SYED TAUHIDUN NABI

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PhD candidate in Computer Science (expected May 2027) working in Internet measurement, with a focus on mobile network infrastructure, IP geolocation accuracy, and broadband equity. Doctoral research published and presented at ACM IMC and SIGCOMM, informed by prior industry experience in mobile access and core network planning (LTE RAN and gateways). 2026 ISOC Pulse Fellow in Internet Resilience; PhD Research Intern with the Internet Measurement team at Cisco ThousandEyes.

Education

Virginia Tech — **GPA: 4.0/4.0** — **May 2027 (Exp.)**
PhD in Computer Science — *Blacksburg, Virginia*
Advisor: Dr. Shaddi Hasan (Chair - PhD Committee)
Committee: Dr. Tijay Chung, Dr. Jeff Reed, Dr. Sang Lee, Dr. Syed Ishtiaque Ahmed (UofT)

Virginia Tech — **GPA: 4.0/4.0** — **Dec. 2025**
M.S. in Computer Science & Application — *Highest Distinction* — *Blacksburg, Virginia*

BRAC University — **GPA: 4.0/4.0** — **Sep. 2021**
M.Sc. in Computer Science Engineering — *Highest Distinction* — *Dhaka, Bangladesh*
Advisor: Dr. Golam Rabiul Alam
Thesis: Empowering Mobile Network Planning through Deep Learning: A Path to Democratization

American International University - Bangladesh — **GPA: 3.63/4.0** — **Feb. 2014**
Bachelor in Electrical & Electronic Engineering — *Among top 7%* — *Dhaka, Bangladesh*

Honors/ Awards

- **Internet Society Pulse Fellow, 2026:** Awarded the prestigious ISOC Pulse Fellowship in Internet Resilience
- **NSF Student Travel Grant, ACM SIGCOMM 2026:** To present research at SIGCOMM 2026
- **Pratt Fellowship, 2026:** Departmental Excellence Award — awarded by the Department of Computer Science (VT)
- **Google Cloud Research Credits, 2026:** Awarded ∼$1,000 in GCP compute credits to support PhD research
- **Best Research Publication Award:** Recognized for outstanding research publication award at BRAC University
- **Best Performance Award:** Honored multiple times by the Technology Division at Robi Axiata during the tenure from 2017 to 2022

Publications

Peer-Reviewed Journal & Conference

- **Red is Sus: Automated Identification of Low Quality Service Availability Claims in the US National Broadband Map** (Full Paper; *ACM IMC 2024*)

  Focus: Built a *Machine Learning classifier* (ROC AUC > 0.98) that flags misreported ISP claims in the FCC's National Broadband Map. *Paper link*

  Authors: **Syed Tauhidun Nabi**, Zhuowei Wen, Brooke Ritter, Shaddi Hasan
  Conference: *ACM Internet Measurement Conference 2024* · Madrid, Spain, Nov 4–6, 2024.

- **Deep Learning Based Fusion Model for Multivariate LTE Traffic Forecasting and Optimized Radio Parameter Estimation**

  Focus: Fusion deep learning model on 6.2M LTE time-series samples for eNodeB cell-level traffic forecasting and proactive cellular RAN layer parameter tuning. *Paper link*

  Authors: **Syed Tauhidun Nabi**, Md Rashidul Islam, Md Golam Rabiul Alam, Giancarlo Fortino
  Publisher (Journal): IEEE Access; Date of Publication: Feb 10, 2023.

Peer-Reviewed Posters & Workshops (Full Papers in Preparation)

- **Signal Sense: Measuring Mobile Broadband Inequality** (Poster; *ACM SIGCOMM 2026*)

  Focus: Proposed the *iQoE index* from crowdsourced data and showed that measurement density tracks wealth, leaving poorer communities invisible in standard cellular KPIs.

