

# BIOMETRY, M.S.

**Admissions to the Biometry M.S. have been suspended as of fall 2021 and will be discontinued as of fall 2023. If you have any questions, please contact the department.**

Biometry is the development and application of statistical methods to biological problems. At the University of Wisconsin, biometry refers to this application to problems from plant, animal and agricultural biology. (Biostatistics denotes this application to human biology.) The biometry program is an M.S. degree program in the field of biometry.

The program is interdisciplinary, providing formal course work in statistics and biology, consulting experience, and supervised research combining the two areas. Students completing the program will understand biological processes and have the ability to apply and extend a broad range of statistical concepts and techniques to biological problems. This integration of statistics and biology is the distinguishing feature of the program. The biometry program is distinct from the M.S. statistics program in its interdisciplinary emphasis and corresponding reduced depth in statistics. (Students interested in training with statistical consulting as the primary focus should apply for the M.S. in statistics through the statistics department.)

The biometry program is intended for two groups of students:

1. students simultaneously working toward or intending to work toward a Ph.D. in a biological discipline and
2. non-Ph.D. students.

Students who complete the M.S. in Biometry and the Ph.D. in a biological science should be at the forefront of quantitative biological research. Students who stop with the M.S. in Biometry, possibly obtaining another M.S. in a biological science concurrently, will be well suited for positions with industry or government focused on quantitative biological research.

## ADMISSIONS

**Admissions to the Biometry M.S. have been suspended as of fall 2021 and will be discontinued as of fall 2023. If you have any questions, please contact the department.**

Please consult the table below for key information about this degree program's admissions requirements. The program may have more detailed admissions requirements, which can be found below the table or on the program's website.

Graduate admissions is a two-step process between academic programs and the Graduate School. **Applicants must meet** the minimum requirements (<https://grad.wisc.edu/apply/requirements/>) **of the Graduate School as well as the program(s)**. Once you have researched the graduate program(s) you are interested in, apply online (<https://grad.wisc.edu/apply/>).

Requirements	Detail
Fall Deadline	March 15
Spring Deadline	November 1
Summer Deadline	The program does not admit in the summer.

GRE (Graduate Record Examinations)	Required.
English Proficiency Test	Every applicant whose native language is not English or whose undergraduate instruction was not in English must provide an English proficiency test score and meet the Graduate School minimum requirements ( <a href="https://grad.wisc.edu/apply/requirements/#english-proficiency">https://grad.wisc.edu/apply/requirements/#english-proficiency</a> ).
Other Test(s) (e.g., GMAT, MCAT)	n/a
Letters of Recommendation Required	3

Prospective students may apply for admission to the biometry program without application to any other program. Prospective students may also apply simultaneously with application to another program or after admission into another program. It is anticipated that most students enrolled in the biometry program will be enrolled concurrently in another program.

Acceptance of a prospective student by a statistical and biological co-advisor, who should be identified at the time of application, is necessary for admission into the Program and input from prospective co-advisors will be sought in the admissions process. It is expected that most students will be supported through a biological department or program or with their own funds. Opportunity for financial support through the program is extremely limited.

Applicants to the M.S. program should have completed the following prerequisites:

1. undergraduate calculus (MATH 221 Calculus and Analytic Geometry 1, MATH 222 Calculus and Analytic Geometry 2, and MATH 234 Calculus–Functions of Several Variables or equivalent);
2. a course in statistics (HORT/F&W ECOL/STAT 571 Statistical Methods for Bioscience I and STAT/F&W ECOL/HORT 572 Statistical Methods for Bioscience II or equivalent one year sequence);
3. background courses in biology (e.g., BOTANY/BIOLOGY 130 General Botany, ZOOLOGY/BIOLOGY 101 Animal Biology & ZOOLOGY/BIOLOGY 102 Animal Biology Laboratory, BIOLOGY/BOTANY/ZOOLOGY 151 Introductory Biology & BIOLOGY/BOTANY/ZOOLOGY 152 Introductory Biology).

The background courses in biology are a bare minimum; it is anticipated that almost all successful applicants will have a strong background in some area of biological science. Under extenuating circumstances, students may appeal to the Biometry Executive Committee for exemptions to prerequisites or requirements.

## FUNDING

### GRADUATE SCHOOL RESOURCES

Resources to help you afford graduate study might include assistantships, fellowships, traineeships, and financial aid. Further funding information (<https://grad.wisc.edu/funding/>) is available from the Graduate School. Be sure to check with your program for individual policies and restrictions related to funding.

