

## SCHOOL OF COMPUTER SCIENCE

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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 2021 258**

### — 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.

### 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

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

# 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 be 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

### Visual Odometry in Darkness for Planetary Micro-Rover Autonomy

Carnegie Mellon's bold, innovative lunar micro-rover will be humanity's first venture to seek and characterize ice at the lunar poles.

Vision-based algorithms must function under the unique lighting experienced at a lunar pole.

Methodologies will be developed and evaluated to guide the rover, including a "FAST" feature for use in darkness and the testing and selection of the stereo vision algorithm.

### Theoretical Studies in Quantum Information Theory

Through this research, full proofs are developed for Gao's Quantum Union Bound and Gentle Sequential Measurement theorems.

The Quantum Union Bound gives an upper bound on the probability that at least one out of a sequence of "quantum events" occurs, in terms of the probabilities of each individual event occurring.

The related Gentle Sequential Measurement theorem bounds the distance of the final quantum state from the initial quantum state, conditioned on none of these events occurring.

### Formal Verification of Next-Generation Airborne Collision Avoidance System with Adversarial Intruder Behavior

This research focuses on the design of aircraft collision avoidance algorithms.

Existing collision avoidance systems have been analyzed assuming severe restrictions, limiting their safety guarantees in real-world collision scenarios.

The research takes a conceptually significant and practically relevant departure from existing models — generalizing them to hybrid games with two independent players.

By proving the existence of winning strategies for the resulting models in differential game logic, collision-freedom is established for flight paths with evolving vertical/horizontal velocities.



## AVG STARTING SALARY

# \$120,253

## GRADUATE SUCCESS

— **99%** Employed or in grad school within six months of graduation

DATA AS OF JANUARY 2021  
90% OF GRADUATES RESPONDING






## RECENT EMPLOYERS

Affirm	Google
Amazon.com	Microsoft
APT	Uber ATG
Facebook	

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

## Carnegie Mellon University

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