Department of Biomedical Informatics

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Degrees Awarded
M.S. in Clinical Informatics
M.S. in Imaging Informatics
M.S. in Translational Bioinformatics
Advanced Graduate Certificate in Clinical Informatics
Advanced Graduate Certificate in Imaging Informatics
Advanced Graduate Certificate in Translational Bioinformatics

PhD graduate program forthcoming

Web Site
https://bmi.stonybrookmedicine.edu/

The Department of Biomedical Informatics currently offers graduate work leading to the Master of Science* degree and Advanced Graduate Certificate in three areas of specialization, or Tracks:

1) Clinical Informatics - enhancing the quality and efficiency of clinical workflows;

2) Imaging Informatics - integrative analysis and management of biomedical images; and

3) Translational Bioinformatics - application of informatics methods to advance patient related biomedical research, from Clinical Genomics to Population Health.

The new Stony Brook University Biomedical Informatics Program is a collaboration of the School of Medicine and in the College of Engineering and Applied Sciences. This interdisciplinary field studies and pursues the effective use of biomedical data, information, and knowledge for scientific inquiry, problem solving and decision making, driven by efforts to improve human health.

We embed BMI Education in research and operations at the Stony Brook University Health Sciences Center, where quantitative sciences have emerged at the very core of efforts to understand, prevent and treat disease. Further, our program emphasizes the ability of trainees to produce software artifacts and conduct computational experiments, along the same lines as the College of Engineering and Applied Sciences. The resulting refactoring of Informatics equips BMI trainees to play a new role in a Systems Biomedicine enterprise that spans from patient-centric information systems to the distributed analytics needed to contextualize emerging biomolecular Big Data resources.

Students will be instructed via a combination of classroom teaching, seminars, and/or structured projects. Graduates can expect careers in academia, research, healthcare, industry, or government.

For more information, visit our website: https://bmi.stonybrookmedicine.edu/

* The new doctoral program in Biomedical Informatics is currently under review.

Admission requirements for M.S. programs in Biomedical Informatics:

1. A bachelor’s degree in Biomedical Informatics, or a related field such as computer science, another engineering discipline, physical science, chemistry, mathematics

OR a bachelor’s degree in biology, biochemistry, pharmacology, social science

OR post baccalaureate training equivalent to the above

OR a bachelor’s degree in humanities with coursework and projects in digital arts and media

Stony Brook University Graduate Bulletin: www.stonybrook.edu/gradbulletin
OR an MD Degree.

2. A grade point average of at least B or equivalent in all engineering, mathematics, and science courses.

3. Completion and submission of the Graduate Record Examination (GRE) General Test.

4. Two letters of recommendation.

5. Acceptance by both the Biomedical Informatics Graduate Program and the Graduate School.

6. In addition, students must meet all admissions requirements, fees, and deadlines of the Stony Brook University Graduate School.

Requests for exceptions to the stated admissions requirements must be submitted in writing and approved by the BMI Graduate Program Director and The Graduate School.

Admission requirements for Advanced Graduate Certificate programs in Biomedical Informatics:

1. A bachelor’s degree in Biomedical Informatics, or a related field such as computer science, another engineering discipline, physical science, chemistry, mathematics

OR a bachelor’s degree in biology, biochemistry, pharmacology, social science

OR post baccalaureate training equivalent to the above

OR a bachelor’s degree in humanities with coursework and projects in digital arts and media

OR an MD Degree.

2. Acceptance by both the Biomedical Informatics Graduate Program and the Graduate School.

3. In addition, students must meet all admissions requirements, fees, and deadlines of the Stony Brook University Graduate School.

Requests for exceptions to the stated admissions requirements must be submitted in writing and approved by the BMI Graduate Program Director and The Graduate School.

Facilities of the Biomedical Informatics Department and Graduate Program

The Biomedical Informatics Department has a strong foothold in computing and in biomedical sciences. Our Department was jointly established by the College of Engineering and Applied Sciences and the Stony Brook University School of Medicine.

BMI’s three locations on campus offer students and faculty front seats in key centers of collaborative activity. Each BMI Department location features extensive learning and research suites with faculty and administrative offices, Postdoctoral trainee stations, classroom and meeting space, and student labs equipped with desktop computers, each with 1TB storage space, 16GB main memory, and a 4-core CPU. The Department’s HSC Suites have opened in the Health Sciences Center HSC Level 3, and include the Chair’s suite and administrative center. A second BMI location with office, meeting and student lab is under construction in the Old Computer Science Building on West Campus. The third BMI Department suite will be housed with the Cancer Center in the new Medical and Translational Research (MART) building being constructed adjacent to the new Stony Brook Children’s Hospital. Virtual meeting solutions continue to keep all Department members together, and enable distance learning.

