

Pubali Datta

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Research Interests

System Security, Serverless Cloud and IoT Security, Information Flow Control, Forensics Analysis, Data provenance.

Education

- **University of Illinois Urbana-Champaign (UIUC)** Urbana, IL
Doctor of Philosophy in Computer Science 2017-2023
- **Jadavpur University** Kolkata, India
Master of Engineering in Computer Science & Engineering 2011-2013
- **West Bengal University of Technology** Kolkata, India
Bachelor of Technology in Computer Science & Engineering 2007-2011

Thesis.....

- **PhD thesis (2023):** *Defending against Emerging Threats in Serverless Computing through Information Flow Analysis*
 - Adviser: Dr. Adam Bates
- **Master's thesis (2013):** *Resource requirement prediction for scheduling jobs in grid environment.*
 - Adviser: Dr. Nandini Mukherjee

Awards & Honors

- 2022 - *Invited to talk at Rising Stars in Computer Science talk series.* Organized by UMass Amherst Manning CICS.
- 2022 - *USENIX Security Symposium Travel Grant, \$830 Award.*
- 2021 - *Nominated for the Mavis Future Faculty Fellows Program 2021.* Organized by Grainger College of Engineering, UIUC.
- 2020 - *Rising Stars 2020 participant, 1 of 152 women selected internationally.* Organized by EECS at UC Berkeley.
- 2020 - *Leader of the runner up team in TracerFIRE workshop (collocated with ACSAC).* Organized by Sandia National Laboratories.
- 2020 - *The Web Conference 2020 Scholarship, \$1666 Award.* Sponsored by NSF.
- 2019 - *ACM CCS Travel Grant, \$1000 Award.* Sponsored by ACM.
- 2019 - *GREPSEC IV Workshop (collocated with IEEE S&P) Participant, 1 of 35 selected internationally.* Supported by NSF.
- 2018 - *IEEE S&P student travel award, \$1400 Award.* Sponsored by IEEE.

- 2018 - *Nominated for Microsoft Research Ada Lovelace Fellowship*. Department of Computer Science, UIUC.
- 2018 - *ACM-W scholarship for conference attendance, \$600 Award*. Awarded by ACM.
- 2014 - *Outstanding paper award*. Awarded by CTO, TCS Innovation Labs.
- 2013 - *Ranked 3rd in the class of Master of Engineering*. Department of Computer Science & Engineering, Jadavpur University.
- 2011 - *GATE Scholarship for 2 years during Master's studies*. Sponsored by Govt. of India.
- 2011 - *Best student award in the class of B.Tech (Computer Science & Engineering)*. Sponsored by TCS.

Publications

Conference Publications.....

- [C11] Phoebe Moh, **Pubali Datta**, Noel Warford, Adam Bates, Nathan Malkin, and Michelle L. Mazurek. "Characterizing Everyday Misuse of Smart Home Devices". In: *Accepted to appear in IEEE Symposium on Security and Privacy (S&P)* (2023).
- [C10] **Pubali Datta**, Isaac Polinsky, Adam Bates, and William Enck. "Alastor: Reconstructing the Provenance of Serverless Intrusions". In: *USENIX Security Symposium*. 2022.
- [C9] Isaac Polinsky, **Pubali Datta**, Adam Bates, and William Enck. "SCIFFS: Enabling Secure Third-Party Security Analytics using Serverless Computing". In: *The ACM Symposium on Access Control Models and Technologies (SACMAT)*. 2021.
- [C8] **Pubali Datta**, Prabuddha Kumar, Tristan Morris, Michael Grace, Amir Rahmati, and Adam Bates. "Valve: Securing Function Workflows on Serverless Computing Platforms". In: *Proceedings of The Web Conference (formerly WWW)*. 2020.
- [C7] Wajih Ul Hassan, Mohammad Ali Nouredine, **Pubali Datta**, and Adam Bates. "OmegaLog: High-fidelity attack investigation via transparent multi-layer log analysis". In: *Network and Distributed System Security Symposium (NDSS)*. 2020.
- [C6] Riccardo Paccagnella, **Pubali Datta**, Wajih Ul Hassan, Adam Bates, Christopher Fletcher, Andrew Miller, and Dave Tian. "Custos: Practical tamper-evident auditing of operating systems using trusted execution". In: *Network and Distributed System Security Symposium (NDSS)*. 2020.
- [C5] Arnav Sankaran, **Pubali Datta**, and Adam Bates. "Workflow Integration Alleviates Identity and Access Management in Serverless Computing". In: *Annual Computer Security Applications Conference (ACSAC)*. 2020.
- [C4] **Pubali Datta***, Qi Wang*, Wei Yang, Si Liu, Adam Bates, and Carl A. Gunter. "Charting the Attack Surface of Trigger-Action IoT Platforms". In: *Proceedings of the 2019 ACM SIGSAC Conference on Computer and Communications Security (CCS)*. 2019. (* = co-primary authors).
- [C3] Arijit Mukherjee, Anupam Basu, Swarnava Dey, **Pubali Datta**, and Himadri Sekhar Paul. "To Run or Not to Run: Predicting Resource Usage Pattern in a Smartphone". In: *Internet of Things. User-Centric IoT*. 2015.

