Akond Rahman

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https://akondrahman.github.io/

Summary

Researcher in the area of software engineering focused on DevOps and secure software development. Research supported by external grants that have totaled over 4.1 million USD till date.

Education

- **Doctor of Philosophy (Ph.D.) in Computer Science**   Aug 2014 - July 2019
    - Dissertation title: "Anti-patterns in Infrastructure as Code"
    - Adviser: Laurie Williams
    - Committee: Tim Menzies, Chris Parnin, Jonathan Stallings
    - North Carolina State University, Raleigh, NC, USA

- **Master of Science (M.Sc.) in Computer Science and Engineering**   Jan 2012 - May 2014
    - University of Connecticut, Storrs, CT, USA

- **Bachelor of Science (B.Sc.) in Computer Science and Engineering**   Dec 2004 - Oct 2009
    - Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh

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Awards & Honors

- **Distinguished Reviewer**
  Technical Track, 2021 Mining Software Repositories Conference (MSR). Link: `https://twitter.com/msrconf/status/1390444181655539716`.

- **2020 COE Distinguished Dissertation Award, NC State University**
  For my PhD dissertation 'Anti-patterns in Infrastructure as Code'. Link: `https://tinyurl.com/akond-coe`.

- **2020 CSC Outstanding Dissertation Award, NC State University**
  For my PhD dissertation 'Anti-patterns in Infrastructure as Code'. Link: `https://tinyurl.com/akond-csc`.

- **NC State Nominee for the Council of Graduate Schools/ProQuest Distinguished Dissertation Award, 2020**
  For my PhD dissertation 'Anti-patterns in Infrastructure as Code'.

- **ACM SIGSOFT Distinguished Paper Award**
  For the paper '*The Seven Sins*: Security Smells in Infrastructure as Code Scripts' at ICSE 2019, Montreal, Canada. Link: `https://www.sigsoft.org/awards/distinguishedPaperAward.html`

- **ACM SIGSOFT Doctoral Symposium Award**
  Dissertation proposal related to DevOps and Infrastructure as Code won the ACM SIGSOFT Best Doctoral Symposium Award at ICSE 2018, Gothenburg, Sweden.

- **Microsoft Open Source Challenge**
  Won the **Grand Prize** of the 2016 Microsoft Open Source Challenge. I used Microsoft Research's Deep Semantic Similarity Model (DSSM) tool to quantify the semantic similarity of software repositories. Link:`http://tiny.cc/unp1by`.

- **University Scholarship for Merit**
  Received this award for maintaining $>= 3.75$ CGPA in 4 semesters from 2007 to 2009 during my B.Sc. at the Bangladesh University of Engineering and Technology (BUET).

- **Dean's List Award**
  Received this award for achieving academic excellence for two semesters in the year of 2008 during the Bachelors program in Bangladesh University of Engineering and Technology.

RESEARCH FUNDING

10. Co PI, NKAT-VI: A Virtual Institute for Cyber Research and Experiential Education, U.S. Griffis Institute (June 2024 - June 2025). Lead PI: Hossien Sarrafzadeh (NC A&T University), Co-PI: Michael Whitman (Kennesaw State University), and Fan Wu (Tuskegee University) , Amount: 764,048 USD (Total)

9. Lead PI, REU Supplement for SaTC: TTP: Small: eSLIC: Enhanced Security Static Analysis for Configuration Scripts, U.S. National Science Foundation (Mar 2024 - Sep 2024), Amount: 14,400 USD (Total)

8. Single PI, SHF: Core: Small: Resilient Operations for Deployment Units Used in Container Orchestration, U.S. National Science Foundation (Oct 2023 - Sep 2026), Amount: 553,295 USD (Total)

7. Lead PI, REU Supplement for SaTC: TTP: Small: eSLIC: Enhanced Security Static Analysis for Configuration Scripts, U.S. National Science Foundation (Mar 2023 - Sep 2023), Amount: 12,000 USD (Total)

6. Co-PI, Hands-on Learning Modules for Software Supply Chain Security Education, U.S. National Security Agency (February 2023 - August 2025). Co-PI: Hossain Shahriar, and Nazmus Sakib (Kennesaw State University), Amount: 75,000 USD (Total)

