatistics. Every Biostatistics student has an account and is eligible for 5000 hours of free computing each semester. Hours beyond this need authorization from an advisor. The cluster consists of 60 compute nodes with a total of 1092 physical CPU cores and ~7TB of memory. The cluster has a number of statistical software packages installed including: R, SAS, and Python. The cluster makes use of Slurm for workload management. More information about the cluster is available on the department website (https://sph.umich.edu/biostat/computing/cluster/index.html) or by email (sph-biostat-help@umich.edu).

Advanced Research Computing (ARC) provides a central HPC cluster environment for researchers at the University of Michigan and their collaborators. Access to this cluster, known as Great Lakes (https://arc.umich.edu/greatlakes/), requires authorization from an advisor. ARC also maintains several high-performance research storage options. For more details about the University cluster and storage options visit the ARC-TS website (https://arc.umich.edu/systems-services/).

Other Support Services

Biostatistics Student Association (BSA): The Biostatistics Student Association (BSA) is an organization for master's and doctoral students studying or interested in biostatistics at the School of Public Health at University of Michigan. BSA primarily organizes extracurricular activities, social events, and provides students the opportunity to get together in their leisure for events outside of academia. If interested in joining or learning more, email um.sph.bsa@umich.edu.

Diversity, Equity and Inclusion: Our Biostatistics Diversity, Equity and Inclusion (DEI) Committee was established in 2017 and is composed of students, staff and faculty, who create and host intercultural exchanges, discussions of DEI-related research topics, retreats and workshops. Our Biostatistics Student DEI Committee was formed by students in 2020, and is working to: incorporate datasets that highlight health inequities into the required applied analysis classes and increase students' exposure to health inequities and the history of inequities in Biostatistics. They host a DEI book club and journal club. School and University DEI efforts are described at SPH DEI and U-M DEI. For resources listed by identity groups, please see Campus Mind Works - For Those Who Identify As...

Disability/Academic Accommodations: Students needing special classroom or exam accommodation should inform faculty as early as possible in the semester. To receive accommodations for physical or mental health needs, you must first register with the university's Services for Students with Disabilities. Once you have completed this process, please provide your instructors with your VISA letter before, or during the first week of classes. If circumstances arise that require you

to register later during the semester, the department will make arrangements as quickly as possible but please note that some accommodations take longer to implement than others (e.g. scheduling live captioning during Zoom sessions or providing a separate testing location.) Faculty and staff will only share enough information to make arrangements, and only with the appropriate people. Details of your diagnosis or disability will be kept as private as possible.

Mental Health Resources: The School of Public Health has an "embedded" counselor from the Counseling and Psychological Services (CAPS) Program at the University. CAPS provides confidential, short-term counseling, support groups, mental wellness classes and online mental health resources. Students are encouraged to make use of CAPS services as needed - with or without speaking to the Wellness and Inclusion Advocate. In addition to contacting the embedded counselor directly, you may also contact the central CAPS office for urgent care or to choose a different therapist. Some CAPS therapists are multilingual. UHS also provides Mental Health Services including medication. Campus Mind Works offers tools, workshops and support groups.

Sexual and Gender-Based Misconduct Reporting and Resources: Sexual harassment is a form of discrimination based on one's perceived sex. Sexually harassing behaviors are classified into sexual coercion, unwanted sexual attention, and gender harassment. Anyone can be a target of sexually harassing behaviors and the impact is negative and damaging to the individual who is harassed, close communities and the broader institution in which the harassment takes place. In Biostatistics, we do not tolerate sexually harassing behaviors by students, staff or faculty. We value a diverse, inclusive and respectful environment in our department, the School of Public Health and at the University of Michigan. We ask for all members of the department to cultivate an environment of respect.

The university provides confidential and non-confidential resources in response to sexual misconduct. The Sexual Assault Prevention and Awareness Center (SAPAC), CAPS, UHS Sexual Assault Services and the Office of the Ombuds are all confidential resources. You may also make a crime report to the Division of Public Safety & Security and/or an informational report to the Equity, Civil Rights, Title IX Office (ECRT.) ECRT is responsible to investigate and report on issues of discrimination, which includes sexual and gender-based misconduct under Title IX. If you disclose misconduct to a university employee (including the Wellness and Inclusion Advocate) who is not designated as a confidential resource, they will be required to file an informational report with ECRT that includes your name and information you shared. This does not obligate you to take any action, and names are not included in public reports, but ECRT would contact you to offer resources. In situations where appropriate, ECRT may refer students to the university's Mediation Services.