- [C2] Ansuman Banerjee, Himadri Sekhar Paul, Arijit Mukherjee, **Pubali Datta**, and Sajal Kumar Das. "An access point to device association technique for optimized data transfer in mobile grids". In: *20th IEEE International Conference on Parallel and Distributed Systems (ICPADS)*. 2014.
- [C1] **Pubali Datta**, Swarnava Dey, Himadri Sekhar Paul, and Arijit Mukherjee. "ANGELS: A framework for mobile grids". In: *Applications and Innovations in Mobile Computing (AIMoC)*. 2014.

Workshop Publications.....

- [W2] Himadri Sekhar Paul, **Pubali Datta**, Ansuman Banerjee, and Arijit Mukherjee. "Compute on the Go: A Case of Mobile-Cloud Collaborative Computing Under Mobility". In: *Adaptive Resource Management and Scheduling for Cloud Computing*. 2015.
- [W1] Ansuman Banerjee, Himadri Sekhar Paul, Arijit Mukherjee, Swarnava Dey, and **Pubali Datta**. "A Framework for Speculative Scheduling and Device Selection for Task Execution on a Mobile Cloud". In: *Adaptive Resource Management and Scheduling for Cloud Computing*. 2014.

Book Chapter.....

- [B1] Ansuman Banerjee, Himadri Sekhar Paul, Arijit Mukherjee, Swarnava Dey, and **Pubali Datta**. "A Framework for Speculative Job Scheduling on Mobile Cloud Resources". In: *Big Data Analytics for Cyber-Physical Systems*. 2020.

Posters and Demos.....

- [P6] Phoebe Moh, Adam Bates, Michelle L. Mazurek, Noel Warford, **Pubali Datta**, and Nathan Malkin. "Poster: Characterizing Misuse and Snooping in Home IoT Devices". In: *SOUPS* (2022).
- [P5] Riccardo Paccagnella, **Pubali Datta**, Wajih Ul Hassan, Adam Bates, Christopher Fletcher, and Andrew Miller. "Poster: Securing Operating System Audit Logs". In: *Network and Distributed System Security Symposium* (2019).
- [P4] **Pubali Datta** and Adam Bates. "Poster: Attack Surface Modelling in Trigger Action Platforms". In: *IEEE Symposium on Security and Privacy* (2018).
- [P3] **Pubali Datta**, Tristan Morris, Hayawardh Vijayakumar, Michael Grace, Adam Bates, and Amir Rahmati. "Poster: Toward Secure & Serverless Trigger-Action Platforms". In: *IEEE Secure Development Conference* (2018).
- [P2] Dibyanshu Jaiswal, **Pubali Datta**, Sounak Dey, Himadri Sekhar Paul, Tanushyam Chatopadhyay, Avik Ghose, Abhishek Singh, Arpan Pal, and Arijit Mukherjee. "Demo: A Smart Framework for IoT Analytic Workflow Development". In: *ACM Conference on Embedded Networked Sensor Systems* (2015).
- [P1] Swarnava Dey, **Pubali Datta**, Arijit Mukherjee, Himadri S. Paul, and Anupam Basu. "Poster: Facilitating Continued Run of Sensor Data Analytics Services Using User Driven Proactive Memory Reclamation Scheme". In: *ACM Conference on Embedded Network Sensor Systems* (2014).

Patents

- [F2] Swarnava Dey, Arijit Mukherjee, **Pubali Datta**, and Himadri Sekhar Paul. *User driven smartphone scheduling enhancement for running data analytics application*. US Patent 10,320,704. June 2019.
- [F1] Himadri Sekhar Paul, Arijit Mukherjee, Ansuman Banerjee, Swarnava Dey, Arpan Pal, and **Pubali Datta**. *Task allocation in a computing environment*. US Patent 9,471,383. Oct. 2016.

