Paul Vines

Leesburg, VA, USA paul.l.vines@gmail.com +1 540 903-8987
paulvines.com

ABOUT ME

Cybersecurity researcher with experience in network security, privacy, machine learning, and formal methods. Interested in performing research focused on advancing the state-of-the-art in cybersecurity. Other research interests include anonymity, privacy, and adversarial machine learning.

EDUCATION

Ph.D. and Master of Science 2017/2015
Allen School of Computer Science & Engineering, University of Washington, Seattle
Bachelor of Science 2012
Computer Science and Biology; Valedictorian; Roanoke College, Salem, VA

EXPERIENCE

Assoc. Research Director / Principal Engineer - Two Six Technologies 2020-present

- Principal Investigator of DARPA RACE and MICE network security programs
- Led Agile team of six developers over multiyear research project
- Designed covert channels and a novel compositional framework
- Developed classifiers for covert traffic, and applied Adversarial ML to automatically characterize and evade classification
- Designed automated protocol inference and mimicry algorithms

Senior Principal Research Engineer - FAST Labs / BAE Systems Inc. 2017-2020

- Principal Investigator on DARPA SafeDocs developing verified parsers
- Led development of Network Tomography Inference on DARPA EdgeCT
- Investigated ML classification of encrypted multiplexed network traffic

Graduate Researcher - University of Washington 2012-2017

- Designed, implemented, and evaluated a covert communication system utilizing game network traffic
- Pioneered using targeted advertising for personal surveillance (ADINT)
- Developed Android malware detection using information-flow analysis
- Evaluated web-tracking and user privacy defense efficacy using machine learning

Software Engineer - ExtraHop Networks 2015

- Wrote high-performance C code to process and analyze network traffic

SKILLS

- Computer and Network Security
- Research Leadership
- Technical Writing and Communication
- System Design, Threat Modeling, and Implementation
- Data Analysis, Machine Learning, and Visualization
- Reverse Engineering of Network Protocols
- Cloud/Docker-based infrastructure
- Experience Programming in: Python, C++, Rust, Golang, Java, JavaScript

PUBLICATIONS

- *Ten Years Gone: Revisiting Cloud Storage Transports to Reduce Censored User Burdens.* **Paul Vines**. FOCI 2024.
- *Communication Breakdown: Modularizing Application Tunneling for Signaling Around Censorship.* **Paul Vines**, Samuel McKay, Jesse Jenter, and Suresh Krishnaswamy. PETS 2024
- *Reasoning with Assurance Arguments Under Uncertainty.* Sumit Ray, Rebecca Cathey, **Paul Vines**, Allyson O'Brien
- *Exploring ADINT Exploring ADINT: Using Ad Targeting for Surveillance on a Budget — or — How Alice Can Buy Ads to Track Bob.* **Paul Vines**, Franziska Roesner, Tadayoshi Kohno. WPES 2017
- *Rook: Using Video Games as a Low-Bandwidth Censorship Resistant Communication Platform.* Paul Vines, Tadayoshi Kohno. WPES 2015
- *Static Analysis of Implicit Control Flow: Resolving Java Reflection and Android Intents.* Paulo Barros, Rene Just, Suzanne Millstein, **Paul Vines**, Werner Dietl, Marcelo D'Amorim, Michael D. Ernst. ASE 2015
- *Collaborative Verification of Information Flow for a High-Assurance App Store.* Michael D. Ernst, Rene Just, Suzanne Millstein, Werner Dietl, Stuart Pernsteiner, Franziska Roesner, Karl Koscher, Paulo Barros, Ravi Bhoraskar, Seungyop Han, **Paul Vines**, Edward X. Wu. CCS 2014
- *R2B2: PIN-Cracking Robot.* Justin Engler, **Paul Vines**. DefCon 2013.

REFERENCES

References available upon request.