Study Aids: Selected previous exams from MS and PhD core courses (601, 602, 650, 651, 653, 801, and 802) are available on Google Drive. Contact the Graduate Program Coordinator to obtain access if the link does not work, but first make sure you are logged into your umich account (i.e. not a personal google account).

Wellness Resources: The Department of Biostatistics (shared with the Department of Epidemiology) has a Wellness and Inclusion Advocate whose role is to work with students facing challenges in stress and work-life balance, problems with home or family life, or difficulties dealing with the program or other aspects of graduate student life that the student has not been able to resolve with assistance from the academic advisor, or would prefer not to discuss with the advisor. Students are strongly encouraged to make use of the Advocate to sort out issues as early as possible to preserve or improve their quality of life while in the program. The University also provides many other wellness resources. For more information, click on the wellness icon on your canvas account or visit University Health Service Wolverine Wellness. In addition, visit this Google spreadsheet for many SPH and U-M student resources including support and resources for academics, finances, parenting, wellness, and food. Another resource for wellness is the Continuum of Care spreadsheet.

Writing Lab: Learning to write well is a key part of a successful statistician's "toolbox". The School of Public Health maintains a Writing Lab at 3226 SPH II for all graduate students. The Lab provides support for drafting proposals, writing dissertations, responding to advisors and professors, and preparing manuscripts. Services are provided on both a drop-in and appointment basis. The Sweetland Center for Writing is another writing resource for students and provides similar services for all students on campus.

Facilities and Amenities

School of Public Health. Health insurance (GradCare) and dental insurance (option 1) is provided to GSRA and GSIs. Unfunded international students are required to purchase U-M International Student/Scholar Health Insurance (IHI) (https://internationalcenter.umich.edu/resources/healthins). Unfunded domestic students can purchase health insurance through Domestic Student Health Insurance Plan Health (https://uhs.umich.edu/dship).

The School of Public Health buildings are open from 7:00 am-6:00 pm. You will need to use your MCard to access at other times.

The front office personnel are the key operators for the copy machines. They can help with assigning copy codes, training, and when problems arise with the machines.

The Department and the School have mandatory student email groups where policies, procedures, events and important information will be shared. You are responsible for receiving and acting upon any information included in emails to sph.students@umich.edu and sph.bio.students@umich.edu Each Biostatistics student is given a mail folder which is located in the Biostatistics Copy Room (M4311). While the majority of important student information is now electronic, you may still receive items in your mail folder such as returned assignments so we recommend you check it periodically.

Funded students are provided a workspace. Study Carrels are open on the 4th floor of SPH II and available for reservation during the Fall and Winter semesters. See the Graduate Program Coordinator for more details.

A refrigerator and microwave are provided for shared use in our kitchenette. Please be sure to wipe up any spills in the microwaves and clean things out of the refrigerator in a timely manner. Do not put anything other than water down the sink drains. You are welcome to enjoy your lunch in these areas as well, please clean up after yourself. Also keep in mind that offices are across the hall from the common room. Please keep it fairly quiet since people are working.

There are several gender inclusive restrooms located within the School of Public Health: SPH I: Basement Room B857T; SPH II: Floor 2 Room 2237T and Floor 3 Room 3237.

The Department of Biostatistics maintains lactation space in M4239 A. The School of Public Health has two lactation rooms, 2759 SPH I and 6023 SPH II. To gain access, contact SPH facilities.

Room M2025 (located in the SPH II hallway that connects with SPH I) is designated as a 'Reflection Room' for the School. This space can be used for prayer, meditation, or private reflection any time throughout the day.

To reserve conference rooms 4034 and 4117, please see the front office personnel. Rooms throughout the School can be requested/reserved using the SPH intranet "The Heights" here.

University of Michigan. Your M-Card is your student ID and gives you access to the library system, recreation facilities, student priced tickets for University Musical Society and theatrical events, etc. M-Cards are issued at student orientation and are good for 5 years; replacements or renewals can be obtained at 1011 Student Services Building (SSB) or at other sites on campus.

