

# Peter He

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## Education

**Cornell University**, College of Engineering, Ithaca, NY  
Bachelor of Science, Electrical & Computer Engineering

**Expected May 2027**  
Expected Minor in Robotics

## Skills

**Programming:** Python, Java, C, C++, Linux, Pytorch, OpenCV, Three.js, Swift, COLMAP, Unity, Machine Learning

**Hardware:** Microcontrollers, Embedded Systems, Firmware, PCB Design, KiCad, 3D Printing, Fusion (CAD), Wearables

## Awards

Computing Research Association (CRA) Outstanding Undergraduate Researcher Award **2025**  
*Honorable Mention*

ACM CHI 25' Best Paper **2025**  
*Honorable Mention*

## Research Papers

### **SeamPose: Repurposing Seams as Capacitive Sensors in a Shirt for Upper-Body Pose Tracking**

Tianhong Catherine Yu, \*Manru Mary Zhang, \*Peter He, Chi-Jung Lee, Cassidy Cheesman, Saif Mahmud, Ruidong Zhang, Francois Guimbretiere, Cheng Zhang

[dl.acm.org/doi/abs/10.1145/3654777.3676341](https://dl.acm.org/doi/abs/10.1145/3654777.3676341)

ACM UIST 24'

### **SplatOverflow: Asynchronous Hardware Troubleshooting**

Amritansh Kwatra, Tobias Wienberg, Ilan Mandel, Ritik Batra, Peter He, Francois Guimbretiere, Thijs Roumen

<https://dl.acm.org/doi/10.1145/3706598.3714129>

*Honorable Mention ACM CHI 25'*

## Research Experience

### **Smart Computer Interfaces for Future Interactions (SciFi) Lab**

**Dec 2023 - Present**

#### *Undergraduate Research Assistant*

*Ithaca, NY*

- Currently leading a first-author project to fabricate textile-based dry electrodes for sensing and electrostimulation.
  - Co-advised by Prof. Cheng Zhang in the SciFi Lab and Prof. Cara Nunez in the HAPPI Lab.
- Co-second author on [research paper](#) using capacitive sensing and deep learning to track upper body poses.
  - Presented at the **ACM User Interface Software and Technology (UIST) '24** conference.
  - Responsible for firmware and electronics design for the wearable textiles project with an integrated capacitive sensing system for upper body body-pose estimation and tracking.
  - Designed a custom PCB for microcontroller integration with FDC2214 capacitive sensing chips.
- Conducted data acquisition and wrote a data processing script in Python to clean and convert capacitance signals into data that can be trained for pose estimation using a computer vision model as the ground truth.

### **Human Augmentation in Physical and Perceptual Interactions (HAPPI) Lab**

**Jan 2026 - Present**

#### *Undergraduate Research Assistant*

*Ithaca, NY*

- Co-advised for the textile-based dry electrodes project mentioned above.
- Fabricated sensor electrodes for an upcoming ICRA submission on using machine learning to calibrate the effects of sensor curvature (bending) for sensor readings.
  - Responsible for designing silver-resin based capacitive electrodes, textile matrix electrodes, and conductive thread matrix electrodes.
  - Oversaw and figured out a process to create polydimethylsiloxane (PDMS) silicone pads of custom thickness for capacitive pressure sensors through heat-pressing.
- Designed a custom printed circuit-board for a 6x6 resistive sensing matrix.

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## Matter of Tech Lab at Cornell Tech

May 2024 - Sep 2024

### Research Intern

NYC, NY

- Designed and wrote a Python library to facilitate real-time localization of phone camera-feeds into 3D-gaussian splat scenes of hardware devices for the purpose of remote hardware maintenance.
  - Written based on recent research advancements in feature matching algorithms for 3D spaces.
  - Optimized a Pytorch pipeline reducing localization time through pre-loading models and optimizing structure for smaller-scale scenes.
  - Camera localization library created was implemented and used in an **accepted ACM Conference on Human Factors in Computing Systems (CHI) '25 [research paper](#)**.
- Wrote custom script to segment Gaussian Splats of machines based off of corresponding CAD file.
- Received \$10,000 BURE grant through Cornell to fund this internship, research, and conference travel.

