Oliver Michel
Academic Curriculum Vitae

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I am a postdoctoral research associate at Princeton University working with Professor Jennifer Rexford. Before joining Princeton, I was a postdoctoral researcher at the University of Vienna working with Professor Stefan Schmid. I received a Ph.D. and M.S. in Computer Science from the University of Colorado Boulder advised by Professor Eric Keller and a B.Sc. in Computer Science from the University of Vienna. During my studies, I spent one year at the University of Illinois at Urbana-Champaign, working with Professor Brighten Godfrey. Previously, I also worked as a software engineer at Tupalo.com and Tourradar.com and interned as a WAN Automation engineer at Juniper Networks. My research focuses on hardware support for real-time video conferencing applications, scalable packet-level network monitoring, programmable data planes, and high-performance networking architectures.

Education

Philosophical Doctor (Ph.D.), Computer Science
University of Colorado Boulder, Aug. 2015 – Aug. 2019
Research Area: Systems & Networking
Thesis: Cloud-Scale Packet-Level Network Telemetry & Analytics

Master of Science (M.S.), Computer Science
University of Colorado Boulder, Aug. 2013 – May 2015

Bachelor of Science (B.Sc.), Computer Science
University of Vienna, Austria, Jan. 2009 – Jan. 2013
Thesis: Adaptive Source Routing and Speculative Execution for Multi-Homed Wireless Clients in Preclinical Medical Care

Experience

Postdoctoral Research Associate
Advisor: Jennifer Rexford
Princeton University, USA, Sep. 2021 - *ongoing*

Postdoctoral Research Associate
Advisor: Stefan Schmid
University of Vienna, Austria, Apr. 2020 – July 2021

Backend Software Engineer
TourRadar GmbH, Vienna, Austria, Aug. 2019 – Feb. 2020

Graduate Research Assistant
Advisor: Eric Keller
University of Colorado Boulder, USA, Aug. 2013 – May 2019

Undergraduate Research Assistant (part-time)
University of Vienna, Austria, Oct. 2010 – Jun. 2011 and Aug. 2012 – Jan. 2013

Software Engineer (part-time)
Tupalo Internetservices GmbH, Vienna, Austria, Jun. 2009 – Jun. 2011

Publications

Enabling Passive Measurement of Zoom Performance in Production Networks
Oliver Michel, Satadal Sengupta, Hyojoon Kim, Ravi Netravali, Jennifer Rexford
ACM Internet Measurement Conference (IMC '22), Nice, France, 2022

Getting back what was lost in the era of high-speed software packet processing
Marcelo Abranches, Oliver Michel, Eric Keller
ACM Workshop on Hot Topics in Networks (HotNets '22), Austin, TX, USA, 2022

PowerTCP: Pushing the Performance Limits of Datacenter Networks
Vamsi Addanki, Oliver Michel, Stefan Schmid
USENIX Symposium on Networked System Design and Implementation (NSDI '22), Renton, WA, USA, 2022

Efficient Network Monitoring Applications in the Kernel with eBPF and XDP
Marcelo Abranches, Oliver Michel, Eric Keller, Stefan Schmid
IEEE Conference on Network Function Virtualization and Software-Defined Networking (NFV-SDN '21), Heraklion, Greece, 2021 – **Won Best Paper Award**

The Programmable Data Plane: Abstractions, Architectures, Algorithms, and Applications
Oliver Michel, Roberto Bifulco, Gábor Rétvári, Stefan Schmid
ACM Computing Surveys (CSUR), Vol. 54, Issue 4, July 2021

Software Packet-Level Network Analytics at Cloud Scale
Oliver Michel, John Sonchack, Greg Cusack, Maziyar Nazari, Eric Keller, Jonathan M. Smith
IEEE Transactions on Network and Service Management (TNSM), Vol. 18, Issue 1, Mar. 2021

Network Defragmentation in Virtualized Data Centers
Oliver Michel, Eric Keller, Fernando M.V. Ramos
6th IEEE International Conference on Software Defined Systems (SDS-2019), Rome, Italy, 2019

PIQ: Persistent Interactive Queries for Network Analytics
Oliver Michel, John Sonchack, Eric Keller, Jonathan M. Smith
ACM International Workshop on Security in Software Defined Networks & Network Function Virtualization (SDN-NFV Sec. 2019), Dallas, TX, USA, 2019

Packet- Level Analytics in Software without Compromises
Oliver Michel, John Sonchack, Eric Keller, Jonathan M. Smith
10th USENIX Workshop on Hot Topics in Cloud Computing (HotCloud '18), Boston, MA, USA, 2018

Scaling Hardware Accelerated Monitoring to Concurrent and Dynamic Queries With *Flow
John Sonchack, Oliver Michel, Adam J. Aviv, Eric Keller, Jonathan M. Smith
2018 USENIX Annual Technical Conference (ATC '18), Boston, MA, USA, 2018

Machine Learning-Based Detection of Ransomware using SDN
Greg Cusack, Oliver Michel, Eric Keller
ACM International Workshop on Security in Software Defined Networks & Network Function Virtualization (SDN-NFV Sec. 2018), Tempe, AZ, USA, 2018

SDN in Wide-Area Networks: A Survey
Oliver Michel, Eric Keller
4th IEEE International Conference on Software Defined Systems (SDS-2017), Valencia, Spain, 2017

Policy Routing using Process-Level Identifiers
Oliver Michel, Eric Keller
3rd IEEE Intl. Symposium on Software Defined Systems (SDS-2016), Berlin, Germany, 2016