There is limited parking available on the U-M campus. U-M Parking and Transportation Services has information at ltp.umich.edu/parking/ about student parking options. We strongly encourage you to walk, bike, or take public transportation to SPH during the week. The parking lot on Washington Heights is open for non-permit holders on evenings and weekends. In addition to the Ann Arbor bus system (see below), the University of Michigan runs an extensive bus services (the "blue buses") throughout North, Central, and South Campus, as well as to graduate student housing; see https://ltp.umich.edu/transit/routes.php for more details.

The University provides a number of resources for graduate students with children or other family dependents. These include parental accommodation allowing students to maintain full-time status immediately after the birth or adoption of a child; leave of absence for urgent family necessities or dependent care; subsidies for the child care; and the "Family Helpers" program that connects members of the U-M community who want to offer occasional/short-term/part-time services with members of the U-M community in need of assistance. A full list of resources is available at rackham.umich.edu/rackham-life/grad-students-with-children.

The University has a number of artistic and musical performance venues. The University Music Society offers discounted tickets to University of Michigan students: see https://ums.org/season/tickets/student-tickets/.

Ann Arbor. Ann Arbor has an excellent public bus system for a US city of its size (Ann Arbor Area Transportation Authority), although weekend service is limited relative to weekday service. Details of the system are available at www.theride.org. Your M-card can be used to ride all AATA buses for free.

International Students

If you have questions about visas, work permits, and other general questions about life in Ann Arbor, you can visit the International Center. The International Center also hosts various cultural and social events and workshops throughout the year.

The English Language Institute offers a full range of courses and other types of language and academic support for international graduate students.

For additional writing support you may also wish to seek assistance at the School of Public Health Writing Lab or the Sweetland Center for Writing.

If needed, international students may purchase health insurance via the International Center. Information can be found here.

Vacation and Travel

PhD students are expected to work and study during all terms including Spring/Summer. In addition to regular University of Michigan holidays and season days, students employed as GSRAs are expected to get a minimum of 10 business days of vacation per year. All GSRA vacations need to be approved by the advisor.

If traveling abroad for study, conferences, or personal reasons, please be sure to review the U-M international travel policy. This policy can be found on the Human Resources website and includes information about the U-M Travel Registry, U-M resources, and additional optional insurance. For details, go to hr.umich.edu/benefits-wellness/benefits-enrollment/changing-your-benefits/life-events/international-travel.

For international students traveling outside the US, please speak with the International Center to discuss timeframe and potential obstacles (e.g., visa approval). Students, especially if still needing required classes, should be aware that special processing now is common and often takes up to 2 months. If international students are unable to return due to administrative issues (e.g., visa delays), an unpaid leave may be required depending on the duration of the absence.

Off-campus work needs to be agreed upon with the faculty advisor prior to departure. A written statement of work expectations is required and must be filed with the Biostatistics Graduate Office. Please fill out the following work agreement with the necessary information and signatures. The request should be emailed to Nicole Fenech (fenechn@umich.edu) and will be sent to the Associate Chair for Academic Affairs for review. If grant funding is involved, the request will also be reviewed by an account manager to determine funding requirements while abroad.

Graduate Student Research Assistants: Responsibilities and Best Practices

Overview. The opportunity to work as a Graduate Student Research Assistant (GSRA) is one of many important strengths of our department. The department can provide this opportunity because our faculty have been successful at obtaining grant funding as principal investigators and in convincing research collaborators that co-mentoring our Biostatistics graduate students is rewarding and worth the substantial cost of stipend and tuition owing to the knowledge, creativity, and work ethic of our students. Continued GSRA support for present and future students requires that students perform well as GSRAs, so that department faculty and our collaborators continue to obtain and renew these positions. It is equally important for GSRAs to perform well in coursework:in fact, satisfactory progress towards degree requirements and a grade average of better than B+ are required for a student to remain eligible for a GSRA position.

This document is intended to help students and their faculty advisors navigate the dual roles of graduate student and GSRA by providing guidance for best GSRA practices. However, please note that each GSRA position comes with its own requirements and expectations. Early and frequent communication between the supervisor and the GSRA is vital to achieve a productive working relationship.

