Kathryn Gray

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EDUCATION

University of Colorado at Boulder

August 2015 - May 2019

Received a Bachelors of Science in both Computer Science and Applied Mathematics.

University of Arizona

August 2019 - May 2024

PhD in Computer Science

PUBLICATIONS

- Kathryn Gray, Mingwei Li, Reyan Ahmed, Md. Khaledur Rahman, Ariful Azad, Stephen Kobourov, Katy Börner. “A Scalable Method for Readable Tree Layouts”, TVCG 2023
- Kathryn Gray, Mingwei Li, Reyan Ahmed, Md. Khaledur Rahman, Ariful Azad, Stephen Kobourov, Katy Borner, “A Map-based Interactive System for Visualizing Large Networks with Semantic Zooming, Workshop on Map-based Interfaces and Interactions (MAPII)
- Kathryn Gray, Mingwei Li, Reyan Ahmed, Stephen Kobourov. “Drawing Evolving Trees”, *Graph Drawing September 2022*
- Kathryn Gray, Daniel Ries, Joshua Zollweg. “Low-shot, Semi-supervised, Uncertainty Quantification Enabled Model for High Consequence HSI Data”, *2022 IEEE Aerospace Conference (AERO) March 2022*
- Mason Sun Yin, Kathryn Gray, Scott Perry, Stephen Kobourov, “Drawing Graphs on the Sphere”, *Proceedings of the International Conference on Advanced Visual Interfaces, Article 17, pages 1-9*, September 2020
- Kathryn Gray, Daniel Smolyak, Sarkhan Badairli, and George Mohler. “Coupled IGMM-GANs for deep mulitmodal anomaly detection in human mobility data”, *ACM Transactions on Spacial Algorithms and Systems, Volume 6, Issue 4,* August 2020

Work in Progress

- Kathryn Gray, Jaimie Murdock. “Visualizing Known Unknowns”, submitted to EuroVis
- Kathryn Gray, Brian Bell, Stephen Kobourov. “Wooly Graphs”

EXPERIENCE

Sandia National Laboratory — *Intern*

June 2021 - Present

Worked with several teams, including work involving machine learning, graph visualization, and graph algorithms. Currently working to create visualizations for ontology data in order to give simple ways to discover issues within complex systems.

University of Arizona — *Graduate Research Assistant*, *Teaching Assistant*

August 2019 - Present

Created multi-level map-like graph visualizations that are crossing-free, contain no label overlap, and are compact, expanded this to dynamic tree visualization that maintains crossing-free, overlap-free, compactness, and stability

Guest instructed classes, helped students in office hours, and graded for Data Structures, Human-Computer Interactions, and Data Visualization

Worked on various projects such as modeling ant locomotion, CatSat imaging, and spherical graph visualization while mentoring and supporting undergraduate student research

Arizona Swing Cats — *President 2023*, *Vice President 2021-2022*

August 2021 - Present

Creative director behind the Tucson Swing Festival, a three day event with live music, national level instructors, competitions, and collaborations with dance groups throughout Tucson. Responsible for coordinating all volunteers, scholarships, and instructors. Additional duties include running weekly and monthly dance events in Tucson, managing finances, applying for funding, and instructing lessons.

Sandia National Laboratory — *Intern*

Summer 2020

Created machine learning models for target detection using both low-shot learning and semi-supervised learning techniques. Combined Siamese Networks and

semi-supervised learning techniques such as virtual adversarial training and expert averaging adversarial training for a model that is both robust to unlabeled data and to small amounts of target data. Optimized the previous model by tuning hyperparameters and trying different model architectures.

Oak Ridge National Laboratory — *Artificial Intelligence Summer Institute Intern*

June 2019 - August 2019

Worked with a team of students and professionals to create a model of the human gut biome. Created a system that determines the best parameters for a mathematical model based on output from a neural network. Worked with Generative Adversarial Networks to generate new data. Created a discriminator network to give a score based on how well the model is performing.

University of Colorado — *Research Assistant*

August 2018 - May 2019

Worked with a team analyzing how to avoid flash crashes in the electric grid given algorithms for nest thermostats and small timestep price changes. Created the mathematical model and used numerical methods to simulate the electric grid with smart home thermostats.

University of Colorado — *Discovery Learning Apprentice*

August 2018 - May 2019

Worked with a graduate student to understand the risk when relocating after a natural disaster, analyzing statistical significance of data. Determined the best way to model the data and find correlations. Additionally worked with another graduate student to analyze post data after earthquakes.

Indiana University Purdue University at Indianapolis — *Research Experience for Undergraduates*

June 2018 - September 2018

Worked on research that used bidirectional generative adversarial networks to determine anomalies in human mobility data. Improved previous methods by using IGMM to account for multimodal data. Presenting work at the REU Symposium for Data Science at the IEEE Conference on Big Data. Full paper published at ACM Transactions on Spatial Algorithms and Systems.

University of Colorado — *Learning/Course Assistant*

August 2016 - May 2017

Encouraged students to think deeply about topics taught in Calculus 1, Calculus 2, Data Structures, Matrix Methods, and the Art of Computational Thinking. Created solutions, held office hours, and graded homework.

Engineers Without Borders, Rwanda — *Secretary*, *PR Director*

November 2016 - May 2019

Student-led organization working with villages in Rwanda to build water catchment systems. Worked with survey Data analysis and communications within the team, which led to discovering communication breakdowns with some of the locations. Maintained and created social media presence as PR Director.

LinDave Institute — *Instructor*

June 2014, July 2015

Developed curriculum and taught a class to twenty students ages eight to thirty. Taught beginning circuitry and programming. Helped set up a program that continues to reach underprivileged students in California.

Knit On, Scratch On — *Founder*

August 2013 - August 2014

Designed and fabricated knitted items that interacted with Scratch. These items included a piano scarf, a piano glove, a memory game, and several knitted button designs. Presented a poster at the Scratch Conference in 2014 highlighting this work.

AWARDS and SCHOLARSHIPS

- ARCS (Achievement Rewards for College Scientists) Scholar 2021-2022 Scholarship donated by the ARCS foundation, a women-led foundation for students in STEM fields. Additionally, allows opportunities for mentorship, networking, and broader reach for research
- CU Esteemed Scholars Sewell Scholarship 2015-2019
- Zayo NCWIT Scholarship 2015-2019
- Mathematical Contest in Modeling (MCM), Meritorious 2019, Honorable Mention 2018, Successful Participant 2017
- Most Creative Hack, T9 Hacks, 2017
- NCWIT Aspirations in Computer Science Runner Up, 2015