Biomedical Informatics & Data Science, PhD

Degree Requirements

Biomedical Informatics & Data Science

The Biomedical Informatics & Data Science Program is a graduate training program at WashU, housed under the Roy and Diana Vagelos Division of Biology and Biomedical Sciences (DBBS). PhD training in Biomedical Informatics and Data Science (BIDS) at Washington University is offered by the Division of Biology and Biomedical Sciences with faculty leadership from the Institute for Informatics, Data Science and Biostatistics (I^2DB).

Mission

The mission of I^2DB is to focus on the informatics, data science, and biostatistics landscape at WashU Medicine to transform research, education, and patient care. It emphasizes precision medicine and efforts to improve the quality of healthcare and public health initiatives locally, nationally, and worldwide.

Purpose

The BIDS PhD program provides opportunities for graduate students with diverse backgrounds to gain expertise in the field of biomedical informatics, to train as future biomedical researchers and industry leaders in biomedical informatics and data science core competencies, and to engage in scholarly activities under the guidance of experienced informatics faculty. Beyond an educational program, the mission of BIDS is to support biomedical informatics practice through applied research in real-world settings. The objectives of BIDS are to do the following:

- Expand students' knowledge in data science theories and applications in biomedical informatics;
- Provide training and hands-on research and industry experience in biomedical informatics and data science;
- Assist students in enhancing and applying their skills in translational science, real-world problem solving, and dissemination of knowledge;
- Encourage students to pursue careers in academia and/or industry through exposure to professional role models or mentors; and
- Develop and improve students' skills in interdisciplinary teamwork and communication.

To earn a PhD at within the Roy and Diana Vagelos Division of Biology and Biomedical Sciences at Washington University, a student must complete all courses required by their department; maintain satisfactory academic progress; pass the qualifying examination; complete all requirements for doctoral candidacy; create a Research Advisory Committee (RAC); submit a Title, Scope, and Procedure Form; fulfill residence and Mentored Experience Requirements; write, defend, and submit a dissertation; and apply for program completion (graduation) via Workday Student.

Program Requirements

- **Total Units Required:** 36 units
- **Degree Length:** Seven years
  - Students are expected to maintain satisfactory academic progress in accordance with academic milestones. Students entering their seventh year in the program will receive a warning letter in regards to reaching their stated degree length. Students entering their eighth year in the program will be required to obtain permission from the Associate Dean of Graduate Education. Across DBBS programs, the average time to degree is 5.6 years.
  - **Note:** Students must be enrolled in 9 graduate credits each semester to retain full-time status. As students complete their coursework, if enrolled in fewer than 9 graduate credits, they must enroll in a specific Biology & Biomedical Sciences research graduate course to maintain fulltime status. Prior to completing 36 credit units, students will enroll in BBS 5900 Research for research credit; after completing 36 credit units, students will enroll in BBS 9000 Full-Time Graduate Research/ Study, which will show 0 credit units but fulfills full-time status. Students should follow advising instructions to ensure proper enrollment prior to Add/Drop.
  - Continued support is guaranteed for the duration of the student's graduate studies, provided that the student maintains satisfactory progress toward completion of the degree.
- **Grade Requirement:** Required courses generally consist of four to nine courses in areas fundamental to the student's program. Students are expected to maintain a B average in graduate courses.

Required Courses

DBBS Required Courses

- BBS 5098 Graduate Research Fundamentals
- BBS 5011 Ethics & Research Science

Program Required Courses

- BDSAI 5001 R for Biomedical Sciences
- BDSAI 5002 Python for Biomedical Sciences
- BDSAI 5003 Introduction to Biomedical Data Science
- BDSAI 5004 Introduction to Biomedical Informatics
- BDSAI 5112 Advanced AI Topics in Biomedical Informatics: Deep Learning, Transformers, and Large Language Models
- Two semesters of BBS 5999 Independent Work

Advanced Electives

BIDS students must take one to four semesters of advanced electives, dependent upon Program Director advising. Common elective coursework includes the following:

- BMI 5204 Mixed Methods in Biomedical Informatics
- BMI 5205 The Electronic Health Record
- MSB 503 Statistical Computing with SAS
- MSB 560 Biostatistics I
- MSB 570 Biostatistics II
- MSB 621 Computational Statistical Genetics
- MSB 550 Intro to Bioinformatics
- BBS 5910 Nano Topics in Biology and Biomedical Sciences

Journal Clubs

BIDS students must complete two semesters of journal clubs. BMI 5200 Biomedical Informatics Research in Progress is a recommended journal club for BIDS students.

Laboratory Rotations

Selecting a thesis advisor is the most important decision a student makes in graduate school. To help each student make an informed, thoughtful choice, the Division builds in flexibility to explore options. Students usually participate in three lab rotations during their first year. Additional rotations can be arranged, and rotation lengths are flexible. Students usually begin their thesis research by the end of their first year.

Scientific Scholarship

Keeping abreast of scientific developments is critical for faculty and students alike. The Division offers many ways to stay current. More than 15 weekly biology seminars provide excellent opportunities to meet outstanding scientists from outside Washington University. Several annual symposia bring internationally recognized speakers to campus. Journal clubs meet weekly for students, postdoctoral fellows and faculty to present and discuss current scientific literature. A number of Interdisciplinary Research Pathways allow students to enhance their PhD program. Program retreats allow for informal interaction among students and faculty. The Division also provides funds for each student for professional development.