Hours of Employment. GSRA appointments within the Department are at 50% effort, requiring 20 hours of work per week. Some GSRA positions require this 20 hours per week to be consistent across the semester. More commonly, hours are more flexible. Somewhat more hours might be expected by the supervisor during key weeks with abstract and grant deadlines, while lighter hours might be requested by the student during exam weeks or other busy times. GSRAs and their faculty supervisor should discuss this issue at the beginning of their time working together. Communicating about deadlines/timelines of importance to both the supervisor and the GSRA can help with managing priorities and keeping work expectations both reasonable and productive.

Spring and summer months (May to August) are typically the most productive time for a GSRA while also being less costly for the supervisor, as no tuition is charged in that time period. Therefore, even though students are not guaranteed funding in the summer, GSRAs are generally expected to work throughout the year. GSRAs are guaranteed a minimum of 10 business days of vacation per year; always check with your supervisor(s) before scheduling vacations/time off. Many supervisors are flexible about time away, particularly if work meetings for pressing deadlines can be held via conference call or video conferencing during time away. Summer internships or other extended absences that interrupt GSRA work typically are not allowed, although this is again something that can be discussed with your GSRA supervisor. Expectations about vacations and summer internships are again topics that should be discussed during the first GSRA/supervisor meeting so that you and your supervisor can plan accordingly.

General Expectations. GSRAs are expected to conduct themselves professionally as a member of the research team and to proactively work to advance the research project(s). This includes working to understand the broad goals and activities of the project and their own specific task(s). The GSRA is not expected to succeed at their task without help, but they are expected to identify barriers to progress and proactively seek help to address those barriers.

Onboarding. Becoming a useful part of the research team as quickly as possible is important. Upon learning about the GSRA appointment, the student should schedule a meeting with the primary supervisor to learn about the upcoming work and discuss the structure of the working relationships. Here is a (non-exhaustive) list of strategies that can help you to get up to speed as fast as possible:

- Information overload is typical during the first stage of a GSRA appointment. Prioritize information that allows

you to get going with your work; many details will become clearer once you get started on your data analysis or methods problem. Ask for help to prioritize your learning.

- Make sure you understand the computer environment used for the project. You may need to download new software or even familiarize yourself with a new programming language. Identify resources that help you get started.
- Your goal should be to try some analyses early on and present some preliminary results as soon as possible. These initial results will typically not be perfect but instead be the start of an iterative process that will lead to final results and help you understand key aspects of the project.
- Ask about available resources for understanding your project. Often, there will be a set of papers that provides the foundation of your project. You should continue to deepen your mastery of the biological/medical aspects and the statistical aspects of the project throughout your employment.
- If the research topic or an analysis method is new to you, ask for reference materials to get up to speed. Ask if a previous GSRA has worked with the topic/dataset/method before and might be willing to mentor during the early stages of a project.
- Current or previous GSRAs working for the same supervisor should be willing to help with advice, code, and encouragement. These GSRAs have useful experience with the study team, may have worked with some of the same datasets, and may have experience with standard or non-standard analysis methods favored by the supervisor.
- Some supervisors maintain a cloud folder (e.g. Dropbox or Google Drive) with SAS, R, or other relevant code written by GSRAs for previous projects and/or reading material that can be helpful in getting oriented to the job. Soon, you should be contributing well commented code and examples of how to do new analysis techniques to the repository of information available to current and future GSRAs, staff, and faculty.
- Following a meeting while you are new to a project can be challenging. Ask if it is okay to record meetings so that you can review your notes at a later time. Take snapshots of handwritten notes for reference and for sharing with the group, as appropriate.
- If you are working on a project with an external collaborator, it may be useful to establish some initial protocols for communication between you, your advisor, and the collaborator. In particular, you want to achieve clarity whether collaborators typically contact you directly with requests, or whether such requests go through your advisor. Similarly, you may want to establish whether you should communicate results directly to the collaborator or whether they should be assessed by your advisor first.

Meetings. Regular meetings constitute a necessary time investment by the GSRA and supervisor and their collaborators, if any. If necessary, set up a regularly scheduled meeting that fits with everyone's schedule and send an invitation to other team member calendars (if this is not done by someone else on the team). Here are some steps to maximize the utility of this time investment.

