# Yixin Sun

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## EDUCATION

**Princeton University**, Princeton, New Jersey — Sep 2014 – Present
PhD candidate in Computer Science
Information Controls Fellowship, Fellowship in Natural Sciences and Engineering

**University of Virginia**, Charlottesville, Virginia — Aug 2009 – May 2013
B.A. in Computer Science and Mathematics, *Highest Distinction*
Echols Scholar, Intermediate Honor, Dean's List of Distinguished Students

## PUBLICATIONS

**Sun, Y.**, Edmundson, A., Vanbever, L., Li, O., Rexford, J., Chiang, M., Mittal, P.. "RAPTOR: Routing Attacks on Privacy in Tor." In 24th USENIX Security Symposium (USENIX Security 2015) (pp. 271-286). [15% acceptance rate]

**Sun, Y.**, Skadron K.. "Prefix Scan and Minimum Spanning Tree with OpenCL." University of Virginia, Dept. of Computer Science. Technical Report CS-2013-02.

Su, P., Park, B., Lee, J., **Sun, Y.**. "Proof-of-Concept Study for a Roadway Reservation System: Integrated Traffic Management Approach." Transportation Research Record: Journal of the Transportation Research Board 2381 (2013), 1-8.

## RESEARCH EXPERIENCE

**RAPTOR: Routing Attacks on Privacy in Tor**
*Collaborators: Anne Edmundson, Laurent Vanbever, Oscar Li, Jennifer Rexford, Mung Chiang, Prateek Mittal, Princeton University*
Present a suite of new attacks, called Raptor attacks, that can be launched by Autonomous Systems (ASes) to compromise user anonymity over the Tor network.
* Y. Sun, A. Edmundson, L. Vanbever, O. Li, M. Chiang, J. Rexford and P. Mittal. "RAPTOR: Routing Attacks on Privacy in Tor." *USENIX Security 2015*.

**Counter-RAPTOR: Safeguarding Tor Against Active Routing Attacks**
*Collaborators: Anne Edmundson, Nick Feamster, Mung Chiang, Prateek Mittal, Princeton University*
Design and build countermeasures to defend against active routing attacks on Tor. We propose a new relay selection algorithm to proactively protect Tor users from being affected in an active attack, and build a live BGP monitoring system that reactively detects routing anomalies involving Tor relays in real time.
* *In Submission*

**EpDNS: End-Point DNS Monitoring with Domain Name-Program Association for Security Analysis**
*Collaborators: Kangkook Jee, Lauri Korts-Parn, NEC Labs*
Design and build a new end-point oriented system, called EpDNS, that uses DNS sensors at end-hosts to monitor DNS activities associated with the responsible programs. The system provides higher detection accuracy on various DNS-based attacks and has been deployed to Linux and Windows systems.
* *In Submission*

**Prefix Scan and MST with OpenCL**
*Collaborator: Kevin Skadron, University of Virginia*
Optimize parallel prefix scan and minimum spanning tree algorithms on GPU. Performance evaluation on Nvidia and AMD GPUs in comparison with CUDA and CLPP implementations.
* Y. Sun, K. Skadron. Prefix Scan and Minimum Spanning Tree with OpenCL. U.Va., Dept. of Computer Science, Technical Report CS-2013-02.

**Roadway Reservation System**
*Collaborators: Peng Su, Byungkyu Park, Joyoung Lee, University of Virginia*
Design and model roadway reservation system where two lanes of the freeway in the road network are controlled by reservation.
* P. Su, B. Park, J. Lee, Y. Sun. Proof-of-Concept Study for a Roadway Reservation System: Integrated Traffic Management Approach. Transportation Research Record: Journal of the Transportation Research Board 2381 (2013): 1-8.

**Research Experiences for Undergraduates**
*Collaborator: Brian Parshall, University of Virginia*
Literature review and study on algebraic and finite groups, group homomorphism and isomorphism, Nilpotent matrices.
* Under NSF Award Number: 1001900

## WORK EXPERIENCE

**Graduate Research Assistant, Princeton University** Sep 2014 – Present
Security and Privacy Lab, *Professor Prateek Mittal*
EDGE Lab, *Professor Mung Chiang*
Joint research work with Professor Prateek Mittal and Professor Mung Chiang at the intersection of security/privacy and networks.

**Research Intern, NEC Labs** May 2016 – Aug 2016
Build a new DNS monitoring system and design detection techniques on DNS-based attacks.

**Research Intern, Verisign Labs** Jun 2015 – Aug 2015
Measure and analyze DNS data from Tor exit relays and onion leakage at DNS servers.

**ICF International**
Full time Back-end Web Developer Jul 2013 – Jun 2014
Summer Intern Jun 2012 – Aug 2012
Develop Java/Grails web applications.

## ACADEMIC HONORS & AWARDS

Information Controls Fellowship - Senior Fellow 2015 – 2016
USENIX Security Grants for Women Aug 2015
Fellowship in Natural Sciences and Engineering, Princeton U. 2014 – 2015
Echols Scholar, University of Virginia 2010 – 2013
Dean's List of Distinguished Students, University of Virginia 2010 – 2012
ACM ICPC Honorable Mention, Mid-Atlantic Region Nov 2011
Intermediate Honor, University of Virginia Oct 2011

## INVITED TALKS

RAPTOR: Routing Attacks on Privacy in Tor
*Conference*: USENIX Security 2015, Washington D.C. Aug 2015
*Academia*: University of Virginia, hosted by Prof. Dave Evans Nov 2015

## SERVICES

Reviewer for IEEE Transactions on Mobile Computing 2016
Reviewer for IEEE Communications Magazine 2016
Session chair for Grace Hopper conference 2016

## TEACHING EXPERIENCE

*Teaching Assistant*, Princeton U., Advanced Computer Networks Fall 2016
*Instructor*, U.Va., Carnival of Mathematics Spring 2013
*Teaching Assistant*, U.Va., Algorithms Fall 2012
*Teaching Assistant*, U.Va., Discrete Math Spring 2012
*Teaching Assistant*, U.Va., Intro to Computing 2010 – 2011