

Arlei Silva

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Computer Science and Ken Kennedy Institute
Electrical and Computer Engineering (joint appointment)
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Rice University
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Houston, TX 77005

Education

University of California, Santa Barbara, Santa Barbara, CA

Ph.D., Computer Science Department, 2019

Universidade Federal de Minas Gerais, Belo Horizonte, MG, Brazil

M.Sc., Computer Science Department, 2011

Universidade Federal de Minas Gerais, Belo Horizonte, MG, Brazil

B.Sc., Computer Science Department, 2008

Research Interests

Data Mining/Science, Graphs/Networks, Machine Learning, Algorithms.

Selected Publications (scholar)

- 1) Debolina Halder Lina, [Arlei Silva](#), *Fair Graph Machine Learning under Adversarial Missingness Processes*. International Conference on Learning Representations (ICLR), 2026.
- 2) Xinyu Yao, Daniel Bourgeois, Abhinav Jain, Yuxin Tang, Jiawen Yao, Zhimin Ding, [Arlei Silva](#), Chris Jermaine, *DOPPLER: Dual-Policy Learning for Device Assignment in Asynchronous Dataflow Graphs*. International Conference on Learning Representations (ICLR), 2026.
- 3) Joao Mattos, Debolina Halder Lina, [Arlei Silva](#), *Breaking the Dyadic Barrier: Rethinking Fairness in Link Prediction Beyond Demographic Parity*. AAAI Conference on Artificial Intelligence (AAAI), 2026.
- 4) Delaram Pirhayatifard, [Arlei Silva](#), *Cross-Domain Graph Anomaly Detection via Test-Time Training with Homophily-Guided Self-Supervision*. Transactions on Machine Learning Research (TMLR), 2025. Also presented at the Learning on Graphs Conference (LoG), 2025.
- 5) Joao Mattos, Zexi Huang, Mert Kosan, Ambuj Singh, [Arlei Silva](#), *Attribute-Enhanced Similarity Ranking for Sparse Link Prediction*. International Conference on Knowledge Discovery and Data Mining (KDD), 2025.
- 6) Junhao Frank Ran, Yifan Wu, Delaram Pirhayatifard, Joao Mattos, [Arlei Silva](#), *TrafficPulse: A Road-Sensor Assisted Traffic Tweet Misinformation Detection System*. IEEE S&P Workshop on Securing Next-Generation Intelligent Transportation Systems (SecureTrans), 2025.

- 7) Arnold Kazadi, James Doss-Gollin, Arlei Silva, *Flood Simulation with Physics-informed Message-passing*. International Conference on Machine Learning (ICML), 2024.
- 8) Arnold Kazadi, James Doss-Gollin, Antonia Sebastian, Arlei Silva, *FloodGNN-GRU: A Spatio-Temporal Graph Neural Network for Flood Prediction*. Environmental Data Science (EDS), 2024.
- 9) Sushovan Das, Arlei Silva, T. S. Eugene Ng, *Rearchitecting Datacenter Networks: A New Paradigm with Optical Core and Optical Edge*. IEEE International Conference on Computer Communications (INFOCOM), 2024.
- 10) Sushovan Das, Arlei Silva, T. S. Eugene Ng, *Near Non-blocking Performance with All-optical Circuit-switched Core (Poster)*. ACM SIGCOMM Conference (SIGCOMM), 2023.
- 11) Debajyoti Kar, Mert Kosan, Debmalya Mandal, Sourav Medya, Arlei Silva, Palash Dey, Swagato Sanyal, *Representation-based Individual Fairness in Clustering (Extended Abstract)*. International Conference on Autonomous Agents and Multiagent System, 2023.
- 12) Mert Kosan, Arlei Silva, Sourav Medya, Brian Uzzi and Ambuj Singh, *Graph Macro Dynamics with Self-Attention for Event Detection*. AAAI Workshop on Deep Learning on Graphs: Method and Applications, 2023.
- 13) Arnav Burudgunte, Arlei Silva, *Sensor Placement for Learning on Networks*. ACM Conference on Knowledge Discovery and Data Mining - Undergraduate Consortium, 2023.
- 14) Arnold Kazadi, James Doss-Gollin, Antonia Sebastian, Arlei Silva, *Flood Prediction with Graph Neural Networks*. NeurIPS Workshop on Tackling Climate Change with Machine Learning, 2022.
- 15) Furkan Kocayusufoglu, Arlei Silva, Ambuj Singh, *FlowGEN: Neural Generative Model for Flow Graphs*. ACM Conference on Knowledge Discovery and Data Mining, 2022.
- 16) Phillip Tran, Arlei Silva, *History as a data science: Missing data imputation on the the slave voyages dataset*. ACM Conference on Knowledge Discovery and Data Mining - Undergraduate Consortium, 2022.
- 17) Furkan Kocayusufoglu, Arlei Silva, Ambuj Singh, *FlowGEN: Neural Generative Model for Flow Graphs*. ACM Conference on Knowledge Discovery and Data Mining, 2022.
- 18) Zexi Huang, Arlei Silva, Ambuj Singh, *POLE: Polarized embedding for signed networks*. ACM Conference on Web Search and Data Mining, 2022.
- 19) Zexi Huang, Arlei Silva, Ambuj Singh, *A Broader Picture of Random-walk based Graph Embedding*. ACM Conference on Knowledge Discovery and Data Mining, 2021.
- 20) Arlei Silva, Furkan Kocayusufoglu, Saber Jafarpour, Francesco Bullo, Ananthram Swami, Ambuj Singh, *Combining Physics and Machine Learning for Network Flow Estimation*. International Conference on Learning Representations (ICLR), 2021.
- 21) Palash Dey, Suman Kalyan Maity, Sourav Medya, Arlei Silva, *Network Robustness via K-core*. International Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2021.
- 22) Arlei Silva, Ambuj Singh, *Group Testing on a Network*. AAAI Conference on Artificial Intelligence (AAAI), 2021.

