

Computer Science PhD Handbook

2023-24

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Disclaimer

Please be aware that the [University Bulletin](#) is a legal document governing all academic regulations. If anything in this handbook contradicts the Bulletin, the Bulletin will take precedent.

Introduction

The Department of Computer Science PhD handbook provides an overview of the requirements and procedures for the PhD program and is meant to complement other sources which apply more broadly to all students at Brandeis University (e.g., the Brandeis University Bulletin, the Rights & Responsibilities Handbook, and information on Disabilities Services and Support) or to students in the Graduate School of Arts and Sciences (e.g., the GSAS Student Handbook and Handbook for Teaching Fellows). A list of resources for graduate students in the Division of Science is here:

[DivSci Graduate Student Resources](#)

Onboarding Checklist

- Read this Handbook for the Department of Computer Science.
- Walk through the checklist and the Accepted Student page (<https://www.brandeis.edu/gsas/admissions/accepted-students.html>) for incoming graduate students organized by the Graduate School of Arts and Sciences.
- Attend the Office of Graduate Affairs Graduate Student Orientation on Friday, August 25th, 10:00 - 6:00 p.m. [2023 Graduate Student Orientation Schedule](#)
- International Students: Attend the International Student Welcome Days on August 24-26: [International Student Welcome Days](#) (only for those students who are coming to the U.S. to study).
- Attend Office of Equal Opportunity (OEO) Training
- Attend the Computer Science Orientation which takes place on Wednesday, August 30 from 9:45 am – 1:00pm in Rapaport Treasure Hall, Goldfarb Library
- The Office of Graduate Affairs hosts social and educational events throughout the year, so follow them at: <https://www.brandeis.edu/graduate-affairs/your-home-on-campus/index.html>
- If you decide to move closer to Campus, do you have your housing all set? Check out the link to the Key Housing Resources: <http://www.brandeis.edu/gradstudent/housing/index.html>

PhD Requirements

In order to qualify for the degree of Doctor of Philosophy, a student must ordinarily complete a minimum of four years of graduate study, including three full years of residence and a fourth year devoted to the preparation of a doctoral dissertation. Under certain conditions, credit for advanced standing will be granted for work taken in residence in graduate schools of other universities. Computer Science also requires development as a teacher.

Each student will have the opportunity to develop skills as a teacher through close supervision of progressive pedagogic experiences by assisting or teaching one or more courses, as appropriate. Participation in ongoing discipline-specific, as well as skill-specific training through department- and school-wide seminars during a student's teaching apprenticeship in the Graduate School of Arts and Sciences, is expected. Students serving as Teaching Assistants or Teaching Fellows are

considered responsible reporters under Title IX and will be required to participate in relevant training prior to serving as a Teaching Assistant or Teaching Fellow.

To be eligible for the PhD degree, the student must (1) complete all course, residence and teaching requirements and (2) have written and successfully defended the doctoral dissertation and (3) be otherwise in good standing. Good standing means achieving at least a B- in all courses which count toward the degree, and have no unresolved incompletes.

Students entering Brandeis with no previous graduate work must earn the doctorate within eight years from the inception of study. Students with a Masters Degree or who are granted credit for a year of graduate work completed elsewhere must earn the degree within seven years from the inception of their study at Brandeis.

Students who have passed the terminal point for the degree must petition the Graduate School for an extension no later than the final semester prior to the expiration of their time to graduate. Petitions for extensions will be sent to eligible students in the last semester of their eighth year of study. These completed petitions must be returned to the Graduate School by the date specified on the petition. Students no longer eligible for additional extensions will receive a letter stating that they must finish their degree by the close of the summer term.

PHOOD Seminars

The PhD students self-organize a fortnightly hour-long meeting with food purchased by the department. It is important for all PhD students in their first four years to attend and gain experience presenting their research. Alternatively, a student may present a paper they have read to the group. The PHOOD seminar is a way to build community as most of our labs only have 1 or 2 students, unlike, say, biology labs.

