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.

### FRESHWATER MARINE SCIENCE, PH.D.

**FUNDING**

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 DEGREE REQUIREMENTS AND SATISFACTORY PROGRESS

To make progress toward a graduate degree, students must meet the Graduate School Minimum Degree Requirements and Satisfactory Progress (http://guide.wisc.edu/graduate/#policiesandrequirementstext) in addition to the requirements of the program.

#### DOCTORAL DEGREES

Ph.D.

**MINIMUM GRADUATE DEGREE CREDIT REQUIREMENT**

51 credits

**MINIMUM GRADUATE RESIDENCE CREDIT REQUIREMENT**

32 credits

**MINIMUM GRADUATE COURSEWORK (50%) REQUIREMENT**

Half of degree coursework (26 out of 51 total credits) must be completed in graduate-level coursework; courses with the Graduate Level Coursework attribute are identified and searchable in the university’s Course Guide (http://my.wisc.edu/CourseGuideRedirect/BrowseByTitle).

**PRIOR COURSEWORK REQUIREMENTS: 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.

**PRIOR COURSEWORK 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.

**PRIOR COURSEWORK 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.

**CREDITS PER TERM ALLOWED**

15 credits
PROGRAM-SPECIFIC COURSES REQUIRED
Students are required to develop a plan of courses with their advisor.

DOCTORAL MINOR/BREADTH REQUIREMENTS
All doctoral students are required to complete a minor.

OVERALL GRADUATE GPA REQUIREMENT
3.00 GPA required

OTHER GRADE REQUIREMENTS
Students must earn a B or above in all courses counting toward degree requirements.

PROBATION POLICY
A semester GPA below 3.0 will result in the student being placed on academic probation. If a semester GPA of 3.0 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.

ASSESSMENTS AND EXAMINATIONS
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.

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.

LANGUAGE REQUIREMENTS
No language requirements.

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.

LEARNING OUTCOMES

KNOWLEDGE AND SKILLS
• Regardless of whether an individual is awarded a master's degree, the doctoral level learning goals are inclusive of the master's level learning goals.
• Articulate challenges, frontiers, and limits with respect to theory, knowledge or practice within relevant areas of freshwater and marine sciences.
• Formulate ideas, concepts, designs, and/or techniques beyond the current boundaries of knowledge within the students' relevant research field(s).
• Conduct research that makes a substantive contribution.
• Demonstrate breadth within freshwater and marine sciences.
• Communicate complex or ambiguous ideas in a clear and understandable manner.
• Consider the implications of the discipline to broader societal concerns.

PROFESSIONAL CONDUCT
• Foster ethical conduct and professional guidelines.

PEOPLE

Faculty: Stanley (chair) (Integrative Biology), Bahr (Geoscience), Block (Civil and Environmental Engineering), Cardiff (Geoscience), Carpenter (Integrative Biology), Desai (Atmospheric and Oceanic Sciences), Fratta (Civil and Environmental Engineering), Ginder-Vogel (Civil and Environmental Engineering), Goldberg (Pathobiological Sciences), Graham (Botany), Gratton (Entomology), Hotchkiss (Botany), Hurley (Civil and Environmental Engineering), Krysan (Horticulture), Kucharik (Agronomy), Lee (Integrative Biology), Liu (Atmospheric and Oceanic Sciences), Loheide (Civil and Environmental Engineering), McIntyre (Integrative Biology), McKinley (Atmospheric and Oceanic Sciences), McMahon (Civil and Environmental Engineering), Noguera (Civil and Environmental Engineering), Potter (Civil and Environmental Engineering), Remucal (Civil and Environmental Engineering), Vander Zanden (Integrative Biology), Wu (Civil and Environmental Engineering)