



## SCHOOL OF COMPUTER SCIENCE

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### Programs

Artificial Intelligence (BS)

Computational Biology (BS)

Computer Science (BS)

Human-Computer Interaction (BS)

Bachelor of Computer Science and Arts (BCSA)\*

Robotics (additional major only)

#### Minors

Artificial Intelligence  
Computational Biology  
Computer Science  
Human-Computer Interaction  
Language Technologies  
Machine Learning  
Neural Computation  
Robotics  
Software Engineering

\* Interdisciplinary major offered in conjunction with the College of Fine Arts

Carnegie Mellon University's School of Computer Science is a community of students and faculty passionate about using technology to change the world. Our top-ranked programs provide both the theoretical knowledge and hands-on experience needed to solve any problem in computer science. Extensive research opportunities and a vast alumni network mean that our graduates are well-equipped to pursue a wide variety of career and graduate school opportunities. We launch the next generation of innovators who address real-world issues and improve the way people live and work.

### — A World Leader in Computing Research

Maybe you're interested in creating a robot to help people with mobility issues. Perhaps you want to explore emerging technologies with our acclaimed faculty. Or maybe you can't wait to push boundaries with your fellow students during hackathons. At Carnegie Mellon's School of Computer Science, you can do all of that and more. You'll immerse yourself in computing research and have the opportunity to expand your mind through campus-wide multidisciplinary learning that customizes your educational path. And you may choose to double major or pursue coursework in one or more of Carnegie Mellon's other areas of study.

Each major within the School of Computer Science has its own set of core courses and program requirements. Depending on

the course of study, these include a mix of mathematics, engineering, communications, humanities, science, ethics and free electives. As a student, you'll have the opportunity to experience our Robotics Institute — the first of its kind in the world and a leader in research, education and innovation. You'll learn from renowned professors. And you'll forge your own path, which may include study abroad in various locations, including Carnegie Mellon University in Qatar's CS program, located in Doha's Education City.

### FIRST-YEAR CLASS

— FALL 2022 **220**

### — Did you know?

**WE LIKE FIRSTS.** We launched the nation's **first Bachelor of Science in Artificial Intelligence**. And our Robotics Institute was the **FIRST OF ITS KIND IN THE WORLD**.

Our **COMPUTATIONAL BIOLOGY** Department was the **first to be created within** a computer science school.

**NEARLY HALF** (46%) of undergraduates in the School of Computer Science are **WOMEN**, well **above the national average**.

We work hard to **MATCH RECRUITERS WITH OUR TALENTED STUDENTS** through campus career fairs, information sessions, technical presentations, course

sponsorships, meet-and-greet programs and involvement in an array of unique programming.

# SCHOOL OF COMPUTER SCIENCE

## — Curriculum Overview

There's a reason that our college is known and respected world-wide. Our undergraduate degree programs are complemented with minors and interdisciplinary study that allow you to create your individualized, formative educational experience. You'll dive into foundational coursework beginning your first semester, and this strong foundation in computational thinking and complex problem solving ensures that you'll have the skills needed to secure an internship as early as the summer after your first year. You'll declare your major by the middle of your second semester.

Because computer science may be just one of your passions, our curriculum offers you the flexibility to pursue other academic interests — from complementary fields like math or electrical engineering to subjects like music or foreign languages. Carnegie Mellon's rich interdisciplinary culture will support your exploration of whatever those interests may be.

Study abroad, research and extracurricular activities that connect you to opportunities within the Pittsburgh community round-out your personal and educational growth with us.

## — Student Research

### Ergometric Multilinear Futures

In functional languages, it can be challenging to implement parallel functions efficiently through futures, with memory management and granularity being significant bottlenecks. This research provides the theoretical basis for addressing both of these challenges.

In this work, the researchers developed a language based on a mixed linear/nonlinear model, formulated in a semi-axiomatic sequent calculus so its natural computational interpretation encompasses futures.

The researchers augment their language with ergometric types to capture the total work of program execution under a flexible model of amortized cost based on potentials. This step allows for informed scheduling decisions and partially automated granularity control in both purely linear and multilinear settings.

The researchers also prove type safety — including accuracy of reference counts and accounting of potential.

### Vocal Fold Dynamics for Automatic Detection of ALS From Voice

Amyotrophic lateral sclerosis (ALS) is a progressive neurodegenerative disease whose diagnostic methods are complicated and rely on subjective judgments from physicians. This situation could be greatly improved by developing an expedient, objective diagnostic aid based on voice recordings.

Since ALS affects motor neurons and causes dysfunction in speech and respiration, researchers hypothesized that analyzing features that capture the essential characteristics of the biomechanical process of speech could successfully distinguish people with ALS from non-ALS controls. Their strong results demonstrate the potential for using vocal fold dynamics to detect ALS from voice recordings in the future.

"I JUST GOT HERE, AND  
I FELT THAT VIBE.  
I KNEW IT WAS  
WHERE I SHOULD BE."  
—HARLENE, CLASS OF 2021

## AVG STARTING SALARY

# \$125,845

## GRADUATE SUCCESS

— **98%** Employed or in  
grad school within  
six months  
of graduation

DATA AS OF JANUARY 2022  
91% OF GRADUATES RESPONDING






## RECENT EMPLOYERS

Affirm	Google
Amazon.com	Microsoft
APT	Uber ATG
Facebook	



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