

Prashant Anantharaman

Doctor of Philosophy (Ph.D.) Candidate,
Department of Computer Science,
Dartmouth College, NH, USA.

Phone: (510) 904-8439
Email: lists@prashant.at
Web: <https://prashant.at>, [@parsingpunisher](#)

Education

Doctor of Philosophy (Ph.D.) in Computer Science – September 2017 – June 2022 (Expected)

Dartmouth College, NH, USA.

Research Area: Systems Security

Advisors: Dr. Sean W. Smith

Master of Science in Computer Science – August 2015 – June 2017

Dartmouth College, NH, USA.

Research Area: Systems Security

Advisors: Dr. Sean W. Smith and Dr. Sergey Bratus

Bachelor of Engineering in Computer Science and Engineering – August 2011 – May 2015.

College of Engineering Guindy, Chennai, India

Research Area: Compilers and Systems

Thesis: Code Compaction in LLVM IR.

TCS Best Senior Thesis Award.

Thesis Advisor: Dr. Arul Siromoney

Experience

SRI International, New York, NY, USA – Internet-of-Things Security and Privacy Center

June 2018 – September 2018

Student Associate.

Advisors: Dr. Michael Locasto, Dr. Gabriela Ciocarlie, Dr. Ulf Lindqvist.

Device identification and fingerprinting in Internet-of-Things networks using clustering.

SRI International, Menlo Park, CA, USA – Internet-of-Things Security and Privacy Center

June 2017 – September 2017

Student Associate.

Advisors: Dr. Bogdan Cocos, Dr. Michael Locasto, Dr. Ulf Lindqvist.

Designing *composite-metrics* to understand the security of Internet-of-Things ecosystems.

SRI International, Menlo Park, CA, USA – Internet-of-Things Security and Privacy Center

June 2016 – September 2016

Student Associate.

Advisors: Dr. Michael Locasto, Dr. Gabriela Ciocarlie, Dr. Ulf Lindqvist.

Building *Language-theoretic security* compliant clients for application layer Internet-of-Things protocols.

Samsung R&D Institute, Bangalore, India – Intelligent Search Team

May 2013 – July 2013

Student Trainee.

Advisor: Mohan Sundar B.

Worked on an independent project of designing a graph searching system using Neo4J and Apache Giraph.

Current Projects

Verified Parser Generators for File Formats
 FPGA-based LangSec Parsers
 Traffic Validator for Smart Grid Networks

Publications

Book Chapters

1. **Prashant Anantharaman** et al.
 “Intent as a Secure Design Primitive”
 Modeling and Design of Secure Internet of Things
 John Wiley and Sons, Inc.
2. I. Agadacos, **Prashant Anantharaman** et al.
 “Securing Smart Cities: Implications and Challenges”
 Modeling and Design of Secure Internet of Things
 John Wiley and Sons, Inc.

Patents

1. Gabriela F Ciocarlie, Ioannis Agadacos, Chien-Ying Chen, Matteo Campanelli, **Prashant Anantharaman**, Monowar Hasan, Ulf Lindqvist, Michael Locasto, Bogdan Copos, Tancrede Lepoint, Matthew Filippone
 “Modeling cyber-physical attack paths in the internet-of-things”
 2020/5/21: US Patent number 16634591

Conferences and Workshops

15. **Prashant Anantharaman***, Liwei Song*, Ioannis Agadacos, Bogdan Copos, Gabriela Ciocarlie, Ulf Lindqvist, Michael E. Locasto
 “IoTHound: Environment-agnostic Device Identification and Monitoring”
 10th International Conference on the Internet of Things (IoT 2020), Malmo, Sweden
 ★ *Best Paper Award (Top 1 paper out of 84 submitted papers)*
 October 6-9th, 2020
 **Equal Contributions*
14. S. Ali, **Prashant Anantharaman** and S.W. Smith
 “Armor Within: Defending against Vulnerabilities in Third-Party Libraries”
 Sixth Language-theoretic Security (LangSec) IEEE Security and Privacy Workshop
 May 2020.
13. P. Mundkur, **Prashant Anantharaman**, S. Ali, L. Briesemeister, N. Shankar and S.W. Smith.
 “The Parsley Data Format Definition Language”
 Sixth Language-theoretic Security (LangSec) IEEE Security and Privacy Workshop.
 May 2020.
12. I.R. Jenkins, **Prashant Anantharaman**, R. Shapiro, J.P. Brady, S. Bratus and S.W. Smith.
 “Ghostbusting: Mitigating Spectre with Intraprocess Memory Isolation”
 7th Annual Symposium and Bootcamp on Hot Topics in the Science of Security (HotSoS '20).
 April 2020.
11. **Prashant Anantharaman**, Kartik Palani, Sean W. Smith
 “Scalable Identity and Key Management for Publish-Subscribe Protocols in the Internet-of-Things”
 9th International Conference on Internet of Things (IoT 2019), Bilbao, Spain

