Portia Cooper

(520) 334-8525 portiacooper@arizona.edu pcoopercoder.github.io pcoopercoder portia-cooper

Education

UNIVERSITY OF ARIZONA *Tucson, Arizona*

M.S. COMPUTER SCIENCE, GPA: 4.0/4.0 Jan 2025 –May 2026 (expected)

Thesis: Impact of Character Perturbations on Tokenization and Embedding Methods
Committee: Dr. Mihai Surdeanu, Dr. Eduardo Blanco, & Dr. Steven Bethard

University of Arizona *Tucson, Arizona*

B.S. COMPUTER SCIENCE, GPA: 4.0/4.0 Jul 2022 – Dec 2024

Honors Thesis: Training Neural Classifiers to Recognize Hate Speech Masked by Homoglyphs
Advisors: Dr. Mihai Surdeanu & Dr. Eduardo Blanco

Undergraduate training was accelerated due to >100 college units earned during middle/high school, including data structures, object-oriented programming, discrete math, vector calculus, and differential equations.

Publications

Portia Cooper, Eduardo Blanco, and Mihai Surdeanu. 2025. The Lies Characters Tell: Utilizing Large Language Models to Normalize Adversarial Unicode Perturbations. In Findings of the Association for Computational Linguistics: ACL 2025, pages 18932–18944, Vienna, Austria. Association for Computational Linguistics. link

Portia Cooper, Harshita Narnoli, and Mihai Surdeanu. 2024. Finding a Wolf in Sheep's Clothing: Combating Adversarial Text-To-Image Prompts with Text Summarization. *arXiv preprint arXiv:2412.12212*. link

Portia Cooper, Mihai Surdeanu, and Eduardo Blanco. 2023. Hiding in Plain Sight: Tweets with Hate Speech Masked by Homoglyphs. In Findings of the Association for Computational Linguistics: EMNLP 2023, pages 2922–2929, Singapore. Association for Computational Linguistics. link

Multi-Year Awards

Barry Goldwater Scholarship 2024

National, highly competitive scholarship for undergraduate students pursuing research careers in natural science, engineering, mathematics, and computer science—up to $15,000 over two years.

Flinn Scholarship 2022

Full-ride scholarship that includes tuition, stipend, and two study abroad experiences at any Arizona public university (1.8% acceptance rate)—valued at more than $135,000 over four years.

Research & Technical Experience

Machine Intelligence and Visualization Group, Sandia National Laboratories *Albuquerque, New Mexico*

M.S./PH.D. RESEARCH & DEVELOPMENT INTERN May 2025 – Present
Supervisor: Dr. Jaimie Murdock

- Optimize topic modeling systems for scientific corpora as a component of the IRIS project, which seeks to design hallucination-free artificial subject matter experts.

- Perform entity extraction and normalization of technical documents for knowledge graph generation.
- Build linguistic analysis tool to perform ontology creation for scientific corpora.
- Utilized high-performance computers to execute IRIS project experiments.
- Selected for year-round employment (15 hours per week) due to outstanding technical contributions during Summer 2025 internship.

Computational Language Understanding Lab, University of Arizona *Tucson, Arizona*

LAB MEMBER/RESEARCHER Apr 2022 – Present

Advisors: Dr. Mihai Surdeanu & Dr. Eduardo Blanco

- Evaluate the robustness of tokenization and embedding methods against adversarial character perturbations, including homoglyphs, leetspeak, emojis, and whitespace.
- Developed novel method to combat Unicode perturbations through usage of direct and indirect LLM-based normalization.
- Neutralized adversarial text-to-image prompts through small encoder- and large language model-based direct text summarization.
- Created method to identify text containing homoglyph perturbations and assembled the Offensive Tweets with Homoglyph dataset (N=90,788).
- Tested Active Learning case selection as a strategy to minimize human exposure to toxic material during content annotation.