- Prepare well for each meeting, be on time, listen carefully, and ask questions. During meetings, you will likely be asked to report on your progress since the last meeting. Bring your laptop to each meeting and be prepared to share your screen with the research team. Slides are often a good means of describing the work done.
- The art of clearly communicating statistical ideas to a non-statistically minded collaborator can be challenging and is an important skill to develop. Don't be frustrated when you are having a hard time making yourself understood. Take note of the approaches used when individuals with different skill sets communicate successfully, for example, when a mentor teaches a collaborator how to interpret results of analyses or explains why one analysis is preferred to another.
- When describing your work, it is often useful to briefly indicate how much time you invested. This allows your advisor to make sure you are not overburdened and may also help them identify inefficiencies with your approach.
- During meetings, you will often be given new tasks. Try to make sure you understand the requested tasks. If

specifics of the task are unclear, ask during the meeting or follow-up afterwards to get the necessary information. During brainstorming meetings, many potential ideas may be suggested. Be sure to review action items before the meeting ends and clarify 'nice to have' and 'must have' tasks and their deadlines.

- If a regular meeting time cannot be found, always try to set the time for the next meeting before the meeting ends. Meetings can occasionally be rescheduled if the GSRA or supervisor is unavoidably not prepared, but this should not occur often.
- Even if the current project appears finished, consider setting a time for brainstorming about the next project to help keep things moving forward with the research team.

Data Handling. Many GSRA positions will involve the analysis of biomedical data. Such data are reliably less organized and more complex than expected, often creating complications during the analysis. Strategies to minimize these complications include:

- Never assume the dataset provided is without errors. Check for missing values, unrealistic data values, inconsistencies in dates, etc. When you come across data values with apparent problems, note the subject IDs that have issues. Often the person who provided the data can go to the original data source for clarification and correction of data quality issues.
- If merging data from multiple sources to produce the analysis data set, keep all original datasets together in the same place. Save a copy of the merged dataset along with code that produced it.
- Appropriately guard confidential data. THIS IS EXTREMELY IMPORTANT. Understand ownership and restrictions of the data you are analyzing. Do not share the data with others without the explicit permission of the owners. Do not submit abstracts or make presentations based on the data without making sure all data owners have seen and agreed to your abstract or presentation materials. Make sure your accounts containing such data are secured with strong passwords.

Programming/Computational Analysis. Much of your GSRA work will be based on computer programs created by you or others. Efficiency can be gained for you and your team members by following some basic concepts:

- Organize and comment your code with future programmers in mind. It is the GSRA's responsibility to produce and pass on a well commented version of code/data/analyses used in submitted/published manuscripts. Use interpretable variable names, for instance, 'female' is better than 'gender'. Indicate units clearly, for instance, 'height_ft' is better than height.
- If possible, organize code in a format that allows for easy editing. Thus, if your supervisor requests additional tweaks during a meeting you may be able to run the code from your laptop prior to the meeting. For instance, GSRAs should be able to run additional regression models by copying and pasting an existing model and editing in new variable names the supervisor wishes to explore. GSRAs in early stages of research are not typically expected to program 'live' in meetings, but with further experience this skill is extremely valuable in moving projects forward to publication. Coding alongside your mentor in live meetings can be a terrific opportunity to grow as a programmer and research collaborator. Always verify code that was programmed 'live' in meetings to make sure any data quality or coding errors are caught prior to moving forward with the project.
- If your work makes use of a sequence of existing programs, create a script that runs this sequence. This will make it faster for you to re-run an analysis and by saving the script you will more easily be able to remember how the analysis was done.
- As the project progresses, archive old code and create new scripts that correspond to the most current version of the project/manuscript draft. At the time of either manuscript or revision submission, the dataset used to produce tables, figures, etc. cited in the manuscript should be frozen with no further updates made so that results cited in the manuscript can be reproduced at any time. Code should be organized and commented according to the order the results are given in the final version of the paper. For instance, 'code for Table 1', followed by the

corresponding R or SAS code. Well-commented coding will make it easier for future GSRAs to orient themselves to the research team and verify their own code is working correctly.

- When using computational resources such as the Biostatistics or Center for Statistical Genetics cluster, be respectful of other users. Make sure that you understand how to submit jobs and learn how to use computational resources effectively. Consider which results you save to disk, as filling up the cluster's hard disk will make the cluster inaccessible for everyone. Before running a computationally challenging job on e.g. the whole genome, analyze only a subset (e.g. chromosome 20) to make sure your scripts work as expected. If possible, test new software on a desktop before running it on a cluster.