5. Lead PI, SaTC: EDU: Authentic Learning Modules for DevOps Security Education, U.S. National Science Foundation (January 2023 - December 2025). Co-PI: Hossain Shahriar, Herbert J Mattord, Michael E Whitman, Maria Valero, Md Abdullah A Khan (Kennesaw State University), Fan Wu, Cassandra F Thomas, Jay Bhuyan, Kai Koong, and Xiao Chang (Tuskegee University), Amount: 399,882 USD (Total)

4. Co-PI, Tennessee Tech Cybercorps Renewal: An Enahnced and Integrated Scholar Experience in Cybersecurity, U.S. National Science Foundation (Aug 2021 - Aug 2022) PI: Muhammad Ismail, Co-PI: Denis Ulybychev, Eric Brown, Maanak Gupta (Tennessee Tech University), Amount: 1,917,081 USD (Total)

3. Lead PI, Cybersecurity Mini Grant, U.S. National Science Foundation (Dec 2020 - Mar 2021). Co-PI: Denis Ulybychev (Tennessee Tech University), Amount: 5,000 USD (Total)

2. Lead PI, SaTC: TTP: Small: eSLIC: Enhanced Security Static Analysis for Configuration Scripts, U.S. National Science Foundation (Oct 2020 - Sep 2024), Co-PI: Marcelo D' Amorim, former Co-PI Chris Parnin (NC State University), Amount: 444,720 USD (Total)

1. Co-PI, EDGE Curriculum Development Grant, Tennessee Tech University (Jan 2020 - May 2020), PI: Maanak Gupta (Tennessee Tech University), Amount: 5,000 USD (Total)

PUBLICATIONS

68. **Akond Rahman**, Dibyendu Brinto Bose, Yue Zhang, and Rahul Pandita, "An Empirical Study of Task Infections in Ansible Scripts", in Empirical Software Engineering, January 2024.

67. Yue Zhang, Rachel Meredith, Wilson Reeves, Julia Coriolano, Ali Babar, and **Akond Rahman**, "*Does Generative AI Generate Smells Related to Container Orchestration?*: An Exploratory Study with Kubernetes Manifests", in the 21st International Conference on Mining Software Repositories 2024, January 2024.

66. **Akond Rahman**, Dibyendu Brinto Bose, Farhat Lamia Barsha, and Rahul Pandita, "Defect Categorization in Compilers: A Multi-vocal Literature Review", in ACM Computing Surveys (CSUR), September 2023.

65. **Akond Rahman** and Chris Parnin, "Detecting and Characterizing Propagation of Security Weaknesses in Puppet-based Infrastructure Management", in IEEE Transactions on Software Engineering (TSE), April 2023.

64. **Akond Rahman**, Dibyendu Brinto Bose, Raunak Shakya, and Rahul Pandita, "Come for Syntax, Stay for Speed, Understand Defects: An Empirical Study of Defects in Julia Programs", in Empirical Software Engineering, March 2023.

63. **Akond Rahman**, Shazibul Islam Shamim, Dibyendu Brinto Bose, and Rahul Pandita, "Security Misconfigurations in Open Source Kubernetes Manifests: An Empirical Study", in ACM Transactions on Software Engineering and Methodology, January 2023.

62. Yue Zhang, Fan Wu, and **Akond Rahman**, "Practitioner Perceptions of Ansible Test Smells", in the 2nd International Workshop on the Foundations of Infrastructure Specification and Testing, co-located with the 20th IEEE International Conference on Software Architecture (ICSA 2023).

61. Yue Zhang, Muktadir Rahman, Fan Wu, and **Akond Rahman**, "Quality Assurance for Infrastructure Orchestrators: Emerging Results from Ansible", in the 2nd International Workshop on the Foundations of Infrastructure Specification and Testing, co-located with the 20th IEEE International Conference on Software Architecture (ICSA 2023).

60. Farzana Ahamed Bhuiyan and **Akond Rahman**, "Log-related Coding Patterns to Conduct Postmortems of Attacks in Supervised Learning-based Projects", in ACM Transactions on Privacy and Security, December 2022.

59. Md Jobair Hossain Faruk, M. Tasnim, Hossain Shahriar, Maria Valero, Akond Rahman and Fan Wu, "Investigating Novel Approaches to Defend Software Supply Chain Attacks," 2022 IEEE International Symposium on Software Reliability Engineering Workshops (ISSREW), Charlotte, NC, USA, 2022.

