

# SAZZADUR RAHAMAN

Assistant Professor, University of Arizona

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## ⚙️ RESEARCH INTEREST

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I work towards making security research more democratized and affordable. I am broadly interested in building robust systems and methodologies by using program analysis, applied cryptography, formal verification, internet measurement and machine learning-based techniques. I emphasize on transitioning my work into practice. My strength is building rigorous methodologies and deployable systems.

## 🎓 EDUCATION

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### **Ph.D. in Computer Science,**

Virginia Tech, USA

Aug. 2015 – Aug. 2020

**Thesis:** *From Theory to Practice: Deployment-grade Tools and Methodologies for Security Compliance Measurements*

**Advisor:** Dr. Danfeng (Daphne) Yao, Professor, Elizabeth and James E. Turner Jr. '56 Faculty Fellow.

### **B.Sc. in Computer Science and Engineering,**

Bangladesh University of Engineering and Technology (BUET), Bangladesh

2006 – 2012

## 🐾 PROFESSIONAL APPOINTMENTS

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**University of Arizona,** Tucson, AZ, USA

Aug. '20 – Present

*Assistant Professor,* Computer Science

**Data Security Technologies, LLC,** Dallas, TX, USA

May '19 – Aug. '19

*Software Engineering Intern,* SecureDL Team

**Data Security Technologies, LLC,** Dallas, TX, USA

May. '17 – Aug. '17

*Software Engineering Intern,* SecureDL Team

**Kona Software Lab Ltd,** Dhaka, Bangladesh

Mar. '14 – Jul. '15

*Software Engineer and Team Lead,* Kona Pay Team

**Therap Services, LLC,** Dhaka, Bangladesh

Apr. '12 – Feb. '14

*Software Engineer,* System Team

## ☆ HONORS AND AWARDS

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- **Torgersen Award Finalist**, Best Ph.D. research (Poster track) 2021
- **CSAW '20 Applied Research Competition Finalist**, Paper on Security Certification (CCS 19) 2020
- **NSA Best Science of Security Paper Nomination**, CryptoGuard (CCS 19) 2020
- **Pratt Fellowship**, Fall 2019 and Spring 2020 2019
- **Bitshare Fellowship**, Fall 2018 and Spring 2019 2018
- **Champion in .Net platform**, Inter University System Design Competition-2011, BUET 2011
- **Dean's List Award**, BUET Session 2009-10

## 📖 PUBLICATIONS

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Journal Papers

- [TDSC'21] Sazzadur Rahaman, Haipeng Cai, Omar Chowdhury and Danfeng (Daphne) Yao. "From Theory to Code: Identifying Logical Flaws in Cryptographic Implementations." IEEE Transactions on Dependable and Secure Computing (TDSC). 2020. **(Impact Factor: 6.404)**

## Conference Papers

- [CheckMATE'21] Ben Jacobsen, [Sazzadur Rahaman](#), Saumya Debray. “*Optimization to the Rescue: Evading Binary Code Stylometry with Adversarial Use of Code Optimizations.*” The CheckMATE workshop collocated with the ACM Conference on Computer and Communications Security (CCS), 2021.
- [SecDev'20] Mazharul Islam, [Sazzadur Rahaman](#), Na Meng, Behnaz Hassanshahi, Padmanabhan Krishnan and Danfeng (Daphne) Yao). “*Coding Practices and Recommendations of Spring Security for Enterprise Applications.*” IEEE Secure Development Conference. Atlanta, GA, September 2020.
- [CCS'19] [Sazzadur Rahaman](#), Gang Wang, Danfeng (Daphne) Yao. “*Security Certification in Payment Card Industry: Testbeds, Measurements, and Recommendations.*” ACM Conference on Computer and Communications Security (CCS'19). London, UK. November 2019. (Acceptance Rate: 16%, ★ **CSAW'20 Best Applied Research Finalist**)  
**Source code:** <https://github.com/sazzad114/{pci-checker,buggycart}>
- [CCS'19] [Sazzadur Rahaman](#), Ya Xiao, Sharmin Afrose, Fahad Shaon, Ke Tian, Miles Frantz, Murat Kantarcioglu, Danfeng (Daphne) Yao. “*CryptoGuard: High Precision Detection of Cryptographic Vulnerabilities in Massive-sized Java Projects.*” ACM Conference on Computer and Communications Security (CCS'19). London, UK. November 2019. (Acceptance Rate: 16%, ★ **Adopted by Oracle, NSA Best Science of Security Paper Nomination**)  
**Source code:** <https://github.com/CryptoGuardOSS/cryptoguard>
- [SecDev'19] Sharmin Afrose, [Sazzadur Rahaman](#), Danfeng (Daphne) Yao. “*CryptoAPI-Bench: A Comprehensive Benchmark on Java Cryptographic API Misuses.*” 2019 IEEE Secure Development Conference (SecDev'19). McLean, VA. September 2019. (Acceptance Rate: 36%, ★ **Used by multiple research groups**)  
**Source code:** <https://github.com/CryptoGuardOSS/cryptoapi-bench>
- [PETS'17] [Sazzadur Rahaman](#), Long Cheng, Danfeng (Daphne) Yao, He Li, and Jung-Min (Jerry) Park. “*Provably Secure Anonymous-yet-Accountable Crowdsensing with Scalable Sublinear Revocation.*” 17th Privacy Enhancing Technologies Symposium (PETS'17). Minneapolis, MN, USA. July, 2017.  
(Acceptance Rate: 21.7%)
- [SecDev'17] [Sazzadur Rahaman](#), Danfeng (Daphne) Yao. “*Program Analysis of Cryptography Implementations for Security.*” 2017 IEEE Secure Development Conference (SecDev'17). Cambridge, MA, USA. September, 2017.
- [ICIEV'14] [Sazzadur Rahaman](#), Tousif Ahmed Eshan, Sad Al Abdullah, and Md. Saidur Rahman. “*Antibandwidth Problem for Itchy Caterpillars.*” IEEE International Conference on Informatics, Electronics & Vision (ICIEV'14). Dhaka, Bangladesh. May, 2014.
- [ISMS'13] Mohammad Raihanul Islam, [Sazzadur Rahaman](#), Rakibul Hasan, Ridwan Rashid Noel, Asif Salekin, and Hasan Shahid Ferdous. “*A Novel Approach for Constructing Emulator for Microsoft Kinect XBOX 360 Sensor in the .NET Platform.*” IEEE International Conference on Intelligent Systems Modelling & Simulation (ISMS'13). Bangkok, Thailand. January, 2013.

