Jacob Miller

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EDUCATION

PhD, Computer Science, Mathematics Minor — Expected May 2024
University of Arizona

- *Dissertation:* Visualizing Graphs with Non-Euclidean Geometries
- *Committee:* Stephen Kobourov (advisor), Alon Efrat, Joshua Levine, Karl Glasner

B.S., summa *cum laude*, Computer Science — May 2020
Southwestern Oklahoma State University (SWOSU)

SUMMARY OF RESEARCH SKILLS

Video editing * Survey Design/Implementation (Qualtrics) * Python * Javascript * Web Visualization * Node.js

RESEARCH INTERESTS

Graph Layout * Graph Visualization * Dimension Reduction * Graph Algorithms * Visual Analytics * Data Transformation

PUBLICATIONS

Conference Publications

- **Miller, Jacob**, Vahan Huroyan, Stephen Kobourov, Raymundo Navarrete, and Md Iqbal Hossain. “Embedding Neighborhoods Simultaneously t-SNE (ENS-t-SNE)” *2024 IEEE 17th Pacific Visualization Symposium (PacificVis).*
- **Miller, Jacob**, Mohammad Ghoniem, Hsiang-Yun Wu, and Helen Purchase. “On the Perception of Small Subgraphs.” *2023 31st International Symposium on Graph Drawing.*
- **Miller, Jacob**, Vahan Huroyan, and Stephen Kobourov. “Balancing between the Local and Global Structures (LGS) in Graph Embedding” *2023 31st International Symposium on Graph Drawing.*
- **Miller, Jacob**, Vahan Huroyan, and Stephen Kobourov. "Spherical Graph Drawing by Multi-dimensional Scaling." *2022 30th International Symposium on Graph Drawing*.
- **Miller, Jacob**, Stephen Kobourov, and Vahan Huroyan. "Browser-based Hyperbolic Visualization of Graphs." *2022 IEEE 15th Pacific Visualization Symposium (PacificVis)*. IEEE, 2022

Poster Publications

- Klesen, Felix, **Jacob Miller**, Fabrizio Montecchiani, Martin Nollenburg, and Markus Wallinger. “What happens at Dagstuhl? A peek through visualization.” *2023 31st International Symposium on Graph Drawing.* (Best Poster Award)

Under Review

- **Miller, Jacob**, Dhruv Bhatia, Stephen Kobourov. “The State of the Art in non-Euclidean Graph Visualization” *2024 IEEE EuroVis .*

RESEARCH EXPERIENCE

Research Assistant — January 2021 - Present
University of Arizona, Department of Computer Science

- Analyzed novel problems in graph visualization, graph algorithms, and dimension reduction.
- Developed innovative solutions to address complex challenges within these areas.
- Implemented solutions using Python and JavaScript to address identified research problems.
- Conducted thorough comparisons between implemented solutions and existing alternatives.
- Collaborated with team members and peers to enhance the overall research process.
- Successfully contributed to development of research papers submitted to conferences and journals.
- Ensured the clarity and coherence of written materials to meet publication standards.
- Assisted advisor in course organization and assignments.
- Worked closely with undergraduate research assistants to provide guidance and advice

PhD Intern May 2022 - Present

Pacific Northwest National Laboratory, Richland, WA, USA

- Developed innovative graph visualization solutions for sponsor datasets, enhancing data
- Implemented a novel layout to visualize several layers of a multi-layer graph simultaneously.
- Designed a multi-layer PageRank algorithm, contributing to experimental data analysis.
- Contributed to a larger project by developing a dynamic graph layout algorithm.
- Conducted experiments to validate the effectiveness of visualization and algorithmic solutions.
- Collaborated with interdisciplinary teams, working with theoreticians, engineers, and designers.

TEACHING EXPERIENCE

Teaching Assistant Spring 2021

Algorithms and Geometric Algorithms

- Conducted weekly office hours to enhance students' understanding of lecture material and address questions related to homework problems.
- Collaborated with the professor to clarify and edit homework problems, ensuring clarity and alignment with learning objectives.
- Assessed and graded homework assignments, providing constructive feedback to aid in students' academic development.

PROFESSIONAL AFFILIATIONS

- President, Computer Science Graduate Student Council (Fall 2023-Spring 2024)