Owen M. Hoffman

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Education

Swarthmore College | Swarthmore, PA Aug. 2022 – May 2026
Candidate for B.A. in Computer Science & B.S. in Engineering

- **CS GPA: 4.00/4.00** – Overall GPA: 3.87/4.00

Publications & Presentations

Conference Papers

- **Hoffman, O.**, Peng, K., Kamal, S., You, Z., & Venkatagiri, S. (2026). *ScamPilot: Simulating Conversations with LLMs to Protect Against Online Scams.* In *Proceedings of the 2026 CHI Conference on Human Factors in Computing Systems (CHI '26)*, April 13–17, 2026, Barcelona, Spain. ACM, New York, NY, USA, 32 pages. **Conditionally accepted**. DOI (to appear): `10.1145/3772318.3791313`. Preprint: link.

Workshop & Short Papers

- **Hoffman, O.**, Peng, K., You, Z., Kamal, S., & Venkatagiri, S. *Promoting Online Safety by Simulating Unsafe Conversations with LLMs.* Accepted as a position paper at the *ACM CUI Workshop on Personas Evolved: Designing Ethical LLM-Based Conversational Agent Personalities*, 2025. Available at arXiv:2507.22267.

Posters & Presentations

- **Hoffman, O.**, Peng, K., Kamal, S., You, Z. *TargetPractice: Simulating Conversations with LLMs Can Protect Against Online Scams.* Poster presentation, *Sigma Xi Undergraduate Research Symposium*, Swarthmore College, Fall 2025.

Professional Experience

Research Assistant – Collective Resilience Lab Jan. 2025 – Present
Swarthmore College, Computer Science Department – PI: Professor Sukrit Venkatagiri *Swarthmore, PA*

LLM RAG Pipeline for Explaining Data Websites Track *(In progress)* *Sep. 2025 – Present*

- Scraping privacy policies from visited websites and using an LLM to extract key disclosures about data collection and use.
- Designing an interface that clearly summarizes what information website tracks about users over time.
- Implementing a Chrome browser extension that logs visited URLs, sends them to a backend analysis pipeline, and displays the resulting privacy summaries on our website.
- **Status/Outcome:** In progress; targeting a 2026 ACM UIST Submission.

ScamPilot: LLM Agents for Scam Prevention *(Conditionally Accepted CHI '26)* *Jan. 2025 – Sep. 2025*

- Built an online research application with LLM agents that simulate scam conversations to test inoculation-based training and compare active-learning interfaces.
- Designed a prompting pipeline that generates realistic, goal-directed conversations which adapt to user input while preserving controlled, safe agent behavior.
- Ran a user study (N = 150) comparing experimental interfaces against a control; found significant improvements in scam recognition (+8%), response efficacy (+9%), and a pre- to post-survey change in self-efficacy (+19%)
- Implemented a statistics pipeline with robustness and sensitivity analyses.
- Coordinated weekly working sessions to refine methodology, track issues, and divide tasks across contributors.
- **Status/Outcome:** Position paper *accepted* (ACM CUI Personas Workshop 2025); full manuscript *Conditionally Accepted* (CHI 2026).

Teaching Team – Grader & Lab Teaching Assistant Sep. 2024 – Present
Swarthmore College, Department of Engineering *Swarthmore, PA*

- **Grader:** *ENGR 021: Computer Engineering Fundamentals* (Fall 2024, Fall 2025) and *ENGR 012: Linear Physical Systems Analysis* (Spring 2025); grade assignments, write rubrics, and provide written feedback.
- **Lab Teaching Assistant:** *ENGR 021: Computer Engineering Fundamentals* (Fall 2025); Provide in-lab support to help student teams achieve project goals, including coaching, troubleshooting/debugging, and ensuring that deliverables align with course rubrics and expectations.
- Coordinate with instructors and the teaching team to streamline assessments and update materials.

Software Developer Intern Jun. 2024 – Aug. 2024

Plurilock Security Inc. *Vancouver, Canada (Remote)*

- Developed three iterations of a new user interface in TypeScript with React.
- Built and integrated over ten REST API service calls using JSON Web Tokens for authorization.
- Implemented dynamic data updates and designed React components with hooks for filtering and search.
- Collaborated in an agile team using the GitFlow branching model and code reviews.
- Performed functionality testing and QA for new interface features.