## Tutorials

- [SecDev'20] Ya Xiao, Miles Frantz, Sharmin Afrose, [Sazzadur Rahaman](#) and Danfeng (Daphne) Yao. “*Tutorial: Principles and Practices of Secure Cryptographic Coding in Java*” (90 minutes Tutorial). 2020 IEEE Secure Development Conference (SecDev'20). September, 2020.
- [SecDev'18] [Sazzadur Rahaman](#), Na Meng and Danfeng (Daphne) Yao. “*Tutorial: Principles and Practices of Secure Crypto Coding In Java*” (90 minutes Tutorial). 2018 IEEE Secure Development Conference (SecDev'18). Cambridge, MA, USA. September, 2018.

## Patents

- Fahad Shaon, [Sazzadur Rahaman](#). “*Systems and methods for proactive and reactive data security*”. U.S. Patent Application No: 16/698,328. (filed).

## Posters

- [S&P'19] [Sazzadur Rahaman](#), Ya Xiao, Sharmin Afrose, Ke Tian, Miles Frantz, Danfeng (Daphne) Yao, Na Meng, Barton P. Miller, Fahad Shaon, Murat Kantarcioglu. “*Poster: Deployment-quality and Accessible Solutions for Cryptography Code Development.*” 2019 IEEE Symposium on Security and Privacy (IEEE S&P'19). San Francisco, CA, USA. May, 2019.
- [CCS'19] [Sazzadur Rahaman](#), Ya Xiao, Sharmin Afrose, Ke Tian, Miles Frantz, Danfeng (Daphne) Yao, Na Meng, Barton P. Miller, Fahad Shaon, Murat Kantarcioglu. “*POSTER: Deployment-quality and Accessible Solutions for Cryptography Code Development.*” 2019 ACM Conference on Computer and Communications Security (ACM CCS'19). London, United Kingdom. November 2019.
- [SecDev'19] Sharmin Afrose, [Sazzadur Rahaman](#), Danfeng (Daphne) Yao. “*A Comprehensive Benchmark on Java Cryptographic API Misuses.*” 2019 IEEE Secure Development Conference (SecDev'19). McLean, VA. September 2019.
- [SecDev'17] [Sazzadur Rahaman](#), Long Cheng, Danfeng (Daphne) Yao, He Li, and Jung-Min (Jerry) Park. “*Enabling Large-scale Anonymous-yet-Accountable Crowdsensing*” (Poster). 2017 IEEE Secure Development Conference (SecDev'17). Cambridge, MA, USA. September, 2017.

- [USENIX SEC'16] Sazzadur Rahaman, Long Cheng, He Li, Danfeng (Daphne) Yao and Jung-Min (Jerry) Park. "GroupSense: Scalable Crowdsensing with Privacy and Accountability." (Poster). 2016 USENIX Security (USENIX SEC'16). Austin, TX. August, 2016.

## SELECTED TEACHING EXPERIENCE

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- *CSC 696I - Advanced Topics in Security*: Spring 2021, University of Arizona.
- *CS 4264 - Principles of Computer Security*: Spring 2020, Virginia Tech.

## SELECTED DEPARTMENTAL SERVICES

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- *MS and AMP admission committee*: Fall'20, Spring'21, Fall'21
- *PhD admission committee*: Spring'21.