Scientific Communication in Writing. An important aspect of research is the ability to disseminate research results to a wider audience. As a GSRA, you may be asked to draft (segments of) a paper that describe your work and to create publication-ready figures of your results. For both non-native and native speakers, improving English communication skills has short- and long-term benefits that are worth the additional effort that may be required. International students should take advantage of opportunities to speak with and listen to English when possible, and ask other international students on campus for advice/resources for improving English language skills.

For all GRSAs, here is a list of approaches on how to work on your writing skills:

- Read through previously published papers by the group for examples of good writing, especially well-written statistical Methods and Results sections.
- Be proactive in producing sentences, paragraphs, or sections that might be included in early manuscript drafts. Leverage the resources provided by the U of M for improving your writing, including the SPH Writing Lab and Sweetland Writing Center. Be prepared to take on the drafting of a paper should the opportunity arise.

Creating publishable figures often requires plotting the same data in multiple different ways to identify the display that best supports the claims of the publication. During the early stages of a project, it is typically acceptable to show drafts of tables and figures as opposed to highly polished tables and figures. However, as the final figures and analyses are identified for a manuscript, it is important for the GSRA to produce publication quality tables and figures. After you have settled on the type of display item you are creating consider the following aspects:

- Tables and figures should not include variable names used in code, but the appropriate label. For instance, 'height_ft' should be replaced with 'Height (feet)'.
- Always make sure that units are displayed and that reference groups are clearly identified (as appropriate). It may be necessary to change units to a more interpretable scale when reporting parameter estimates (years typically better than days, for instance).
- Make sure that font sizes used in tables and figures are large enough to be legible when reduced in size for a publication.
- Double-check whether figures will appear in color or in black and white in the published manuscript. Legends and line types used in figures should be interpretable if converted from color to black and white.
- Cross-reference numbers cited in the main text with numbers shown in tables and figures to make sure these match one another and are based on the most up-to-date version of analyses.
- Look for obvious typos/inconsistencies. Do numbers displayed in tables add up correctly to the total number of subjects in the manuscript? Is a consort diagram needed to describe why sample sizes are different between analyses? Are displayed confidence intervals consistent with the significance of p-values shown in tables or cited within the manuscript?

Do not regard this list as a completely thorough reference for writing. Please consult your advisor for additional advice. Reporting a Problem With Your GSRA Position. Although most GSRAs in our department have positive experiences working with and learning from their faculty supervisor(s), issues sometimes do arise. Examples include: overwork,

unclear expectations for work or time off, dissatisfaction with work topic, personality or other sort of mismatch with supervisor, and discrimination, harassment, or emotional/verbal abuse. When these problems occur, if possible GSRAs should attempt to resolve them by speaking with their supervisor directly as a first step. Problems can often be resolved through an open conversation. However, if the direct approach fails, or if the problem is so severe that one-on-one negotiation is impossible (e.g. harassment or abuse), GSRAs have several options to try and improve their situation. Students can meet with a faculty or staff member they trust to try and resolve the situation. If they do not feel comfortable doing so, they can also use U-M conflict resolution resources, such as the Office of Student Conflict Resolution (OSCR, https://oscr.umich.edu/), Graduate Employees' Organization (GEO, https://www.geo3550.org/), and the Equity, Civil Rights, and Title IX Office (ECRT, https://ecrt.umich.edu/). Please note that GEO does not directly support GSRA grievances, but they will provide resources and advocate for you in the department. Students may also request a meeting with the Biostatistics Student Conflict Resolution Committee (BSCRC) to discuss their problem and future steps.
As in any workplace, you should expect your supervisor to treat you with respect and courtesy, and you should do the same to them. Although you may do so if you wish, you are not expected to communicate with your supervisor by text, frequently attend weekend or evening meetings, or comply with last-minute requests issued during non-business hours. For more information on the guidelines for graduate students to report discrimination and/or harassment, please refer to the website from Rackham Graduate School: https://rackham.umich.edu/rackham-life/discrimination-and-harassment/. Please note that if you report sexual harassment through the form given above, the recipient of the report is required by University of Michigan policy to report the claim to the Equity, Civil Rights, Title IX Office (ECRT), so that for reports of sexual harassment, confidentiality WILL NOT be guaranteed.

