FRESHWATER MARINE SCIENCE, PH.D.

The program offers curricula leading to the master of science and doctor of philosophy degrees or a doctoral minor in freshwater and marine sciences. Interdisciplinary in nature, each individualized program of study provides graduate training in aquatic sciences and integrates related sciences. Students enrolled in the program are advised by faculty in several departments in the College of Letters & Science, the College of Engineering, the College of Agricultural and Life Sciences, and the School of Veterinary Medicine.

UW–Madison is recognized worldwide as a leader in the field of limnology and aquatic ecology. The limnology and marine sciences program began in 1962 as the oceanography and limnology program. The program combines research and teaching from several fields and departments to develop a greater understanding of aquatic systems—their origins, inhabitants, phenomena, and impact on human life.

This graduate program emphasizes limnological studies and is based on the premise that limnology and marine sciences are integrated fields requiring a broad base in the fundamental disciplines. Students may specialize in limnology or in marine sciences, or they may focus on processes common to both environments.

Facilities for freshwater and marine research and instruction in the biological, chemical, and physical areas of limnology and marine sciences are available at UW–Madison through the Center for Limnology, the Water Science & Engineering Laboratory, and the departments of faculty participating in the program. The Center for Limnology also maintains a year-round laboratory at Trout Lake. This facility is a well-equipped biological field station in the Northern Highlands lake district of Wisconsin. Several research vessels are available for research on the Great Lakes. Ships belonging to other institutions are used for oceanographic field research.

Study plans are individually tailored for each student by a guidance and evaluation committee composed of at least three faculty members including the major professor, another professor from the major field of interest, and a third from another discipline. At least two must be from the limnology and marine sciences faculty, one from the biological sciences, and one from the physical sciences. The committee guides the student in developing study plans, research, and career goals.

All Ph.D. candidates are expected to obtain a broad background in aquatic sciences and depth in their research area. The background may include biology, chemistry, data science, geology, physics, or other related fields. The major, by nature of the program, includes advanced courses in several subdisciplines in freshwater and marine sciences. The minor may be used to obtain tools of research, focus in greater depth on a single discipline within freshwater and marine sciences, or open additional areas related to the field, such as the social sciences.

FACILITIES

Facilities and staff are available for advanced study in a wide variety of biological fields including aquatic and terrestrial ecology, conservation biology, cell/molecular/developmental and neurobiology, endocrinology, ethology, genetics, evolution and systematics, comparative physiology, and physiological ecology.

In addition to a broad range of well-equipped laboratories, research facilities include advanced microscopy facilities (http://www.microscopy.wisc.edu), limnological laboratories on campus (Lake Mendota) and in northern Wisconsin (Trout Lake), the University Arboretum, the Zoological Museum, and a Molecular Systematics Laboratory.

ADMISSIONS

ADMISSIONS

Applicants to the program typically have at least one year of college-level biology, chemistry, physics, and calculus. In addition, applicants should highlight their substantive experiences and career goals in freshwater and marine sciences. Prospective students make direct contact with potential faculty advisors. Admission depends upon finding a match between the skills and interests of the applicant and the needs of a suitable faculty mentor.

GRADUATE SCHOOL ADMISSIONS

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

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 processes related to funding.

PROGRAM RESOURCES

Various types of financial-assistance programs are available to qualified students in the form of research assistantships, teaching assistantships, fellowships, and special grants. Decisions regarding financial support are based on letters of recommendation, grades, Graduate Record Exam (GRE) scores, and, for research assistantships, the matching of interests or experience of the applicant to the research program. For research assistantships, the applicant’s interests and experience must match the needs of the funding project. Students are encouraged to seek outside 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

<table>
<thead>
<tr>
<th>Mode of Instruction</th>
<th>Face to Face</th>
<th>Evening/Weekend</th>
<th>Online</th>
<th>Hybrid</th>
<th>Accelerated</th>
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</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
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</table>

Mode of Instruction Definitions

- **Evening/Weekend:** These programs are offered in an evening and/or weekend format to accommodate working schedules. Enjoy the advantages of on-campus courses and personal connections, while keeping your day job. For more information about the meeting schedule of a specific program, contact the program.

- **Online:** These programs are offered primarily online. Many available online programs can be completed almost entirely online with all online programs offering at least 50 percent or more of the program work online. Some online programs have an on-campus component that is often designed to accommodate working schedules. Take advantage of the convenience of online learning while participating in a rich, interactive learning environment. For more information about the online nature of a specific program, contact the program.

- **Hybrid:** These programs have innovative curricula that combine on-campus and online formats. Most hybrid programs are completed on-campus with a partial or completely online semester. For more information about the hybrid schedule of a specific program, contact the program.

- **Accelerated:** These on-campus programs are offered in an accelerated format that allows you to complete your program in a condensed time-frame. Enjoy the advantages of on-campus courses with minimal disruption to your career. For more information about the accelerated nature of a specific program, contact the program.

