

Saurav Ghosh

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<https://ghoshsaurav.github.io/>

Interest

Human-Centered AI, Scientific Visualization, Signal Analysis, System Security, Quantum Computing, Decentralized Systems, Blockchain

Education

Washington University in St. Louis, United States

Aug 2025 – May 2031

Doctor of Philosophy in Computer Science

GPA: **3.8/4.0**

- Principal Investigator: [Alvitta Ottley](#) ; Area: Algorithms, Data Visualization, Human-AI Interaction
- Thesis: Uncertainty-Aware Peak Detection for GC-MS Signal Analysis.

Master of Science in Computer Science

Aug 2025 – May 2027

- Advisor: [Raj Jain](#) ; Area: Quantum Computing, Cryptographic Protocols, Internet & Networks, Quantum Security
- Project: Layered threat analysis of quantum cryptographic protocols, including QKD, QPKS, and QDS
- Courses: Recent Advances in Networking, System Security, Trustworthy Autonomy

Southeast Missouri State University, United States

Aug 2023 – May 2025

Master of Science in Applied Computer Science

GPA: **4.0/4.0**

- Advisor: [Reshmi Mitra](#) ; Area: Decentralized System Security, Blockchain, Internet of Things.
- Thesis: Access Control in P2P Network: A Blockchain Based Approach, December 2024; proquest.com/docview/3176153023
- Courses: Information Security in System Admin, Network Security & Defense, Distributed Cloud Computing

BRAC University¹, Bangladesh

Jan 2017 – Sept 2021

Bachelor of Science² in Computer Science

GPA: **3.0/4.0**

- Advisor: [Md. Golam Rabiul Alam](#) ; Area: Machine Learning & Deep Learning, Computer Vision
- Thesis: Prostate Cancer Detection using Deep Learning with Transfer Learning Approach. <http://hdl.handle.net/10361/16454>
- Courses: Information Security, Computer Networks, Data Communications, Artificial Intelligence

Awards

- **Outstanding MS in Applied Computer Science³ 2024–2025**; Harrison College of Business & Computing.
- **2nd Place**, Graduate Capstone Oral Presentation, 32nd Annual Student Research Conference | SEMO 2024.
- **2nd Place**, Graduate Capstone Poster Presentation, 32nd Annual Student Research Conference | SEMO, 2024.

Research Experience

Graduate Research Assistant – [VIBE Lab](#), Washington University

Apr 2026 – Present

- Contribute to [Waters Corporation](#)-funded research grant on its proprietary ApexTrack peak detection algorithm.
- Conduct research on uncertainty-aware peak detection and build visual analytics tools for human-centered AI decision support.
- Develop interpretable GC-MS signal-analysis pipelines using Python, SciPy, pandas, HDF5, and label-based evaluation.

Graduate Research Fellow – [Jain Lab](#), Washington University

Aug 2025 – Mar 2026

- Supported Qatar Research, Development, and Innovation ([QRDI](#)) Academic Research Grant, [ARG01-0501-230053](#), “Building the Foundation for a Scalable and Secure Quantum Internet”, and Cisco University Research Grant Number [98690499](#).
- Researched analytical frameworks to evaluate system resilience of quantum-secured protocols, including QKD, QPKS, and QDS.
- Modeled Physical, Link, and Network-level vulnerabilities to assess resilience in quantum-secure communication systems.

Mentored Summer Research⁴ – [SPARK Lab](#)

May 2024 – Aug 2024

- Co-authored peer-reviewed conference papers published in Springer proceedings, including CAINE 2024 & CATA 2025.

¹ Private Research University of Bangladesh, Ranked 801–1000th in [Times World University Ranking](#) and #228 in [QS Asian University Ranking](#).

² Verified International Academic Qualifications by World Education Services (WES), February 2022; Credential ID **5423152**

³ Awarded to **One graduating student per academic year** in recognition for highest academic excellence and contribution across program cohort.

⁴ Academic research project works conducted remotely under the supervision of Reshmi Mitra, Southeast Missouri State University.

- Developed an automated vulnerability inspection framework using Nmap and CVE for distributed remote networks.
- Designed blockchain-based access control mechanisms using smart-contract architecture for secure P2P & IoT environments.

Publications

[Journal]

- **Ghosh, S.**, Tanrikulu, B., Mitra, R., Roy, I., & Gupta, (2025, December) *Incentive-Driven Access Control Framework with Smart Contracts for Secure P2P Networks*, Elsevier Blockchain: Research and Applications, doi.org/10.1016/j.bcra.2025.100426
- **Ghosh, S.**, & Amer, S. (2025, July). *Improving Cryptography Education through Adaptive Web Interfaces: Usability, Accessibility, and Interactive Learning*. International Journal of Computer Applications, Vol. 187 (No. 26), doi.org/10.5120/ijca2025925450

[Conference]