58. Shapna Akter, Md Jobair Hossain Faruk, Nafisa Anjum, Mohammad Masum, Hossain Shahriar, Nazmus Sakib, **Akond Rahman**, Fan Wu, and Alfredo Cuzzocrea, "Software Supply Chain Vulnerabilities Detection in Source Code: Performance Comparison between Traditional and Quantum Machine Learning Algorithms", 2022 IEEE International Conference on Big Data (Big Data), Osaka, Japan, 2022.

57. **Akond Rahman** Shazibul Islam Shamim, Hossain Shahriar, and Fan Wu, "Can We use Authentic Learning to Educate Students About Secure Infrastructure as Code Development?", in the 27th ACM Conference on Innovation and Technology in Computer Science Education (ITiCSE) 2022.

56. Mohammad Mehedi Hassan and **Akond Rahman**, "*As Code Testing*: Characterizing Test Quality in Open Source Ansible Development", in the 15th IEEE International Conference on Software Testing, Verification and Validation (ICST) 2022.

55. **Akond Rahman** and Tushar Sharma, "Lessons from Research to Practice on Writing Better Quality Puppet Scripts", in the 29th IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER) 2022.

54. Farzana Ahamed Bhuiyan, Stacey Prowell, Hossain Shahriar, Fan Wu, and **Akond Rahman**, "*Shifting Left for Machine Learning*: An Empirical Study of Security Weaknesses in Supervised Learning-based Projects", in the 46th IEEE Computer Society Computers, Software, and Applications Conference (COMPSAC), 2022.

53. Dibyendu Brinto Bose, Gerald C. Gannod, **Akond Rahman**, and Kaitlyn Cottrell, "What Questions Do Developers Ask About Julia?", in the ACM Southeast Conference (ACM SE '22) 2022.

52. Dibyendu Brinto Bose, Kaitlyn Cottrell, and **Akond Rahman**, "*Vision for a Secure Elixir Ecosystem*: An Empirical Study of Vulnerabilities in Elixir Programs", in the ACM Southeast Conference (ACM SE '22) 2022.

51. **Akond Rahman**, Farhat Lamia Barsha, and Patrick Morrison, "*Shhh!*: 12 Practices for Secret Management in Infrastructure as Code", in the IEEE Secure Development Conference (SecDev) 2021.

50. Md Jobair Hossain Faruk, Hossain Shahriar, Maria Valero, Farhat Lamia Barsha, Shahriar Sobhan, Md Abdullah Khan, Michael Whitman, Alfredo Cuzzocrea, Dan Lo, **Akond Rahman**, and Fan Wu, "*Malware Detection and Prevention using Artificial Intelligence Techniques*" in the 2021 IEEE International Conference on Big Data (Big Data), 2021

49. **Akond Rahman**, Hossain Shahriar, and Dibyendu Brinto Bose, "*How Do Students Feel About Automated Security Static Analysis Exercises?*" in the Frontiers in Education Conference (FIE), 2021

48. **Akond Rahman**, Hossain Shahriar, and Dibyendu Brinto Bose, "Exercise Perceptions: Experience Report From A Secure Software Development Course", in the 14th International Conference on the Quality of Information and Communications Technology (QUATIC) 2021.

47. Kaitlyn Cottrell, Dibyendu Brinto Bose, Hossain Shahriar, and **Akond Rahman**, "An Empirical Study of Vulnerabilities in Robotics", in the 45th IEEE Computer Society Computers, Software, and Applications Conference (COMPSAC) 2021.

46. **Akond Rahman** and Laurie Williams, "A Different Kind of Smell: Security Smells in Infrastructure as Code Scripts", in the IEEE Security and Privacy (S&P) Magazine 2021.

45. Farzana Ahamed Bhuiyan, Justin Murphy, Patrick Morrison, and **Akond Rahman**, "Practitioner Perception of Vulnerability Discovery Strategies", in the 2nd International Workshop on Engineering and Cybersecurity of Critical Systems (EnCyCriS 2021), co-located with the 43rd International Conference on Software Engineering (ICSE 2021).

44. Dibyendu Brinto Bose, **Akond Rahman** and Shazibul Islam Shamim, "'Under-reported' Security Defects in Kubernetes Manifests", in the 2nd International Workshop on Engineering and Cybersecurity of Critical Systems (EnCyCriS 2021), co-located with the 43rd International Conference on Software Engineering (ICSE 2021).

43. **Akond Rahman** and Effat Farhana, "An Empirical Study of Bugs in COVID-19 Software Projects", in the Journal of Software Engineering, Research, and Development (JSERD), 2021.

