John Sonchack
Curriculum Vitae

Affiliation: Postdoctoral Researcher at Princeton University
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Research Interests

My research is in the general areas of networking and security. I am interested in making networked systems faster, safer, and easier to build. To achieve these goals, my research bridges all layers of the systems stack, from low level hardware to high level user abstractions. I solve problems with a cross disciplinary approach, publishing in a variety of fields including networking, security, programming languages, and machine learning.

Education

Ph.D., Computer and Information Science *2020*
University of Pennsylvania
Thesis: Balancing Performance and Flexibility in Hybrid Telemetry Systems
Advisor: Jonathan M. Smith

M.S.E., Computer and Information Science *2011*
University of Pennsylvania
Areas of study: Network Security and Machine Learning
Advisor: Jonathan M. Smith

B.S., Mathematics *2009*
Villanova University
Areas of study: Statistics and Quantitative Finance
Mentors: Paul Pasles, Klaus Volpert

Professional Experience

Stateless, Inc.
Contractor, 2019
Project: design and implementation of hardware-accelerated network dataplanes.

Chubb Insurance
Consultant, 2012
Project: understanding and quantifying cyber security risks to large organizations.

Financial Software Systems
Intern, 2010
Project: modeling financial assets and building extensible pricing engines.

Publications

Conference papers

1. Nofel Yaseen, John Sonchack, and Vincent Liu (2020). tpprof: A Network Traffic Pattern Profiler. In: *USENIX Symposium on Networked Systems Design and Implementation (NSDI)*, pp.1015–1030.
2. Liangcheng Yu, John Sonchack, and Vincent Liu (2020). Mantis: Reactive Programmable Switches. In: *ACM Conference on Special Interest Group on Data Communication (SIGCOMM)*, pp.296–309.

3. Nikos Vasilakis, Ben Karel, Yash Palkhiwala, John Sonchack, André DeHon, and Jonathan M Smith (2019). Ignis: scaling distribution-oblivious systems with light-touch distribution. In: *ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*. [27% acceptance].

4. John Sonchack, Adam J Aviv, Eric Keller, and Jonathan M Smith (2018). Turboflow: Information rich flow record generation on commodity switches. In: *European Conference on Computer Systems (EuroSys)*. [16% acceptance, **awarded best student paper**].

5. John Sonchack, Oliver Michel, Adam J Aviv, Eric Keller, and Jonathan M Smith (2018). Scaling hardware accelerated network monitoring to concurrent and dynamic queries with* flow. In: *USENIX Annual Technical Conference (ATC)*. [20% acceptance].

6. Nofel Yaseen, John Sonchack, and Vincent Liu (2018). Synchronized network snapshots. In: *ACM Conference on Special Interest Group on Data Communication (SIGCOMM)*. [18% acceptance].

7. John Sonchack, Adam J. Aviv, Eric Keller, and Jonathan M. Smith (2016). Enabling Practical Software-defined Networking Security Applications with OFX. In: *Network and Distributed System Security Symposium (NDSS)*. [15% acceptance].

8. John Sonchack, Anurag Dubey, Adam J. Aviv, Jonathan M. Smith, and Eric Keller (2016). Timing-based Reconnaissance and Defense in Software-defined Networks. In: *Annual Computer Security Applications Conference (ACSAC)*. [22% acceptance].

9. John Sonchack and Adam J. Aviv (2014). LESS Is More: Host-Agent Based Simulator for Large-Scale Evaluation of Security Systems. In: *Annual European Symposium on Research in Computer Security (ESORICS)*. [24% acceptance].

Journal articles

1. John Sonchack and Adam J. Aviv (2016). Exploring Large Scale Security System Reproducibility with the LESS Simulator. *Journal of Computer Security*.

2. John Sonchack, Adam J. Aviv, and Jonathan M. Smith (2015). Cross-Domain Collaboration for Improved IDS Rule Set Selection. *Journal of Information Security and Applications*.

Workshop papers

1. Henri Maxime Demoulin, Nikos Vasilakis, John Sonchack, Isaac Pedisich, Vincent Liu, Boon Thau Loo, Linh Thi Xuan Phan, Jonathan M. Smith, and Irene Zhang (2019). TMC: Pay-as-you-Go Distributed Communication. In: *Asia-Pacific Workshop on Networking (APNET)*.

