Why Computer Science at Brandeis?

Brandeis offers students the opportunity to explore the fundamentals of both theoretical and practical aspects of computing in preparation for graduate school or jobs in the computer industry. Additionally, the curriculum provides stimulating and useful preparation for a number of related fields such as law, medicine, and economics.

Curriculum Overview

Students have the option of completing a bachelor of arts, bachelor of science, or minor in computer science. The BA requires six core courses, two lab courses, two courses in mathematics, and four electives. The BS requires a third mathematics class and an additional four electives.

Half of the required electives for the bachelor’s degrees can be fulfilled with cross-listed courses. Students regularly take electives while completing core courses.

The minor in computer science consists of one required course (COSI 21a: Data Structures) and any five other computer science courses, one of which can be a cross-listed course.

The department also offers a fifth-year master’s program in which students stay an additional year beyond the BA or BS in order to obtain a master of arts in computer science.

Electives for the computer science program span a wide range of topics including artificial intelligence, programming languages, systems, and theory.

Artificial Intelligence. Brandeis offers courses in cognitive science, intelligent behavior, machine learning, computational linguistics, and bioinformatics taught by faculty who are leaders in these fields.

Programming Languages and Systems. The offerings in this area include courses in database systems, operating systems, networks, parallel computing, data compression, human computer interfaces, and computer graphics.

Theory. Theoretical computer science offerings provide a foundation on which much of the software industry depends. Brandeis offers theory courses in algorithms, programming language theory, information theory, and cryptology.

Graduate-Level Electives. Advanced undergraduates may also take 200-level graduate electives with permission of the instructor. These high-level, seminar-style courses deal with topics in artificial intelligence, natural language processing, systems, and computational logic.
Opportunities for Research
Undergraduates have ample opportunity to engage in cutting-edge research. Students often find employment in faculty research labs, occasionally publishing joint papers. Independent study courses are another popular mechanism for going beyond the curriculum and getting involved in research. The senior honors thesis provides an opportunity to spend an entire year working on a self-directed research topic under the guidance of a faculty member.

An Interdisciplinary Approach
Computer science is, by nature, interdisciplinary, as much of the research in the field is driven by the numerous and diverse applications of computer technology. Accordingly, the department offers interdisciplinary courses—such as Bioinformatics (BCHM 170b) and Internet and Society (COSI 33b)—as well as providing elective credit for a variety of courses offered in other areas; these range from anthropology courses like Social Relations in Cyberspace, to microelectronics lab courses in physics.

Career and Education Options
Computer science students at Brandeis go on to explore a wide variety of career paths. Many start careers in the information technology industry; others pursue graduate school. About half of all computer science majors are double-majors, primarily in the fields of anthropology, biology, economics, English, mathematics, and physics. Double-majors often choose career paths that combine their interests, such as computational biology or e-business. Others pursue professional training that will allow them to combine their computational expertise with other domains, such as medicine and law.

Faculty
Following is a list of department faculty members and their areas of specialization:

- **Timothy Hickey, chair and undergraduate advising head**
  Analysis of algorithms, logic programming and parallel processing, symbolic manipulation, groupware

- **Richard Alterman**
  Artificial intelligence, cognitive modeling, natural language processing, memory-based reasoning, everyday activity

- **Mitch Cherniack**
  Databases, software engineering, programming languages

- **Jacques Cohen**
  Compiler design, analysis of parallel algorithms, logic programming, data structures, bioinformatics

- **Ira Gessel**
  Combinatorics

- **Pengyu Hong**
  Computational biology, image processing, statistical machine learning

- **Harry Mairson**
  Logic in computer science, Lambda calculus and functional programming, type theory and constructive mathematics, complexity theory, algorithmics

- **Jordan Pollack**
  Artificial intelligence, neural networks, machine learning, evolutionary computation, dynamical systems

- **James Pustejovsky, graduate advising head**
  Artificial intelligence, computational linguistics, machine learning

- **Liuba Shrira**
  Operating systems, distributed systems, multicache computing

- **James Storer, graduate advising head**
  Data compression and image processing, computational geometry, parallel computing, algorithms