Appendix: Resources and Forms

Accessible from The Heights Student Resources

Department Resources

Master of Science Course Planner app
Biostatistics GSRAs – Responsibilities and Best Practices
Biostatistics Department Directory

Forms for Current Biostatistics Students

Mandatory Form for Scheduling a Proposal or Defense
Candidacy Requirements (PDF): Used to indicate completion of candidacy requirements and candidacy approval.
Dissertation Committee (PDF): Used to designate dissertation committee members.
Biostatistics Course Waiver Request Form
Readmission/Change in status/Dual degree application: Form used to reapply to U-M if a previous degree was earned here, to change program status, or to apply for a dual-degree.
Transfer of credit: Document used to provide transfer of credit information.
Rackham: Other printable forms and procedures.
Mentoring Plan for PhD Students (PDF)
Mentoring Plan for MS Students, Unfunded (PDF)
Mentoring Plan for MS Students, Funded (PDF)
Dissertation Proposal Guide (PDF)
Proposal Feedback Form (PDF)

DEPARTMENT LEADERSHIP

BHRAMAR MUKHERJEE
DEPARTMENT CHAIR

M4208 SPH II / 764-6544 / bhramar@umich.edu

KELLEY KIDWELL
ASSOCIATE DEPARTMENT CHAIR FOR ACADEMIC AFFAIRS

M4146 SPH II / 764-6724 / kidwell@umich.edu

LU WANG
ASSOCIATE DEPARTMENT CHAIR FOR RESEARCH

M4132 SPH II / 647-6935 / luwang@umich.edu

TRIVELLORE RAGHUNATHAN
DIVERSITY, EQUITY & INCLUSION CHAIR

M4073 SPH II / 647-4619 / teraghu@umich.edu

ADMINISTRATIVE STAFF

DAN BARKER
UNIX SYSTEMS ADMIN SENIOR

M4017 SPH II
danbarke@umich.edu

- Advise and assist with departmental research computing
- Administer departmental computing cluster
- User onboarding, training, and support
- Software and hardware installation and upgrades
- Assist SPH users with campus research resources including Great Lakes, Armis 2, Turbo, and Data Den

CHRISSY DOBSKI
RESEARCH ADMIN INTER

M4240 SPH II
936-9813 / cdobski@umich.edu

- Provide guidance and counsel for stewardship of sponsored funding
- Assist faculty with carryover requests, no cost extensions, grant transfers, and relinquishment
- Prepare hardship requests and budgets
- Coordinate effort changes between projects/ shortcodes
- Send faculty updated reports
- Assist faculty with pre-award applications

NICOLE FENECH
ACADEMIC PROGRAM MANAGER

M4226 SPH II
615-9817 / fenechn@umich.edu

- Oversees daily operations of student services team
- Recruitment and Admissions
- Student communications, administration, database management
- Prospective and current student event programing
- PhD program requirements
- Course scheduling
- Student advising
- MS/MPH degree audits as needed

DEB HAAS
Executive Secretary

M4011 SPH II
764-6544 / debhaas@umich.edu

- Maintain Chair's calendar
- Monthly faculty meeting agenda
- Annual faculty retreat
- Annual promotion party
- Prepare faculty promotional review packages
- Faculty search advertising, application, interviews
- International processing for department staff, faculty and visitors

ADMINISTRATIVE STAFF (CONTINUED)

LACEY HOFFMAN
Professional Development and Career Navigator

M4023 SPH II
lahoffma@umich.edu

- Career Opportunities
- Cover Letter and Resume Review
- Navigating Career Challenges
- Professional Development
- Student events
- Student services support

DAWN KEENE
RESEARCH ADMIN SENIOR

M4240 SPH II
647-3944 / dhke@umich.edu

- Provide guidance and counsel for stewardship of sponsored funding
- Assist faculty with carryover requests, no cost extensions, grant transfers, and relinquishment
- Prepare hardship requests and budgets
- Coordinate effort changes between projects/ shortcodes
- Send faculty updated reports
- Assist faculty with pre-award applications