Quantitative Biology Specialization

Students wishing to obtain this specialization must first gain approval from the Director of Graduate Studies. This should be done as early as possible, ideally during the first year of graduate studies. In order to receive the PhD in Computer Science with additional specialization in Quantitative Biology, candidates must complete (a) the requirements for the PhD described above and (b) the course requirements for the quantitative biology specialization that are described in the quantitative biology section of the University Bulletin.

Any alteration to the quantitative biology course requirements must be approved by the Director of Graduate Studies and by the quantitative biology program faculty advisory committee.

PhD Learning Goals

Students graduating with a Ph.D. in Computer Science are expected to:

- 1) Attain research expertise and complete a significant body of original research that advances a specific field of computer science.
- 2) Communicate fundamental knowledge of their field of research, as well as details of their own research, in both written and oral form, to expert and non-expert audiences.
- 3) Teach computer science topics effectively, for those interested in teaching careers.
- 4) Be competitive for appropriate positions in industry and academia.

PhD Advisor

Ph.D. students are expected to work closely with their faculty advisor on research projects of mutual interest. Most students will be assigned an advisor upon entry to the program. Students on a Waltz or Michtom fellowship should do independent studies with several faculty and by the end of the second year, the student must obtain the consent of a computer science faculty member to serve as advisor and dissertation committee chair.

Secondary Mentor

By the end of the second year, students must have agreement from a second CS faculty member to serve as a mentor as well as serve on the student's ultimate Dissertation committee.

Changing Advisor

In the rare case that the relationship between a student and their advisor goes awry, the student must find another advisor right away. Students without an advisor cannot continue in the PhD program.

Michtom and Waltz Fellowships

The **Michtom Fellowship** which is awarded to superior PhD Applicants provides the student with up to 2 years to find an advisor by doing initial research with various faculty. Two years of summer support for research are included with the fellowship. Note that the advisor must want to work with the student also, so engaging and getting preliminary research results is important.

Until they find an advisor, the DGS will serve as advisor to Michtom and Waltz fellows.

The **David Waltz Fellowship** which also provides 2 summer research supports, honors the work of David Waltz, for his pioneering research in the field of AI and his promotion of women and minorities in Computer Science. Waltz was a CS professor from 1984-1993 at Brandeis University who passed in 2012.

"Probably the greatest praise for David's leadership came from women who have worked with him. David recruited and promoted women not as a crusader for equal rights but because it was for him obviously the right and wise thing to do. The lessons that teachers, researchers, supervisors--in fact any of us here in this House or elsewhere--can draw from David Waltz are not primarily about computer science and artificial intelligence. They are that the greatest creativity comes from inspiring others; the greatest technique of team-building is listening; the greatest innovation is kindness." [Congressman Rush Holt]

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Contact Information

Mailing Address

Brandeis University
Computer Science Department, MS 018
415 South Street Waltham, MA 02453 USA

Mail

Normally Brandeis related mail would be sent to you at this address and placed in your mailbox in the Dept. Office for you to pick up. All PhD's will have card swipe access to the administrative office.

Building Access

Your Brandeis ID card will allow you after-hours building access to Volen as well as the administrative office.

FACULTY				
Graduate Advising Head	Jordan Pollack	Volen 213	pollack@brandeis.edu	
Department Chair	Nianwen Xue	Volen 254	xuen@brandeis.edu	

STAFF				
Program Coordinator	Anne Gudaitis	Volen 261	gudaitis@brandeis.edu	781-736-2700-
DivSci Graduate Affairs	Amy Smack	Kosow 104	amysmack@brandeis.edu	781-736-3148
Department Administrator	Michael Golitsyn	Volen 261	golitsyn@brandeis.edu	781-736-2701
Chief System Administrator	Chris Allison	Volen 125	guru@cs.brandeis.edu	781-736-2717
Systems / Guru Information	www.cs.brandeis.edu/~guru			