42. Farzana Ahamed Bhuiyan, Md Bulbul Sharif, and **Akond Rahman**, "Security Bug Report Usage for Software Vulnerability Research: A Systematic Mapping Study", in the journal of IEEE Access, 2021.

41. **Akond Rahman**, Md. Rayhanur Rahman, Chirs Parnin, and Laurie Williams, "Security Smells in Ansible and Chef Scripts: A Replication Study", in the Journal of ACM Transactions on Software Engineering and Methodology (TOSEM), 2021.

40. Mohammad Mehedi Hasan, Farzana Ahamed Bhuiyan, and **Akond Rahman** "Testing Practices for Infrastructure as Code", in the Languages and Tools for Next Generation Testing Workshop - LANGETI 2020, co-located with the ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE).

39. Farzana Ahamed Bhuiyan, and **Akond Rahman**, "Characterizing Co-located Insecure Coding Patterns in Infrastructure as Code Scripts", in the 2020 Workshop on Human Centric Software Engineering and Cyber Security, co-located the 35th IEEE/ACM International Conference on Automated Software Engineering (ASE), September 2020.

38. Farzana Ahamed Bhuiyan, **Akond Rahman**, and Patrick Morrison, "Vulnerability Discovery Strategies Used in Software Projects", in the 2020 Workshop on Human Centric Software Engineering and Cyber Security, co-located the 35th IEEE/ACM International Conference on Automated Software Engineering (ASE), September 2020.

37. **Akond Rahman** and Farzana Ahamed Bhuiyan "A Vision to Mitigate Bioinformatics Software Development Challenges", in the 2020 Workshop on Human Centric Software Engineering and Cyber Security, co-located the 35th IEEE/ACM International Conference on Automated Software Engineering (ASE), September 2020.

36. Md. Shazibul Islam Shamim, Farzana Ahamed Bhuiyan, and **Akond Rahman**, "XI Commandments of Kubernetes Security: A Systematization of Knowledge Related to Kubernetes Security Practices", in the IEEE Secure Development Conference (SecDev) September 2020.

35. **Akond Rahman**, Effat Farhana, and Laurie Williams, "The 'as Code' Activities: Development Anti-patterns for Infrastructure as Code", in the Journal of Empirical Software Engineering (EMSE) 2020.

34. Farzana Ahamed Bhuiyan, Raunak Shakya, and **Akond Rahman**, "Can We Use Software Bugs to Identify Software Vulnerability Strategies?" in Proceedings of the Symposium and Bootcamp on the Science of Security (HotSoS) 2020, Lawrence, Kansas, April 2020.

33. Justin Murphy, Elias T. Brady, Shazibul Islam Shamim, and **Akond Rahman**, "A Curated Dataset of Security Defects in Scientific Software Projects" in Proceedings of the Symposium and Bootcamp on the Science of Security (HotSoS) 2020, Lawrence, Kansas, April 2020.

32. Raunak Shakya and **Akond Rahman**, "A Preliminary Taxonomy of Techniques Used in Software Fuzzing" in Proceedings of the Symposium and Bootcamp on the Science of Security (HotSoS) 2020, Lawrence, Kansas, April 2020.

31. **Akond Rahman**, Effat Farhana, Chris Parnin, and Laurie Williams, "*Gang of Eight*: A Defect Taxonomy for Infrastructure as Code Scripts", in Proceedings of the International Conference on Software Engineering (ICSE) 2020, Seoul, South Korea.

30. **Akond Rahman** "Anti-patterns in Infrastructure as Code", PhD Dissertation, NC State University 2019.

29. Md. Rayhanur Rahman, **Akond Rahman** and Laurie Williams, "*Share, But Be Aware*: Security Smells in Python Gists", in Proceedings of the International Conference on Software Maintenance and Evolution (ICSME) 2019, Ohio, USA, Oct 2019.

28. Effat Farhana, Nasif Imtiaz, and **Akond Rahman** "Synthesizing Program Execution Time Discrepancies in Julia Used for Scientific Software" in Proceedings of the International Conference on Software Maintenance and Evolution (ICSME) 2019, Ohio, USA, Oct 2019.

27. Nuthan Munaiah, **Akond Rahman**, Justin Pelletier, Laurie Williams, and Andrew Meneely. "Characterizing Attacker Behavior in a Cybersecurity Penetration Testing Competition", in Proceedings of the International Symposium on Empirical Software Engineering and Measurement (ESEM) 2019, Porto de Galinhas, Brazil, Sep 2019.

