BIOMEDICAL DATA SCIENCE, M.S.

The 31-credit M.S. degree program in biomedical informatics covers core concepts and allows for concentrated coursework, in both methodology and application. The goal of the program is to prepare graduates to

1. understand and apply key concepts and methodologies from computer science and statistics to biology and biomedicine;
2. demonstrate knowledge of biological, biomedical, clinical, and population health concepts and problems; and
3. contribute to the solutions of the central computational problems in biology and medicine, using methods from computer science, statistics, and engineering.

The curriculum has two tracks with substantial overlap. The professional track is intended for students who have an undergraduate degree in computer science, engineering, biology, or a health-related field, and are interested in a terminal M.S. degree that will equip them to work as a biomedical informatics professional in industry, a hospital, or a research lab. The research track is for students who have an advanced degree in a clinical field, and are interested in doing research that has a significant biomedical informatics component.

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.

MASTER'S DEGREES

M.S., with available professional, and research tracks

MINIMUM GRADUATE DEGREE CREDIT REQUIREMENT

30 or 31 credits

MINIMUM GRADUATE RESIDENCE CREDIT REQUIREMENT

16 credits

MINIMUM GRADUATE COURSEWORK (50%) REQUIREMENT

Half of the coursework (15 out of 30 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 are allowed to count no more than 9 credits of graduate coursework from other institutions. Coursework earned five or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

PRIOR COURSEWORK REQUIREMENTS: UW–MADISON UNDERGRADUATE

With program approval, students are allowed up to 7 credits numbered 300 or above from a UW–Madison undergraduate degree are allowed to count toward the degree. Coursework earned five or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

PRIOR COURSEWORK REQUIREMENT: UW–MADISON UNIVERSITY SPECIAL

With program approval, students are allowed to count no more than 9 credits of course work numbered 300 or above taken as a UW–Madison Special student. Coursework earned five or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

CREDITS PER TERM ALLOWED

15 credits

PROGRAM-SPECIFIC COURSES REQUIRED

B M I/COMP SCI 576 Introduction to Bioinformatics, B M I/COMP SCI 567 Medical Image Analysis, B M I/MEDICINE 918 Health Informatics for Medical Students, and B M I/STAT 541 Introduction to Biostatistics, B M I/POP HLTH 551 Introduction to Biostatistics for Population Health, or STAT/F&W ECOL/HORT 571 Statistical Methods for Bioscience I.

OVERALL GRADUATE GPA REQUIREMENT

3.00 GPA required.

OTHER GRADE REQUIREMENTS

Students must earn a B or above in all core curriculum coursework.

PROBATION POLICY

The status of a student can be one of three options:

1. Good standing (progressing according to standards; any funding guarantee remains in place).
2. Probation (not progressing according to standards but permitted to enroll; loss of funding guarantee; specific plan with dates and deadlines in place in regard to removal of probationary status.
3. Unsatisfactory progress (not progressing according to standards; not permitted to enroll, dismissal, leave of absence or change of advisor or program).

ADVISOR / COMMITTEE

All students are required to conduct a yearly progress report meeting with their advisor, scheduled by December 17 and completed by April 30. Failure to do so will result in a hold being placed on the student’s registration.

ASSESSMENTS AND EXAMINATIONS

No formal examination required. The research track requires a research project of 3–6 credits.

TIME CONSTRAINTS

If students have been absent for five or more years, they must file a new Graduate School application for admission and submit it with a new application fee. Master’s degree students who have been absent for five
or more consecutive years lose all credits that they have earned before their absence. Students may count the coursework completed before their absence for meeting graduate degree-credit requirements; the Graduate School will not count that work toward the Graduate School’s minimum residence credit requirement.

**LANGUAGE REQUIREMENTS**

No language requirements.

**ADMISSIONS**

Potential students include both those with bachelor’s degrees in an area of data-science (e.g., computer science, statistics), as well as health professionals and clinicians (e.g., M.D.’s, Pharm.D.’s, DNP’s, R.N.’s). It is expected that admitted candidates will have demonstrated an aptitude for computer science and math, fundamental programming skills, knowledge of data structures and algorithms, and at least two semesters of college calculus. We will however consider candidates who have a wide range of undergraduate backgrounds; providing opportunities to develop necessary skills immediately upon entering the program.

Applicants are evaluated on their previous academic record, GRE or MCAT scores, letters of recommendation, and a personal statement. For additional information about admission to the program, see M.S. Program in Biomedical Informatics (https://www.biostat.wisc.edu/content/ms_program_in_biomedical_data_science) on the department website. All applications must be submitted online.

**LEARNING OUTCOMES**

**KNOWLEDGE AND SKILLS**

- Understand, apply, and evaluate common informatics theories, methods, and tools related to biological and biomedical problems, health care and public health.
- Apply, adapt, and validate an existing approach to a specific biomedical and health problem.
- Produce solutions that address academic or industrial needs using informatics tools and knowledge.
- Evaluate the impact of biomedical informatics applications and interventions.
- Understand the challenges and limitations of technological solutions.
- Demonstrate scholarly oral and written presentations.

**PROFESSIONAL CONDUCT**

Adhere to the professional and legal standards of conduct in biomedical informatics.

**PEOPLE**

**Faculty:** Brennan, Broman, Buchanan, Burnside, Chappell, Chung, Coen, Craven, DeMets, Dewey, Dyer, Fischer, Gangnon, Gianola, Gitter, Keles, Kendzierski, Kim, Lindstrom, Mendonça, Newton, Page, Palta, Patel, Peissig, Rathouz, Rosa, Rosenberg, Roy, Shavlik, Si, Singh, Sorkness, Wahba, Wang, Yandell, Yu, Zhang