- 23) Sourav Medya, Tianyi Ma, Arlei Silva, Ambuj Singh, *K-core Resilience: A Game Theoretic Approach*. International Joint Conference on Artificial Intelligence (IJCAI), 2020.
- 24) Sourav Medya, Arlei Silva, Ambuj Singh, *Approximate Algorithms for Data-driven Influence Limitation*. IEEE Transactions on Knowledge and Data Engineering (TKDE), 2020.
- 25) Arlei Silva, Ambuj Singh, Ananthram Swami, *Spectral Algorithms for Temporal Graph Cuts*. The Web Conference (WWW), 2018.
- 26) Sourav Medya, Arlei Silva, Ambuj Singh, Prithwish Basu, Ananthram Swami, *Group Centrality Maximization via Network Design*. SIAM International Conference on Data Mining (SDM), 2018.
- 27) Arlei Silva, Gowtham Bellala, *Privacy-Preserving Multi-party Clustering: An Empirical Study*. IEEE International Conference on Cloud Computing (CLOUD), 2017.
- 28) Arlei Silva, Xuan-Hong Dang, Prithwish Basu, Ambuj Singh, Ananthram Swami, *Graph Wavelets via Sparse Cuts*. ACM Conference on Knowledge Discovery and Data Mining (KDD), 2016.
- 29) Xuan-Hong Dang, Arlei Silva, Prithwish Basu, Ambuj Singh, Ananthram Swami, *Outlier Detection from Network Data with Subnetwork Interpretation*. IEEE International Conference on Data Mining (ICDM), 2016.
- 30) Arlei Silva, Petko Bogdanov, Ambuj Singh, *Hierarchical In-Network Attribute Compression via Importance Sampling*. IEEE International Conference on Data Engineering (ICDE), 2015.
- 31) Arlei Silva, Sara Guimaraes, Wagner Meira Jr, Mohammed Zaki, *ProfileRank: Finding Relevant Content and Influential Users based on Information Diffusion*. ACM International Workshop on Social Network Mining and Analysis (SNAKDD), 2013.
- 32) Arlei Silva, Wagner Meira Jr., Mohammed J. Zaki, *Mining Attribute-structure Correlated Patterns in Large Attributed Graphs*. Proceedings of the VLDB Endowment (PVLDB), 2012.
- 33) Mehdi Kaytoue, Arlei Silva, Loic Cerf, Wagner Meira Jr., Chedy Raissi, *Watch me Playing, I am a Professional: A First Study on Video Game Live Streaming*. ACM International Workshop on Mining Social Network Dynamics (MSND), 2012.
- 34) Arlei Silva, Wagner Meira Jr, Mohammed J Zaki, *Structural Correlation Pattern Mining for Large Graphs*. ACM International Workshop on Mining and Learning with Graphs (MLG), 2010.