DEPARTMENT	LOCATION	@brandeis.edu	PHONE	www.brandeis.edu/...
Graduate School of Arts and Sciences (GSAS)	Bernstein-Marcus	gradschool	781-736-3410	gsas/
English Language Programs (ELP)	Rabb 340	arinaldo	781-736-3992	elp/
Health Center	Stoneman Building	brandeishealthcenter	781-736-3677	health/
Counseling Center	Mailman Building	bcc	781-736-3730	counseling/
Career Services	Kutz 219	gsascareers	781-736-3414	gsas/career/
Housing	Kutz Grad Student Ctr.	weglinski	781-736-3547	graduate-student-affairs/housing/

International Students and Scholars Office (ISSO)	Kutz 215	isso	781-736-3480	isso/
Registrar	Kutz 121	registrar	781-736-2010	registrar/
Workday	Website	Course registration, payment, transcript, emergency information, etc.		workday/

PhD Requirements

Satisfactory completion of an approved schedule of nine computer science courses numbered 100 or above of which two may be chosen from the following courses: COSI 152aj, COSI 152bj, COSI 153aj, COSI 153bj, COSI 154aj, COSI 293aj, COSI 210aj, COSI 200a,b and COSI 210a. “J” courses are offered during the Justice Brandeis summer semester. Students may petition the director of graduate studies to substitute courses from other departments that are relevant to their research area. Students who have obtained a Masters degree in Computer Science may petition to reduce their course requirements by a maximum of 6 courses.

If funded for the summer, PhD students are required to do work related to their research area under the supervision of a faculty member. Alternatively, students can get an industrial internship. Students doing dissertation research over the summer should register for CONT 250. Students doing an industrial internship must have the consent of their advisor and should register for COSI 393g.

Residency Requirement

The minimum residency requirement is three years. Neither summer school nor Justice Brandeis Semester (JBS) counts towards the residency requirement. For 6 semesters, students are expected to be physically in the greater Boston area and to participate in the in-person life of the university community.

Academic Status

Students must maintain a minimum of a B- in all required courses. At the end of each semester in the program, students who have an average of less than B- in these courses will be subject to probation or withdrawal from the program.

Every year there will be a progress review which the student fills out and which is reviewed by the faculty of the department. Students who do not make progress towards their PhD may go on academic probation or be asked to leave the program.

Masters Degree

After taking 9 courses, PhD students may apply for an MS degree in passing in their second year, although international students may delay this for strategic purposes having to do with CPT and OPT (More information on the ISSO site).

Thesis Proposal and Thesis Defense

The adviser and the director of graduate studies establish a thesis committee consisting of the adviser, one other Brandeis Computer Science faculty such as the secondary mentor, and one or more appropriate external members from outside the department or outside Brandeis. Either the Advisor or Mentor must be tenured.

The PhD candidate must prepare a written thesis proposal that surveys the relevant literature and states the goals of the dissertation and topics to be investigated (including aspects already completed or underway), along with an oral presentation to the thesis committee that is open to computer science faculty who wish to attend.

In order to secure a room for the Proposal Hearing, please complete the [Dissertation Proposal Hearing Form](#) as early as possible.

Thesis Defense

Public defense of a completed dissertation will be announced three weeks in advance. Copies of the complete thesis will be available to the faculty during these three weeks.

<https://www.brandeis.edu/gsas/student-resources/thesis-dissertation-guide.html>

Teaching Requirements

Teaching is a critical skill required in both academic and industrial careers that follow graduation. To prepare students for this role, students normally serve as teaching interns for one course per year or Teaching Assistant for two courses a year. Teaching responsibilities may include assisting with course design and lecture preparation, giving an occasional class lecture, assignment formulation and grading.

Course assignments are made at the beginning of semesters by the department administrator in consultation with the faculty. Often PhD students work as TAs to their own advisor, but working for other faculty is a good way to get to know them.