Homoglyph Visualization Project *Tucson, Arizona*

DEVELOPER Mar 2025 – May 2025

Project Advisor: Dr. Josh Levine

- Developed visualization for direct comparison between Latin letters and their homoglyph commonalties determined by the Unicode Standard, human annotation, and GPT 4o using D3.js. link

Gerrymandering Redistricting Simulation *Tucson, Arizona*

DEVELOPER Mar 2024 – May 2024

Project Advisor: Dr. Todd Proebsting

- Developed redistricting simulation of Iowa's counties via an interactive map created using Leaflet.js with the goal of promoting greater societal awareness of gerrymandering. link

AI4ALL Portfolio Project *Oakland, California*

PROGRAM PARTICIPANT May 2021 – Aug 2021

Mentor: Adán Rivas (Data Scientist, Accenture)

- Built computer vision model that detects firearms in images through international program that paired students with industry mentors.

Inspirit AI *Palo Alto, California*

PROJECT TEAM MEMBER Jun 2021 – Jul 2021

Advisor: Dr. Nima Leclerc (Doctoral Student, University of Pennsylvania)

- Worked with team to develop machine learning model that detects fake online news by analyzing website domain names, URL content, and HTML tags.

AZ Snake ID *Tucson, Arizona*

DEVELOPER Oct 2020 – Apr 2021

- Compiled and managed dataset of snake images in coordination with Arizona-Sonora Desert Museum and Tucson Herpetological Society.

AI4ALL, University of Maryland, College Park *College Park, Maryland*

PROGRAM PARTICIPANT Jul 2020

Advisor: Ryen Krusinga (Doctoral Student, University of Maryland, College Park)

- Worked with team to develop convolutional neural network that classifies leaf images from 185 tree species.

Teaching Experience

University of Arizona Girls Who Code *Tucson, Arizona*

LEAD FACILITATOR Oct 2022 – May 2025

FACILITATOR Aug 2019 – Sep 2022

CHARTER MEMBER Feb 2017 – Jul 2019

- Led teams of up to 14 graduate and undergraduate students to provide computer science instruction to 6th-12th graders.
- Delivered weekly lectures and supervised student projects.
- Developed training curriculum and slide decks.
- Increased club membership by 350% from 2022 to 2025 through social media outreach and retention initiatives.
- Interviewed and hired applicants for staff positions.
- Represented club in media interviews.

Girls Who Code (National Organization) *New York City, New York*

LEAD TEACHING ASSISTANT Summer 2023

TEACHING ASSISTANT Summer 2022

- Worked with corporate partners, including Raytheon, Ford, and Bank of America, and instructional team to staff virtual technology camp that served > 8,000 high school students in 2022-2023.
- Supported virtual classroom selected as a high-achieving model and visited by *Tarika Barrett,* CEO of Girls Who Code.

Honors

SPOT Award, Sandia National Laboratories 2025

Award for outstanding technical contributions to the IRIS Project.

Outstanding Senior, College of Science, University of Arizona Fall 2024

Most outstanding graduating senior in the College of Science; first computer science major selected in more than a decade (since 2012); represented graduating class as convocation speaker.

Outstanding Senior, Department of Computer Science, University of Arizona Fall 2024

Most outstanding graduating senior in the Department of Computer Science; selected based on research and community involvement.

Collegiate Award Finalist, National Center for Women & Information Technology 2024

International award for outstanding technical contributions by undergraduate and graduate women in the United States and Canada.

Helen S. Schaefer Scholarship 2024

Scholarship recognizing exceptional undergraduate research and service activities.

Collegiate Award Honorable Mention, National Center for Women & Information Technology 2023

International award sponsored by Amazon and Qualcomm—$2,500 cash prize.

Galileo Circle Scholarship 2023, 2024, & 2025

Award for outstanding undergraduate and graduate student research in the University of Arizona College of Science.

Harriet Silverman Scholarship 2023

Scholarship for significant research contributions and community outreach.

