HARBOR LABS

SOFTWARE & NETWORKING EXPERTS

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Profile

I am a Principal at Harbor Labs with specialties is network security, network communications, software architecture, and programming languages. With over a decade of industry and academic experience providing software development, software reviews, security reviews, cryptographic analysis, and technical training, I enable clients to succeed in their technology projects. I also have extensive experience as a technical expert having supported legal teams with analysis and insight on patents, DMCA, code theft, and trade secrets. In addition to providing numerous code reviews, expert reports, and technical analyses, I have been deposed several times and have testified at trial.

I completed my Ph.D. at Rice University in 2009 where my thesis investigated questions of security and anonymity in peer-to-peer (P2P) systems like BitTorrent. In addition to my professional work at Harbor Labs, I am an Adjunct Associate Research Scientist at Johns Hopkins University where I teach network security classes, mentor student capstone projects, and engage in academic research.

Education

2009	*Rice University*	**Ph.D. in Computer Science**
2004	*Brigham Young University*	**M.S. in Computer Science**
2000	*Brigham Young University*	**B.S. in Computer Science**

Academics and Research

12/2014-Present *Johns Hopkins University* **Adjunct Associate Research Scientist**

- Teach graduate level courses on network security
- Advise student capstone projects
- Engage in academic research

1/2014-12/2014 *Johns Hopkins University* **Lecturer**

- Teach graduate level courses on network security
- Advise student capstone projects

Industry Positions

2011-Present	*Harbor Labs*	**Principal**
2005-2011	*Independent Security Evaluators*	**Senior Security Analyst**
2005	*Google*	**Summer Intern**
2001-2003	*Metrowerks (Formerly Lineo, Inc.)*	**Software Engineer II**

Academic Awards

Brown Fellowship

John and Eileen Tietze Fellowship

Patents

Co-inventor: Orsini, R. 2014. Systems and methods for security data in motion. U.S. Patent 8,745,372 filed November 24, 2010 and issued June 3, 2014.

Co-inventor: Orsini, R. 2014. Systems and methods for security data in motion. U.S. Patent 8,745,379 filed August 20, 2012 and issued June 3, 2014.

Co-inventor: O'Hare, R. 2014. Systems and methods for security data. U.S. Patent 8,677,148 filed January 27, 2012 and issued March 18, 2014.

JHU MSSI Capstones

Research on the Heartbleed Vulnerability, Jingru Chen, Yaning Liu, Yifan Yu, Zhiyue Zu (May 2015)

Buying Friends: Identifying Botnet Customers and Mapping Out Botnets on Twitter, Richard Eaton (May 2015)

Security Techniques for Developing iOS Applications, Kartik Thapar (February 2015)

Privacy and Threats in Bitcoin, Jie Feng, Jianxiang Peng, Likai Zhang (January 2015)

Publications

Seth James Nielson, *PLAYGROUND: Preparing Students for the Cyber Battleground*, Submitted to the Journal of Computer Science Education.

Aviel D. Rubin, Seth J. Nielson, Sam Small, Christopher K. Monson, *Guidelines for Source Code Review in Hi-Tech Litigation*, Harbor Labs White Paper (September 2013)

Seth James Nielson, *Reintroducing Pylogical*, BYU SEQuOIA Technical Report, (March 2012)

Seth James Nielson and Dan S. Wallach, *The BitTorrent Anonymity Marketplace*, arXiv Technical Report 1108.2718, (August 2011)

Seth James Nielson, Caleb E. Spare, and Dan S. Wallach, *Building Better Incentives for Robustness in BitTorrent*, arXiv Technical Report 1108.2716, (August 2011)

Seth James Nielson, *Designing Incentives for Peer-to-Peer Systems*, Rice University Department of Computer Science Ph.D. Thesis (2010)

Seth James Nielson and Charles D. Knutson, *Design Dysphasia and the Design Patterns Maintenance Cycle*. *Information & Software Technology,* volume 48, number 8, pp. 660- 675, (August 2006)

Seth James Nielson, Scott S. Crosby, and Dan S. Wallach, *A Taxonomy of Rational Attacks*. In *Proceedings of the Fourth International Workshop on Peer-to-Peer Systems (IPTPS '05)*, Ithaca, New York, (February 2005)

Seth James Nielson, *OO++ Design Patterns, GOF Revisited*, Brigham Young University Department of Computer Science Master's Thesis (2004)

Seth James Nielson, Seth J. Fogarty, and Dan S. Wallach, *Attacks on Local Searching Tools*, arXiv Technical Report 1108.2704 (Originally produced in December, 2004, available on arXiv as of August 2011)

Rob Kunz, Seth Nielson, Mark Clement, Quinn Snell, *Effective Bandwidth for Traffic Engineering*, in *Proceedings of the IEEE Workshop on High Performance Switching and Routing (HPSR 2001),* Dallas, TX, (May 2001)

Selected Consulting and Industry Experience

7/2015-Present *Medical Device Security*

Client: Confidential

Overview: Ongoing security evaluation of medical devices from a major manufacturer

- Principal consultant for a one-year, multi-stage engagement
- On-site interviews and discussion with technical staff
- Evaluation of physical hardware and networks, design docs, etc.
- Confirmation of reported vulnerabilities
- Security recommendations for current and future products

