

# SAZZADUR RAHAMAN

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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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### Virginia Tech, USA

Aug. 2015 – Current

*Ph.D. Candidate* in Computer Science (5th Year).

**Thesis:** “From Theory to Practice: Deployment-grade Tools and Methodologies for Security Compliance Measurements”, **Advisor:** Danfeng (Daphne) Yao, Professor.

#### **Thesis committee:**

1. Danfeng (Daphne) Yao (Chair), Professor, Turner Fellow & CACI Fellow, Computer Science, Virginia Tech
2. Gang Wang (External), Assistant Professor, Computer Science, University of Illinois at Urbana-Champaign
3. David Evans (External), Professor, Computer Science, University of Virginia
4. Naren Ramakrishnan (Member), Professor, Computer Science, Virginia Tech
5. Patrick Schaumont (Member), Professor, Department of Electrical and Computer Engineering, Virginia Tech

### Bangladesh University of Engineering and Technology (BUET), Bangladesh

2006 – 2012

*B.S. in Computer Science and Engineering.*

**Thesis:** “Antibandwidth Problem for Itchy Caterpillars”, **Advisor:** *Md. Saidur Rahman*, Professor.

## 📖 PUBLICATIONS

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### Journal Papers

- **[TDSC’19]** 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). 2019.  
**(Impact Factor: 6.404)**

### Conference Papers

- **[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, United Kingdom. November 2019.  
**(Acceptance Rate: 16%)**  
**Sources:** <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, United Kingdom. November 2019.  
**(Acceptance Rate: 16%, Adopted by Oracle)**  
**Source:** <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:** <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 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'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.

### ☆ HONORS AND AWARDS

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- **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

### 🐾 PROFESSIONAL APPOINTMENTS

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**Virginia Tech**, Blacksburg, VA, USA

Dec. '19 – May. '20

Teaching Instructor, CS 4264 - Principles of Computer Security

<b>Virginia Tech</b> , Blacksburg, VA, USA <i>Graduate Teaching Assistant</i> , CS/ECE 5584 - Network Security	Aug. '19 – Dec. '19
<b>Data Security Technologies, LLC</b> , Dallas, TX, USA <i>Software Engineering Intern</i> , SecureDL Team	May '19 – Aug. '19
<b>Virginia Tech</b> , Blacksburg, VA, USA <i>Graduate Research Assistant</i> , Yao Group	Aug. '15 – May '19
<b>Data Security Technologies, LLC</b> , Dallas, TX, USA <i>Software Engineering Intern</i> , SecureDL Team	May. '17 – Aug. '17
<b>Kona Software Lab Ltd</b> , Dhaka, Bangladesh <i>Software Engineer and Team Lead</i> , Kona Pay Team	Mar. '14 – Jul. '15
<b>Therap Services, LLC</b> , Dhaka, Bangladesh <i>Software Engineer</i> , System Team	Apr. '12 – Feb. '14

## GRANTS

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### Contribution in Proposal

- NSF CBET Division (Award no. 1645121, 1645285) \$100,000
- NSF CNS Division Of Computer and Network Systems (Award no. 1929701) \$700,000

### Research Contribution in Other Grants

- Office of Naval Research (ONR) (Award no. N00014-17-1-2498) \$1,200,000
- NSF CNS Division Of Computer and Network Systems (Award no. 1717028) \$500,000

## TALKS

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- Paper presentation, “CryptoGuard: High Precision Detection of Cryptographic Vulnerabilities in Massive-sized Java Projects”, **CCS'19**, London, UK 2019
- Paper presentation, “Security Certification in Payment Card Industry: Testbeds, Measurements, and Recommendations”, **CCS'19**, London, UK 2019
- **Podcast**, Jamie Davis and Sazzadur Rahaman, “Research on the dangers of copy/pasting code”, with Snyk.io. 2019
- **Invited talk**, “Understanding and Minimizing The Gap Between Secure Coding Theory and Practice” The University of Wisconsin-Madison, Madison, WI (**Hosted by Prof. Barton Miller**) 2019
- **Tutorial**, “Principles and Practices of Secure Crypto Coding In Java” SecDev'18, Cambridge, MA 2018
- Paper presentation, “Program Analysis of Cryptography Implementations for Security” SecDev'17, Cambridge, MA 2017
- Paper presentation, “Enabling Large-scale Anonymous-yet-Accountable Crowdsensing” **PETS'17**, Minneapolis, MN 2017
- **Invited talk**, “Smart Card to the Cloud for Convenient, Secured NFC Payment” JavaOne'15, San Francisco, CA 2015
- **Invited talk**, “Languages in JVM Ecosystem and The future of JVM” JUG, BD (Meetup 5.0), Dhaka, BD 2015
- **Invited talk**, “Java 8: Lambda expression and Stream API” JUG, BD (Meetup 3.0), Dhaka, BD 2015
- Paper presentation, “Antibandwidth problem for itchy caterpillar” ICIEV'17, Dhaka, BD 2014

## SELECTED PROFESSIONAL SERVICES

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- *Journal Reviewer:* IEEE Transactions on Dependable and Secure Computing (TDSC)
- *External Reviewer:* PETS '18 '19, SecDev '18
- *Sub Reviewer:* CCS '17 '18 '19, S&P '18 '19 '20, NDSS '19, WWW '19, AsiaCCS '17 '18, DSN '17
- *Student Volunteer:* CCS 2017
- *Attended Conferences:* SEC 2016, PETS 2017, SecDev 2017, CCS 2017, SecDev 2018, SecDev19, CCS 2019.

## MENTORING EXPERIENCE

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- **PhD Students:** Sharmin Afrose, Ya Xiao, Mazharul Islam
- **MS Students:** Miles Frantz, Hannah Roth (2017)

## MISCELLANEOUS

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- **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.

## REFERENCES

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- Prof Danfeng (Daphne) Yao (PhD Advisor)  
Professor, Elizabeth and James E. Turner Jr. '56 Faculty Fellow and CACI Faculty Fellow,  
Department of Computer Science,  
Virginia Tech, USA.  
Email: danfeng@vt.edu
- Prof Gang Wang (PhD Thesis Committee Member and Research Collaborator)  
Assistant Professor,  
Department of Computer Science,  
University of Illinois at Urbana-Champaign, USA.  
Email: gangw@illinois.edu
- Prof Murat Kantarcioglu (Supervisor at Data Security Technologies and Research Collaborator)  
Professor, Director of UTD Data Security and Privacy Lab,  
Department of Computer Science,  
University of Texas at Dallas, USA.  
Email: muratk@utdallas.edu