Ehsan Moradi

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Profile

Ph.D. in Computer Science from the University of Saskatchewan, specializing in high-performance graph visualization and GPU-accelerated computing. Recognized for a strong track record in publishing high-impact research and leading interdisciplinary projects. Committed to academic excellence, combining deep technical expertise in distributed systems with a proven ability to deliver effective, engaging university-level instruction.

Education

PhD in Computer Science 2020 – 2025
University of Saskatchewan, Saskatoon, SK, Canada
- **Thesis Title:** Fast Visualization Methods for Massive Networks
- **Advisor:** Dr. Debajyoti Mondal

Research Interests

- Algorithms and complexity
- Computational geometry
- GPU-accelerated computing (GPGPU) and distributed processing
- Social networks, and telecommunications technology
- Scalable visualization techniques for big data
- AI-assisted approaches to pattern discovery and hierarchy detection in massive graphs

Professional Experience

Research and Teaching Experience

Research Assistant 2020 – 2025
University of Saskatchewan, Saskatoon, SK, Canada

- Designed and implemented GPU-accelerated algorithms for scalable network visualization.
- Conducted research on streaming algorithms for real-time graph visualization.
- Published in top-tier conferences and journals, including *Journal of Graph Algorithms and Applications*.
- Collaborated on interdisciplinary projects applying visualization techniques to environmental and urban data.

Lecturer 2015 – 2023
University of Saskatchewan, Saskatoon, SK, Canada

- Courses Taught:
  - CMPT 215: Introduction to Computer Organization and Architecture (2025)
  - CMPT 270: Developing Object-Oriented Systems (2022, 2025)
  - CMPT 260: Mathematical Logic and Computing (2023)
  - CMPT 145: Principles of Computer Science (2023)

Technical and Vocational University.

- Courses Taught:
  - Data Structures (2018)
  - Algorithms (2017)
  - Web Programming (2016)
  - English for Computer Science students (2015).

Teaching Assistant 2020 – 2025
University of Saskatchewan, Saskatoon, SK, Canada

- Supported courses in Algorithms, Data Structures, Concurrent Programming, Parallel Programming for Scientific Computing, Principles of Computer Science and Information Visualization.

Project Leadership

Prairie Water Data Visualization Dashboard 2021 – 2025

- Led the development of interactive dashboards for visualizing hydrological model outputs.
- Collaborated with environmental scientists to create user-friendly tools for data analysis.

Saskatoon Bus Transit Smart Data Visualization Dashboard 2022 – 2023

- Designed and implemented a real-time visualization dashboard for transit data analysis, facilitating immediate network monitoring.
- Collaborated with city officials to translate complex data into actionable insights for urban mobility planning and decision-making.
- Supervised and mentored three undergraduate research assistants, guiding them through the software development and data analysis lifecycle.

VGA: Visualization for Geospatial Analytics (framework) 2022 – 2025

- Co-developing a modular, plugin-based framework for web-based geospatial dashboards, utilizing JSON-configured components to maximize code reusability.
- Mentoring two undergraduate students in modular software design and full-stack development best practices.

Publications

Journal Papers

1. Keil, J. M., Mondal, D., **Moradi, E.**, & Nekrich, Y. (2022). Finding a Maximum Clique in a Grounded 1-Bend String Graph. *Journal of Graph Algorithms and Applications*, 26(4), 553–575.
2. Fazlali, M., **Moradi, E.**, & Tabatabaee, H. (2017). Adaptive Parallel Louvain Community Detection on a Multicore Platform. *Microprocessors and Microsystems*.
3. Nazari, P., **Moradi, E.**, Nazari, S., Khaligh, J., & Shayestehfar, M. (2014). Applying Genetic Algorithm in Selecting Providers of Supply Chain in Big Stores. *Journal of Advances in Mathematics (JAM)*.

Conference Papers

1. **Moradi, E.**, Shvets, M., & Mondal, D. (2025). Visualization of Node-Centric Hierarchical Structures in Directed Graphs. *IV2025: Information Visualisation Theory & Practice.*
2. Hossein, I., **Moradi, E. (presenter)**, Mondal, D., Kobourov, S. (2025). Map Visualizations for Graphs with Group Restrictions. *Graphics Interface 2025 (GI 2025)*, Kelowna, BC, Canada.
3. **Moradi, E.**, Mondal, D. (2023). BigGraphVis: Visualizing Communities in Big Graphs Leveraging GPU-Accelerated Streaming Algorithms. *VISIGRAPP - IVAPP*.
4. Keil, J. M., Mondal, D., **Moradi, E.** (2020). Finding a Maximum Clique in a Grounded 1-Bend String Graph. *Canadian Conference on Computational Geometry*.
5. **Moradi, E.**, Fazlali, M., & Tabatabaee, H. (2015). Fast Parallel Community Detection Algorithm Based on Modularity. *18th CSI International Symposium on Computer Architecture & Digital Systems (CADS 2015)*.

Poster Presentations

1. **Moradi, E.**, Mondal, D. (2020). Visualizing Massive Networks by GPU-Accelerated Streaming Algorithms. *28th International Symposium on Graph Drawing and Network Visualization (GD 2020)*.
2. Shvets, M., **Moradi, E.** (2022). Visualizing Node-Specific Hierarchies in Directed Networks. *30th International Symposium on Graph Drawing and Network Visualization (GD 2022)*.

Under Review / Submitted

- Wang, S.; **Moradi, E.**; Mondal, D.; Schneider, K. *VGA: A Modular Framework for Building Map-Based Visualizations on the Web.* **IEEE PacificVis 2026** (Pacific Visualization Symposium), *submitted*

Preprints

- **Moradi, E.** (2025). *Community Detection on Model Explanation Graphs for Explainable AI. arXiv:2510.27655 [cs.SI]* (also cs.AI), v1, Oct 31, 2025. DOI: 10.48550/arXiv.2510.27655.

In Preparation

- **Moradi, E.**, Mondal, D. Quality-Space Trade-offs in Revealing Clusters in Large Network Visualizations, 2025.

Collaborations

- **University College Cork (UCC), Ireland:** Smart Manufacturing Project, Constraint Programming, Euler Path Applications.
- **Global Institute for Water Security, University of Saskatchewan:** Prairie Water Project, Dynamic Visualization.
- **City of Saskatoon:** Transit data visualization and optimization.

Awards and Honors

- Departmental Scholarship, University of Saskatchewan (2020 – Present)
- Full scholarship, University College Cork (2020)
- Recognized for designing national health assessment tools (2019)
- Official Consultant in Computer Network Systems. (2015–2020)
- Ranked 1260 among 100,000+ in National University Entrance Exam (2007)

Technical Skills

- **Programming Languages:** C++, C#, Java, Python, Delphi, PHP, TCL, HTML, CSS
- **Data Visualization:** D3.js, Tableau, Plotly, Matplotlib
- **Deep Learning:** TensorFlow, Keras, PyTorch
- **Frameworks:** NetworkX, .NET, OpenMP, MPI, CUDA
- **Networking:** Cisco (CCNA), Microsoft (MCSE)

Leadership and Service

- **Vice President of Finance & Operations,** Graduate Students' Association, University of Saskatchewan (2021–2023)
- **Local Organizer,** 32nd Canadian Conference on Computational Geometry (2020)
- **Vice President of Finance,** Computer Science Graduate Council & International Students' Association
- **Coding Team Leader,** JDKU Higher Education Institute (2010)