October 22-25th, 2019

★ *Nominated for the Best Paper Award, and received an Honorable Mention Award for the Top 3 papers (Top 3 papers out of 84 submitted papers)*

10. **Prashant Anantharaman**, Vijay Kothari, J. Peter Brady, Ira Ray Jenkins, Sameed Ali, Michael C. Millian, Ross Koppel, Jim Blythe, Sergey Bratus, and Sean W. Smith “Mismorphism: The Heart of the Weird Machine” Twenty-seventh International Workshop on Security Protocols, Trinity College, Cambridge, UK April 12–14th, 2019.
9. Vijay Kothari, **Prashant Anantharaman**, J. Peter Brady, Ira Ray Jenkins, Sameed Ali, Michael C. Millian, Ross Koppel, Jim Blythe, Sergey Bratus, and Sean W. Smith “Human-Computability Boundaries” Twenty-seventh International Workshop on Security Protocols, Trinity College, Cambridge, UK April 12–14th, 2019.
8. Michael C. Millian, **Prashant Anantharaman**, Sergey Bratus, Sean W. Smith, Michael E. Locasto “A Roadmap for Converting an Electric Power Utility Network to Defend Against Crafted Input” Thirteenth Annual IFIP WG 11.10 International Conference on Critical Infrastructure Protection, Arlington, VA March 11–12th, 2019.
7. **Prashant Anantharaman**, Kartik Palani, Rafael Brantley, Galen Brown, Sergey Bratus, Sean W. Smith “PhasorSec: Protocol Security Filters for Wide Area Measurement Systems” IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids, Aalborg, Denmark October 29-31, 2018
6. **Prashant Anantharaman**, J. Peter Brady, Patrick Flathers, Vijay H. Kothari, Michael C. Millian, William G. Nisen, Jason Reeves, Nathan Reiting, Sean W. Smith. “Going Dark: A Retrospective on the North American Blackout of 2013” New Security Paradigms Workshop (NSPW '18), Windsor, UK August 28-31, 2018
5. Ioannis Agadacos*, Chien-Ying Chen*, Matteo Campanelli*, **Prashant Anantharaman***, Monowar Hasan*, Bogdan Cocos*, Tancrede Lepoint, Michael Locasto, Gabriela F. Ciocarlie, Ulf Lindqvist
* *Equal Contributions*
“Jumping the Air Gap: Modeling Cyber-Physical Attack Paths in the Internet-of-Things” 3rd ACM CCS Cyber-Physical Systems Security and Privacy Workshop November 2017
4. **Prashant Anantharaman**, Michael M. Millian, Sergey Bratus, Meredith L. Patterson. “Input Handling Done Right: Building Hardened Parsers using Language-theoretic Security” 2nd IEEE Cybersecurity Development Conference, Boston, MA September 2017
3. **P. Anantharaman**, M. Locasto, G. Ciocarlie, U. Lindqvist. “Building hardened Internet-of-Things implementations using Language-theoretic Security” IEEE Symposium on Security and Privacy – Language-theoretic Security Workshop. May 2017
2. **P. Anantharaman**, K. Palani, D. Nicol, S.W. Smith. “I am Joe’s Fridge: Scalable Identity in the Internet of Things” IEEE International Conference on Internet of Things. December 2016
1. G. Ramakrishnan, **P. Anantharaman**, and S. Mukherjee. “Proactive Resource Provisioning Model for Cloud Federation.” International Conference on Distributed Computing and Internet Technology. January 2016