Projects

Selected projects demonstrate expertise across **robotics**, **computer vision**, **deep learning**, and **digital signal processing**.

Senior Capstone: Trash vs. Recycling Robot | *(in progress)*

- Designing an end-to-end vision-to-control pipeline for a mobile robot that approaches seated users, classifies trash vs. recycling, and routes items to the correct onboard bin.
- Implementing a short-horizon model predictive controller (MPC) that predicts the robot's future motion and maintains comfortable human–robot separation distances while completing its task.

Autonomous TurtleBot Cone-Course Navigation | *ROS, Python*

- Integrated camera-based perception with wheel-encoder odometry and implemented a pure-pursuit controller for real-time cone-course navigation.
- Applied camera-based blob detection with ROS `tf` frame transforms; issued motion commands via `geometry_msgs/Twist` with acceleration filtering to reduce odometry slip.
- Designed a hybrid navigation strategy combining a search state for lost gates with a tuned pure pursuit controller for smooth, efficient path following.
- Used Kobuki `SensorState` feedback (cliff, bumper sensors) to enforce safety and support emergency stops.

Multi-Object Blob Detection and Tracking | *Python, OpenCV, NumPy*

- Constructed a real-time computer vision pipeline to detect and track multiple colored objects in dynamic video sequences.
- Utilized background subtraction, HSV-based color segmentation, and morphological filtering to robustly isolate moving blobs under noise.
- Extracted contour-based features to compute object centroids, orientations, and trajectories; generated visualizations of real-time paths.
- Showcased lightweight, custom computer vision methods applicable to robotics perception tasks requiring efficient object tracking.

Convolutional Neural Network for Image Classification | *Python, TensorFlow/Keras*

- Trained a convolutional neural network on the MNIST dataset, reaching **99.2% test accuracy**.
- Benchmarked against a PCA+KNN baseline (96% accuracy), reducing classification error by over **75%**.
- Investigated kernel sizes, depth, and regularization strategies; visualized training dynamics and performance with Matplotlib.
- Illustrated the strengths of deep learning over classical approaches for scalable computer vision tasks.

Yes/No Speech Recognition System | *MATLAB, DSP, Machine Learning*

- Designed a supervised speech classifier to recognize "yes" vs. "no" from 2,400 labeled audio samples.
- Extracted key spectral and temporal features (MFCCs, zero-crossing rate, RMS energy, spectral flux, centroid) for use in MATLAB's Classification Learner.
- Achieved **93.8% test accuracy**, demonstrating the value of feature-based DSP pipelines for lightweight voice-command HRI systems.

Honors & Awards

Swarthmore College Summer Research Fellowship — Full-time undergraduate research in Human–Computer Interaction (Summer 2025).

Sigma Xi, The Scientific Research Honor Society, Associate Member (elected 2025)

Sigma Xi Travel Grant — Supported attendance and presentation at the ACM CUI Workshop on Personas Evolved (2025).

Centennial Conference Academic Honor Roll — Men's Lacrosse (2×: 2024, 2025).

Featured in Swarthmore College News — "A World of Learning: Summer Research Across Disciplines and Continents" (Summer 2025).

Memberships & Activities

ACM SIGCHI, Student Member (2025–Present)

IEEE Robotics and Automation Society, Student Member (2025–Present)

Varsity Lacrosse, Swarthmore College (2022–Present)

Quant Trading Club, Member (2023–2024)

Technical Skills

Robotics & Perception: ROS (navigation stack, camera packages), TurtleBot, OpenCV, Real-time control, Camera-based navigation, Path planning (A*)
Programming Languages: Python, C/C++, MATLAB, R, TypeScript/JavaScript, SQL
Machine Learning & AI: Neural networks (CNNs, autoencoders), Supervised methods (KNN, decision trees, logistic regression), TensorFlow, Keras, Scikit-learn, LLM prompt engineering
Signal Processing: Feature extraction from audio signals (MFCCs, spectral features, ZCR, RMS), Fourier analysis (DFT, FFT), digital filter design, classification of speech and acoustic signals
Data Science: pandas, NumPy, Matplotlib
Developer Tools & Systems: Git, Docker, VS Code, Linux, AWS