The Biomedical Informatics Department (BMI) has a cluster computing system dedicated to research, development, and education in high performance computing, systems software, and applications. The cluster system consists of 10 compute nodes and 10 storage nodes. Each compute node has 2 10-core Intel Xeon CPUs, 2 NVIDIA K40 Tesla GPUs, one Intel Xeon Phi co-processor, 256GB main memory, a 512GB SSD, and 2 1TB hard-disks. Each of the storage nodes has 2 6-core CPUs, 64GB main memory and 95TB disk storage in RAID 5 configuration. All the nodes in the cluster are connected to each other via high performance Infiniband Switches. The cluster system is housed in the Department of Computer Science. BMI also owns a small Virtual Machine server farm consisting of a Dell PowerEdge server with 4 8-core CPUs, 256 GB main memory, and 28TB disk storage. This server is used to host VMs for development and testing purposes.

In addition to BMI owned servers and computers, researchers have access to XSEDE resources (https://www.xsede.org) through a scientific gateways grant. The XSEDE resources include Stampede which is a distributed-memory Dell Linux Cluster with over 6,400 nodes. Each node has 2 Intel Xeon E5 (Sandy Bridge) processors, 32GB memory, and an Intel Xeon Phi Coprocessor (MIC Architecture) with 8GB memory. The computation nodes are interconnected with Mellanox FDR InfiniBand technology. BMI’s Student and meeting space has wifi and wired connections available to the SBU network. In recent years the use of cloud computing has taken center stage in both translational biomedical informatics and bioinformatics and students will also be introduced to those resources.

General Requirements for the Biomedical Informatics Graduate Program

Registration: Students must register for at least one graduate credit in the semester in which the diploma is awarded.
Language Requirement: There is no foreign language requirement.

Grade Point Average: To be certified for graduation a cumulative graduate grade point average of 3.0 (out of 4.0) or better is required.

General Requirements for the M.S. in Biomedical Informatics

The M.S. program has been designed to provide students with the core foundations of Biomedical Informatics and the flexibility to define a specialization that best meets their career objectives. Students may select the M.S. with Thesis option or the M.S. with Capstone Project option. Students also select a track to focus on: Imaging Informatics, Clinical Informatics or Translational Bioinformatics.

Required Courses:

1. All M.S. students are required to take the initial BMI sequence:

   a. BMI 501 Introduction to Biomedical Informatics
   
   b. BMI 502 Life Sciences for Biomedical Informatics

   OR BMI 503 Computer Science for Biomedical Informatics

   c. Based on Student’s selected track (BMI 501 must be taken before or at the same time as BMI 511, BMI 512 and BMI 513):

      BMI 511 Translational Bioinformatics

      OR BMI 512 Clinical Informatics

      OR BMI 513 Imaging Informatics

2. All M.S. Students are required to take BMI 540 Statistical Methods in Biomedical Informatics.

3. All full-time M.S. graduate students are required to register each semester for BMI 592 Biomedical Informatics Masters/Pre-Candidate Seminar, and obtain a satisfactory grade.

4. Students must complete all the required courses (marked “req” on the M.S. Course Table with Track options, below) from at least one of the Biomedical Informatics program Tracks.

5. A minimum of 18 graduate credits must be taken in the Biomedical Informatics Program (includes all BMI courses and all BMI-Approved Elective courses from other departments). Of these, 15 credits must be in courses other than BMI 590, BMI 591, BMI 592, BMI 595, BMI 596, BMI 690, BMI 691, BMI 695, and BMI 696 (the independent study, independent reading, seminar, special topics and special problems courses).

6. All courses taken outside the Program for application to the graduate degree requirements are subject to prior approval of the student's advisor and the BMI Graduate Program Director.

7. Up to 15 credits from the Advanced Graduate Certificate in Biomedical Informatics may be applied to the M.S. degree in Biomedical Informatics provided they meet the course requirements for the M.S. degree.

Transfer Credits:

A maximum of 12 graduate credits may be transferred from other programs toward the M.S. degree. These may include up to 6 credits from other institutions. The maximum also includes any credits received from Biomedical Informatics courses while having non-degree status at Stony Brook as an SPD or GSP student. Credits used to obtain any prior degrees are not eligible for transfer. All requests for transfer of credits require the prior approval of the BMI Graduate Program Director.

Time Limit:

Full-time students must complete all M.S. degree requirements within three years. Part-time students must complete all M.S. degree requirements within five years. For any term in the M.S. program, 12 credits are needed for students to be considered full-time.

Requirements for the MS in Biomedical Informatics - With Thesis

The M.S. Thesis option is intended for students who wish to perform Biomedical Informatics research. A written thesis is submitted and is defended in an oral examination.

A student choosing the M.S. Thesis option must define a suitable research question and select a M.S. Thesis research advisor, who must approve the M.S. Thesis research.