26. **Akond Rahman** and Laurie Williams, "Source Code Properties of Defective Infrastructure as Code Scripts", in the Journal of Information and Software Technology (IST).

25. Kanthi Sarpatwar, Venkata Sitaramagiridharganesh Ganapavarapu, Karthikeyan Shanmugam, **Akond Rahman**, and Roman Vaculin, "Blockchain Enabled AI Marketplace: The Price You Pay For Trust", in the Proceedings of the International Workshop of Blockchain Meets Computer Vision and Artificial Intelligence 2019, CA, USA 2019.

24. **Akond Rahman**, Effat Farhana, and Nasif Imtiaz, "*Snakes in Paradise?*: Insecure Python-related Coding Practices in Stack Overflow" in Proceedings of the International Conference on Mining Software Repositories (MSR) 2019, Montreal, Canada, May 2019.

23. Nasif Imtiaz, **Akond Rahman**, Effat Farhana, and Laurie Williams, "Challenges with Responding to Static Analysis Tool Alerts", in Proceedings of the International Conference on Mining Software Repositories (MSR) 2019, Montreal, Canada, May 2019.

22. **Akond Rahman** and Laurie Williams, "A Bird's Eye View of Knowledge Needs Related to Penetration Testing" in Proceedings of the Symposium and Bootcamp on the Science of Security (HotSoS) 2019, Nashville, Tennessee, April 2019.

21. **Akond Rahman**, Chris Parnin, and Laurie Williams, "*The Seven Sins*: Security Smells in Infrastructure as Code Scripts", in the International Conference on Software Engineering (ICSE) 2019. (**ACM SIGSOFT Distinguished Paper Award**)

20. **Akond Rahman**, Rezvan Mahdavi-Hezaveh, and Laurie Williams, "A Systematic Mapping Study of Infrastructure as Code Research", in the Journal of Information and Software Technology (IST).

19. **Akond Rahman**, Amritanshu Agrawal, Rahul Krishna, and Alexander Sobran, "Characterizing The Influence of Continuous Integration: Empirical Results from 250+ Open Source and Proprietary Projects", in 4th International Workshop on Software Analytics (SWAN 2018), co-located with European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE) 2018.

18. **Akond Rahman**, Jonathan Stallings, and Laurie Williams "Defect Prediction Metrics for Infrastructure as Code Scripts in DevOps", in Companion Proceedings of the 40th International Conference on Software Engineering (ICSE '18), 2018.

17. **Akond Rahman**, Asif Partho, Pat Morrison, and Laurie Williams "What Questions Do Programmers Ask About Configuration As Code?", in Proceedings of the 4th International Workshop on Rapid Continuous Software Engineering (RCoSE '18), co-located with International Conference for Software Engineering (ICSE) 2018, Gothenburg, Sweden, May, 2018.

16. **Akond Rahman**, "Comprehension Effort and Programming Activities: Related? Or Not Related?", in International Conference of Mining Software Repositories (MSR) 2018, Gothenburg, Sweden, May 2018.

15. **Akond Rahman**, "Characteristics of Defective Infrastructure as Code Scripts in DevOps", in Companion Proceedings of the 40th International Conference on Software Engineering (ICSE '18), 2018. (**ACM SIGSOFT Best Doctoral Symposium Paper Award**)

14. Rahul Krishna, Amritanshu Agrawal, **Akond Rahman**, Alexander Sobran and Tim Menzies, "What is the Connection Between Issues, Bugs, and Enhancements? (Lessons Learned from 800+ Software Projects)", in Companion Proceedings of the 40th International Conference on Software Engineering (ICSE '18), 2018.

13. Amritanshu Agrawal, **Akond Rahman**, Rahul Krishna, Alexander Sobran and Tim Menzies, "We Don't Need Another Hero? The Impact of "Heroes" on Software Development", in Companion Proceedings of the 40th International Conference on Software Engineering (ICSE '18), 2018.

12. **Akond Rahman**, and Laurie Williams, "Characterizing Defective Configuration Scripts Used for Continuous Deployment", in Proceedings of the 11th International Conference on Software Testing, Validation, and Verification (ICST '18), 2018.

11. **Akond Rahman** "Anti-patterns in Infrastructure as Code" in Proceedings of the International Conference of Software Testing, Validation, and Verification (ICST-PhD Symposium) 2018, Vasteras, Sweden, April 2018.