All students who serve as Teaching Assistants, Course Assistants, or Teaching Fellows must complete a series of trainings: the Office of Equal Opportunity training, the Supporting Students Outside of Academics training, the Pedagogy training, and (for international students who have not received a previous degree from a US college or university) the International Pedagogy training. Students only need to complete each training once and will receive emails in the semester they are first teaching with information about schedules and signing up.

Academic Integrity

Below is an example of academic honesty policy for a programming class. There may be small variations between classes, but this is a good example of what is acceptable. It is your responsibility to make sure you know the academic honesty policy at the beginning of the semester and abide by it throughout the semester. The ramifications of academic dishonesty are severe and can result in failing a class or worse. Cases of academic dishonesty are routinely referred to the Dean's office.

ACADEMIC INTEGRITY

As stated in the Rights and Responsibilities handbook, "Every member of the University community is expected to maintain the highest standards of academic honesty. A student shall not receive credit for work that is not the product of the student's own effort."

Programming assignments must be completed individually (unless specified otherwise by the instructor); all code you submit must be your own work. You may discuss general ideas of how to approach an assignment, but never specific details about the code to write. Any help you receive from or provide to classmates should be limited and should never involve details of how to code a solution.

As a student of this course you are agreeing to the following rules:

You may not work as a partner with another student on a programming assignment.

You may not get code from online sources.

You may not show another student your solution to an assignment, nor look at his/her solution, for any reason.

You may not have another person "walk you through" an assignment, describe in detail how to solve it, or sit with you as you write it. You also may not provide such help to another student. This includes current or former students, tutors, friends, TAs, web site forums, or anyone else.

You may not post your homework solution code online or ask others for online help. This includes: Public message boards, forums, file sharing sites and services, or any other online system.

Under our policy, the student who gives inappropriate help is as guilty as the one who receives it. Instead of providing such help to someone who does not understand an assignment, point them to other class resources such as lecture examples, the textbook, or emailing a TA or instructor. You must not share your solution and ideas with others. You must also ensure that your work is not copied by others, such as making sure to log out of shared computers, not leaving printouts of your code in public places, and not emailing your code to other students or posting it on the web. We enforce this policy by running similarity detection software over all submitted student programs.



Computer Science Faculty

Lotus Goldberg

PhD, McGill University

Professor of Linguistics; Vice Chair, Linguistics and Computational Linguistics Programs

Research Interests

Theoretical syntax and the syntax-semantics interface; ellipsis and null anaphora; morphosyntax; structure of Modern Hebrew and other Semitic languages; corpus linguistics.

Courses Taught

Ling 100a Introduction to Linguistics

Ling 115a Morphology

Ling 120b Syntactic Theory
Ling 121b Syntax II
Ling 125b Linguistic Typology
COSI 138a Computational Linguistics 2nd
Ling 190b Topics in Linguistics
Ling 195a Introduction to Research in Linguistics and
Computational Linguistics



Tim Hickey

Computer Supported Learning / Educational Technology / Game Design

Research Interests

Educational technology; computer Science education; 3D game design; interval arithmetic; scientific visualization; computer supported learning; groupware and collaborative editing; constraint logic programming.

Courses Taught

COSI 2a Introduction to Computers
COSI 11a Programming in Java and C
COSI 12b Advanced Program Techniques
COSI 89a Research Internship
COSI 152a/b Web App Development
COSI 153a Mobile Application Development
COSI 153b Mobile Game Design
COSI 154a The JBS Incubator
COSI 155b Computer Graphics
COSI 164a Introduction to 3-D Animation
COSI 320a/b IT Entrepreneurship Pract. I/II
EL 94a Experiential Learning Practicum



Pengyu Hong

Bioinformatics / Machine Learning / Image Processing

Research Interests

Computer science, machine learning; image processing, bioinformatics; biomedical informatics; intelligent education.

