Prashant Anantharaman

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

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Education

Doctor of Philosophy (Ph.D.) in Computer Science – June 2017 –
Dartmouth College, NH, USA.
Research Area: Systems Security
Advisors: Dr. Sean W. Smith and Dr. Sergey Bratus

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 Copos, Dr. Michael Locasto, Dr. Ulf Lindqvist.
Designing *composite-metrics* for understanding 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

IoTHound: Environment-agnostic Device Characterization, Identification, and Monitoring

Macaroon-based Key Management Scheme for Publish-subscribe Systems

Talks and Presentations

PhasorSec: Protocol Security Filters for Wide Area Measurement Systems
IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids
Aalborg, Denmark
October 29th, 2018

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

Publications

Conferences and Workshops

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 Reitinger, Sean W. Smith.
   "Going Dark: A Retrospective on the North American Blackout of 2038"
   New Security Paradigms Workshop (NSPW '18), Windsor, UK
   August 28-31, 2018

5. Ioannis Agadakos*, Chien-Ying Chen*, Matteo Campanelli*, **Prashant Anantharaman***, Monowar Hasan*, Bogdan Copos*, 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

Press and News Coverage

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-a

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-protection

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.

Projects

Hackathon Projects (Available on GitHub)

FoodRoach: Locating the nearest location on campus providing free-food at a particular point of time.
Software(s) used: *Ruby on Rails, Android*.
Winner - Best Dartmouth Hack.

File Sharing Portal: Developed a "Social Network for sharing of Files and Videos". Software(s) used: *Ruby on Rails, mysql*.

Guindy Times Website: Developed the website and API for the college news magazine. http://guindytimes.com. Software(s) used: *Ruby on Rails, postgresql, Redis*

Kurukshetra : College Tech Fest Website: Developed the website of the college tech fest. Developed the website and the API for the android application. http://archive15.kurukshetra.org.in. Software(s) used: *Ruby on Rails, mysql, angularjs*

Research Projects

DARPA RADICS: Building hardened parsers and setpoint monitoring capabilities for industrial control systems.

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 OCRed document. We achieved an accuracy of almost 90%. Software(s) used: *Java,Ruby on Rails, Tesseract OCR*

Academic Projects

Kabali: A ruby gem to inspect the YARV structures. Ruby YARV structures and stacks aren't so easy to inspect and comprehend, this gem would give you a step by step description of the modifications in the stack. **Received a citation for this project.**

Sankalan: A ruby gem to make mdb and dtrace interchangeably.

Yalnix: A simple operating system in C. Implemented memory management and all syscalls as a part of the Operating Systems course.

Programing Environments

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

Plaforms: 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

Selected Fellowships and Awards

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

TCS Award for Best Senior Thesis – 2015