10. **Akond Rahman**, Priysha Pradhan, Asif Partho, and Laurie Williams, "Predicting Android Application Security and Privacy Risk with Static Code Metrics", in Proceedings of the 4th International Conference on Mobile Software Engineering and Systems (MOBILESoft '17), 2017. pages: 149-153.

9. **Akond Rahman**, Asif Partho, David Meder, and Laurie Williams, "Which Factors Influence Practitioners' Usage of Build Automation Tools?", in Proceedings of the 3rd International Workshop on Rapid Continuous Software Engineering (RCoSE '17), 2017. pages: 20-26.

8. Morgan Burcham, Mahran Al-Zyoud, Jeffrey Carver, Mohammed Alsaleh, Hongying Du, Fida Gilani, Jun Jiang, **Akond Rahman**, Ozgur Kafali, Ehab Al-Shaer, and Laurie Williams, "Characterizing Scientific Reporting in Security Literature: An analysis of ACM CCS and IEEE S&P Paper", in Proceedings of the Symposium and Bootcamp on the Science of Security (HotSoS'17) 2017, pages: 13-23.

7. **Akond Rahman** and Laurie Williams, "Software Security in DevOps: Synthesizing Practitioners' Perceptions and Practices", in Proceedings of International Workshop on Continuous Software Evolution and Delivery (CSED), May, 2016, Austin, TX, USA.

6. **Akond Rahman** and Laurie Williams, "Security Practices Used in DevOps", in Proceedings of Symposium and Bootcamp on the Science of Security (HotSoS), April, 2016, Pittsburg, PA, USA.

5. **Akond Rahman**, Eric Helms, Laurie Williams, and Chris Parnin, "Synthesizing Continuous Deployment Practices in Software Development", in Proceedings of 13th Agile Conference, pages 1-10, Washington D.C., USA, August, 2015.

4. **Akond Rahman**, Md. Atiqul Islam Mollah, and Mahmuda Naznin, "Multiple Targets Tracking Using Kinematics in Wireless Sensor Networks" in Wireless Sensor Network, pages 263-274, August, 2011.

3. **Akond Rahman**, Mahmuda Naznin, and Md. Atiqul Islam Mollah, "Energy Efficient Multiple Targets Tracking Using Target Kinematics in Wireless Sensor Networks" in Proceedings of 4th International Conference on Sensor Technologies and Applications (SensorComm), pages 275-280, Venice, Italy, July, 2010.

2. **Akond Rahman**, Mahmuda Naznin, and Md. Atiqul Islam Mollah, "Service Priority Based Target Tracking Framework in a Wireless Sensor Network" in Proceedings of 3rd IEEE International Conference on Computer Science and Information Technology (ICCSIT), pages 389-392, Chengdu, China, July, 2010.

1. M.M.Shahiduzzaman, Mahmuda Naznin, and **Akond Rahman**, "Portable and Secure Multimedia Data Transfer in Mobile Phones Using Record Management Store (RMS)" in Proceedings of 3rd IEEE International Conference on Computer Science and Information Technology (ICCSIT), pages 364-367, Chengdu, China, July, 2010.

Thesis Supervision

- PhD:

    3. Pemsith Mendis: Thesis Supervisor

    2. Md. Shazibul Islam Shamim: Thesis Supervisor

    1. Farzana Ahamed Bhuiyan: Thesis Supervisor (Graduated, First Appointment: Research Scientist at Meta, formerly known as Facebook)

- M.Sc.:

    2. Raunak Shakya: Thesis Supervisor (Graduated, First Appointment: Software Engineer at Mineral Works)

    1. Justin Murphy: Thesis Supervisor (Graduated, First Appointment: Vulnerability Researcher, U.S. Department of Homeland Security (DHS))

Community Service

- **Discussion Co-Lead**:

    - Discussion Co-lead, 'Software/Hardware Supply Chain Security', NSF Secure and Trustworthy Computing (SaTC) PI Meeting, 2022

- **Panelist**:

    - National Science Foundation (NSF), 2023
    - National Science Foundation (NSF), 2022
    - National Science Foundation (NSF), 2021

- **Co-chair**:

    - Diversity and Inclusion Track, International Conference on Software Maintenance and Evolution (ICSME) 2021

- **Program Committee Assignment**:

