

Stephen Phillips

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EDUCATION

University of Pennsylvania

Ph.D. in Computer Science (Advisor: Kostas Daniilidis)

August 2014 - May 2021

University of Pennsylvania

M.Sc. in Computer Science

August 2014 - June 2016

University of California, Los Angeles

B.S. in Computer Science (GPA 3.97)

August 2010 - June 2014

TEACHING EXPERIENCE

Engineering 27/Computer Science 72 Computer Vision

January 2022 - May 2023, two times

Instructor

Swarthmore College

- Sophomore/junior level, 15 students
- Topics: Fundamentals of computer vision, image processing, neural networks, and 3D reconstruction.
- Updated 20 lectures, 12 homework assignments, and four projects. Fully designed two lectures and an open-ended capstone project.

Engineering 71 - Digital Signal Processing

January 2022 - May 2022

Instructor

Swarthmore College

- Junior/senior level, five students
- Topics: Discrete time signals, Z-transforms, Fourier Transforms, and the Fast Fourier Transform.
- Fully designed all lectures and projects, with homework from textbook. Designed projects on DNA correlation, linear predictive coding, and sound classification with band-pass filters.

Engineering 15 - Fundamentals of Digital and Embedded Systems

August 2021 - December 2022, two times

Co-instructed with lab instructor Professor Erik Cheever

Swarthmore College

- Freshman level, 50 students
- Topics: Introducing programming with Arduino, and laboratory assignments on hardware implementations.
- Designed lectures, homework assignments, and exams. Homework used Adafruit Circuit Playground, implemented in Adafruit's C language variant.

Engineering 19 - Numerical Methods and Applications in Engineering

August 2021 - December 2021

Instructor

Swarthmore College

- Sophomore level, 19 students
- Topics: Introduction to Python, NumPy, and SciPy, basic numerical method algorithms and analysis.
- Designed all 22 lectures, 12 homework assignments, two exams, and five projects, and one open-ended final project.

CIS 107/VLST 209 - Visual Culture through the Computer's Eye

January 2021 - June 2021

Co-instructor and co-designer with Dr. Will Schmenner.

University of Pennsylvania

- Junior level, online, 15 students (approximately evenly split between Humanities and Engineering)
- Topics: Intersection of computer vision and visual studies, dataset and algorithm design, discussion and writing on the real-world stakes of computer vision and the digital humanities.
- Designed engineering-oriented lectures, facilitated class discussions, mentored student teams in designing datasets.

ACADEMIC EXPERIENCE

Visiting Assistant Professor

September 2021 - May 2023

Swarthmore College

Swarthmore, PA

- Teaching focused two year professorship
- Mentored two students on senior thesis projects. See Teaching section for classes taught.
- Mentored five undergraduate students in extracurricular multi-sensor fusion and machine learning projects, all five continued to graduate programs in CS/engineering.

TEACHING ASSISTANT EXPERIENCE

MCIT 515 - Linear Algebra for Machine Learning

July 2020 - December 2020

Head teaching assistant under Professor Jean Gallier

University of Pennsylvania

- Master's level, online, 25-35 students. Students are not expected to have any background in Computer Science.
- Topics: Basics of linear algebra to prepare students for machine learning applications. Link to MCIT program page.
- Graded homework assignments, developed a project auto-grader, and held office hours.

MEAM620 - Advanced Robotics

January 2016 - May 2019, three times

Lecturer and teaching assistant, under various instructors

University of Pennsylvania

- Master's level, 30-40 students
- Topics: Robotic path planning, control theory, and machine perception/computer vision for quadrotors, with projects using real quadrotors. Link to course wiki.
- Held office hours, designed an auto-grader, assisted with hardware testing for student projects, and designed and delivered six lectures on computer vision for robotics

CIS390 - Robotics: Planning and Perception

September 2015 - December 2015

Teaching assistant/course designer under Prof. Daniilidis

University of Pennsylvania

- Sophomore level, 20 students
- Topics: New course in robotic path planning algorithms with Python projects.
- Course designed from scratch with other teaching assistants; primary responsibility was designing a simulation environment to test robotic planning algorithms for course coding projects.

