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## Education

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- August 2018**      ***Ph.D. Computer Science, Cornell University***  
Thesis Title: A Reactive Approach for Use-based Privacy  
Advisor: Fred Schneider
- May 2014**      ***M.S. Computer Science, Cornell University***  
Advisors: Fred Schneider, Rafael Pass
- June 2009**      ***B.A. cum laude Computer Science and Mathematics, Harvard University***  
Thesis Title: Composition of Zero-Knowledge Proofs  
Advisor: Salil Vadhan

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## Awards and Honors

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- 2017**      ***Outstanding Teaching Award***  
CS5431: Practicum in System Security
- 2010**      ***NSF Graduate Research Fellowship***
- 2009**      ***Strauss Hawkins Fellowship***

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## Research

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System security and data privacy. My thesis work developed a new approach to data security in the modern world based on use-based authorizations. The focus was on understanding user privacy preferences, designing a reactive policy language for use-based authorizations, enforcing such authorizations in decentralized systems using Intel SGX, and extending our regime to support practical use-based privacy. See my website for current projects.

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## Publications

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- E. Birrell and F. B. Schneider. A Reactive Approach for Use-based Privacy. *In submission*.
- E. Birrell, A. Gjerdrum, H. Johansen, D. Johansen, R. van Renesse, and F. B. Schneider. SGX Enforcement of Use-based Privacy. In *Workshop on Privacy in Electronic Society (WPES)*, 2018.
- H. Johansen, E. Birrell, R. van Renesse, F. B. Schneider, M. Stenhaus, and D. Johansen. Enforcing Privacy Policies with Meta-Code. In *Asia-Pacific Workshop on Systems (APSys)*, pages 16:1-16:7, 2015.
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E. Birrell and F. B. Schneider. Federated Identity Management Systems: A Privacy-based Characterization. *IEEE Security & Privacy*, Vol. 11(5), pages 36-48, Sept/Oct 2013.

E. Birrell, K.-M. Chung, R. Pass, and S. Telang. Randomness-Dependent Message Security. In *Tenth IACR Theory of Cryptography Conference (TCC)*, pages 699-718, 2013.

E. Birrell and R. Pass. Approximately Strategy-Proof Voting. In *International Joint Conferences on Artificial Intelligence (IJCAI)*, pages 67-72, 2011.

E. Birrell and S. Vadhan. Composition of Zero-Knowledge Proofs with Efficient Provers. In *Seventh IACR Theory of Cryptography Conference (TCC)*, pages 572-587, 2010.

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## Teaching Experience

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Spring 2018	<b>Instructor, Department of Computer Science, Cornell University</b> CS 5430: System Security
Fall 2017, Spring 2018	<b>Instructor, Department of Computer Science, Cornell University</b> CS 2110: Object-Oriented Programming and Data Structures (w/ David Gries) CS 2111: Programming Practicum (w/ David Gries)
Spring 2017, Spring 2018	<b>Instructor, Department of Computer Science, Cornell University</b> CS 5431: Practicum in System Security
Spring 2013, Spring 2015	<b>Teaching Assistant, Department of Computer Science, Cornell University</b> CS 5430: System Security (Course Instructors: Fred Schneider, Michael Clarkson)
Fall 2011	<b>Teaching Assistant, Department of Computer Science, Cornell University</b> CS 6830: Cryptography (Course Instructor: Rafael Pass)
Spring 2009	<b>Teaching Fellow, Department of Computer Science, Harvard University</b> CS 105: Privacy and Technology CS 124: Data Structures and Algorithms
Fall 2008	<b>Teaching Fellow, Department of Computer Science, Harvard University</b> CS 121: Introduction to Theoretical Computer Science
Spring 2008	<b>Course Assistant, Department of Mathematics, Harvard University</b> Math 21a: Multivariable Calculus
Fall 2007	<b>Course Assistant, Department of Mathematics, Harvard University</b> Math 1b: Calculus, Series, and Differential Equations
Spring 2007	<b>Course Assistant, Department of Mathematics, Harvard University</b> Math 1a: Introduction to Calculus
Fall 2006	<b>Course Assistant, Department of Mathematics, Harvard University</b> Math 21b: Linear Algebra and Differential Equations

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## Projects Supervised

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Spring 2017

***M.Eng. Project***

Students: Jacqueline Law, Nishad Mathur, Ning Wang, Zhan Zhao  
Title: *PostIt: A System for Secure Password Management*

Spring 2016

***M.Eng. Project***

Student: Andy Yi-Chun Huang  
Title: *Use-based Security for Mobile Health Apps*

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## Outreach

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2010 - 2018

***Workshop Leader, Expanding Your Horizons***

Expanding Your Horizons (EYH) is a one-day conference for junior high girls that introduces them to different STEM fields through a series of hands-on workshops. Over the last few years, I have designed and run workshops that introduce these girls to different areas of computer science including programming (with Scratch) and networking (with paper airplanes).

2017-2018

***Graduate Student Fellow, GRASSHOPR***

The Graduate Student School Outreach Program (GRASSHOPR) pairs graduate students with local teachers in Tompkins County. Over the last two years, I have developed an inter-disciplinary mini-course on privacy and technology that I teach to local high school students.

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## Invited Talks

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November 2017

***The Avenance Project***

DataBox Symposium, London, England

September 2017

***SGX Enforcement of Use-Based Privacy***

ASRG Seminar, Cisco, Morrisville, NC

August 2017

***SGX Enforcement of Use-Based Privacy***

International Personal Data Systems Workshop, Sommarøy, Norway

September 2016

***Use-Based Privacy***

International Personal Data Systems Workshop, Tromsø, Norway

March 2012

***Approximately Strategy-Free Voting***

Cryptography Colloquium, Microsoft Research, Redmond, WA

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