Presentations

Towards a Hallucination-Free Future: Improving Topic Generations for the IRIS Project *Albuquerque, New Mexico*

New Mexico Intern Symposium, Sandia National Laboratories. Aug 7, 2025

Paper Review: Prompts Have Evil Twins *Tucson, Arizona*

Computational Language Understanding Lab Reading Group, University of Arizona. Mar 21, 2025

Making the Most of the Flinn Scholarship *Tucson, Arizona*

Flinn Scholar Finalists Visit, University of Arizona. Feb 24, 2025

Convocation Address: Life Lessons from the Lab video *Tucson, Arizona*

Fall 2024 College of Science Convocation, University of Arizona. Dec 19, 2024

Commencement Address: Technical Skills Aren't Enough *Tucson, Arizona*

Fall 2024 Department of Computer Science Commencement, University of Arizona. Dec 19, 2024

Training Neural Classifiers to Detect Unicode Perturbations *Tucson, Arizona*
Arizona Board of Regents Visit Poster Session, University of Arizona. Nov 21, 2024

Python Basics: University of Arizona Girls Who Code Demonstration *Tucson, Arizona*
Women's Hackathon, University of Arizona. Apr 6, 2024

Paper Review: ByT5: Towards a Token-Free Future with Pre-Trained Byte-to-Byte Models *Tucson, Arizona*
Computational Language Understanding Lab Reading Group, University of Arizona. Mar 15, 2024

University of Arizona Girls Who Code—Reinventing the Future of Technology *Tucson, Arizona*
Tucson Festival of Books, University of Arizona. Mar 9, 2024

Smarter, Faster, More Ethical AI *Virtual*
AiC Collegiate Competition, National Center for Women & Information Technology. Feb 5, 2024

Training Transformer Models to Recognize Hate Speech Masked by Homoglyphs *Tucson, Arizona*
Galileo Circle Scholars Poster Session, University of Arizona. Oct 24, 2023

Adversarial Unicode Perturbations *Denver, Colorado*
AiC Collegiate Award Ceremony, National Center for Women & Information Technology. Aug 12, 2023

Training Neural Classifiers to Recognize Hate Speech Masked by Homoglyphs *Virtual*
AiC Collegiate Competition, National Center for Women & Information Technology. May 15, 2023

Detecting Hate Speech Masked by Homoglyphs *Tucson, Arizona*
W.A. Franke Research Pinnacle Poster Presentation, University of Arizona. Apr 18, 2023

Breaking Into Undergraduate Research *Tucson, Arizona*
Flinn Scholar Finalists Visit, University of Arizona. Feb 15, 2023

Department Service

Czar (Reading Group Coordinator), Computational Understanding Language Lab. Jan 2025 – May 2025

Department Representative, Catlina Foothills High School Falcon Connections Fair. Mar 3, 2025

Student Representative, Search Committee for Computer Science Department Head. Spring 2023

Students Mentored

Emma Langlais, 2024 Flinn Scholar, University of Arizona. 2024 – 2025

Joshua Bunnell, 2023 Flinn Scholar, Arizona State University. 2023 – 2024

Programming Languages & Skills

Python, Java, C, C++, JavaScript, HTML, CSS, Git, Bash, Agile, & D3.JS.

Natural Languages

English, native proficiency.

Spanish, elementary proficiency (2 years of study).

Japanese, elementary proficiency (1 year of study).

Swedish, elementary proficiency (1 year of study and Summer 2024 study abroad in Sweden).

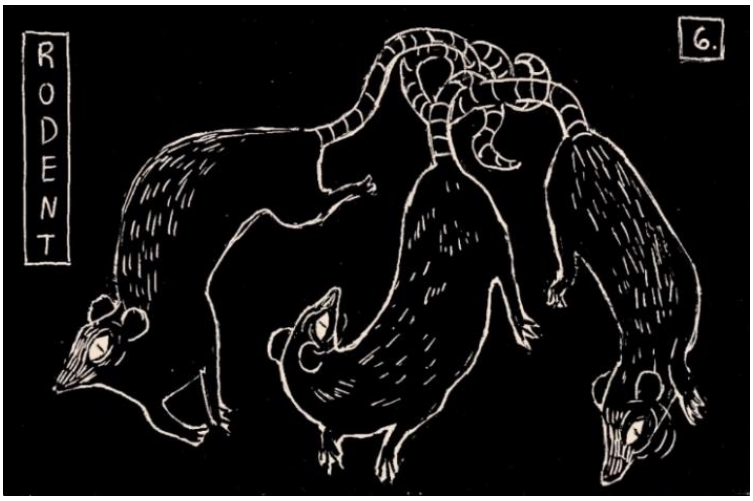
Auxiliary Qualities

High-Profile Speaking & Media Experience

I was a commencement speaker at the Fall 2024 University of Arizona College of Science Convocation (video). I have presented my research at high-profile events, including the 2024 Arizona Board of Regents' visit attended by Michael Crow, Arizona State University President, Suresh Garimella, University of Arizona *President,* and other distinguished guests. I am frequently featured on the University of Arizona website and social media channels. In addition, I have broadcast journalism experience—I was a student news anchor for KVOA, the NBC affiliate in Tucson.

