Zohair Shafi

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Education

Northeastern University   *Boston, MA, U.S.*
PhD in Computer Sciences (Machine Learning and Network Science) - GPA 3.98/4   Sep. 2021 - Jun. 2026 (Expected)

Visvesvaraya Technological University   *Bangalore, KA, India*
Bachelor of Engineering in Computer Sciences - CGPA 8.16/10   Aug. 2015 - Jun. 2019

Publications

[1] Gupta, S., Biggs, S., Laber, M., **Shafi, Z.**, Walters, R., Paul, A. 2026. **DeepWeightFlow: Re-Basined Flow Matching for Generating Neural Network Weights** In The Fourteenth International Conference on Learning Representations (**ICLR**). [Link]

[2] **Shafi, Z.** and Kadioglu, S., 2025. **FORGE: Foundational Optimization Representations from Graph Embeddings**. arXiv preprint arXiv:2508.20330 (In DiffCOAlg Workshop **NeurIPS** 2025). [Link]

[3] **Shafi, Z.**, Savcisens, G., and Eliassi-Rad, T., 2025. **REGE: A Method for Incorporating Uncertainty in Graph Embeddings**. In Proceedings of the 2025 SIAM International Conference on Data Mining (**SDM**). [Link]

[4] **Shafi, Z.**, Miller, B.A., Eliassi-Rad, T. and Caceres, R. S., 2025. **Accelerated Discovery of Set Cover Solutions via Graph Neural Networks**. In International Conference on the Integration of Constraint Programming, Artificial Intelligence, and Operations Research (**CPAIOR**). [Link]

[5] **Shafi, Z.**, Chatterjee, A., and Eliassi-Rad, T., 2025. **Explaining Node Embeddings**. In Transactions on Machine Learning Research (**TMLR**). [Link]

[6] Miller, B.A., **Shafi, Z.**, Ruml, W., Vorobeychik, Y., Eliassi-Rad, T. and Alfeld, S., 2025. **Defense Against Shortest Path Attacks**. In Proceedings of the 2025 SIAM International Conference on Data Mining (**SDM**). [Link]

[7] Miller, B.A., **Shafi, Z.**, Ruml, W., Vorobeychik, Y., Eliassi-Rad, T. and Alfeld, S., 2023. **Attacking Shortest Paths by Cutting Edges**. ACM Trans. Knowl. Discov. Data (**TKDD**) 18, 2, Article 35 (February 2024), 42 pages. [Link]

[8] **Shafi, Z.**, Miller, B.A., Chatterjee, A., Eliassi-Rad, T. and Caceres, R. S., 2023. **GRASP: Accelerating Shortest Path Attacks via Graph Attention**. In Deep Learning on Graphs Workshop, Knowledge Discovery and Data Mining (**KDD**) [Link]

[9] Chatterjee, A., Walters, R., **Shafi, Z.**, Ahmed, O.S., Sebek, M., Gysi, D., Yu, R., Eliassi-Rad, T., Barabási, A.L. and Menichetti, G., 2023. **Improving the generalizability of protein-ligand binding predictions with AI-Bind**. **Nature Communications**, 14(1), p.1989. [Link]

[10] Miller, B.A., **Shafi, Z.**, Ruml, W., Vorobeychik, Y., Eliassi-Rad, T. and Alfeld, S., 2021, September. **PATHATTACK: Attacking Shortest Paths in Complex Networks**. In Joint European Conference on Machine Learning and Knowledge Discovery in Databases (**ECML-PKDD**) (pp. 532-547). Springer. [Link]

[11] Liu, D.*, **Shafi, Z.***, Fleisher, W., Eliassi-Rad, T. and Alfeld, S., 2021, July. **RAWLSNET: Altering Bayesian Networks to Encode Rawlsian Fair Equality of Opportunity**. In Proceedings of the 2021 AAAI/ACM Conference on AI, Ethics, and Society (**AIES**) (pp. 745-755). [Link]

