Peter He

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Education
Cornell University, College of Engineering, Ithaca, NY   **Expected May 2027**
Bachelor of Science, Electrical & Computer Engineering   Expected Minor in Computer Science

Skills
Programming: Python, Linux, Pytorch, OpenCV, C, C++, HTML, Javascript, Three.js, VR/AR, Unity, Swift, PlatformIO
Hardware: Micro-controllers, Fusion 360, PCB Design, KiCad, 3D Printing, Rapid Prototyping, Embedded Systems

Relevant Experiences
Smart Computer Interfaces for Future Interactions (SciFi) Lab   **Dec 2023 - Present**
Undergraduate Research Assistant   *Ithaca, NY*
- Currently leading own first-author project on wireless sensing and power transmission for XR interactions aiming for submission to **IMWC 25'**
- Co-second author on research paper using capacitive sensing and deep learning to track upper body poses in real-time.
  - 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 set up a python data processing pipeline for vision-based pose estimation computer vision model used as the ground truth for our custom model.

Matter of Tech Lab at Cornell Tech   **May 2024 - Sep 2024**
Research Intern   *NYC, NY*
- Led the design and creation of a python library to facilitate real-time localization of a phone camera into a 3D-gaussian splat scene based on recent research advancements in feature matching algorithms for 6-DoF visual hierarchical localization.
  - 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 submission.
  - Wrote a Three.js WebXR interface for phone and VR headset localization with Flask backend.

Cornell XR (Virtual, Augmented & Mixed Reality) Club   **Dec 2023 - Present**
Founder & President   *Ithaca, NY*
- Founded the Cornell XR Club to create a community of student XR enthusiasts that will draw attention to the innovative field by developing apps, hardware, and games and hosting events related to XR on campus.
- Leading a project integrating haptics hardware interactions with a photorealistic VR environment.
  - Researching and developing a pair of custom VR haptics gloves based on prior open-source designs.
  - Created a Unity program for experiments with realistic physics-based haptic glove interactions.

IEEE @ Cornell   **Feb 2024 - Present**
Corporate Lead   *Ithaca, NY*
- Managing 10+ corporate board members in completing corporate outreach tasks and organizing career and industry focused events for Electrical & Computer Engineering majors on campus.

Projects
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.
  - Used OpenBCI's Galea BCI VR Headset connected to Unity with a dynamic interactive environment based off of 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.

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