



# MASTER of SCIENCE Computer Science

## Conventional or Fully Online



### Program Overview

The Computer Science Master's program provides graduates with a broad and deep knowledge of computer science by offering a strong core program with a wide selection of elective courses. The program maintains a balance between theory, systems, and applications, with emphasis on software development.

Our students gain the ability and confidence to use their knowledge by working on realistic scale projects within the graduate courses. Students are exposed to situations where they work as a member of a team as well as being individually responsible for an entire project, from problem specification to the completion of the solution. Additionally, students learn to conduct independent research and present their results in oral and written forms. Students graduate with the knowledge and skills required to develop and design high-quality computer systems and application software. Students have the ability to follow the rapid changes in the field of Computer Science. As highly qualified professionals, our students are ready to compete for responsible positions in the computer industry, research institutions, government, or to pursue their education in PhD programs.

### Faculty and Principal Areas of Expertise

**Balasubramanian, Ramprasad** Professor, BSc 1989 University of Madras, India, MS 1991 University of Toledo, MSOperRes 1993 University of Kentucky, PhD 1999 University of South Florida. Specializations: computer vision, multi-vehicle coordination, distributed control, pattern recognition.

**Bergstein, Paul L** Associate Professor, BS 1978 SUNY College of Environmental Science and Syracuse University, MS 1981 Massachusetts Institute of Technology, PhD 1994 Northeastern University. Specializations: software engineering, programming languages, and database systems.

**Khatib, Firas** Assistant Professor, BA 2001 University of California Berkeley, Ph.D. 2008, University of California Santa Cruz. Specializations: Bioinformatics, Protein Structure Determination/Prediction & Design, and Machine Learning.

**Koop, David** Assistant Professor, BS 2002 Calvin College, MS 2005 University of Wisconsin-Madison, PhD 2012 University of Utah. Specializations: Visualization, Computer Provenance, Data Science.

**Shao, Ming Daniel** Assistant Professor, BS 2006 Beihang University, MS 2010 Beihang University, PhD 2016 Northeastern University. Specializations: Transfer Learning, Social Media Analytics, Graph Approximation and Clustering.

**Sun, Maoyuan** Assistant Professor, BS 2009 China Agricultural University, MEd 2011 Peking University, PhD 2016 Virginia Tech. Specializations: Visual Analytics, Information Visualization, Human Computer Interaction, Human-Centered Machine Learning.

**Valova, Iren** Professor, MSc 1991 Technical University, Sofia, Bulgaria, PhD 1997 Tokyo Institute of Technology. Specializations: artificial intelligence, neural networks, pattern recognition.

**Xu, Haiping** (Chairperson) Associate Professor, BS 1989 Zhejiang University, MS 1998 Wright State University, PhD 2003 University of Illinois at Chicago. Specializations: software engineering, distributed computing, multi-agent systems, and formal methods.

**Zhang, Xiaoqin Shelley** Associate Professor, BS 1995 University of Science and Technology of China, MS 1998, PhD 2002 University of Massachusetts Amherst. Specializations: multi-agent systems, intelligent agents, collective intelligence.

### Graduate Degrees and Program Requirements

#### Computer Science Master's Program

Applicants must submit the required application materials to the Office of Graduate Studies. In addition, they must submit GRE general scores. The personal statement should explain the candidate's goals and objectives concerning his/her professional career. Applicants should have a bachelor's degree from an accredited institution (applicants who do not meet this criterion may also be considered for admission if they can demonstrate convincingly that they have the equivalent of a baccalaureate degree). In addition, they should demonstrate:

- Ability to write programs in a high-level programming language (such as C, C++, Java)
- Knowledge of computer architecture, and operating systems
- Knowledge of software engineering
- Knowledge of mathematical analysis, elements of theoretical foundations of computer science and analysis of algorithms

#### Degree Requirements

Candidates for the MS degree in CIS must complete a minimum of 30 credits of coursework including a master project, six CIS elective courses and three core courses, chosen from:

- CIS 522 Algorithms and Complexity
- CIS 560 Theoretical Computer Science
- CIS 570 Advanced Computer Systems
- CIS 580 Paradigmatic Software Development

As many as two undergraduate CIS technical electives may serve as graduate electives, only with previous approval of the Graduate Curriculum Committee. EGR 500 Graduate Internship Course takes the place of one 400 level technical elective.

Students must meet the university graduate requirement of at least a 3.0 grade point average; only courses graded C or better may count toward the degree. Students must pass the course CIS 599 graduate seminars for two semesters.

#### Online MS Program

The Online MS in Computer Science program is a fully online program planned to allow students to graduate in four semesters. This Online program is designed to provide students an education equivalent to the education offered through our conventional MS program. Both programs have the same requirements. Our Online program requires a Master's Project providing a culminating experience to every student by working one-on-one with a faculty member with expertise in the area of the student's interest. UMass Dartmouth has been voted a Top Value school and the College of Engineering's fully online MS in Computer Science program delivers on that value promise. CIS 599 requirement does not apply to students in online MS program.

## Computer Science Post-Baccalaureate Certificate

A Post-Baccalaureate certificate offers working professionals recognition of a coherent program of advanced study at the graduate level. This certificate can be taken either online or in the classroom; it requires the completion of two core courses and three additional CIS 500/600-level courses (15 credits). This certificate program is compatible with our MS degree requirements, enabling certificate recipients to transition to a degree program without loss of credits. Completion of the Certificate with a GPA of no less than a B+ waives the GRE requirement for applicants to the Master in Computer Science program. Upon completion of this certificate program, participants will have gained knowledge of advanced computer systems and software development, advanced knowledge of selected areas of modern computing including but not limited to intelligent information systems, computer networks, and software engineering, and understanding of new advances in the discipline of computing such as neural and evolutionary computing and data science.