## REQUIREMENTS

### MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum academic progress and degree requirements (<http://guide.wisc.edu/graduate/#policiesandrequirements>), in addition to the program requirements listed below.

### MAJOR REQUIREMENTS

#### MODE OF INSTRUCTION

Face to Face	Evening/ Weekend	Online	Hybrid	Accelerated
Yes	No	No	No	No

#### Mode of Instruction Definitions

**Accelerated:** Accelerated programs are offered at a fast pace that condenses the time to completion. Students are able to complete a program with minimal disruptions to careers and other commitments.

**Evening/Weekend:** Courses meet on the UW–Madison campus only in evenings and/or on weekends to accommodate typical business schedules. Students have the advantages of face-to-face courses with the flexibility to keep work and other life commitments.

**Face-to-Face:** Courses typically meet during weekdays on the UW–Madison Campus.

**Hybrid:** These programs combine face-to-face and online learning formats. Contact the program for more specific information.

**Online:** These programs are offered 100% online. Some programs may require an on-campus orientation or residency experience, but the courses will be facilitated in an online format.

### CURRICULAR REQUIREMENTS

#### Requirements Detail

Minimum Credit Requirement	30 credits
Minimum Residence Credit Requirement	16 credits
Minimum Graduate Coursework Requirement	At least half of degree coursework (15 credits out of 30 total credits) must be completed in statistics courses numbered 600 or above (which the statistics department considers to be graduate courses).
Overall Graduate GPA Requirement	3.00 GPA required.
Other Grade Requirements	A grade of B or better must be received in any course used to fulfill the required and elective course requirements.
Assessments and Examinations	Candidates must complete a project with an emphasis on the integration of statistics and science. A final oral examination is also required upon completion of the coursework and project.

Language Requirements No language requirements.

### REQUIRED COURSES

Code	Title	Credits
<b>Required Coursework</b>		
<i>Intro Math Stat, completed using one of the following sequences:</i>		6
STAT/MATH 309 & STAT/MATH 310	Introduction to Probability and Mathematical Statistics I and Introduction to Probability and Mathematical Statistics II	
STAT 311 & STAT 312	Introduction to Theory and Methods of Mathematical Statistics I and Introduction to Theory and Methods of Mathematical Statistics II	
Or equivalent one-year sequence		
<i>Statistics 600+</i>		6
Students choose graduate-level courses numbered above 600. <sup>1</sup>		
<i>Statistics 500+</i>		3
Students choose graduate-level courses numbered above 500. <sup>2</sup>		
<i>Biological</i> <sup>3</sup>		9
<i>Consulting Experience</i>		
STAT 699 Research <sup>5</sup>	Directed Study <sup>4</sup>	3
		3
<b>Total Credits</b>		<b>30</b>

1

Excluding STAT/B M I 641 Statistical Methods for Clinical Trials, STAT 698 Directed Study, STAT 699 Directed Study, and STAT 990 Research.

2

Excluding STAT/F&W ECOL/HORT 571 Statistical Methods for Bioscience I, STAT/F&W ECOL/HORT 572 Statistical Methods for Bioscience II, STAT 698 Directed Study, and STAT 990 Research. Credits from suitable quantitative courses taught in other (non-biological) departments (e.g., mathematics) may be substituted.

3

Excluding introductory statistics courses and research. Other criteria are that at least six credits are taken in a single discipline or in closely related disciplines, at least six credits are taken at the 700 level and above or in courses specifically designated as graduate courses, and a maximum of three credits are obtained in statistically oriented courses (e.g., AGRONOMY/HORT 811 Biometrical Procedures in Plant Breeding).

4

Students must complete 3 credits of STAT 699 Directed Study by consulting in two ways: 1) students may complete hours in one of several approved campus statistically related consulting services (e.g., the CALS Statistical Consulting Facility, Data Science Hub, Social Science Computing Cooperative or other as approved by Biometry program chair) or, (2) students may complete hours through a project with an individual PI that is approved by the Biometry program chair. This consists of supervised consulting and will provide exposure to statistical issues surrounding a broad range of problems in biology, provide awareness of practical issues such as experiment management, data collection, data recording, etc., and provide experience assisting others in designing experiments and analyzing data. Three credits are roughly equivalent to a single project that can be completed in one semester, and involves about 135 hours of effort, including meetings with consulting clients, background research, data analyses, etc.