Invited Talks

- *Looking Past the Abstractions: Characterizing Information Flow in Real-World Systems*, Rising Stars in Computer Science lecture series at UMass Amherst Manning College of Information and Computer Sciences, November 16, 2022.
- *Writing in Engineering and Physical Sciences*, Doctoral Research Support Program at University of Illinois, October 21, 2022.
- *Alastor: Reconstructing the Provenance of Serverless Intrusions*, 31st USENIX Security Symposium 2022, August 10-12, 2022.
- *Workflow Integration Alleviates Identity and Access Management in Serverless Computing*, Annual Computer Security Applications Conference (ACSAC), December 7-11, 2020.
- *Valve: Securing Function Workflows on Serverless Computing Platforms*, The Web Conference, April 20-24, 2020.

Media Coverage

- “*Illinois CS sends four participants, 28 faculty mentors to rising stars 2020*”, Aaron Seidlitz, Illinois CS. November 18, 2020. <https://cs.illinois.edu/news/illinois-cs-sends-four-participants-28-faculty-mentors-to-rising-stars-2020>

Industry Appointments

- **VMware Inc.**
Research Intern *May 2022 – August 2022*
Worked on improving VMware Carbon Black EDR tools using data provenance techniques in threat analytics, supervised by Dr. David Ott and Dr. Matthew Lentz.
- **VMware Inc.**
Research Intern *May 2021 – January 2022*
Worked on building a programmable and extensible software-defined security platform to aid XDR threat analytics, supervised by Dr. David Ott and Dr. Matthew Lentz.
- **SRI International** **Menlo Park, CA**
Research Intern *May 2019 – August 2019*
Worked on automated protocol extraction of container orchestration systems, supervised by Dr. Vinod Yegneswaran and Dr. Ashish Gehani.
- **Samsung Research America** **Mountain View, CA**
Research Intern *May 2018 – August 2018*

Worked on designing a secure and serverless IoT app and workflow development platform as part of Knox Security, supervised by Dr. Amir Rahmati and Dr. Michael Grace.

- **TCS Innovation Labs** **India**
Systems Researcher *August 2013 – June 2017*
Employed data flow analysis techniques to detect data conflicts and race conditions in embedded systems. Designed IoT application workflow development framework and deploying workflows on the platform. Developed collaborative mobile cloud computing framework and efficient task scheduling algorithms for the framework.

Academic Appointments

- **Graduate Research Assistant**
 - The Secure & Transparent Systems Lab, led by Prof. Adam Bates. University of Illinois. Fall 2017 – Spring 2019, Summer 2020 – Fall 2022.
- **Graduate Teaching Assistant**
 - Advanced Computer Security CS 563, University of Illinois, Spring 2020.
 - Computer Security I CS 461, University of Illinois, Fall 2019.
 - Distributed Computing Lab, Jadavpur University, Spring 2013.
 - Systems Programming Lab, Jadavpur University, Fall 2012.
- **Guest Lecturer**
 - Advanced Computer Security CS 563, University of Illinois, Spring 2020.
Presented two 60 minute lectures on different aspects of serverless cloud security.
 - Illinois Cyber Security Scholar Seminar CS 491, University of Illinois, Spring 2022.
Presented a 60 minute lecture on “Defending against Emerging Threats in Serverless Computing”.
- **Summer Intern**
 - Computer Vision & Pattern Recognition Unit (CVPRU), Indian Statistical institute, Summer 2010 & 2011.
Worked on collecting handwritten data (in Bengali) in digitized form and preprocessing the data for further analysis. Designed a framework for detection and recognition of vowel modifiers appearing in offline handwritten isolated Bengali characters.

Student Advising

Undergraduate level.....

- Akash Yogen Patel (UIUC) - Supervising on a research project on protocol specialization in REST-based systems, Spring 2021.
- Siddharth Agarwal (UIUC) - Supervised semester-long research project through the PURE¹ program, Fall 2018.
- Alec Liv-Feyman (UIUC) - Supervised semester-long research project through the PURE program, Fall 2018.

Graduate level.....

- Arnav Sankaran (UIUC) - Supervised and co-authored [C5], 2020.
- Prabuddha Kumar (Stony Brook University) - Supervised and co-authored [C8], 2019-2020.

¹Promoting Undergraduate Research in Engineering at UIUC

Service

- **Program Committee**

- USENIX Security Symposium 2023.
- USENIX Security Symposium 2022.
- IEEE Symposium on Security and Privacy 2021 (Shadow PC).
- Mobile Serverless Workshop, co-located with ACM MobiSys 2021.

- **External Reviewer**

- Network and Distributed System Security Symposium 2021.
- Network and Distributed System Security Symposium 2019.

- **Advocacy and Outreach**

- Participated in a Graduate student panel on “Why did you decide to go to Graduate School and what did you wish you knew when applying” as part of Road Map to Graduate School course offered to UIUC Grainger College of Engineering undergraduate students.
- Founder and co-organizer of the Broadening Participation in Computing (BPC) book club at UIUC.