2. Oliver Michel, John Sonchack, Eric Keller, and Jonathan M Smith (2019). PIQ: Persistent Interactive Queries for Network Security Analytics. In: *ACM International Workshop on Security in Software Defined Networks & Network Function Virtualization (SDN-NFV Sec.)*

3. Hans Giesen, Lei Shi, John Sonchack, Anirudh Chelluri, Nishanth Prabhu, Nik Sultana, Latha Kant, Anthony J McAuley, Alexander Poylisher, André DeHon, et al. (2018). In-network computing to the rescue of faulty links. In: *ACM SIGCOMM 2018 Morning Workshop on In-Network Computing (NetCompute)*.

4. Oliver Michel, John Sonchack, Eric Keller, and Jonathan M Smith (2018). Packet-level analytics in software without compromises. In: *USENIX Workshop on Hot Topics in Cloud Computing (HotCloud)*.

5. John Sonchack and Jonathan M Smith (2018). PathMiner Powered Predictable Packet Processing. *NDSS Workshop on Binary Analysis Research (BAR)*.

6. John Sonchack, Adam J. Aviv, and Eric Keller (2016). Timing SDN Control Planes to Infer Network Configurations. In: *ACM International Workshop on Security in Software Defined Networks and Network Function Virtualization (SDN-NFV Sec.)*

7. John Sonchack and Adam J. Aviv (2013). Bridging the Data Gap: Data Related Challenges in Evaluating Large Scale Collaborative Security Systems. In: *USENIX Workshop on Cyber Security Evaluation and Testing (CSET)*.

8. John Sonchack and Jonathan M. Smith (2011). Signature Correlations in Multiple Honeypot Defense System. In: *Proceedings of the Future Internet Workshop*.

Posters

1. Oliver Michel, John Sonchack, Adam J Aviv, and Eric Keller (2018). Scalable, Hardware-Accelerated Network Analytics. In: *USENIX Symposium on Networked Systems Design and Implementation (NSDI)*.
2. John Sonchack, Adam J. Aviv, Eric Keller, and Jonathan M. Smith (2015). OFX: Enabling OpenFlow Extensions for Switch-Level Security Applications. In: *ACM SIGSAC Conference on Computer and Communications Security (CCS)*.
3. John Sonchack, Adam J. Aviv, and Jonathan M. Smith (2013). Parameterized Trace Scaling (poster). In: *USENIX Security Symposium (USENIX Security)*.

Technical reports

1. John Sonchack (2014). *Openflow Control Platforms*. Tech. rep. University of Pennsylvania.
2. John Sonchack (2010). *Bot Detection Techniques*. Tech. rep. University of Pennsylvania.

Teaching

- **Guest Lecturer**, University of Pennsylvania
  Networked Systems (graduate level), *2016, 2017, 2018*

- **Lead Teaching Assistant**, University of Pennsylvania
  Computer and Network Security (graduate level), *2011, 2012*

- **Reading Group Organizer**, University of Pennsylvania
  Programmable Networking and Security, *2014*

Professional Service

Program Committee

- The International Conference on Internet Monitoring and Protection (ICIMP), *2018, 2019*

- Security in Softwarized Networks: Prospects and Challenges (SecSoN), *2018*

- ACM International Workshop on Security in Software Defined Networks & Network Function Virtualization (SDN-NFV Security), *2017*

- Workshop on Cyber Security Experimentation and Testing (CSET), *2015*

Reviewer

- ACM/IEEE Symposium on Architectures for Networking and Communications Systems (ANCS), *2019*

- IEEE Journals (Transactions on Networking, Letters of the Computer Society, Communications Letters, Software, Transactions on Dependable and Secure Computing, Transactions on Information Forensics & Security), *2015, 2016, 2017, 2018, 2019*

- IEEE Global Communications Conference (GLOBECOMM), *2019*

- Bulletin of Electrical Engineering and Informatics (BEEI), *2019*

- Annual Computer Security Applications Conference (ACSAC), *2013, 2014*

- Workshop on Cyber Security Experimentation and Testing (CSET), *2013, 2014*

Other Activities

- NSF grant panelist (in-person), *2019*

- NSF Visioning Workshop on Programmable Security in a Software Defined World, *2018*