Carnegie Mellon University

SCHOOL OF COMPUTER SCIENCE

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 2023 **220**

Programs

Artificial Intelligence (BS)

Computational Biology (BS)

Computer Science (BS)

Human-Computer Interaction (BS)

Robotics (BS)

Bachelor of Computer Science and Arts (BCSA)*

Minors

Artificial Intelligence
Computational Biology
Computer Science
Human-Computer Interaction
Information Security, Privacy and Policy
Language Technologies
Machine Learning
Neural Computation
Robotics
Software Engineering

Additional CS Concentrations

Algorithms and Complexity
Computer Graphics
Computer Systems
Principles of Programming Languages

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

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 ***RAY AND STEPHANIE LANE 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, concentrations 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 helps set you up for success in your future coursework and any internships you may want to pursue. You'll declare your major by the middle of your second semester.

Because computing may be just one of your passions, our curriculum offers you the flexibility to pursue other academic interests — from complementary fields like mathematics and computer 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

Learning Shared Safety Constraints From Multitask Demonstrations

As robots move from the lab to the real world, it becomes increasingly important to ensure they behave safely. Unfortunately, manually specifying what safe behavior is to a robot is often time-consuming and error-prone. This research takes a first step toward automatically learning safety constraints from data and approaches the problem via an extension of inverse reinforcement learning (IRL) techniques. Traditional IRL consists of providing demonstrations of desired behavior and attempts to extract a reward function that would make the demonstrated behavior optimal. This research assumes that access to optimal safe behavior and the reward are provided, and then extracts the constraint that the expert was satisfying. (For example, this method would demonstrate that crashing into cyclists is forbidden, even though it would make getting to a destination faster.) Unfortunately, the constraint learning problem is ill-posed and has limited practical applicability. This work proposes a multitask extension of inverse constraint learning that leverages diverse data to learn more reasonable constraints.

Distilling Neural Fields for Real-Time Articulated Shape Reconstruction

This research presents a method for reconstructing articulated 3D models from videos in real-time, without test-time optimization or manual 3D supervision during training. Prior work often relies on prebuilt deformable models or slow per-scene optimization through differentiable rendering (e.g., dynamic NeRFs). Such methods fail to support arbitrary object categories, or are unsuitable for real-time applications. To address the challenge of collecting large-scale 3D training data for arbitrary deformable object categories, this research uses off-the-shelf video-based dynamic NeRFs as 3D supervision to train a fast feed-forward network, turning 3D shape and motion prediction into a supervised distillation task. This temporal-aware network uses articulated bones and blend skinning to represent arbitrary deformations, and is self-supervised on video datasets without requiring 3D shapes or viewpoints as input. This method yields higher-fidelity 3D reconstructions than prior real-time methods for animals, with the ability to render realistic images at novel viewpoints and poses.

AVG STARTING SALARY

$149,498

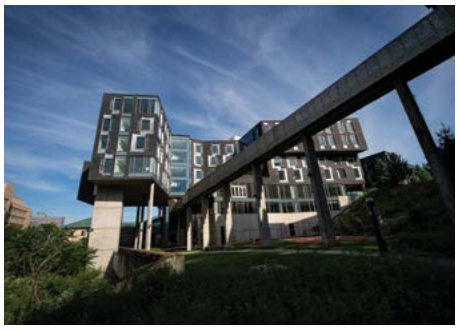
GRADUATE *SUCCESS*

94% **Employed or in grad school (2023 graduates)**

DATA AS OF JANUARY 2024
91.6% OF GRADUATES RESPONDING

RECENT EMPLOYERS

Amazon	Google
Apple	Jane Street
Bloomberg	Meta
Duolingo	Microsoft
Goldman Sachs	Netflix



Carnegie Mellon University

OFFICE OF ADMISSION
CARNEGIE MELLON UNIVERSITY
5000 FORBES AVENUE
PITTSBURGH PA 15213-3890
T: 412.268.2082
F: 412.268.7838
E: admission@andrew.cmu.edu
W: cmu.edu/admission

carnegiemellonadmission
CarnegieMellonU
CarnegieMellon
Carnegie Mellon University

cmu.is/admission-scs

February 2024