Talks and Presentations

IoTHound: Environment-agnostic Device Identification and Monitoring
10th International Conference on Internet of Things (IoT 2020)
October 8th, 2020

Building Hardened IoT Implementations with LangSec
Nullcon Security Conference, Goa, India
March 2nd, 2019

Ghostbusters: A tale of ELF, ABI and Spectre
BSidesAugusta
Augusta, GA
September 20th, 2018

Going Dark: A Retrospective on the Blackout of 2038
New Security Paradigms Workshop
Windsor, UK
August 28th, 2018

LangSec for Critical Infrastructure: SSP21, a secure lightweight SCADA protocol
5th LangSec Workshop at IEEE Symposium on Security and Privacy (Oakland)
San Francisco, CA
May 24th, 2018

Input Handling Done Right: Building Hardened Parsers using Language-theoretic Security
IEEE Cybersecurity Development Conference
Boston, MA
September 24th 2017

Building Hardened Internet-of-Things Clients using Language-Theoretic Security
4th LangSec Workshop at IEEE Symposium on Security and Privacy (Oakland)
San Jose, CA
May 25th 2017

Building vertically hardened Industrial-Control-Systems applications using Language-theoretic security
2nd CREDC Industrial Workshop
Tempe, AZ
March 28th 2017

Scalability Identity in the Internet of Things
IEEE International Conference on Internet of Things
Chengdu, China
December 18th 2016

Selected Fellowships and Awards

Won Best Paper Award at the 10th International Conference on Internet of Things (IoT'19).

Won Honorable Mention Award for one of the top 3 papers at the 9th International Conference on Internet of Things (IoT'20).

50% fee scholarship for first year of masters at Dartmouth College.

TCS Award for Best Senior Thesis – 2015.

Press and News Coverage

Dartmouth Press – Dartmouth's PhasorSec Protects Power Grids from Cyberattack – https://www.dartmouth.edu/press-releases/dartmouths_phasorsec_protects_power-grids_from_cyberattack.html

Dartmouth News – Graduate Students Create Computer-Chip Security Fix – <https://news.dartmouth.edu/news/2018/10/graduate-students-create-computer-chip-security-fix>

Bleeping Computer – Academics Announce New Protections Against Spectre and Rowhammer Attacks – <https://www.bleepingcomputer.com/news/security/academics-announce-new-protections-against-spectre-and-rowhammer-attacks/>

The Register – Spectre rises from the dead to bite Intel in the return stack buffer – https://www.theregister.co.uk/2018/07/23/spectre_return_stack_buffer/

SlashDot – Academics Publish New Software-Level Protections Against Spectre and Rowhammer Attacks – <https://it.slashdot.org/story/18/07/23/1613217/academics-publish-new-software-level-protections-against-spectre-and-rowhammer-attacks>

Teaching Experience

Teaching Assistant for *Programming Languages (COSC 59)*, September 2016– November 2016.

Fall 2016 (1 lecture). Instructor – Dr. Sergey Bratus.

Ruby on Rails Instructor at FSFTN Summer Camp, June 2015.

Number of Participants: 120.

Venue: IIT Madras.

Research Projects

DARPA RADICS: Building hardened parsers and setpoint monitoring capabilities for industrial control systems. I also built various UI tools using Ruby on Rails and Python Flask to monitor and visualize network traffic alerts in Smart Grid Networks.

KeggyFuzzer: Building smart fuzzers from parser-combinator input. We build a top-down fuzzer generator.

Tamil OCR and Error Correction: This project was funded by "Centre for Technology Development and Transfer, Anna University". Error corrections were made on an OCR'd document. We achieved an accuracy of almost 90%. Software(s) used: *Java, Ruby on Rails, Tesseract OCR*

Programming Environments

Languages: C++, C, Java, Python, Ruby, HTML/CSS

Platforms: Unix (Linux, Solaris)

Tools: Wireshark, Git version control, Emacs and vim text editors

Databases: Mysql, Postgresql, Oracle

Frameworks: Ruby on Rails, Django, LLVM, Hammer parser-combinator

Github account: <https://github.com/prashantbarca>