

# Scott Ruoti

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## SUMMARY

- My research focused on the creation and evaluation of secure systems that are sufficiently usable to accomplish their security goals in the real-world.
- My research projects have included usable, secure email and online communication, securing cloud data, strong password protocols, safe password entry, and HTTPS encryption and notification.
- I have 6 years of experience in security research
- I have 15 years of programming and application development experience

## EDUCATION

**Ph.D. in Computer Science** April 2011–December 2016  
*Brigham Young University, Utah*

- Dissertation: Usable, Secure Content-based Encryption on the Web
- President of the Computer Science Graduate Student Association
- GPA: 4.0

**M.S. in Computer Science** April 2011–April 2015  
*Brigham Young University, Utah*

- Thesis: Authentication Melee: A Usability Analysis of Seven Web Authentication Systems
- GPA: 4.0

**The Language Flagship in Chinese** August 2008–December 2010  
*Brigham Young University, Utah*

- 2 years of intense Chinese study
- Focused on building professional-level language proficiency in Computer Science
- Semester of graduate study in Computer Science at Nanjing University (南京大学), taught in Chinese

**B.S. Computer Science** August 2004–April 2011

**B.A. Chinese**  
*Brigham Young University, Utah*

- Minor: Mathematics
- GPA: 3.83

## WORK EXPERIENCE–RESEARCH

**Technical Staff** August 2016–Present  
*Massachusetts Institute of Technology Lincoln Laboratory,  
Lexington, Massachusetts*

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**Research Assistant** August 2009–August 2016  
*Internet Security Research Lab, Brigham Young University, Utah*

- Assisted in the writing of all papers submitted by the lab
- Co-authored several NSF grant proposals covering multiple security topics, resulting in 500K in funding
- Conducting research into usable security, secure email, phishing, strong password-protocols, safe password entry, single sign-on and hacking
- Researched and built a system which retrofitted the Web with end-to-end security
- Created a secure email tool which has the highest usability rating of any system tested to-date
- Conduct usability studies of multiple secure email and authentication systems
- Created formal proofs of the Secure Remote Password protocol and designed elliptic curve variants.
- Mentored undergraduates and Master degree students

**Ph.D. Year-round Intern**

December 2014–August 2016

*Sandia National Laboratories, Livermore, CA*

- Funded my Ph.D. research
- Researched intrusion and outlier detection
- Created a novel method to aggregate unsupervised outlier detection algorithms
- Lead work into securing cloud services for use by government agencies

**Research Intern**

April 2014–August 2014

*Blue Coat Systems, Draper, UT*

- Lead research into classify internet IP ranges according to usage patterns
- Developed system allowing threat analysts to quickly ascertain the trustworthiness of a source IP
- Integrated research with existing machine learning systems allowing automatic classification of new traffic and detection of anomalous activity

**PhD Software Engineering Intern**

May 2013–August 2013

*Google, Mountain View, California*

- Led design and development of an enterprise-scale authentication technology
- Designed a third party API and associated libraries
- Assisted in design and discussion of currently deployed Google authentication technologies
- My work is currently in preparation for usability study and possible patent

**Research Intern**

May 2012–August 2012

*Microsoft Research, Redmond, Washington*

- Researched topics including unsupervised learning in facial recognition and social search
- Leveraged third-party authentication protocols
- Developed a mobile application based on the research
- My research is currently in the process of being prepared for patent submission

## WORK EXPERIENCE–SOFTWARE ENGINEERING

**Software Development Engineer Intern**

May 2009–July 2009

*Microsoft, Redmond, Washington*

May 2010–July 2010

- Researched free-form ontological model detection and merging in Excel and other office products
- Developed software to consume OData feeds and display cross-platform KPIs in Silverlight
- Participated in cross-team and cross-discipline planning meetings for Office 2013

**Team Lead, Head Developer, Database Administrator**

March 2008–August 2009

*Computer Lab Solutions, Farmington, Utah*

- Oversaw development of new products and maintenance of legacy code for lab management software currently in use at over 310 universities and colleges
- Lead design in refactoring all existing code from Java and C++ to C# and ASP .NET
- Coordinated the efforts of several teammates