## SELECTED PROFESSIONAL SERVICES

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- **Technical Program Committee**: NDSS '21 '22, PETS '22, SACMAT '22, NSysS '21.
- *Journal Reviewer*: IEEE TDSC, IEEE IoT Journal, Transactions on Embedded Computing Systems.
- *Panelist*: Networking, Systems, and Security (NSysS) 2020.
- *External Reviewer*: ACSAC '20, PETS '18 '19 '20, SecDev '18

## SELECTED TALKS

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- *Compliance Disparity Triangle: Impediments for effective compliance certification*  
**Invited talk**, FACC Workshop at Computer-Aided Verification (CAV), Online. (July, 2021)
- *From Theory to Practice: Deployment-grade Tools and Methodologies for Software Security*  
**Invited talk**, Department of Computer Science, Clemson University, Dhaka, Bangladesh. (September, 2020)
- *Tutorial: Principles and Practices of Cryptographic Coding in Java*  
**Tutorial**, IEEE Secure Development Conference (SecDev'20), Online. (September, 2020)
- *From Theory to Practice: Deployment-grade Tools and Methodologies for Software Security*  
**Invited talk**, Department of CSE, Bangladesh Univ. of Eng. & Tech. (BUET), Bangladesh. (September, 2020)
- *From Theory to Practice: Deployment-grade Tools and Methodologies for Software Security*  
Department of Computer Science, Wayne State University, Detroit, MI. (March, 2020)
- *From Theory to Practice: Deployment-grade Tools and Methodologies for Software Security*  
Department of Computer Science, University of Central Florida, Orlando, FL. (February, 2020)
- *CryptoGuard: High Precision Detection of Cryptographic Vulnerabilities in Massive-sized Java Projects*  
In ACM Conference on Computer and Communications Security (CCS'19), London, UK. (November, 2019)
- *Security Certification in Payment Card Industry: Testbeds, Measurements, and Recommendations*  
In ACM Conference on Computer and Communications Security (CCS'19), London, UK. (November, 2019)
- *Research on the dangers of copy/pasting code*  
In *Snyk.io* Podcast with James Davis. (November, 2019)
- *Understanding and Minimizing The Gap Between Secure Coding Theory and Practice*  
**Invited Talk**, The University of Wisconsin-Madison, Madison, WI. (**Hosted by Prof. Barton Miller**)
- *Principles and Practices of Secure Crypto Coding In Java*  
**Tutorial**, IEEE Secure Development Conference (SecDev'18), Cambridge, MA. (September, 2018)
- *Program Analysis of Cryptography Implementations for Security*  
In IEEE Secure Development Conference (SecDev'17), Cambridge, MA. (September, 2017)
- *Enabling Large-scale Anonymous-yet-Accountable Crowdsensing*  
In 17th Privacy Enhancing Technologies Symposium (PETS'17), Minneapolis, MN. (July, 2017)
- *Smart Card to the Cloud for Convenient, Secured NFC Payment*  
**Invited talk**, JavaOne'15, San Francisco, CA. (2015)
- *Languages in JVM Ecosystem and The future of JVM*  
**Invited talk**, JUG, BD (Meetup 5.0), Dhaka, BD. (2015)
- *Java 8: Lambda expression and Stream API*  
**Invited talk**, JUG, BD (Meetup 3.0), Dhaka, BD. (2015)
- *Antibandwidth problem for itchy caterpillar*  
In IEEE International Conference on Informatics, Electronics & Vision (ICIEV'14), Dhaka, BD. (May, 2014)

## ➡ FUNDING

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- **TRIF NSS** (University of Arizona): PI: Sazzadur Rahaman, Co-PI: Loukas Lazos, Total amount: \$36,701

## 🕒 MENTORING EXPERIENCE

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- **PhD Students:** Ahmad Musa (Fall 2020), Md. Moyeen Uddin (Fall 2021), Saiful Islam Salim (Fall 2021)
- **Master's Students:** Jesse Chen (Spring 2021)
- **Undergraduate Students:** Jesse Chen (Graduated: Fall 2021)
- **Current and Former Student Collaborators:** Sharmin Afrose (VT), Ya Xiao (VT), Mazharul Islam (VT), Miles Frantz (VT), Hannah Roth (VT)

## ♡ MISCELLANEOUS

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- **Program Committee**, for selecting the best applied research contribution for CSAW 2021.
- **Mentor**, University of Arizona Women in Science and Engineering Program (WISE 2021).
- **Mentor**, Individualized Cybersecurity Research Mentoring Workshop 2020 (iMentor 2020).
- **Founding member and initiator**, Java User Group, Bangladesh (JUGBD).
- **Top 7% of StackOverflow users**, 200+ posts with 6000+ Reputation.
- **Qualifier Q/A panelist '17 '18**, Computer Science, Virginia Tech.