Curricular Requirements

<table>
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<tr>
<th>Minimum Credit Requirement</th>
<th>51 credits</th>
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<tbody>
<tr>
<td>Minimum Residence Credit Requirement</td>
<td>32 credits</td>
</tr>
<tr>
<td>Minimum Graduate Coursework Requirement</td>
<td>Half of degree coursework (26 credits out of 51 total credits) must be completed graduate-level coursework; courses with the Graduate Level Coursework attribute are identified and searchable in the university's Course Guide.</td>
</tr>
<tr>
<td>Overall Graduate GPA Requirement</td>
<td>3.00 GPA required.</td>
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<tr>
<td>Other Grade Requirements</td>
<td>Students must earn a B or above in all courses counting toward degree requirements.</td>
</tr>
<tr>
<td>Assessments and Examinations</td>
<td>Doctoral students are required to take a comprehensive preliminary exam by the end of their fifth semester of study in the Ph.D. program. A final oral exam of the doctoral dissertation is required. Deposit of the doctoral dissertation in the Graduate School is required.</td>
</tr>
<tr>
<td>Language Requirements</td>
<td>No language requirements.</td>
</tr>
<tr>
<td>Doctoral Minor/Breadth Requirements</td>
<td>All doctoral students are required to complete a minor.</td>
</tr>
</tbody>
</table>

Required Courses

The degree has a flexible curriculum. Students are required to develop a plan of courses with their advisor. Most students take ATM OCN/BOTANY/CIV ENGR/ENVIR ST/GEOSCI/ZOOLOGY 911 Limnology and Marine Science Seminar and ATM OCN/ENVIR ST/GEOSCI/ZOOLOGY 750 Problems in Oceanography.

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

GRADUATE PROGRAM HANDBOOK

A Graduate Program Handbook containing all of the program’s policies and requirements is forthcoming from the program.

PRIOR COURSEWORK

Graduate Work from Other Institutions

With program approval, students may be to count credits of graduate coursework from other institutions. Coursework earned ten years or more prior to admission to a doctoral degree is not allowed to satisfy requirements.

UW–Madison Undergraduate

With program approval, 7 credits from a UW–Madison undergraduate degree are allowed to count toward the degree. Coursework earned ten years or more prior to admission to a doctoral degree is not allowed to satisfy requirements.

UW–Madison University Special

With program approval, 15 credits taken as a UW–Madison Special Student are allowed toward minimum coursework requirements. Coursework earned ten years or more prior to admission to a doctoral degree is not allowed to satisfy requirements.

Probation

A semester GPA below 3.000 will result in the student being placed on academic probation. If a semester GPA of 3.00 is not attained during the subsequent semester of enrollment the student may be dismissed from the program or allowed to continue for one additional semester based on advisor appeal to the Graduate School.

Advisor / Committee

All incoming students are assigned an advisor. Students are expected to meet with their advisor on a regular basis.

Credits Per Term Allowed

15 credits
TIME CONSTRAINTS
A candidate for a doctoral degree who fails to take the final oral examination and deposit the dissertation within five years after passing the preliminary examination may be required to take another preliminary examination and to be admitted to candidacy a second time.

OTHER
Graduate students in the FMS Program are typically supported through research assistantships, teaching assistantships, fellowships, and special grants. Students are encouraged to seek outside funding and should talk with prospective faculty members regarding funding options.

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. Articulate challenges, frontiers, and limits with respect to theory, knowledge or practice within relevant areas of freshwater and marine sciences.

2. Formulate ideas, concepts, designs, and/or techniques beyond the current boundaries of knowledge within the students' relevant research field(s).

3. Conduct research that makes a substantive contribution.

4. Demonstrate breadth within freshwater and marine sciences.

5. Communicate complex or ambiguous ideas in a clear and understandable manner.

6. Consider the implications of the discipline to broader societal concerns.

7. Foster ethical conduct and professional guidelines.

PEOPLE

FACULTY
Stanley (chair, ehstanley@wisc.edu) (Integrative Biology), Bahr (Geoscience), Block (Civil and Environmental Engineering), Cardiff (Geoscience), Desai (Atmospheric and Oceanic Sciences), Dugan (Integrative Biology), Ginder-Vogel (Civil and Environmental Engineering), Goldberg (Pathobiological Sciences), Graham (Botany), Hotchkiss (Botany), Hurley (Civil and Environmental Engineering), Krysan (Horticulture), Kucharik (Agronomy), Lee (Integrative Biology), Loheide (Civil and Environmental Engineering), McMahon (Civil and Environmental Engineering), Noguera (Civil and Environmental Engineering), Remucal (Civil and Environmental Engineering), Vander Zanden (Integrative Biology), Wright (Civil and Environmental Engineering), Wu (Civil and Environmental Engineering)