Applying Operating System Principles to SDN Controller Design
Matthew Monaco, Oliver Michel, Eric Keller
12th ACM Workshop on Hot Topics in Networks (HotNets-XII), College Park, MD, USA, 2013

More is Less: Reducing Latency via Redundancy
Ashish Vulimiri, Oliver Michel, P. Brighten Godfrey, Scott Shenker
ACM Workshop on Hot Topics in Networks (HotNets-XI), Redmond, WA, USA, 2012

Invited Talks

Enabling Passive Measurement of Zoom Performance in Production Networks
University of Chicago, October 2022

Packet-Level Network Telemetry and Analytics
University of Vienna, April 2019

Cloud-Scale Packet-Level Network Telemetry and Analytics
North American Network Operators Group General Meeting 73, Denver, CO, June 2018

Network Defragmentation in Virtualized Data Centers
University of Lisbon, September 2017

Applying Operating System Principles to SDN Controller Design
University of Illinois at Urbana-Champaign, April 2014

More is Less – Reducing Latency via Redundancy
University of Colorado Boulder, April 2013

Posters

Scalable, Hardware-Accelerated Network Analytics
Oliver Michel, John Sonchack, Adam J. Aviv, Eric Keller
15th USENIX Symposium on Networked System Design and Implementation (NSDI '18), Renton, WA, USA, 2018

Machine Learning-Based Fingerprinting of Network Traffic using Programmable Forwarding Engines
Greg Cusack, Oliver Michel, Eric Keller
NDSS Security Symposium 2018, San Diego, CA, USA, 2018 – **Won Best Poster Award**

Defragmenting the Cloud
Oliver Michel, Eric Keller
13th USENIX Symposium on Networked System Design and Implementation (NSDI '16), Santa Clara, CA, USA, 2016

Extending the Software-Defined Network Boundary
Oliver Michel, Michael Coughlin, Eric Keller
ACM SIGCOMM 2014 Conference, Chicago, IL, USA, 2014

Making the Live Network the Honeypot
Michael Coughlin, Oliver Michel, Eric Keller
11th USENIX Symposium on Networked System Design and Implementation (NSDI '14), Seattle, WA, USA, 2014

Applying Operating System Principles to SDN Controller Design
Oliver Michel, Matthew Monaco, Eric Keller
18th GENI Engineering Conference, New York, NY, USA, 2013

Multihoming and Adaptive Multipath Transmission using off-the-shelf Components in Preclinical Medical Care
Oliver Michel, David Stezenbach, Kurt Tutschku
10th USENIX Symposium on Networked System Design and Implementation (NSDI '13), Chicago, IL, USA, 2013

Adaptive Source Routing
Oliver Michel, Ashish Vulimiri, P. Brighten Godfrey
12th GENI Engineering Conference, Los Angeles, CA, USA, 2012

Technical Reports / Preprints

The Programmable Data Plane: Abstractions, Architectures, Algorithms, and Applications
Oliver Michel, Roberto Bifulco, Gábor Rétvári, Stefan Schmid
IEEE TechRxiv, 2020

Applying Operating System Principles to SDN Controller Design
Matthew Monaco, Oliver Michel, Eric Keller
University of Colorado Technical Report, 2015

Teaching

Lecturer, Network Security (Undergraduate and Graduate Level)
University of Vienna, Spring 2021

Lecturer, Operating Systems (Undergraduate Level)
University of Vienna, Spring 2021

Lecturer, Network Technologies (Undergraduate Level)
University of Vienna, Fall 2020

Guest Lecturer, ECEN5008 Advanced Computer and Networked System Security
Professor Eric Keller
University of Colorado Boulder, Fall 2017

Guest Lecturer, ECEN5013, Advanced Computer Networks
Professor Eric Keller
University of Colorado Boulder, Fall 2013, Fall 2015, Fall 2016

Teaching Assistant, CSCI2400 Computer Systems
Professor Richard Han
University of Colorado Boulder, Fall 2013

Staff Tutor, Network Technologies
Professor Kurt Tutschku
University of Vienna, Spring 2012

Internships

WAN Automation Software Engineer
Juniper Networks OpenLab, Bridgewater, NJ, USA, Summer 2016

Research Intern
University of Colorado Boulder, CO, USA, Summer 2013
Advised by Professor Eric Keller

Research Intern
Information Trust Institute, University of Illinois at Urbana-Champaign, IL, USA, Summer 2012
Advised by Professor Brighten Godfrey

Research Intern
Department of Computer Science, University of Illinois at Urbana-Champaign, IL, USA, Winter 2011
Advised by Professor Brighten Godfrey

Awards and Fellowships

- Best Paper Award, IEEE NFV-SDN 2021
- Best Technical Poster Award, NDSS 2018
- Dean's Outstanding Merit Fellowship, University of Colorado Boulder
- Joint Study Scholarship, University of Vienna, Austria

Service

- TPC Member, ACM SIGCOMM Posters & Demos, 2022
- TPC Member, ACM/IEEE Symposium on Architectures for Networking and Communication Systems (ANCS), 2021
- TPC Member, ACM Workshop on Systems and Network Telemetry and Applications (SNTA), 2022, 2021
- TPC Member + Demo Co-Chair, IEEE Conference on Network Function Virtualization and Software-defined Networks (NFV-SDN), 2021
- Reviewer, Elsevier Computer Networks Journal, 2022
- Reviewer, IEEE Internet of Things Journal, 2022
- Reviewer, IEEE/ACM Transactions on Networking (TON), 2021
- Reviewer, IEEE Transactions on Network and Service Management (TNSM), 2019, 2020, 2021