Courses Taught

COSI 101a Fundamentals of Artificial Intelligence
COSI 123a Statistical Machine Learning
COSI 178a Computational Molecular Biology



Hongfu Liu

Bioinformatics / Machine Learning

Data mining; machine learning; related applications in social media; computer vision; biomedical informatics.

Courses Taught

COSI 21a Data Structures and the Fundamental of Computer Science
COSI 126A Unsupervised Learning and Data Mining
COSI 159 Computer Vision
COSI 150 Recommendation Systems
COSI 177 Scientific Computing in MATLAB



Constantine Lignos

Natural Language Processing

Research Interests

Computational linguistics; natural language processing; language acquisition and change; psycholinguistics.

Courses Taught

COSI 114a Fundamentals of Natural Language Processing 1
COSI 216a Topics in Natural Language Processing
COSI 217b Natural Language Processing Systems



Harry Mairson

Algorithms

Research Interests

Logic in computer science, Lambda calculus, functional programming.

Courses Taught

COSI 29a Discrete Structures
COSI 21b/121b Structure and Interpretation of Computer Programs
COSI 190a Intro to Programming Language Theory



Sophia Malamud

Linguistics

Research Interests

Formal semantics and pragmatics; corpus linguistics; speech acts; game and decision theory; reference and information structure; modality; impersonals and passives; heritage language acquisition.

Courses Taught

Ling 100a Introduction to Linguistics
Ling 130a Introduction to Formal Semantics
Ling 140a Discourse and Pragmatics
Ling 160b Mathematical Methods for Computational Linguistics
Ling 173a Psycholinguistics
Ling 190a Topics in Linguistics
Ling 197a Language Acquisition and Development



Olga Papaemmanouil

Systems / Databases / Big Data

Research Interests

Distributed data management; databases; cloud computing; stream processing.
stream processing

Courses Taught

COSI 12b Advanced Programming Techniques
COSI 129a Introduction to Big Data Analysis
COSI 132b Networked Information Systems
COSI 228a Topics in Distributed Systems



Keith Plaster

Linguistics

Research Interests

Phonological theory; historical linguistics; morphology; heritage linguistics.

Courses Taught

COSI 138a Computational Linguistics 2nd Seminar
LING 100a Introduction to Linguistics
LING 105a Phonetics
LING 110a Phonological Theory
Ling 111a Phonology II
LING 150a Historical Linguistics and Language Change
LING 160b Mathematical Methods for Computational Linguistics
LING 190b Topics in Linguistics
LING 197a Language Acquisition and Development



Jordan Pollack

Artificial Intelligence

Research Interests

Artificial Intelligence; neural networks; machine learning; evolutionary computation and artificial life.

Courses Taught

COSI 2a Introduction to Computers

COSI 10a Problem-solving with Python

COSI 101a Fundamentals of Artificial Intelligence

COSI 113b Artificial Life

COSI 217a Topics in Adaptive Systems



James Pustejovsky

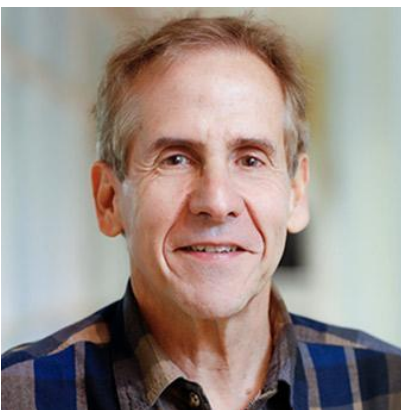
Computational Linguistics / Linguistics / Artificial Intelligence

Research Interests

Theoretical and computational linguistics; artificial intelligence and machine learning; corpus linguistics and annotation; lexical semantics; temporal and spatial reasoning.

Courses Taught

COSI 101a Fundamentals of Artificial Intelligence
COSI 112a Modal, Temporal, and Spatial Logic for Lang
COSI 115 Fundamentals of Computational Linguistics
COSI 129a Introduction to Big Data Analysis
COSI 135b Computational Semantics
COSI 140b Natural Lang Annotation for Machine Learning
COSI 216a Topics in Natural Language Processing



Pito Salas

Research Interests

Entrepreneurship; software development methodologies, large-scale software systems architectures; user interface and user experience.