5

Each student must complete a project that represents an original contribution to biometry. Examples of such contributions may include a novel analysis of some interesting biological data, the creation and evaluation of a useful experimental design, or the development and/or comparison of statistical methods. The project results are to be presented in a manuscript with emphasis on the integration of statistics and science. The manuscript should be of a quality that can lead to a publication.

Students may fulfill this project/manuscript requirement, which is not formally deposited with the Graduate School, by submitting a manuscript to and having an oral examination with their two co-advisors and a third faculty member from an applied area of scholarship. This may be accomplished in several ways: First, students who are also pursuing a PhD may use methodology or data analysis sections of their dissertation to fulfill this requirement. In this case, the Biometry MS oral examination may be concurrent with or at a similar time to the dissertation oral defense to satisfy this requirement.

Second, for a student seeking a double M.S., a joint project report and oral examination by their Biometry MS committee would satisfy this requirement.

Third, students may complete an independent project and manuscript and have their oral examination to satisfy this requirement.

This requirement will be formalized by enrolling in at least three credits of "Research" (e.g. STAT 990 Research or in another department (e.g. HORT 990 Research) in the department of one of the co-advisors. Students who are concurrently pursuing a PhD may wish to register for research credits in their PhD home department with their co-advisors. (These credits cannot be used for meeting other requirements.) For a student seeking a double M.S., a joint thesis would satisfy this requirement.

## POLICIES

### GRADUATE SCHOOL POLICIES

The Graduate School's Academic Policies and Procedures (<https://grad.wisc.edu/acadpolicy/>) provide essential information regarding general university policies. Program authority to set degree policies beyond the minimum required by the Graduate School lies with the degree program faculty. Policies set by the academic degree program can be found below.

## MAJOR-SPECIFIC POLICIES

### PRIOR COURSEWORK

#### Graduate Work from Other Institutions

With program approval, students are allowed to count no more than 9 credits of graduate coursework from other institutions towards the graduate degree credit and graduate coursework (50%) requirements. Coursework earned five or more years prior to admission to the master's degree is not allowed to satisfy requirements.

#### UW–Madison Undergraduate

No credits from a UW–Madison undergraduate degree are allowed to count toward the degree.

#### UW–Madison University Special

No credits earned while a UW–Madison University Special student are allowed to count toward the degree.

### PROBATION

Candidates who fail to meet satisfactory progress criteria in two consecutive reviews will be dropped from the program.

### ADVISOR / COMMITTEE

Students are required to meet with their advisor near the beginning of each semester to discuss course selection and progress.

### CREDITS PER TERM ALLOWED

15 credits

### TIME CONSTRAINTS

If the student is enrolled in a concurrent Ph.D. degree, the student should make application for both the master's and Ph.D. degrees during the semester in which they defend. In other words, the biometry degree should be completed by the semester in which the concurrent Ph.D. degree is completed. It is expected that all enrolled students will complete the program within three years.

### GRIEVANCES AND APPEALS

These resources may be helpful in addressing your concerns:

- Bias or Hate Reporting (<https://doso.students.wisc.edu/bias-or-hate-reporting/>)
- Graduate Assistantship Policies and Procedures (<https://hr.wisc.edu/policies/gapp/#grievance-procedure>)
- Hostile and Intimidating Behavior Policies and Procedures (<https://hr.wisc.edu/hib/>)
  - Office of the Provost for Faculty and Staff Affairs (<https://facstaff.provost.wisc.edu/>)
- Dean of Students Office (<https://doso.students.wisc.edu/>) (for all students to seek grievance assistance and support)
- Employee Assistance (<http://www.eao.wisc.edu/>) (for personal counseling and workplace consultation around communication and conflict involving graduate assistants and other employees, post-doctoral students, faculty and staff)
- Employee Disability Resource Office (<https://employee disabilities.wisc.edu/>) (for qualified employees or applicants with disabilities to have equal employment opportunities)
- Graduate School (<https://grad.wisc.edu/>) (for informal advice at any level of review and for official appeals of program/departmental or school/college grievance decisions)

- Office of Compliance (<https://compliance.wisc.edu/>) (for class harassment and discrimination, including sexual harassment and sexual violence)
- Office of Student Conduct and Community Standards (<https://conduct.students.wisc.edu/>) (for conflicts involving students)
- Ombuds Office for Faculty and Staff (<http://www.ombuds.wisc.edu/>) (for employed graduate students and post-docs, as well as faculty and staff)
- Title IX (<https://compliance.wisc.edu/titleix/>) (for concerns about discrimination)

### College of Agricultural and Life Sciences: Grievance Policy

In the College of Agricultural and Life Sciences (CALs), any student who feels unfairly treated by a member of the CALs faculty or staff has the right to complain about the treatment and to receive a prompt hearing. Some complaints may arise from misunderstandings or communication breakdowns and be easily resolved; others may require formal action. Complaints may concern any matter of perceived unfairness.