- Upadhyay, H., Jeffcott, E., Pant, N., **Ghosh, S.**, Tanrikulu, B., Mitra, R. & Roy, I. Blockchain Network Deployment for Federated IoT Access Control; *Proceedings of the 2026 ACM Southeast Conference (ACMSE 2026)*. doi.org/10.1145/3746467.380154
- Pant, N., **Ghosh, S.**, Upadhyay, H., & Mitra, R. (2026) *Governing Blockchain-based Decentralized Systems*; CAINE 2025. Communications in Computer and Information Science, vol 2740. Springer, Cham. doi.org/10.1007/978-3-032-14893-3_9.
- **Ghosh, S.**, & Das, S. (2025, July). POSTER: *VeilPIR – A Lightweight Private Information Retrieval Protocol for Enhancing Data Privacy in IoT Ecosystems*. In Proceedings of the 18th ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSec) 2025, June 30–July 3, Arlington, VA, USA. ACM. doi.org/10.1145/3734477.3736146
- **Ghosh, S.**, Mitra, R., Redington, L., Dama, P. (2025, June) *Scalable Automated Vulnerability Inspection Framework Using Nmap for CVE Detection in Distributed Remote Networks*; Computers and Their Applications. CATA 2025. Communications in Computer and Information Science, vol 2435. Springer Nature Switzerland, doi.org/10.1007/978-3-031-92178-0_18
- **Ghosh, S.**, Alam, D., Tanrikulu, B., Mitra, R., (2025, May), *Integrating Data-Driven Consensus Protocols and Governance Tokens with PoA for Improved Access Control in Decentralized P2P Networks*; ACM Southeast Conference 2025, Cape Girardeau, Missouri, United States, ISBN: 979-8-4007-1277-7, doi.org/10.1145/3696673.3723058
- **Ghosh, S.**, Ghosh, S., Mitra, R., Roy, I., & Gupta, B. (2024, October). *Securing RC Based P2P Networks: A Blockchain-Based Access Control Framework Utilizing Ethereum Smart Contracts for IoT and Web 3.0*, Computer Applications in Industry and Engineering (CAINE 2024) (Vol. 2242, pp. 73–85). Springer, doi.org/10.1007/978-3-031-76273-4_6
- Mahmud Badhon, A. I., Hasan, M. S., Haque, M. S., Pranto, M. S. H., **Ghosh, S.**, & Alam, M. G. R. (2023, February). *Diagnosing Prostate Cancer: An Implementation of Deep Machine Learning Fusion Network in MRI Using a Transfer Learning Approach*. 6th International Conference on Big Data and Smart Computing (pp. 33-43). doi.org/10.1145/3584871.3584876

Under Review

- Dharkar, V., **Ghosh, S.**, Kumar, S., & Mitra, R. (2025, August); *Quantum Network Systems: Repeaters, Routing, and Algebraic Models*, CRC Press - Taylor & Francis Group.
- Pant, N., Upadhaya, H., Mitra, R., **Ghosh, S.**, & Tanirkulu, B.; *Governance in Blockchain using Behavior Based Governance Token*, ACM Distributed Ledger Technologies: Research and Practice - Special Issue on Blockchain theory and Applications.
- **Ghosh, S.**, Jain, R., Yang, Z., Erbad, A., Abdallah, M. M., Kompella, R., Nejabati, R., & Kaur, E. A layered threat-analysis framework for quantum cryptographic primitives. IEEE Access.

Non-Refereed Research

- *Quantum Blockchain Survey: Foundations, Trends, and Gaps* [cs.CR], July 2025; doi.org/10.48550/arXiv.2507.13720
- *User Privacy and Data Practices in Smart Cameras*, May 2025; doi.org/10.13140/RG.2.2.31905.31842
- *Enhancing Security in P2P Networks: A Blockchain-Based Access Control Framework Utilizing Ethereum Smart Contracts*; Oral Presentation at 32nd Annual Student Research Conference, April, 2024; doi.org/10.13140/RG.2.2.26810.09929
- *Enhancing Cybersecurity Through Automated Vulnerability Inspection*; Poster Presentation at 32nd Annual Student Research Conference, April 2024; Southeast Missouri State University. doi.org/10.13140/RG.2.2.13388.32648
- *Access Control Schemes for Residue Class Based p2p Network*. Poster Presentation at 4th STLCyberCon, University of Missouri – Saint Louis, October 2023; doi.org/10.13140/RG.2.2.30165.54246

Academic Service

- Journal Reviewer: Journal of Educational Technology Development and Exchange [Cite Score: 1.1]
- Program Committee Member & Reviewer: 39th International Conference on Computer Applications in Industry & Engineering.

- Session Chair: ACM Southeast (ACMSE) 2025, Southeast Missouri State University, Cape Girardeau, Missouri.

Teaching

Department of Computer Science

Southeast Missouri State University

Graduate Assistant – Instructor⁵

Jan 2024 – May 2024

- Taught CS101: Python Programming to 40 students, covering core programming concepts and hands-on coding practice.
- Contributed to curriculum development and provided individualized student support to improve programming performance.
- Designed and graded complete assessment process, including assignments, Quizzes, in-class activities, paper exams.