Artist's Eye

My work has been exhibited at the A&M Gallery, Quincie Douglas Library, and University of Arizona; included in a year-long traveling exhibition with 12 venues; and published in *SandScript* magazine. I tap into my creative and artistic abilities throughout the research process from innovative problem solving to color selection for data visualizations.



Portia Cooper, *Rodent #6*, pen and ink on Bristol paper, 2023.

Social Science Research Experience

I have taken full advantage of the cross-cultural social science research opportunities offered by the Flinn Scholarship. I led a 2024 survey of the Scandinavian second-hand clothing industry under the mentorship of Elif Kavakci, and I spent five weeks collecting data in Sweden, Norway, and Denmark. I also worked with Dr. Paul LePore and Dr. Jessica Early to investigate the integration of technology into the Finnish education system, including two weeks of school visits in Finland in 2023. These experiences have broadened my NLP research lens and prompt me to seek out multidisciplinary perspectives in the literature that I review and the faculty members that I consult.

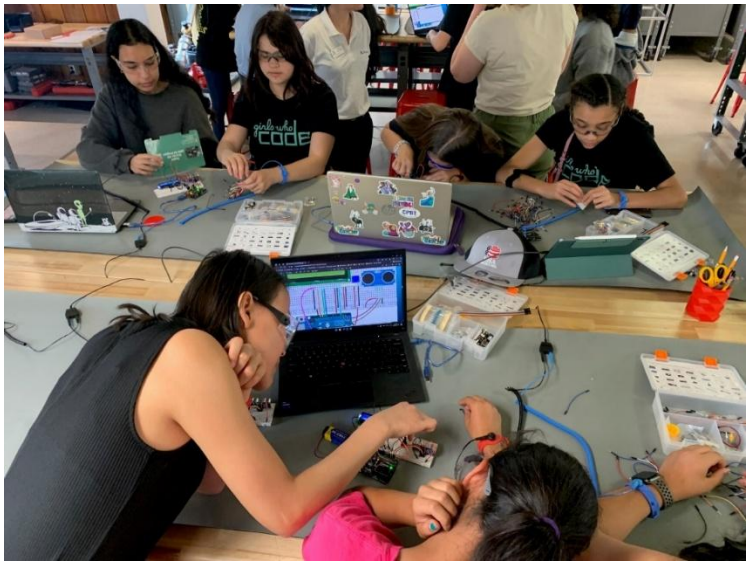
Volunteer Spirit

I stepped up when the Computational Understanding Language Lab at the University of Arizona needed a volunteer to manage the logistics related to weekly research presentations and journal article reviews. I accepted

the position to support the lab, but I quickly discovered that the job was a gift, as it provided opportunities to network with NLP researchers from multiple institutions.

Commitment to Outreach

I got my start in computer science at Girls Who Code when I was 12 (I was featured in a video produced by Arizona Public Media), and I was continuously involved with the club for eight years. At Girls Who Code, we say that we are building a pipeline of tech talent in which those ahead help those behind. I was raised on this philosophy, and I am a direct beneficiary of it. I will always turn around and help those behind me.



University of Arizona Girls Who Code students at 2024 Arduino microcontroller workshop.

Adaptability to Advisor's Communication Preferences

I primarily communicate with Dr. Mihai Surdeanu and Dr. Eduardo Blanco, my research advisors at the University of Arizona, via email. We meet in person infrequently (e.g., once a semester). For other projects, including my work at Sandia National Laboratories, I met with collaborators weekly. I am flexible and happy to adapt to the communication preferences of my Ph.D. program advisor.