    - 47th International Conference on Software Engineering (ICSE 2025) - Technical Research Track
    - 38th IEEE/ACM International Conference on Automated Software Engineering (ASE) 2023 -Industry Track
    - ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE) 2023 - Technical Research Track
    - 46th International Conference on Software Engineering (ICSE 2024) - Technical Research Track
    - 37th IEEE/ACM International Conference on Automated Software Engineering (ASE) 2022 - Late Breaking Results (LBR) Track
    - International Conference on Software Maintenance and Evolution (ICSME) 2022 - Research Track
    - Mining Software Repositories 2022 (MSR 2022) - Shadow PC Mentor
    - Mining Software Repositories 2022 (MSR 2022) - Research Track
    - Innovations in Software Engineering Conference (ISEC) 2021 - ACM Student Research Competition Track
    - International Conference on Software Maintenance and Evolution (ICSME) 2021 - Research Track
    - Mining Software Repositories 2021 (MSR 2021) - Research Track
    - 26th annual conference on Innovation and Technology in Computer Science Education (ITiCSE) 2021 - Associate Program Chair
    - SIGCSE Technical Symposium 2021 (SIGCSE 2021) - Experience Report Track
    - IEEE International Workshop on Reliability and Security Data Analysis (RSDA 2020)

- IEEE/ACM International Conference on Automated Software Engineering 2020 (ASE 2020) - Late Breaking Results Track
- Foundation of Software Engineering (FSE) 2020 - Industry Track
- International Conference on Software Maintenance and Evolution (ICSME) 2020 - Research Track
- Mining Software Repositories (MSR) 2020 - Challenge Track
- Annual Conference on Innovation and Technology in Computer Science Education (ITiCSE) 2020

- **Discussion Lead**:

  - 'Dagstuhl Seminar 23181 - Empirical Evaluation of Secure Development Processes, 2023'
  - 'Dagstuhl Seminar 23082 - Resilient Software Configuration and Infrastructure Code Analysis, 2023'

- **Reviewer**:

  - ACM Transactions on Software Engineering and Methodology (TOSEM) 2020, 2021, 2023
  - IEEE Transactions on Software Engineering (TSE) 2020, 2022
  - Empirical Software Engineering Journal (EMSE) 2022, 2023
  - ACM Transactions on Computing Education (TOCE) 2022, 2023
  - Computers and Security 2021
  - NASA (Grant Reviewer) 2020
  - Journal of Science of Computer Programming (SCP) 2020
  - Journal of Information Technology and Management (ITEM) 2020
  - Journal of Systems and Software (JSS) 2019, 2020
  - IEEE Software 2019, 2020
  - Communications of the ACM (CACM) 2019

- **Sub-reviewer**:

  - ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE) 2019-Industry Track
  - International Symposium on Empirical Software Engineering and Measurement (ESEM) 2019
  - International Conference on Secure Development (SecDev) 2019
  - 6th Annual Hot Topics in the Science of Security Symposium (HotSoS) 2019
  - 12th International Conference on Software Testing, Verification and Validation (ICST) : Industry Track 2019
  - 9th International Symposium on Engineering Secure Software and Systems (ESSoS) 2018
  - 4th International Workshop on Rapid Continuous Software Engineering (RCoSE) 2018
  - 1st International Workshop on Security Awareness from Design to Deployment (SEAD) 2018
  - 28th International Symposium on Software Reliability Engineering (ISSRE) 2017
  - 11th International Symposium on Empirical Software Engineering and Measurement (ESEM) 2017
  - 14th International Conference on Mining Software Repositories (MSR) 2017
  - 37th, and 40th International Conference on Software Engineering (ICSE) 2015 and 2018

- **Student volunteer**:

  - 39th International Conference on Software Engineering (ICSE) 2017
  - 40th International Conference on Software Engineering (ICSE) 2018

- **Team Leader for NCSU Team at IT Architecture Competition**:
  I led the NCSU team in the Student Showdown competition arranged by the Raleigh Chapter of International Association for Software Architects (IASA) (http://members.iasaglobal.org/news/281134/Iasa-IT-Architect-Competition.htm).

Invited Talks

- "Automated Security Testing for Kubernetes", Invited Research Talk, WindRiver Associates, May 24, 2023.

- "Secure Software Development: A Spectrum of Opportunites", Invited Talk, University of Tennessee Chattanooga (UTC) Research Summit, Nov 03, 2022.

- "Come for Syntax, Stay for Speed, Understand defects: Defects in Julia Programs", Invited Talk, US-RSE Community Event, Apr 14, 2022.

- "How Do Students Feel About CAPEC-based Security Static Analysis Exercises?", Invited Talk, CAPEC Program User Summit, Feb 23, 2022.

