Akond Rahman

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Research Interests

Software engineering focused in the area of DevOps, Software Analytics, and Software Security

Professional Experience

- **Assistant Professor** Aug 2019 - Present
  - Tennessee Technological 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 Inc., Raleigh, NC, USA
  - Developed monitoring facilities for the OpenShift infrastructure to facilitate continuous deployment of internal Redhat applications.
  - Facilitated Integration of in-house Redhat application into the OpenShift infrastructure.

- **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 - May 2016
  - Science of Security Lablet, National Security Agency (NSA), USA
  - Investigated attack surface modeling to find vulnerabilities.
  - Studied research methods for science of security.

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

- **Graduate Assistant** Jan 2012 - May 2014
  - University of Connecticut, Storrs, CT, USA
  - Teaching assistant for the 'Introduction to Computer Programming' course for 80 undergraduate students

- Graduate assistant for 'Engineering Computing Services' office. Involved in computer and network troubleshooting
- Research assistant in the Department of Computer Science and Engineering. Involved in human computer interaction research

- **Software Engineer**   Jan 2010 - Jun 2011

  - Dohatec New Media, Dhaka, Bangladesh
  - Designed and developed a Java-based multi-modal biometric system using the MegaMatcher SDK.
  - 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.

Awards & Honors

- **ACM SIGSOFT Distinguished Paper Award**
  For the paper '*The Seven Sins*: Security Smells in Infrastructure as Code Scripts' at ICSE 2019, Montreal, Canada.

- **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. Details are available here http://tiny.cc/unp1by.

- **University Scholarship for Merit**
  Received this award for maintaining decent academic progress for four semesters from 2007 to 2009 during the Bachelors program in Bangladesh University of Engineering and Technology.

Education

- **Doctor of Philosophy (Ph.D.) in Computer Science**   Aug 2014 - June 2019

  - Dissertation title: "Anti-patterns in Infrastructure as Code"
  - Adviser: Dr. Laurie Williams
  - 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 - Sep 2009

  - Bangladesh University of Engineering and Technology, Dhaka, Bangladesh

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Publications

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

- 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 to appear, CA, USA 2019.

- **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. *To appear. Pre-print*

- 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. *To appear. Pre-print*

- **Akond Rahman** and Laurie Williams, "Poster: 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, *To appear.Pre-print*

- **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, *To appear. Pre-print*

- **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), *Pre-print*

- **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, *Pre-print*

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

- **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, *Pre-print*

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

- **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, *Pre-print*

- 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, *Pre-print*

- 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, *Pre-print*

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

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

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

- 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 Symposium and Bootcamp on the Science of Security (HotSoS'17) 2017, pages: 13-23.

- **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.

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

- **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.

- **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.

- **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.

- **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.

- 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.

PRESENTATIONS

- *"Snakes in Paradise?*: Insecure Python-related Coding Practices in Stack Overflow", in International Conference of Mining Software Repositories 2019 (MSR'19) URL

- "What Questions Do Programmers Ask About Configuration As Code?", in 4th International Workshop on Rapid Continuous Software Engineering (RCoSE'18) URL

- "Comprehension Effort and Programming Activities: Related? Or Not Related?", in International Conference of Mining Software Repositories 2018 (MSR'18) URL

- "Characteristics of Defective Infrastructure as Code Scripts in DevOps", in International Conference on Software Engineering 2018 (ICSE'18) URL

- "Characterizing Defective Configuration Scripts Used for Continuous Deployment", in 11th International Conference on Software Testing, Validation, and Verification 2018(ICST'18) URL

- "Predicting Android Application Security and Privacy Risk with Static Code Metrics", in 4th International Conference on Mobile Software Engineering and Systems 2017(MOBILESoft'17) URL

- "Which Factors Influence Practitioners' Usage of Build Automation Tools?", in 3rd International Workshop on Rapid Continuous Software Engineering 2017(RCoSE '17) URL

- "Software Security in DevOps: Synthesizing Practitioners' Perceptions and Practice", in 1st International Workshop on Continuous Software Evolution and Delivery 2016(CSED) URL

- "Synthesizing Continuous Deployment Practices in Software Development", in 13th Agile Conference 2015 (Agile2015) URL

VOLUNTARY EXPERIENCE

- **Reviewer**:

  - Journal of Systems and Software 2019
  - IEEE Software 2018 and 2019
  - 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

- **Mentoring Graduate Students**:
  I voluntarily mentored four PhD and one MSc students at NCSU who are interested in software engineering research. I helped them in their research and course projects, which involved mining software repositories and software security. Through the mentorship experience I learned and resolved technical challenges that students face when approaching a research project for the first time. My mentorship is helping the MSc student in his thesis. The two PhD students are now currently preparing articles for a suitable software engineering research conference.

- **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`).