**Developer, Webmaster, Database Administrator**

August 2004–March 2008

*Brigham Young University, Provo, Utah*

- Participated in the development of lab management software used at 4 universities and college
- Managed all releases of all upgrades and new systems to production
- Worked directly with customers to implement feedback into projects
- Assisted with forensic analysis of criminal activity

## PAPERS

S. Ruoti, J. Andersen, T. Hendershot, D. Zappala, K. Seamons. *Private Webmail 2.0: Simple and Easy-to-Use Secure Email*, 29<sup>th</sup> ACM Symposium on User Interface Software and Technology (UIST 2016). ACM, 2016.

A. Afanasyev, J. Halderman, K. Seamons, D. Zappala, L. Zhang, Y. Yu, S. Ruoti. *Content-based Security for the Web*, 18<sup>th</sup> Workshop on New Security Paradigms (NSPW 2016). ACM, 2016.

S. Ruoti, M. O'Neill, D. Zappala, K. Seamons. *Attitudes Towards the Inspection of Encrypted Traffic*, 12<sup>th</sup> Symposium on Usable Privacy and Security (SOUPS 2016). USENIX, 2016.

S. Ruoti, K. Seamons. *Standard Metrics and Scenarios for Usable Authentication*, 2<sup>nd</sup> Workshop on "Who Are You?! Adventures in Authentication" at the Symposium on Usable Privacy and Security (WAY 2016). USENIX, 2016.

S. Ruoti, J. Andersen, K. Seamons. *Strengthening Passwords-based Authentication*, 2<sup>nd</sup> Workshop on "Who Are You?! Adventures in Authentication" at the Symposium on Usable Privacy and Security (WAY 2016). USENIX, 2016.

S. Ruoti, J. Andersen, S. Heidbrink, M. O'Neill, E. Vaziripour, J. Wu, D. Zappala, K. Seamons. *"We're on the Same Page": A Usability Study of Secure Email Using Pairs of Novice Users*, 34<sup>th</sup> ACM Conference on Human Factors in Computing Systems (CHI 2016). ACM, 2016. **Honorable Mention Award.**

S. Ruoti, B. Roberts, K. Seamons. *Authentication Melee: A Usability Analysis of Seven Web Authentication Systems*, 24<sup>th</sup> International Conference on World Wide Web (WWW 2015), Florence, Italy, May 2015.

S. Ruoti, N. Kim, B. Burgen, T. van der Horst, and K. Seamons, *Confused Johnny: When Automatic Encryption Leads to Confusion and Mistakes*, 9<sup>th</sup> Symposium on Usable Privacy and Security (SOUPS). ACM, 2013.

C. Robison, S. Ruoti, T. W. van der Horst, and K. E. Seamons, *Private Facebook Chat*, 5<sup>th</sup> ASE/IEEE International Conference on Social Computing (SocialCom 2012) and 4<sup>th</sup> ASE/IEEE International Conference on Privacy, Security, Risk and Trust (PASSAT 2012). IEEE, 2012.

#### PREPRINTS

S. Ruoti, D. Zappala, K. Seamons. *MessageGuard: A Browser-based Platform for Usable End-to-End Encryption Research*, arXiv preprint 1510.08943, April 2016.

S. Ruoti, J. Andersen, D. Zappala, K. Seamons. *Why Johnny Still, Still Can't Encrypt: Evaluating the Usability of a Modern PGP Client*, arXiv preprint 1510.08555, September 2015.

M. O'Neill, S. Ruoti, K. Seamons, D. Zappala. *TLS Proxies: Friend or Foe?*, arXiv preprint 1407.7146, April 2015.

#### POSTERS

S. Ruoti, J. Andersen, T. Monson, D. Zappala, K. Seamons. *A Comparison of PGP, IBE, and Password-based Secure Email*, 12<sup>th</sup> Symposium on Usable Privacy and Security (SOUPS 2016). USENIX, 2016.