### Acceptance to a Certificate Program

Applicants must have earned a Bachelor's degree in an appropriate field. Applicants must submit an application, essay, resume and official transcripts of all post-secondary work. However, they are not required to submit GRE scores or recommendation letters. A joint faculty committee will review applications. One element in the review will be to assess whether a student has met the stated prerequisites and in general has the appropriate combination of background and experience to succeed in the program. It is possible for acceptance to be offered with a contingency that the student must take one or more undergraduate prerequisite courses.

### MSCS Online Preparatory Program

For students with a BS degree in fields other than Computer Science or Computer Engineering, we offer a fully-online preparatory program consisting of four fundamental CS courses: CIS 115 Computer Programming with C  
CIS 183 Object-Oriented Programming with Java  
CIS 322 Data Structures and Fundamental Algorithms  
CIS 323 Fundamentals of Computer Systems

This program may be finished within one year, as it is to prepare students to meet the following minimum requirements which serve as a stepping-stone to study computer science at the graduate level. However, even after meeting these requirements, students without a BS in CS degree will still face a challenge of making up certain undergraduate material when taking specific graduate courses.

Students taking these courses are considered to be in "non-degree" status, and therefore not eligible for Financial Aid.

### BS/MS Option in 5 years

The Computer Science department offers an integrated program that allows qualified UMass Dartmouth undergraduate majors in Computer Science to proceed directly to the master's degree program and complete both BS degree and MS degree with a reduction in overall credits required. The option requires a total of 141 credits. Three undergraduate CIS technical electives are substituted by CIS graduate courses. Students pursuing this option are required to complete Master's Thesis CIS 690.

### Eligibility to Apply - BS/MS Option

Current undergraduate computer science students or transfer students are eligible to apply if she/he meets these conditions:

- Completed 60 credits towards UMD BS in Computer Science
- Did not take and is not currently enrolled in any senior level (400-level) or graduate (500-level) CIS course
- Completed CIS courses: CIS 180/181, CIS 190, CIS 272, CIS 273, CIS 280 (or equivalent in case of transfer students)
- Have a 3.0 or higher GPA in CIS.
- Completed mathematics courses: MTH 181/182 & MTH 111/112 with a GPA of 2.8 or higher

## Financial Assistance

A number of teaching and research assistantships are available on a competitive basis. Additionally, other assistance, such as graduate assistantships, may be available.

## Strengths/Highlights

The Computer Science department maintains two general-purpose Windows labs and one general purpose Linux lab. Students have free access to any of the open source software and other software used in the department. Students also have access to software licensed for installation on their personal computers such as the software provided through the department's Microsoft Imagine agreement and other software licensed for university students as described in the following table <https://www.umassd.edu/cits/software>. Students have direct remote access to the department's Linux lab through SSH/SFTP at any time, virtual images of the department's Windows machines are available through the University's virtual computing lab accessed through the <https://my.umassd.edu> site.

The department maintains a high performance computing cluster used for research. Students may utilize the computing cluster for advanced mathematical and network simulations.

Specialized research labs are available for students working on projects in areas such as robotics, parallel and distributed computing, databases, bio-informatics and multi-agent systems.

## Faculty Research

Computer Science faculty members are involved in research and professional activities in their research areas of expertise. CIS faculty members have been awarded grants from National Science Foundations, Department of Energy, Department of Defense, Office of Naval Research, Naval Undersea Warfare Center in Newport, Rhode Island, Commonwealth Information Technology Initiative, UMASS Dartmouth Foundation and companies from local computer industries. Computer Science faculty members actively served as conference chairs, program committee members and grant proposal reviewers for federal funding agencies.

## Alumni and Outstanding Students

**Joe Biron**, who earned a bachelor's degree in 2002, is an independent business owner now pursuing his master's degree at UMass Dartmouth. "The computer science education I received prepared me with a deep background with computational theory and software engineering. The curriculum strikes a balance between fundamental concepts and contemporary skills and prepares the student with a foundation for ongoing learning in the ever-changing field of computer software."

**David Wilusz**, who earned his master's degree in 1995, feels that UMass Dartmouth gave him an in-depth understanding of several key areas and honed his programming skills. For many years after graduation, he worked as a software engineer. Wilusz earned a MBA from Babson College in 2006 and is now Vice President of Credit Products at Markit in New York City, a company that provides data and analytics to investment banks and hedge funds. "Although no longer a software engineer, I still write code from time to time and the technical background I acquired at UMass Dartmouth continues to serve me well in solving complex technical and architectural issues."

**Thomas Silveria** earned a MS degree in 1996. His career includes jobs at Periphonics Corporation in Bohemia, NY; Lockheed Martin in a number of communities; and Raytheon in Portsmouth, RI. A senior software engineer, Silveria noted, "UMass Dartmouth's Computer and Information Science Department will provide you with a world class education. All you have to do is apply yourself."

**Bhushan Bauskar** received a master's degree in 2004. He is a technical specialist at Citigroup Inc. in New York City. "I acquired and honed not only computer science skills, but also management and people skills that are assisting me immensely in my career. I am thankful to the department for providing such a strong foundation for my career."

## Contact Information

[www.umassd.edu/engineering/cis/graduate/](http://www.umassd.edu/engineering/cis/graduate/)  
[cis-grads@umassd.edu](mailto:cis-grads@umassd.edu)

### Please forward all credentials to:

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