  Authors: **Syed Tauhidun Nabi**, Rahul Roy, S. M. Taiabul Haque, Syed Ishtiaque Ahmed, Shaddi Hasan
  Conference: *ACM SIGCOMM 2026* · Denver, CO, Aug 17–21, 2026.
  Status: Full paper in preparation for *ACM SIGCOMM 2027*.

- **NetBreakouts: Mapping Mobile Network Egress Topology** (Workshop Paper; *ACM IMC 2025 PRIME*)

  Focus: Early results on identifying and geolocating mobile core gateways (P-GW/UPF) across U.S. operators using traceroute and BGP data, and inferring regional router topology from hierarchical IPv6 structure.

  Authors: **Syed Tauhidun Nabi**, Shaddi Hasan
  Conference: *ACM IMC 2025 PRIME Workshop* · Madison, WI, Oct 28–31, 2025.
  Status: Full paper in preparation for *ACM IMC 2027*.

Under Submission

- **Lost in the Prefix: Revisiting IP Geolocation Accuracy Across Networks and Geographies** (Under submission; preprint available on arXiv)

  Focus: Large-scale evaluation of four IP geolocation providers across *175 countries*, showing that *mobile networks* and the *Global South* suffer order-of-magnitude higher errors. *Preprint*

  Authors: **Syed Tauhidun Nabi**, Jocelyn Bliton, Tijay Chung, Shaddi Hasan

Research Projects

Lost in the Prefix: Revisiting IP Geolocation Accuracy | *RIPE Atlas, UNICEF Giga, BGP* **Jun'25 – Present**

- *Benchmark:* Evaluated four major providers (MaxMind GeoLite2, IPinfo, IP2Location, DB-IP) against RIPE Atlas and UNICEF Giga ground truth across 175 countries.
- *Mobile Gap:* Found mobile median errors more than 10× higher than fixed networks across all providers (179–207 km vs. 3–16 km).
- *Global South Gap:* Showed failure rates of 53–61% in Asia and 66–72% in Africa, compared to 9–20% in Europe.
- *Root Cause:* Traced both gaps to prefix granularity: provider prefixes in mobile and Global South networks are often coarser than BGP announcements, and ∼70% of mobile prefixes span more than 100 km.

NetBreakouts: Mapping Mobile Network Egress Topology | *Traceroute, IPv6 Inference, BGP* **Apr'25 – Present**

- *Gateway Inference:* Designed a scalable methodology combining traceroute and BGP data to identify and geolocate mobile core gateways (P-GW/UPF) across major U.S. operators.
- *IPv6 Structure Analysis:* Decoded hierarchical IPv6 bit patterns in carrier addressing to infer regional and subregional router topology, enabling carrier-level segmentation.
- *Data Pipeline:* Built Python/Go pipelines for large-scale traceroute parsing, prefix clustering, and longitudinal tracking of carrier egress infrastructure.

Signal Sense: Measuring Mobile Broadband Inequality | *QoE Metrics, Measurement Blind Spots* **Jan'25 – Present**

- *iQoE Metric:* Designed indicative Quality of Experience (iQoE), a normalized broadband-quality index built from large-scale crowdsourced measurements (Ookla, M-Lab), exposing disparities that raw KPIs and administrative aggregation hide.
- *Measurement Invisibility:* Showed that measurement density correlates strongly with wealth, rendering marginalized communities statistically invisible (e.g., the Korail slum inside affluent Gulshan-Banani, Dhaka).
- *Ongoing:* Extending the analysis with passive measurements and a field study toward a full paper for ACM SIGCOMM 2027.

Red is Sus: Auditing the FCC National Broadband Map | *ML, FCC BDC, Speedtest Data* **Jan'23 – Nov'24**

- *Labeled Dataset:* Combined regulatory (FCC BDC) and crowdsourced broadband datasets into 750K+ labeled observations covering 911 ISPs across the entire United States.
- *Classifier:* Built a machine learning classifier (ROC AUC > 0.98) that identifies low-quality ISP availability claims in the National Broadband Map.
- *Impact:* Enables regulators and analysts to prioritize ISP self-reported coverage for targeted review rather than auditing nationwide claims uniformly.