[12] Mishra, S., **Shafi, Z.** and Pathak, S. 2019. **Time Series Event Correlation with DTW and Hierarchical Clustering Methods**. PeerJ Preprints No. e27959v1. [Link]

Work Experience

Fidelity Investments   *Boston, MA, U.S.*
Co-op - Data Scientist - AI Center of Excellence   Jan. 2025 - Jul. 2025

• **Foundational Model for Mixed Integer Programs (MIPs)** [2].
  Goal: Train/Evaluate and deploy a foundational model to represent general mixed integer programming instances
  Impact: Created novel vector quantized graph-based representation approach that led to publication at NeurIPS 2025 DiffCOAlg Workshop (FORGE paper), enabling improved optimization solution strategies
  Scale: General-purpose model applicable across diverse MIP problem classes

• **Customer Representation Architecture**
  Goal: Trained a foundational architecture for representing customer data to support ML applications like product and article recommendation.
  Impact: Reusable representation system that enhanced model development efficiency and consistency across 3 recommendation systems. Proposed model performed on par with existing models with ≈80% fewer input features.

Akamai Technologies

Performance Engineer II - Global Performance And Operations   Jul. 2019 - Jul. 2021

- **Platform Performance Optimization**
  Goal: Improve user experience and system efficiency by optimizing critical platform performance metrics
  Impact: Worked on ≈25 issues/month resolving network bottlenecks, edge server hardware issues (disk/RAM/CPU utilization), content offload memory maps and inter-ISP routing issues on a per customer basis for Fortune 500 customers.
  Scale: Global Akamai CDN platform. Content (in the order of petabytes) from customer origin servers were offloaded across mapped memory hierarchies achieving up to 90% offload for most customers. Throughput scales ranged between 3Mbps - 11Mbps depending on customers and countries.
- **Log Data Mining System**
  Goal: Build scalable systems for extracting insights from raw server logs
  Impact: Enabled data-driven decision-making through actionable insights, improving operational efficiency and issue resolution
  Scale: Processing logs from distributed global server infrastructure - a few million logs per customer per hour
- **Critical Event Scaling**
  Goal: Scale and prepare platform infrastructure for high-traffic events requiring exceptional performance
  Impact: Successfully handled traffic for major global events including **IPL cricket league**, **Super Bowl** and Apple Keynotes like **WWDC** without degradation **Scale:** Up to 10 Tbps of traffic in a single country
- **Intern Mentorship**
  Goal: Mentor and guide junior engineers through complete project lifecycle
  Impact: Ensured successful project completion and presentation delivery, developing next-generation engineering talent

Akamai Technologies

Intern - Platform & Delivery   Jan. 2019 - May 2019

- **Root Cause Analysis System** [12]
  Goal: Develop automated system for identifying root causes of platform issues
  Impact: Improved accuracy and speed of issue identification through time series correlation analysis, reducing mean time to resolution
  Scale: Multiple parallel streams of time series data across distributed infrastructure
- **Network Traffic Visualization Tools**
  Goal: Build visualization tools to understand traffic patterns and demand across the network
  Impact: Improved capacity planning and resource allocation through granular traffic insights
  Scale: Global Akamai network with drill-down capabilities from country level to individual server sets

Skills

Languages	Python, Bash, JavaScript, C, SQL
Statistics	Network Analysis, Anomaly Detection, Time Series Analysis, A/B Testing
Machine Learning	NumPy, Pandas, SciKit-Learn, SciPy, NetworkX, iGraph
Deep Learning	PyTorch, PyG, TensorFlow, Transformers
Visualization	MatPlotLib, Tableau, Seaborn, HighCharts, Grafana, Gephi, Cytoscape
Cloud	Modal.ai, AWS, Azure, GCP

Academic Services

Reviewer	KDD '24, ECAI '25, NeurIPS '25, AI Magazine '25, DiffCoALG@NeurIPS '25, NetSci '26
Program Committee	IAAI '26
Instructor of Record	DS 4400 - Machine Learning and Data Mining, Spring '26, Northeastern University [Course Homepage]