Courses Taught

COSI 12b Advanced Programming Techniques
COSI 105b Software Engineering for Scalability
COSI 152a Web Application Programming
COSI 152b Web App Development for Social Networks
COSI 154a The JBS Incubator
COSI 165a Software Entrepreneurship
COSI 166b Capstone Project for Software Engineering
COSI 167b Software Engineering Laboratory
COSI 202b Software Engineering Lab
COSI 235a IT Entrepreneurship
COSI 236b Software Development for IT Entrepreneurship



Liuba Shriru

Systems / Databases / Big Data

Research Interests

Distributed Systems; reliable and scalable storage systems.

Courses Taught

COSI 131a Operating Systems
COSI 146a Principles of Computer System Design
COSI 147a Distributed Systems



Jim Storer

Theory / Algorithms

Research Interests

Computer algorithms; data compression; communications and archiving (including text, images; video and multimedia); image retrieval and classification; object recognition and parallel computing.

Courses Taught

COSI 21a Data Structures and the Fundamentals of Computing

COSI 130a Introduction to the Theory of Computation

COSI 175a Data Compression and Multimedia Processing

COSI 180a Algorithms



Nianwen Bert Xue

Computational Linguistics / NLP / Machine Translation

Research Interests

Computational linguistics; Chinese language processing; Semantic role labeling; machine translation and annotation, including Chinese Treebank, Chinese Proposition Bank, OntoNotes.

Courses taught

COSI 137b Information Extraction

COSI 216a Topics in Natural Language Processing

LING 131a Programming for Linguistics



Chuxu Zhang

PhD, University of Notre Dame

Research Interests

Data science, machine learning, deep learning and related applications in graph/network mining, recommendation/user modeling, natural language processing, time series/spatial-temporal data analysis, inter-disciplines.

Frequently Asked Questions

1) Will I have a meeting with my advisor before I choose my classes? Will it be clear what classes I need to take?

Yes. After orientation, it should be very clear what classes you need to take; you will also meet with your advisor within the first week of classes so you can make sure you're on the right track.

2) How many classes do students normally take?

We have designed the program so that a student should be able to comfortably take 3 classes per semester. However, there are those students who wish to take 4, and though we do not recommend it, those with strong computer science backgrounds may be comfortable doing this. Regardless, you still have a residency requirement of 3 years.

3) How do I Transfer in courses?

A Brandeis student can transfer in up to 6 courses as long as they have not been used toward fulfilling requirements for another degree. Contact the DGS, Professor Pollack, pollack@brandeis.edu

4) How long do I have to decide before I commit to a class?

If you aren't sure about which elective to take, you should enroll in the course and attend the first couple of classes. You are required to go to the first lecture of any class you are interested in. You will have plenty of time to drop the class if you choose to do so. This Fall, the "add" deadline is Wednesday, September 14, and the "drop" deadline is Thursday, November 14. See detailed academic calendar: <https://www.brandeis.edu/registrar/calendar/fall-2023.html>.

5) If I'm an international student, can I do an internship in the summer? International PhD Students need to complete two academic semesters in residence on an F1 Visa status to be eligible to gain CPT authorization and will enroll in CS 293G, which counts for one academic credit. Usually students enroll in this class during the summer in between their first and second year, once they have found an internship. For further details on the procedures please contact: compsci@brandeis.edu, and the ISSO Office: isso@brandeis.edu.

6) Does the department help me find an internship during my studies and/or a permanent job after graduation?

The Computer Science department provides multiple opportunities for students to establish relationships with stakeholders and industries in the field via our annual computer science career fair, 'meet and greets' with outside companies, as well as tech talks throughout the year.

7) What is a passing grade?

Graduate students must receive a B- or better on all their 100-level or above classes.