- "Growing the Science of Quality Integration for Infrastructure as Code", Invited Seminar, Lane Department of Electrical Engineering and Computer Science, West Virginia University, Jan 28, 2022.

- "Growing the Science of Quality Integration for Infrastructure as Code", Invited Seminar, Department of Computer Science, Binghamton University, Jan 13, 2022.

- "Growing the Science of Quality Integration for Infrastructure as Code", Invited Seminar, Department of Computer Science, Virginia Commonwealth University, Dec 15, 2021.

- "Growing the Science of Quality Assurance for Infrastructure as Code", Research Talk, Department of Computer Science, University of Kentucky, Dec 06, 2021.

- "Integrating Quality Into Infrastructure as Code Development", Research Talk, WindRiver Associates, Oct 22, 2021.

Professional Experience

- **Assistant Professor**   Aug 2022 - Current

  - Auburn University, Auburn, AL, USA
  - Tenure track assistant professor at the Department of Computer Science and Software Engineering

- **Assistant Professor**   Aug 2019 - July 2022

  - Tennessee Tech University, Cookeville, TN, USA
  - Tenure track assistant professor at the Department of Computer Science

- **Research Intern**   May 2018 - Aug 2018

  - IBM Research, IBM TJ Watson Research Center, Yorktown Heights, NY, USA
  - Integrating AI Marketplace protocol with Hyperledger Composer and Hyperledger Fabric.

- **Data Science Intern**   May 2017 - Aug 2017

  - IBM, Research Triangle Park (RTP), NC, USA
  - Mining open source and industry software repositories to assess the merits of continuous integration, identify temporal patterns in defects, and analyze the effect of team size on software project success.

- **Systems Infrastructure Intern**   May 2016 - Aug 2016

  - Redhat, Raleigh, NC, USA
  - Developed monitoring facilities for the OpenShift infrastructure to facilitate continuous deployment of internal Redhat applications.

- **Software Research Intern**   May 2015 - Aug 2015

  - ABB Corporate Research, Raleigh, NC, USA

- Designed, and developed a software framework to detect similar software applications in ABB using SrcML.NET and Natural Language Toolkit (NLTK).

- **Research Assistant**   Jan 2016 - July 2019
  - Science of Security Lablet, National Security Agency (NSA), USA
  - Investigated attack surface modeling to find vulnerabilities.

- **Teaching Assistant**   Aug 2014 - Dec 2015
  - North Carolina State University, Raleigh, NC, USA
  - Conducted class lectures for the graduate-level course 'Software Security'

- **Graduate Assistant**   Jan 2012 - May 2014
  - University of Connecticut, Storrs, CT, USA
  - Graduate assistant for 'Engineering Computing Services' office. Involved in computer and network troubleshooting

- **Software Engineer**   Jan 2010 - Dec 2011
  - Dohatec New Media, Dhaka, Bangladesh
  - Developed and tested an online procurement system for the Ministry of Planning of the People's Republic of Bangladesh using ASP.NET with C# and Microsoft SQL Server.

Teaching Experience

- **Software Quality Assurance**   Fall 2022, Spring 2023, Fall 2023
  - Graduate course focusing on software quality assurance activities, such as software testing and secure software development
  - Department of Computer Science and Software Engineering, Auburn University

- **Resilient DevOps**   Spring 2022
  - Graduate course focusing on state-of-the-art research related to DevOps
  - Department of Computer Science, Tennessee Tech University

- **Software and Systems Security**   Fall 2021
  - Undergraduate course focusing on systems security and secure software development
  - Department of Computer Science, Tennessee Tech University

- **Software Engineering**   Spring/Fall 2021
  - Undergraduate course focusing on software engineering fundamentals and application of Agile methods
  - Department of Computer Science, Tennessee Tech University

- **Secure Software Development**   Fall 2020
  - Graduate course focusing on secure software software development and research
  - Department of Computer Science, Tennessee Tech University

- **Data Mining**   Spring 2020
  - Graduate course focusing on data mining techniques, such as text mining and association rule mining
  - Department of Computer Science, Tennessee Tech University

- **Data Mining & Machine Learning**   Fall 2019
  - Undergraduate course focusing on fundamental data mining and machine learning techniques
  - Department of Computer Science, Tennessee Tech University

Professional Memberships

- "IEEE", 2021 - Current.
- "ACM", 2021 - Current.
- "ACM SIGSOFT", 2021 - Current.