10/2014-Present *Device Certification Consulting*

Client: Security First Corporation

Overview: Evaluate devices and software against regulatory requirements

- Evaluate products against HIPAA, FISMA, SOX, GLBA, NERC, ISO 27002 requirements

8/2013-11/2014 *Privacy Analysis in Forensic Data Collection*

Client: Center for Copyright Information

Overview: Ensure that private information in copyright abuse tracking is adequately protected

- Interviews with technical staff
- Analysis of design and policy documents
- Recommendations for improved privacy protection
- Public executive summary available: http://www.copyrightinformation.org/wp-content/uploads/2014/11/Harbor-Labs-Executive-Summary.pdf

7/2011-12/2011 *Automated Security Tools*

Client: Confidential

Overview: Development of automated tools for security testing

- Development of an automated, parallelized code coverage tool based on gcov
- Development of a tool for fuzzing iOS applications

8/2005-9/2011 *Development of Security-Related Software*

Client: Security First Corporation

Overview: Development of cryptographic library and sundry applilcations

- Technical lead of a secure communication library including prototype, design, and implementation
- Deployment of custom cryptographic library to filesystem encryption

- Hardware acceleration for cryptographic operations using CUDA and GPUs
- Development of custom cryptographic library for data at rest and data in motion

Summer 2005 *Security Intern at Google*

Overview: Development of a fix for privacy loss in the Google Web Accelerator

- Analysis of the security flaw
- Design and implementation of a solution to the problem

1/2001-9/2003 *Software Engineer II at Metrowerks*

Overview: Development of various applications for embedded Linux development

- Technical lead for the development of the SDK UI
- Technical lead for the development of a software update packaging system
- Technical lead for the development of a transparent remote script system

Technical Expertise

1/2001-Present *Software Development*

Languages: C, C++, Java, Python, Objective-C, Assembly

Targets: Applications, libraries, device drivers, simulators, networking stacks, graphics, server code, security code, pedagogical tools, utilities, automation, GUIs, intrusion detection systems, attack simulation technology

Toolkits: QT, Boost, Twisted, SWIG, test harnesses, CUDA

Platforms: Windows, Linux, iOS

9/2004-Present *Vulnerability and System Analysis*

Examples: Medical device security, Google Desktop Search (2004), crypto protocols, viruses, malware, passwords, cryptographic implementation, security policy viability, marketplace viability and risks of existing and future products

Tools: IDA Pro, port scanning, Formal cryptographic analysis tools, GCov and code coverage tools, fuzzing

1/2010-Present *Source Code Review and Analysis*

Samples: Antivirus software, firewall software, high-frequency trading algorithms, wireless protocol implementations, intrusion prevention software, email server software, document signature software

Tools: Understand, customized scripts

1/2010-Present *Technical Analysis of Intellectual Property*

Issues: DMCA and copyright

5/2010-Present *Technical Instruction*

Teaching non-technical professionals about relevant high-tech operations

Teaching technical professionals about technologies relevant to intellectual property

9/2011-1/2012 *Technical Project Management*
Projects: Secure communication application, automated fuzzing tool
Internal: Coding guidelines, manpower allocation, quality assurance
Customer: Requirements analysis, budget and scheduling, conflict resolution

9/2005-9/2011 *Cryptographic Library Development*
Algorithms: AES-GMAC, Shamir Key Splitting, Client-custom algorithms
Special: GPU-accelerated AES (CUDA), file system integration, FIPS certified

Expert Witness

3/2015-8/2015 *Afilias PLC v. Architelos Inc. and Alexa Raad*
Client: Afilias PLC
Counsel: Philip Hampton (of Haynes Boone)
Issues: Misappropriation of Proprietary Information
Technology: Domain name registrars, domain name anti-abuse
Status: Testified 8/2015, Deposed 6/2015

2/2015-Present *Sensus USA Inc. v. Certified Measurement Inc.*
Client: Sensus USA
Counsel: Rafael A. Perez-Pineiro, Javier Sobrado (of Feldman Gale)
Issues: Claims construction, IPR
Technology: Cryptography, certified measurements
Status: Declaration submitted

12/2014-Present *Chad Eichenberger v. ESPN*
Client: Chad Eichenberger
Counsel: David Mindell (of Edelson PC)
Issues: Declaration in support of amended claim
Technology: Privacy
Status: Declaration submitted

9/2014-Present *Fortinet Inc. vs Sophos Inc., et al*
Client: Fortinet
Counsel: Michael Niu, Jordan Jaffe, Kristen Lovin (of Quinn Emanuel)
Issues: Claims construction, IPR, Infringement, Invalidity, Non-infringement
Technology: Network security devices, anti-virus, anti-spam
Status: Deposed 10/2014; Tech tutorial for Court 12/2014

3/2014-Present *M2M Solutions vs Motorola Solutions, Telit Communications, and Telit Wireless*
Client: Telit
Counsel: David Loewenstein (of Pearl Cohen)
Issues: Collaborating expert on both patent infringement and invalidity
Technology: Authentication
Status: Deposed 6/2015

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