

# RYAN BECKETT

355 NW 88th Street, Seattle WA  
(303)956-6712 ◊ ryan.beckett@microsoft.com

## EDUCATION

---

- Princeton University** *September 2013 - June 2018*  
PhD in Computer Science  
Thesis: Network Control Plane Synthesis and Verification
- Princeton University** *September 2013 - May 2015*  
Masters in Computer Science
- University of Virginia** *August 2009 - May 2013*  
BS in Computer Science, BA in Mathematics (3.95 GPA)

## RESEARCH OVERVIEW

---

My research lies at the intersection of programming languages and networks. I am broadly interested in topics spanning compilers, verification, static analysis, distributed systems, and networks.

## AWARDS

---

- ACM SIGCOMM Dissertation Award, 2018**  
SIGCOMM Doctoral Dissertation Award for Outstanding PhD Thesis in Computer Networking and Data Communication. “Ryan Beckett (Network Control Plane Synthesis And Verification) for pioneering contributions in extending the field of network control plane verification and synthesis.”
- Google Fellowship, 2017**  
One of 33 recipients in the world of the 2017 Google Fellowship (one of 4 in the area of Systems and Networking). “To recognize and support outstanding graduate students doing exceptional research in Computer Science and related disciplines.”
- Siebel Scholarship, 2017**  
One of 92 recipients of the 2017 Siebel Scholarship. “To recognize the most talented students at the worlds leading graduate schools of business, computer science, bioengineering, and energy science.”
- ACM SIGCOMM Best Paper Award, 2016**  
Best paper award for the paper entitled Dont Mind the Gap: Bridging Network-wide Objectives and Device-level Configurations. With Ratul Mahajan, Todd Millstein, Jitu Padhye, and David Walker.
- URDS Finalist, 2013**  
Undergraduate Research and Design Symposium (URDS) finalist for a 2013 undergraduate thesis on identifying radars with probabilistic model checking.
- Highest Distinction, 2013**  
Graduated from the University of Virginia in 2013 with the “Highest Distinction” title. Awarded to those with a cumulative GPA above 3.8.
- Intermediate Honors, 2011**  
University of Virginia award for having a GPA in the top 20% of the University after two years.

## PUBLICATIONS

---

**Efficient Verification of Network Fault-tolerance via Counterexample-guided Refinement.** Nick Giannarakis, Ryan Beckett, Ratul Mahajan, David Walker. Computer Aided Verification (CAV), July 2019.

**Control Plane Compression.** Ryan Beckett, Aarti Gupta, Ratul Mahajan, and David Walker. ACM SIGCOMM, August 2018.

**A General Approach to Network Configuration Verification.** Ryan Beckett, Aarti Gupta, Ratul Mahajan, and David Walker. ACM SIGCOMM, August 2017.

**Network Configuration Synthesis with Abstract Topologies.** Ryan Beckett, Ratul Mahajan, Todd Millstein, Jitendra Padhye, and David Walker. In PLDI, July 2017.

**Programming Distributed Control Planes: Invited Demo.** Ryan Beckett, Ratul Mahajan, Todd Millstein, Jitendra Padhye, and David Walker. SOSR, April 2017.

**Don't Mind the Gap: Bridging Network-wide Objectives and Device-level Configurations.** Ryan Beckett, Ratul Mahajan, Todd Millstein, Jitendra Padhye, and David Walker. ACM SIGCOMM, August 2016. Best paper award.

**Temporal NetKAT.** Ryan Beckett, Michael Greenberg, and David Walker. 2016 In ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 16), June 2016.

**Temporal NetKAT.** Ryan Beckett, Michael Greenberg, and David Walker. 2015 PLVNET 2015: 1st Workshop on Programming Languages and Verification Technology for Networking, January 2015.

**An Assertion Language for Debugging SDN Applications.** Ryan Beckett, 2014 X. Kelvin Zou, Shuyuan Zhang, Sharad Malik, Jennifer Rexford, and David Walker. ACM SIGCOMM HotSDN Workshop, August 2014.

## WORK EXPERIENCE

---

**Microsoft (Researcher)** *2018-Present*

- Perform fundamental research in the areas of computer networks and programming languages.

**Microsoft (Intern)** *2015-2016*

- Worked with Ratul Mahajan and Jitendra Padhye to develop a high-level language and compiler for managing routing policy via configurations for the Border Gateway Protocol (BGP) at scale.
- Developed a compiler called Propane to synthesize distributed BGP configurations from a network-wide routing specification that are provably correct independent of the number of network faults.
- Submitted the work to the SIGCOMM conference, winning the 2016 best paper award.

**Secure64 (Intern)** *Summer 2013*

- Implemented a Simple Network Management Protocol (SNMP) interface for the company's Domain Name Server (DNS) products to collect performance statistics.
- Helped build a DNS management web application in the Django Python framework to provide real time monitoring data of production DNS servers.
- Wrote test scripts for the management web application in the Selenium framework.

## INVITED TALKS

---

### **Propane and Minesweeper: Two Tools for Improving Network Reliability, 2018**

Presented at North American Network Operators Group (NANOG).

### **A General Approach to Network Verification, 2017**

Invited talk at Cisco.

### **Programming Distributed Control Planes, 2016**

Invited talk at Google.

## TEACHING EXPERIENCE

---

### **Advanced Computer Networks, Fall 2016**

Teaching Assistant, Princeton University, Department of Computer Science.

### **Algorithms and Data Structures, Spring 2015**

Teaching Assistant, Princeton University, Department of Computer Science.

### **Functional Programming, Fall 2014**

Teaching Assistant, Princeton University, Department of Computer Science.

### **Ordinary Differential Equations, Fall 2010**

Undergraduate TA, University of Virginia, Department of Applied Mathematics.