Zhanna Kaufman

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Northampton, Massachusetts, USA

OBJECTIVE

Seeking a research position at the intersection of software engineering and human factors. I am passionate about understanding how to develop software that people trust. I have experience in formal verification, machine learning (including explainability), and human study design. I also have experience as a research and innovation engineer in industry.

EDUCATION

- **University of Massachusetts Amherst** *September 2021 - Current*
  PhD Candidate for Computer Science at Manning College of Information and Computer Sciences (CICS) Amherst, MA
  ◦ Working under professor Yuriy Brun
  ◦ Member of Laboratory for Advanced Software Engineering Research (LASER)
  ◦ Research Assistant since June 2022

- **Worcester Polytechnic Institute** *July 2018*
  Masters of Science in Computer Science Worcester, MA
  ◦ GPA: 3.91

- **Boston University** *June 2015*
  Bachelor of Science in Electrical Engineering with Minor in Computer Engineering Boston, MA
  ◦ GPA: 3.65 (Magna Cum Laude)

CURRENT PROJECTS

- **Impact of natural language comments on developer understanding of logical code statements** *May 2025 - Current*
  Tools: ChatGPT, Python, Qualtrics, R
  ◦ Augmented an existing dataset of LLM-generated postconditions for HumanEval functions to include natural language comments that are over-specified, under-specified, incorrect, and exact.
  ◦ Developed a study design to measure how well humans understand postconditions with and without natural language comments.
  ◦ Designed an intervention to better allow humans to gauge comment quality.
  ◦ Pre-registered design plan, research questions, and hypotheses in OSF.
  ◦ Currently collecting data.

- **Effect of AI-generated facial features on trust** *May 2025 - Current*
  Tools: Google Colab, PyTorch, encoder4editing, Empirica, thispersondoesnotexist
  ◦ Created a dataset from 25 female and 25 male faces obtained using thispersondoesnotexist.
  ◦ Augmented the dataset using encoder4editing for a final set of 50 male presenting faces, 50 female presenting faces, and 50 androgynous faces.
  ◦ Used Empirica to create a website from where our team can run trust games to test differences in trust toward faces with different feature presentations
  ◦ Currently editing the website in order to begin data collection.

PEER REVIEWED PUBLICATIONS C=CONFERENCE, J=JOURNAL, *=CO-FIRST AUTHOR

[C.1] **Zhanna Kaufman**, Madeline Endres, Cindy Xiong Bearfield, Yuriy Brun (2025). **Your Model Is Unfair, Are You Even Aware? Inverse Relationship Between Comprehension and Trust in Explainability Visualizations of Biased ML Models**. To be in *IEEE Vis 2025*. DOI: 10.48550/arXiv.2508.00140

[C.2] Alex Sanchez-Stern, Abhishek Varghese, **Zhanna Kaufman**, Dylan Zhang, Talia Ringer, Yuriy Brun (2025). **QEDCartographer: Automating Formal Verification Using Reward-Free Reinforcement Learning**. In *IEEE/ACM 47th International Conference on Software Engineering (ICSE)*. DOI: 10.1109/ICSE55347.2025.00033

[C.3] Aimen Gaba*, **Zhanna Kaufman***, Jason Cheung, Marie Shvakel, Kyle Wm. Hall, Yuriy Brun, Cindy Xiong Bearfield (2023). **My Model is Unfair, Do People Even Care? Visual Design Affects Trust and Perceived Bias in Machine Learning**. In *IEEE VIS 2023*. DOI: 110.1109/TVCG.2023.3327192

[C.4] Arpan Agrawal, Emily First, **Zhanna Kaufman**, Tom Reichel, Shizhuo Zhang, Timothy Zhou, Alex Sanchez-Stern, Talia Ringer, Yuriy Brun (2023). **PRoofster: Automated Formal Verification**. In *2023 IEEE/ACM 45th International Conference on Software Engineering: Companion Proceedings (ICSE-Companion)*. DOI: 10.1109/ICSE-Companion58688.2023.00018

[J.1] Alex Sanchez-Stern, Emily First, Timothy Zhou, **Zhanna Kaufman**, Yuriy Brun, Talia Ringer (2023). **Passport: Improving Automated Formal Verification Using Identifiers**. In *IACM Transactions on Programming Languages and Systems*. DOI: 10.1145/3593374