Upon completion, the M.S. Thesis must be defended in an oral examination before a faculty committee of at least three members (of which at least two members must be Biomedical Informatics faculty; one member must be the student’s M.S. Thesis research advisor). This faculty committee must be approved by the BMI Graduate Program Director. The written M.S. Thesis must be distributed to the faculty committee members at least two weeks before the oral examination.
A student choosing the M.S. Thesis option may not switch to the Capstone Project option without permission of the graduate program committee.

A student who has at any time been appointed as a teaching, graduate, or research assistant must choose the M.S. Thesis option unless otherwise approved by the graduate program committee.

Course Requirements for M.S. with Thesis:

21 approved graduate course credits and an accepted Thesis, which is registered as up to 12 credits of **BMI 599 M.S. Research and Thesis in Biomedical Informatics**.

a. No more than a total of 12 credits of **BMI 599** may be applied toward the M.S. degree credit requirements.

b. No more than a total of 6 credits of **BMI 596 Special Problems in Biomedical Informatics-Masters** and **BMI 696 Special Problems in Biomedical Informatics-Doctoral** may be applied toward the course requirements.

c. No credits of **BMI 598 M.S. Capstone Project in Biomedical Informatics** may be applied toward the course requirements for students who select the M.S. with Thesis.

d. Either **BMI 502 Life Sciences for Biomedical Informatics** or **BMI 503 Computer Science for Biomedical Informatics**, but not both, can be applied toward the course requirements.

Requirements for the MS in Biomedical Informatics - With Capstone Project

The Capstone Project option is intended for students who wish to take additional elective courses, plus complete a practicum rotation, instead of the highly-focused M.S. research that is part of the M.S. with Thesis option.

A student choosing the Capstone Project option must select a project advisor. Prior to starting a Capstone rotation, a student is required to submit a project proposal with well-defined deliverables to both his/her academic advisor and project advisor. The student’s project advisor is required to submit a mid-term evaluation to the student’s academic advisor.

The student is required to complete a final report and also present his/her work at a department seminar. Upon completion, the project must be submitted for approval to a faculty committee of at least two members (the academic advisor and the project advisor; at least one committee member must be Biomedical Informatics faculty; committees with more than two members are permitted).

A student who has selected the Capstone Project option may not have been (nor be concurrently) appointed as a teaching, graduate, or research assistant unless otherwise approved by the graduate program committee.

Course Requirements for M.S. with Capstone Project:

30 approved graduate credits, including 6 credits of **BMI 598 M.S. Capstone Project in Biomedical Informatics**.

a. No more than a total of 6 credits of **BMI 598** may be applied toward the M.S. degree credit requirements.

b. No more than a total of 6 credits of **BMI 596 Special Problems in Biomedical Informatics-Masters** and **BMI 696 Special Problems in Biomedical Informatics-Doctoral** may be applied toward the course requirements.

c. No credits of **BMI 599 M.S. Research and Thesis in Biomedical Informatics** may be applied toward the course requirements for students who select the M.S. with Capstone Project.

d. Either **BMI 502 Life Sciences for Biomedical Informatics** or **BMI 503 Computer Science for Biomedical Informatics**, but not both, can be applied toward the course requirements.

**M.S. Course Table with Track options:**

Requirements for the MS in Biomedical Informatics - With Capstone Project

The Advanced Graduate Certificate program has been designed to provide students with the basic grounding in Biomedical Informatics and the flexibility to design a curriculum that best augments their current training. A minimum of 15 credits is required for the Advanced Graduate Certificate.

Required Courses:

1. 15 approved graduate credits including BMI 501, BMI 502 and/or BMI 503. As well as one from the following list corresponding to the track specialization: BMI 511 Translational Bioinformatics, BMI 512 Clinical Informatics or BMI 513 Imaging Informatics.
2. All courses taken outside the Program for application to the graduate degree requirements are subject to prior approval of the student’s advisor and the BMI Graduate Program Director.

3. Students must complete all the required courses from at least one of the Biomedical Informatics program tracks (see AGC Course Table, below).

Transfer Credits:
A maximum of 6 graduate credits may be transferred from other programs toward the Advanced Graduate Certificate. These may include up to 3 credits from other institutions. The maximum also includes any credits received from taking Biomedical Informatics courses while having non-degree status at Stony Brook as an SPD or GSP student. Credits used to obtain any prior degrees are not eligible for transfer. All requests for transfer of credits require the prior approval of the BMI Graduate Program Director.

Time Limit:
Full-time students must complete all Advanced Graduate Certificate requirements within two years. Part-time students must complete all Advanced Graduate Certificate requirements within four years.

**Advanced Graduate Certificate Course Table with track requirements:**

Faculty of Biomedical Informatics Department

Please see the “People” page of the BMI Department website:
https://bmi.stonybrookmedicine.edu/people

NOTE: The course descriptions for this program can be found in the corresponding program PDF or at COURSE SEARCH.