MIKE KLEINSASSER
App Programmer/Analyst Inter

M4017 SPH II
615-0089 / mkleinsa@umich.edu

- Creates R packages
- Shares R packages and code on CRAN and Github
- Maintain departmentally developed R packages
- Maintain website which catalogues software developed by department
- Consult students, faculty, and staff on all things R related
- Optimize R code

DAVE KUBACKI
Business Administrator Lead

M4232 SPH II
647-9979 / dkubacki@umich.edu

- Administrative staff support and oversight
- Department financial support and oversight
- Department human resources and faculty support
- Department Policy, Process and Procedures
- Internal controls
- Faculty incentive programs

ADMINISTRATIVE STAFF (CONTINUED)

MANDI LARSON
Administrative Assistant Sr

M4210A SPH II
764-5450 / larsoama@umich.edu

- General admin support for biostat faculty
- Assist faculty with reimbursement requests and Concur reports
- Department event planning
- Manage room reservations
- Coordinate department seminars
- Update technical papers website
- Faculty merit reviews - input information
- Computer/software and supply ordering

WENDY MASHBURN
RESEARCH ADMIN SENIOR

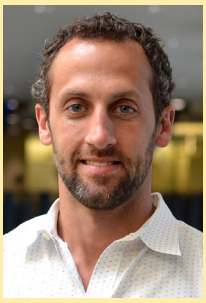
M4240 SPH II
647-1018 / wmashbur@umich.edu

- Provide guidance and counsel for stewardship of sponsored funding
- Assist faculty with carryover requests, no cost extensions, grant transfers, and relinquishment
- Prepare hardship requests and budgets
- Coordinate effort changes between projects/ shortcodes
- Send faculty updated reports
- Assist faculty with pre-award applications

HOLLY MCCAMANT
RESEARCH ADMIN SENIOR

M4234 SPH II
936-2662 / mccamanh@umich.edu

- Provide guidance and counsel for stewardship of sponsored funding
- Assist faculty with carryover requests, no cost extensions, grant transfers, and relinquishment
- Prepare hardship requests and budgets
- Coordinate effort changes between projects/ shortcodes
- Send faculty updated reports
- Assist faculty with pre-award applications

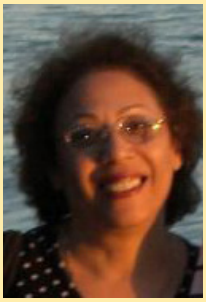


TREVIN MCCUNE
RESEARCH ADMIN LEAD

M4242 SPH II
trevmccu@umich.edu

- Provide guidance and counsel for stewardship of sponsored funding
- Assist faculty with carryover requests, no cost extensions, grant transfers, and relinquishment
- Prepare hardship requests and budgets
- Coordinate effort changes between projects/ shortcodes
- Send faculty updated reports
- Assist faculty with pre-award applications

ADMINISTRATIVE STAFF (CONTINUED)



FATMA NEDJARI
Graduate Program Coordinator

M4224 SPH II
615-9812 / fned@umich.edu

- Coordinate and process admissions to MS and HDS programs
- Recruitment and Admission
- Training grants students appointments
- Advise current students
- MS and HDS degree audits
- Prepare requested letters for students I-20, CPT, OPT
- Alumni events planning

SABRINA OLSSON
Administrative Services Manager

M4218 SPH II
936-7980 / siclayto@umich.edu

- Manage hiring and onboarding for faculty, staff, and postdocs
- Provide guidance for work breaks and leaves of absence
- Maintain and update department HR appointments
- Oversee departmental accounts

CHIDIMMA OZOR COMMER
Wellness & Inclusion Advocate

M4317A SPH II
764-0566 / cozor@umich.edu

- Provide support for students experiencing challenges with workload, work-life balance, and social isolation; provide students with coping skills and connection to university-wide resources
- Organize and lead activities and events that promote cultural integration and wellness
- Participate and provide support for DEI efforts, including committee service and facilitation of DEI or cultural events

KYLE TERWILLEGAR
Communications Specialist

M4210B SPH II
763-2322 / kterwill@umich.edu

- Develop marketing materials and communications for outreach, recruitment, and Department events/ programs
- Advise Department on long-term marketing strategies, including gathering data analytics do develop future campaigns and timelines.
- Develop and manage Departmental websites
- Provide marketing & Communications and alumni support