To ensure a prompt and fair hearing of any complaint, and to protect the rights of both the person complaining and the person at whom the complaint is directed, the following procedures are used in the College of Agricultural and Life Sciences. Any student, undergraduate or graduate, may use these procedures, except employees whose complaints are covered under other campus policies.

1. The student should first talk with the person at whom the complaint is directed. Most issues can be settled at this level. Others may be resolved by established departmental procedures.
2. If the student is unsatisfied, and the complaint involves any unit outside CALs, the student should seek the advice of the dean or director of that unit to determine how to proceed.
  - a. If the complaint involves an academic department in CALs the student should proceed in accordance with item 3 below.
  - b. If the grievance involves a unit in CALs that is not an academic department, the student should proceed in accordance with item 4 below.
3. The student should contact the department's grievance advisor within 120 calendar days of the alleged unfair treatment. The departmental administrator can provide this person's name. The grievance advisor will attempt to resolve the problem informally within 10 working days of receiving the complaint, in discussions with the student and the person at whom the complaint is directed.
  - a. If informal mediation fails, the student can submit the grievance in writing to the grievance advisor within 10 working days of the date the student is informed of the failure of the mediation attempt by the grievance advisor. The grievance advisor will provide a copy to the person at whom the grievance is directed.
  - b. The grievance advisor will refer the complaint to a department committee that will obtain a written response from the person at whom the complaint is directed, providing a copy to the student. Either party may request a hearing before the committee. The grievance advisor will provide both parties a written decision within 20 working days from the date of receipt of the written complaint.
  - c. If the grievance involves the department chairperson, the grievance advisor or a member of the grievance committee, these persons may not participate in the review.
  - d. If not satisfied with departmental action, either party has 10 working days from the date of notification of the departmental

committee action to file a written appeal to the CALs Equity and Diversity Committee. A subcommittee of this committee will make a preliminary judgement as to whether the case merits further investigation and review. If the subcommittee unanimously determines that the case does not merit further investigation and review, its decision is final. If one or more members of the subcommittee determine that the case does merit further investigation and review, the subcommittee will investigate and seek to resolve the dispute through mediation. If this mediation attempt fails, the subcommittee will bring the case to the full committee. The committee may seek additional information from the parties or hold a hearing. The committee will present a written recommendation to the dean who will provide a final decision within 20 working days of receipt of the committee recommendation.

4. If the alleged unfair treatment occurs in a CALs unit that is not an academic department, the student should, within 120 calendar days of the alleged incident, take his/her grievance directly to the Associate Dean of Academic Affairs. The dean will attempt to resolve the problem informally within 10 working days of receiving the complaint. If this mediation attempt does not succeed the student may file a written complaint with the dean who will refer it to the CALs Equity and Diversity Committee. The committee will seek a written response from the person at whom the complaint is directed, subsequently following other steps delineated in item 3d above.

### OTHER

The biometry program is distinct from the M.S. statistics program in its interdisciplinary emphasis and corresponding reduced depth in statistics. (Students interested in training with statistical consulting as the primary focus should apply for the M.S. in statistics through the statistics department.) The program is intended for two groups of students: (1) students simultaneously working towards or intending to work towards a Ph.D. in some biological discipline, and (2) non-Ph.D. students.

## PROFESSIONAL DEVELOPMENT

### GRADUATE SCHOOL RESOURCES

Take advantage of the Graduate School's professional development resources (<https://grad.wisc.edu/pd/>) to build skills, thrive academically, and launch your career.

## LEARNING OUTCOMES

1. Demonstrates understanding and critical evaluation of statistical methods selected for applications in scientific inquiries.
2. Identifies data sources and study design, and assembles appropriate statistical approaches to data analysis, in a particular scientific field of study.
3. Evaluates and synthesizes data information pertaining to questions in the field of study.
4. Communicates data concepts and analysis results clearly.
5. Recognizes and applies principles of ethical and professional conduct.

## PEOPLE

**Faculty:** Professors Clayton (Statistics/Plant Pathology), Ané (Statistics/Botany), Yandell (Statistics/Horticulture), Zhu (Statistics/Entomology)