SKILLS

- **Languages Used Regularly:** Python, R, JavaScript, TypeScript, Bash
- **Languages Used in the Past:** OCaml, Rust, Java, C/C++, Verilog
- **Data Science & Machine Learning:** PyTorch, sklearn, SciPy, TensorFlow, huggingface
- **Cloud Technologies:** Colab, Jupyter
- **DevOps & Version Control:** Git, Docker
- **Mathematical & Statistical Tools:** Rocq, Rstudio, Matlab, NumPy, Pandas, Matplotlib
- **Other Tools & Technologies:** HTML/CSS, Qualtrics, Tableau, LaTeX, Empirica
- **Research Skills:** Formal Verification, Machine Learning Explainability, Quantitative Analysis, Qualitative Analysis, IRB, Data Science, Prototyping, Human Study Design

INDUSTRY EXPERIENCE

- **The MITRE Corporation [🌐]** *June 2015 - January 2022*
  Senior Cyber Research and Innovation Engineer Burlington, MA
  ○ Translated code and calculations for motion trajectories into Python, and integrated translations into complex high-visibility system while ensuring backwards compatibility
  ○ Developed vulnerability models for network prototypes to inform future network architecture proposals and created automated methods of detection and remediation
  ○ Developed solution to cross-cutting issue of messaging between multiple communicating architectures
  ○ Identified and implemented new and innovative methods for communication across diverse network fabrics and devices within a restricted environment.
  ○ Wrote a white-paper about potential applications of various internet protocols to a sponsor problem
  ○ Planned and implemented a method for creation of large datasets specific to a sponsor's needs for data analysis
  ○ Developed DevSecOps pipeline to automate building, integration testing, and software integrity confirmation in critical legacy software
  ○ Investigated methods of using Windows API hooking and DLL injection to subvert spyware
  ○ Verified several CVEs related to container file system accessibility to confirm successful mitigation through patching
  ○ Worked on creating debugging methods for OpenSSL encrypted lwIP TCP/IP stack

RECENT HONORS AND AWARDS

- **Dissertation and Thesis Proposal Writing Fellowship** *Spring 2025*
  Manning College of Information and Computer Sciences (CICS) [🌐]
  ○ One of six students selected

MENTORSHIP AND TEACHING EXPERIENCE

- **Long-term mentor for Undergraduate student** *August 2024 - Current*
  UMass Amherst LASER Lab [🌐]
  ○ Co-lead a project and paper (currently under peer review) with junior (now senior) student in LASER
  ○ Guided the student in learning the process of conducting research and writing papers
  ○ Bridged technical knowledge gaps in software development and statistical analysis
- **Mentor for Undergraduate Research Volunteers (URV) program** *June 2024 - August 2024*
  UMass Amherst CICS Department [🌐]
  ○ Volunteered as a PhD mentor for three undergaduate students performing research
  ○ Developed a research project for each student that matched their research interests
  ○ Students presented project results at an end of summer poster session
- **Teaching Assistant** *September 2021 - June 2022*
  UMass Amherst CICS Department
  ○ TA'd for Computer Networks (CS453) and Introduction to Algorithms (CS311)

VOLUNTEER EXPERIENCE

- **Union Steward and Steward CoChair for CICS Department** *2022 - 2023*
  Graduate Employee Organization [🌐]
  - Provided resources to CICS students to support their rights as Massachusetts workers
  - Assisted in growing the union by encouraging membership through events and office hours
  - As Steward CoChair, led regular meetings for department stewards to voice student needs

- **Red Cross Disaster Action Team member** *2020 - 2021*
  Red Cross [🌐]
  - Provided families impacted by house or apartment fires with resources and financial aid
  - Created a calm and compassionate environment where victims could voice their needs
  - Connected victims with further long-term Red Cross support

- **live blue™ Service Corps Volunteer** *2016 - 2020*
  New England Aquarium [🌐]
  - Assisted in environmental field projects throughout the greater Boston area
  - Worked with the Parks Department to clean up local protected areas and remove invasive species
  - Participated in educational and holiday events at the New England Aquarium

ADDITIONAL INFORMATION

- **Languages:** Russian (Native speaker)
- **Hobbies:** Puzzle games, Slow biking, Even slower hiking, Horror games and movies