## Other Relevant Experience

### Mira

June 2025 - Sept 2025

### Engineering Intern

San Francisco, CA

- AI Wearables startups with \$1M+ in pre-seed funding (\$6.6M seed round) to create display smart glasses.
- Wrote mobile applications in Swift to interface with AI smart glasses with a display.
  - Reverse-engineered Bluetooth protocols and commands for smartglasses to allow our app to communicate with glasses by various manufacturers, creating a general-purpose application.
  - Researched and designed an always-listening Human-AI interface to enable seamless integration of real-time proactive AI assistance to the smart glasses.
- Prototyped gesture and facial recognition software for camera-based smartglasses using the iPhone Vision framework.
- Designed electrical prototypes of various smartglasses with cameras and custom PCBs.
  - Sourced ideal components by meeting with Chinese manufacturers.
  - Reverse engineered bluetooth protocol of other smartglasses to load our custom OS.

### Cornell ECE 3140 Embedded Systems

Jan 2026 - Present

### Course Assistant (TA)

Ithaca, NY

- Grading assignments and proctoring exams for the embedded systems class.
  - I was offered the position after winning the class competition when I took the class.
- Tutoring students and answering questions on Ed Discussion.
- Writing Canvas study materials and lab guides.

### Cornell XR (Virtual, Augmented & Mixed Reality) Project Team

Dec 2023 - Present

### Founder & Full Team Lead

Ithaca, NY

- Founded the Cornell XR Project Team to create a space for students to work on XR and HCI projects.
- Fastest club to ever become an official Cornell Engineering Project Team.
  - Part of a select group of student organizations on campus that can offer academic credit for participating in engineering projects.
- Leading a project to create a full haptic ecosystem featuring various stimuli and kinesthetic feedback.
  - Researching and developing a pair of custom VR haptics gloves with custom firmware, drivers, and printed circuit board based on prior open-source designs.
  - Teaching members serial communication protocols to connect DIY hardware devices to Virtual Reality headsets through Unity.
  - Designing a system integrating custom-made olfactory displays, force-feedback exoskeletal arms, BCI controllers, and omni-directional treadmills.
  - Exploring methods to combine physical hardware and virtual reality to create unique interactions.
- Raising over \$10k in funding from the university as well as various sponsors.
- Engaging with Cornell alumni in the XR industry and hosting them for workshops and talks.

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## Featured Personal Projects

### **Human Operator | MIT HARD MODE: Hardware x AI Hackathon 2026**

#### *Winner of Learn Track*

- Created with a team of 6 to create [Human Operator](#), a human augmentation tool that allows AI to briefly take control of your body to help you learn or do things you cannot do.
- Led the engineering design of the overall electrical muscle stimulation (EMS) system.
  - Conducted a literature review during the hackathon to figure out which fingers were the most suitable to be actuated as well as how to control the human wrist to be able to perform gestures like waving.
  - Was able to successfully control 3 fingers and a wrist through using a TENS unit and relays.
- Integrated the hardware system with a pair of camera glasses to enable a Vision Language Model (VLM) to control and understand how the user is interacting with the world.
  - Successfully got the AI to play piano, and wave hello world as well as be voice-activated.

### **NeuroScent | MIT Reality Hack (XR Hackathon) 2025**

#### *Winner of Hardware Track - Smart Sensing*

- Collaborated with a team of 5 to create [NeuroScent](#), a system connecting VR brain-computer interfaces with olfactory displays to promote users' mental well-being based on biofeedback using OpenBCI's Galea Headset.
  - Created an environment in Unity that reacted and dispensed scent based on detected alpha brain waves.
- Assembled a cheap ~\$60 olfactory display to enable smelling two scents (lavender & orange) from scratch using common rapid-prototyping components and two cheap diffusers referenced from a research paper.
  - Wrote custom ESP32 micro-controller firmware and Unity scripts to enable USB serial connection of the olfactory display to a Unity VR scene.

### **Rewind | HackMIT 2025**

#### *3rd Place Winner of InterSystems Challenge*

- Created Rewind, an memory preservation web app that allows users to store, revisit, and share their memories in various formats such as video, photos, text, and audio.
  - Designed a system for users to query memories using natural language search.
- Developed a pipeline that integrated gaussian splatting to generate 3D scenes from user-uploaded videos for immersive memory viewing.
- Used Three.js and WebXR to let Apple Vision Pro users view their memories in 3D format.

### **FlexVR Wellness | MIT Reality Hack (XR Hackathon) 2024**

#### *Winner of Hardware Track - Creative Inputs/Outputs*

- Developed the [FlexVR Wellness](#) ecosystem to enable remote electro-stimulation therapy.
  - Designed a system where the therapist uses an AR headset to enhance their workflow, communicate with patients, get live data, and control the patient's electro-stimulation therapy while the patient is in a calm, stress-reducing VR environment.
- Wrote ESP32 firmware and did fabrication + hardware design of the project during the hackathon.
- First developers ever to create a system enabling cross-play between the Qualcomm Snapdragon Spaces AR