S. Ruoti, J. Andersen, S. Heidbrink, M. O'Neill, E. Vaziripour, J. Wu, D. Zappala, K. Seamons. *"We're on the Same Page": A Usability Study of Secure Email Using Pairs of Novice Users*, 12<sup>th</sup> Symposium on Usable Privacy and Security (SOUPS 2016). USENIX, 2016.

S. Ruoti, B. Roberts, K. Seamons. *Authentication Melee: A Usability Analysis of Seven Web Authentication Systems*, 11<sup>th</sup> Symposium on Usable Privacy and Security (SOUPS 2015). USENIX, 2015. **Distinguished poster award.**

M. O'Neill, S. Ruoti, K. Seamons, and D. Zappala, *TLS Proxies: Friend or Foe?*, 21<sup>st</sup> ACM SIGSAC Conference on Computer and Communications Security (CCS 2014). ACM, 2014.

#### PRESENTATIONS

*Securing Webmail for the Masses*, Invited Talk, University of Utah, April 13, 2016.

*Securing Webmail for the Masses*, Invited Talk, MIT Lincoln Lab, March 2, 2016.

*Securing Webmail for the Masses*, Invited Talk, University of Tennessee, February 17, 2016.

*When the Rubber Meets the Road*, Invited Talk, Sandia National Laboratories, January 28, 2015.

*Helping Individuals and Organizations Protect Their Online Communication and Data*, Invited Talk, Sandia National Laboratories, November 23, 2015.

*Security and Usability Research at BYU*, Invited Talk, Brigham Young University, College of Physical and Mathematics, College Volunteer Leadership Council, October 9, 2015.

*The Conundrum of Secure Email*, Lightning Talk, 2015 Symposium on Usable Privacy and Security, July 23, 2015.

*Usable Security for Webmail and Single Sign-on*, Invited talk, Symantec CTO Tech Exchange, Culver City, CA, October 17, 2013.

#### PROFESSIONAL SERVICE

Reviewer, ACM SIGSAC Conference on Computer and Communications Security (CCS 2016), Vienna, Austria.

Program Committee Member, European Workshop on Usable Security (EuroUSEC 2016), Darmstadt, Germany, July 2016.

Poster Jury, Symposium on Usable Privacy and Security (SOUPS 2016), Denver, CO, June 2016.

Reviewer, ACM Conference on Human Factors in Computing Systems (CHI 2016), San Jose, CA, May 2016.

Reviewer, IEEE Workshop on Mobile Security Technologies (MOST 2015), San Jose, CA, May 2015.

Reviewer, ACM Conference on Human Factors in Computing Systems (CHI 2015), Seoul, Korea, April 2015.

#### AWARDS

- 2016 Brigham Young University, College of Mathematics and Physical Sciences, Three Minute Thesis – First Place
- 2016 Conference on Human Factors in Computing Systems – Honorable Mention Award
- 2015 Symposium on Usable Security and Privacy – Best Poster Award
- 2013, 2014 (ISC)<sup>2</sup> Graduate Scholarship Recipient
- 2011 Mitre STEM Cyber Challenge – First Place
- 2008, 2009 Techtopia Computer Science Competition – First Place
- 2004 University of Utah ACM Competition – First Place
- 2003, 2004 Brigham Young University ACM Competition – First Place

#### COMPUTER SKILLS

##### **Languages**

- Proficient in: C#, Java, Microsoft Visual C++®, C/C++, ASP .NET, SQL, JavaScript, ES6+, XAML, HTML
- Familiar with: Microsoft Visual Basic® .NET, PHP, F#, Scheme, Ruby, Rails, Matlab, Mathematica, Python

##### **Software**

- Frameworks: JQuery, Bootstrap, ExtJS, NodeJS, MooTools, WPF, WinForms
- Database: Microsoft SQL Server, Microsoft Access, MySQL, FireBird, Oracle, SQLite, Esent
- Platforms: Windows, Linux, Mac OSX

#### LANGUAGES

- English – Native Language
- Mandarin Chinese – Fluent, near native reading, writing, and speaking
  - 汉语水平考试 (HSK) – Level 6 (highest level)
  - Oral Proficiency Interview – Superior (highest level)