

# Zohair Shafi

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## Education

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### Northeastern University

PhD in Computer Sciences (Machine Learning and Network Science) - GPA 3.98/4

Boston, MA, U.S.

Sep. 2021 - Jun. 2026 (Expected)

### Visvesvaraya Technological University

Bachelor of Engineering in Computer Sciences - CGPA 8.16/10

Bangalore, KA, India

Aug. 2015 - Jun. 2019

## Publications

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- [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.**, Savcicens, 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

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### 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 (upto 4k streams) 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

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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

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**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 [\[Course Homepage\]](#)