Work Experience

Cisco ThousandEyes **May 2026 – Aug 2026**
PhD Intern – Data Science & Research (Internet Measurement) *Remote / San Francisco, CA*
Reported to: Dr. Arash Molavi Kakhki | Mentored by: Dr. Álvaro Feal Fajardo & Dr. Kyle Schomp

- Extended ThousandEyes' global active-measurement event-detection pipeline to make cellular (4G/5G) a first-class component, building a network-layer identity (carrier ASN + H3 geo-cell + radio generation); validated on 51K+ measurements at 82% correct attribution.
- Exposed mobile-core opacity: quantified session-IP churn inflating gateways to ∼3 per cellular agent/day vs. ∼0.3 for WiFi, masking shared PGW/UPF infrastructure, and scoped path-trace analysis to recover the true gateway map.
- Root-caused a ∼55% cellular telemetry gap to an untracked Android permission, driving a fix that raised field availability ∼15%.

Virginia Tech – Dept. of Computer Science **Aug 2022 – Present**
Graduate Research Assistant (Internet Measurement & Data Systems) *Blacksburg, Virginia*

- Lead four measurement research projects (see *Research Projects*) spanning broadband auditing, mobile core topology, IP geolocation, and broadband equity, with published work at ACM IMC and SIGCOMM.
- Built reproducible data pipelines processing millions of records across regulatory, measurement, and routing data (FCC Broadband Data Collection, M-Lab, Ookla, RIPE Atlas, UNICEF Giga, BGP), supporting analyses spanning 175 countries and 911 U.S. ISPs.
- Co-mentor undergraduate research groups at Virginia Tech; one mentored team placed third at the 2024 VT Undergraduate Research in Computer Science competition.

Robi Axiata Ltd. **May 2017 – Aug 2022**
Manager – Wireless Systems Engineering & Network Planning *Dhaka, Bangladesh*

- Built large-scale network analytics pipelines using LTE measurement reports and IP-level telemetry to geolocate cell sites and detect routing anomalies with sub-100m precision.
- Designed an internal IP-to-cell mapping framework that reduced drive-test costs by 91% and enabled automated network performance auditing.
- Optimized TCP/IP and RAN parameters through data-driven modeling, improving network throughput by 17%.
- Deployed carrier WiFi offloading integrated with the LTE core using Facebook's Magma Core, relieving congestion in high-demand regions.

Banglalink (VEON) **Aug 2014 – Apr 2017**
Specialist Engineer – Access Networks & Performance Analytics *Dhaka, Bangladesh*

- Monitored and optimized end-to-end cellular network KPIs using real-time traffic and IP telemetry to enhance nationwide infrastructure reliability.
- Implemented automated frequency planning and mobility optimization, improving spectral efficiency across regions.
- Contributed to early validation of next-generation RAN and core designs, focusing on performance, coverage, and IP-level connectivity.

Leadership & Service

Shadow Technical Program Committee (STPC) Member **2026**
ACM Internet Measurement Conference (IMC 2026)

- Reviewed submitted papers and participated in the shadow PC deliberation process alongside the main program committee.

Vice President, CS Graduate Council (CSGC@VT) **Aug 2024 – Jul 2025**
Department of Computer Science *Virginia Tech*

- Represented around 800 CS graduate students; chaired council meetings in the President's absence and oversaw the council's committees.
- Organized departmental events and served as the graduate student voice on department committees.

Technical Skills

Languages: Python, R, Go, SQL
Data Analytics: Pandas, NumPy, PySpark, BigQuery, Matplotlib, Plotly
Networking & Measurement: Traceroute, BGP, DNS, IPv6, IP Geolocation, Internet Resilience
Machine Learning: Tree-based Models, Deep Learning, Large Language Models, Anomaly Detection
Tools & Platforms: Linux, Docker, Git, Jupyter, Google Cloud Platform, AWS (SageMaker, EMR)