Teaching

Machine Learning with Graphs (Graduate), Rice University, Lecturer (3 credits), Spring 2022-26.
Graduate Seminar on Machine Learning, Rice University, Lecturer (1 credit), Fall 2021-25.
Summer School on Machine Learning Optimization, Computer Vision, and Networks, Pontificia Universidad Javeriana (Colombia), Summer 2022
Artificial Intelligence, University of California, Santa Barbara, Teaching Assistant, 2018.
Algorithms and Data Structures, Universidade Federal de Minas Gerais, Teaching Assistant, 2009.
Searching over Big Data, University of California, Santa Barbara, Teaching Assistant, 2013.

Awards and Honors

SecureTrans Best Paper Award 2025.
Travel Awards: VLDB'12, SNAKDD'13, KDD'16.
SNAKDD Best Paper Runner-up 2013.
Best M.Sc Thesis by the Brazilian Computer Society 2011.
Top 6 Undergrad Research Projects by the Brazilian Computer Society 2009.

Mentorship

Yutong Wu. *Graph Machine Learning for Social Networks*, Rice, 2023-.
Delaram Pirhayatifard. *Graph Machine Learning for Cybersecurity*, Rice, 2023-.
Debolina Halder. *Fairness in Graph Machine Learning*, Rice, 2023-.
Arnold Kazadi. *Flood Prediction using Graph Neural Networks*, Rice, 2022-.
Joao Mattos. *Link Prediction*, Rice, 2022-.
Arnav Burudgunte. *Sensor Placement for Infrastructure Networks*, Rice, 2022-.
Caleb Saul. *Flood Prediction using Machine Learning*, Rice (Data Science REU), 2022.
Phillip Tran. *Missing data Imputation on Slave Voyages*, Rice, 2022.
Zexi Huang. *Network Embedding*, UCSB, 2019-20.
Mert Kosan. *Event Detection on Dynamic Graphs*, UCSB, 2019-20.
Meredith Xu, Daniel Hsu. *Characterization of Reddit Place Experiment*, UCSB, 2019-20.
Ali Hajimirza, Jason White. *Network Summarization*, UCSB, 2014-2014.
Sara Ribeiro, Herico Valiati. *Information Diffusion on the Web*, UFMG, 2010-12.

Funding

AI for Climate Risk and Resilience Cluster, Co-PI, Rice K2I (\$16K/\$80K)

Optimization, Efficient Model Engineering, and Distributed Systems Design, Co-PI, Rice K2I, 2024 (\$16.5K/\$100K)

Real-time flood mapping and disaster response with machine learning-based acceleration, PI, Rice K2I, 2024 (\$12.5/\$25K)

Transportation Cybersecurity Center for Advanced Research and Education, Rice PI, US DOT, 2023 (\$1.5/\$15M)

The IFCE-Rice-SENAI Program on Artificial Intelligence for Urban Sustainability and Resilience to Natural Disasters in the Americas, PI, 100K Innovation Fund, 2022 (\$98K)

The IFCE-Rice-SENAI Program on Artificial Intelligence for Urban Sustainability and Resilience to Natural Disasters in the Americas, PI, Google ExploreCSR, 2023 (\$15K)

Academic Service

Faculty Committee for new Master's in AI, 2025

Co-chair of the Workshop on Securing Next-Generation Intelligent Transportation Systems, 2025

Texas Colloquium on Distributed Learning, Organizing Committee, 2025

USDOT UTC CYBER-CARE Associate Director, 2023-

Rice Center for Civic Leadership Faculty Advisory Board, 2024-

Rice Master in Computer Science Admissions Committee, 2025-

Rice Ph.D. in Computer Science Admissions Committee, 2020-

Non-Tenure Track Computer Science Faculty Recruiting Committee, 2023

Proceedings Chair, SIGKDD Conference, 2023

Fellowships Committee, Rice University, 2022-

Judge, Rice D2K Data Science Capstone Competition, 2022

Judge, IEEE Region 5 Poster Competition, 2022

Member, Rice School of Engineering Cities of the Future Committee, 2022

Chair, UCSB Graduate Student Workshop on Computing, 2016

President, UCSB CS Department Graduate Student Council, 2015

Senior Program Committee: AAAI'22

Area Chair: KDD'25-26

Program Committee: KDD'22-26, WSDM'21-26, COMAD'20, WebConf'19-26, AAAI'21-22, SDM'21-25, AAMAS'21, IJCAI'21-24, NeurIPS'24-25, ICLR'24-26, AISTATS'25-26, ICML 25-26

External Reviewer: WWW'17-18, KDD'15-18, WSDM'16-17, TKDE'14-20, TMC'14, TKDD'16, VLDB'18, ICDE'21