Professional Experience

Department of Computer Science

Southeast Missouri State University

Graduate Assistant – Administrative

Aug 2024 – May 2025

- Reviewed CS graduate admission applications to ensure policy compliance to department admission standards and criteria.
- Conducted student orientations, and supported onboarding processes to help students integrate into the academic community.
- Handled communications with department leadership and supported daily operations to ensure administrative workflows.

Office of Career Services

Southeast Missouri State University

Career Ambassador

Sept 2023 – Jan 2024

- Reviewed and improved student resumes and cover letters through one-on-one career advising appointments.
- Collected University alumni employment records to support university career-outcome reporting and employment statistics.
- Coordinated career fair activities with the team to support departmental Economic and Workforce Development goals.

Dzins Myth Limited

Dhaka, Bangladesh

Assistant Manager, IT

Jan 2023 – June 2023

- Maintained website functionality through updates using Visual Studio, GitHub, and HTML.
- Implemented Google Cloud-based data hosting and disaster recovery plans to improve system resilience.
- Coordinated contract communications with international buyers through Slack to support business operations.

IT Officer

Mar 2022 – Dec 2022

- Managed hardware, software, and network infrastructure to support daily IT operations.
- Provided technical support to staff, including user account setup, access management, and troubleshooting.
- Maintained electronic records for B2B transactions, including invoices, shipping documents, and customs declarations.

Technical Skills

- Programming Languages & Technologies: Java, Python, C++, GitHub, MS Office, Confluence, Slack, AnyDesk
- Development Environments: Eclipse, NetBeans, Visual Studio Code, Anaconda Navigator, VirtualBox, Android Studio
- Tools & Frameworks: TensorFlow, PyTorch, Firebase, Colab, Keras, Wireshark, MySQL, LaTeX, ApacheTomcat, Xampp

Selected Projects

- [Label Aggregation Algorithm](#) | Jan 2026 – May 2026; Python, label aggregation, algorithmic decision support, data processing.
- [SPARK Adversarial Safety](#) | Jan 2026 – May 2026; humanoid filters, simulation, noise, crowding robustness, and benchmarking
- [Cloud-Based To-Do List App](#) | Aug – Oct 2024; Firebase Authentication, Firestore, Firebase Hosting, HTML, CSS, and JavaScript
- [Digital Food Restaurant](#) | Feb – May 2021; Servlet, MySQL, MVC Architecture, Tomcat, Eclipse, Xampp, CSS, and JSP
- [Appointment Management System](#) | Oct 2019 – Jan 2020; PHP, MySQL, Database, HTML, Xampp, Web API, Dr. Java
- [Calculator with MVC Pattern](#) | Oct 2019 – Jan 2020; Python, MVC Framework, NetBeans, Android Studio, and XML
- Line Follower (autonomous) BOT | Participated in Technival (KUET) 2018 - LFR; Arduino UNO, IR Sensor, L298 Motor Driver
- Smart Transportation System | Sept – Dec 2019; Computer Vision, ML, OpenCV (Image Processing), Python (Algorithm)

Certifications

- IELTS; Overall Band Score: 7.0 [L: 8.0, R: 7.0, W: 6.0, S: 6.5]⁶
- Connect and Protect: Networks and Network Security | Google, Coursera | May 2024; Credential ID: 4C5ELUWZ2KY3
- Play It Safe: Manage Security Risks | Google, Coursera | Nov 2023; Credential ID: DTKHVNN7F5LT

⁵ Appointed as one of only 12 Graduate Assistants selected to teach independently, a distinction granted through a competitive interview process.

⁶ Proficiency Verified by British Council, Feb 2022; Credential ID: **21BD027325GHOS001A**

- Foundations of Cybersecurity | Google, Coursera | Sep 2023; Credential ID: HJVAAXAKSB2Z

Leadership & Service

- Volunteer Mentor, Code to PhD Mentorship Program (Underrepresented CS Applications) | Sept 2025 – Dec 2025
- Member, *Infrastructure Subcommittee on AI Procurement*, Southeast Missouri State University | Oct 2024 – May 2025
- Annual Advisory Board Meeting, *Department of Computer Science*, Southeast Missouri State University | 2023-24 & 2024-25
- Co-Founder & Secretary, *Sworborno - Social Organization* (Community Education Project) | Jan 2015 – Apr 2016

Professional Development

- *First-Year Leadership Program (FYLP)*, Sponsored by Southeast Missouri State University | Jan 2024 – Mar 2024
- Microsoft Young Bangla Internship Program, *Microsoft Bangladesh & Centre for Research & Innovation* | Jan – Mar 2019
- 'How Computer Programmers Work', *Research Study by Cornell University, University of San Diego, and IPA* | Nov 2018
- Master the Art of Presentation Skills and Public Speaking, *Institute of Career Development, Bangladesh* | Jan – Mar 2019