Coursera - Robotics: Perception

January 2016 - July 2016

Teaching assistant and homework designer

University of Pennsylvania (Online)

- General audience, online, (large-scale MOOC; 20-40 students active)
- Topics: Perception module of the UPenn Robotics Specialization on Coursera, focused on basics of computer vision such as the image formation process up to multi-view geometry. Link to course page.
- Designed four homework assignments, wrote supporting teaching material, and wrote an auto-grader for all assignments.

PUBLICATIONS

Xiaoyi Cai, Siddharth Ancha, Lakshay Sharma, Philip R Osteen, Bernadette Bucher, **Stephen Phillips**, Jiuguang Wang, Michael Everett, Nicholas Roy, and Jonathan P How. 2024. Evora: Deep evidential traversability learning for risk-aware off-road autonomy. *IEEE Transactions on Robotics* (2024).

Stephen Phillips and Kostas Daniilidis. 2019. All graphs lead to Rome: Learning geometric and cycle-consistent representations with graph convolutional networks. *CVPR 2019 Image Matching: Local Features and Beyond Workshop* (2019).

Andrew Jaegle, **Stephen Phillips**, Daphne Ippolito, and Kostas Daniilidis. 2018. Unsupervised learning of image motion by recomposing sequences. *International Conference on Learning Representations (ICLR)* (2018).

Andrew Jaegle, **Stephen Phillips**, and Kostas Daniilidis. 2016. Fast, robust, continuous monocular egomotion computation. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA) 2016*, 773–780.

INDUSTRY EXPERIENCE

Robotist, Applied Scientist

May 2023 - Present

Robotics and AI Institute

Cambridge, MA

- Designed a hardware test workflow for team's trained reinforcement-learning based policies for safe deployment on physical robots outside of simulation.
- Developed a sonar-camera fusion pipeline for indoor navigation on our legged robot platform, reducing collisions in low-texture and cluttered environments.
- Built semantic mapping pipelines combining self-supervised visual features (e.g., DINO) with LiDAR odometry to enable semantic-based terrain traversability assessment downstream.

Waymo Perception Research Intern May 2021 - July 2021
Waymo *Remote*

- Conducted research on multi-sensor fusion of camera and radar models for autonomous driving in adverse weather conditions.
- Implemented camera-radar sensor data fusion components for the model training pipeline.

Google Software Engineering Intern June 2017 - September 2017
Google *Mountain View, CA*

- Worked on Project Tango (later Daydream), researching machine learning techniques to improve inertial measurement unit (IMU) accuracy on smartphones.
- Implemented IMU data processing pipeline to analyze sensor performance across diverse real-world scenarios.

EARLY EXPERIENCE

Undergraduate Researcher August 2013 - July 2014
UCLA Vision Lab under Professor Soatto *Los Angeles, CA*

Android Developer Lead October 2012 - October 2013
UCLA Ozcan Lab *Los Angeles, CA*

Software Engineering Intern June 2013 - August 2013
Google *Venice Beach, CA*

Software Engineering Intern June 2012 - August 2012
Zynx Health *Los Angeles, CA*

AWARDS AND HONORS

Outstanding Reviewer of 3DV 2020

National Science Foundation Graduate Research Grant Honorable Mention

Outstanding Bachelor of Science Degree Award (Computer Science)

OUTREACH VOLUNTEERING

Co-director of Penn Open Labs October 2016 - January 2020
University of Pennsylvania

Robot Design Judge for FIRST Lego League Regional Championship February 2014 - February 2019, three times
University of Pennsylvania

Mentor for NSF Research Experience for Teachers (RET) July 2016 - August 2016
University of Pennsylvania

CHARITY PROJECTS

The First Science of Savings Challenge September 2020
SaverLife

24 Hours of Good November 2013
Google in Venice Beach, CA

San Diego Zoo App March 2011- June 2011
University of California, Los Angeles