

Anduo Wang

Temple University, Computer and Information Sciences

<http://anduowang.github.io>

E-mail: anduowang@gmail.com

Research Interest

As a networking researcher, I apply formal methods, programming language, and database techniques to improve network management.

Education

University of Pennsylvania, Ph.D., Computer and Information Science 08/2013
Advisors: Boon Thau Loo, Andre Scedrov
Thesis: Automated Formal Analysis of Internet Routing Configurations

Tianjin University, B.S., Computer Science 07/2004

Work and Research Experience

Temple University – Associate professor June 2023 - Present
Temple University – Assistant professor January 2016 - June 2023
University of Illinois at Urbana-Champaign – Postdoctoral research associate 12/2013 - 12/31/2015

Awards and Funding

NSF CAREER (single PI), *CAREER: Logical Reasoning of Networks with Partial Knowledge*, \$515,715, Temple University, 07/01/2022 – 06/30/2027 (Award number 2145242)

NSF small (single PI), *CNS Core: Small: Towards a Knowledge Plane for Coordinating Network Policies*, \$478,970, Temple University, 01/10/2019 – 09/2023 (Award number: 1909450)

SOSR'17 student travel NSF Student Travel Support for the ACM SOSR 2017 Conference, \$15,000, Temple University, 2017 – 2018

NSF CRII (single PI), *CRII: NeTS: Towards a database-defined network*, \$160,000, Temple University, 2017 – 2019

Publications

Structural Semantics Management: an Application of the Chase in Networking **Anduo Wang**, Mubashir Anwar, Fangping Lan, Mathew Career, MASCOTS23, November 2023

Demo: Structural Network Minimization: A Case of Reflective Networking Mubashir Anwar, Fangping Lan, **Anduo Wang**, Matthew Caesar, SIGCOMM'23, September 2023

Indirect Network Troubleshooting with The Chase Fangping Lan, Mubashir Anwar, **Anduo Wang**, Matthew Caesar, July, 2023

Design and Implementation of a Strong Representation System for Network Policies Fangping Lan, Sanchari Biswas, Bin Gui, Jie Wu, **Anduo Wang**, ICCCN'22, July 2022

A Network Use for Incomplete Knowledge Management **Anduo Wang**, CIDR'22, January 2022

Faure: A Partial Approach to Network Analysis Fangping Lan, Bin Gui, **Anduo Wang**, HotNets'21, November 2021

Sarasate: A Strong Representation System for Networking Policies Bin Gui, Fangping Lan, **Anduo Wang**, SIGCOMM demo, August 2021

Towards a Semantic Framework for Policy Exchange in the Internet **LFMTP**, July 2021

Flexible Routing with Policy Exchange Bin Gui, Fangping Lan, **Anduo Wang**, ACM APNet, June 2021

Analyzing Internet Routing Policies with Answer Set Programming, **Anduo Wang**, TEASE-LP, May 2020

A Case of Knowledge-driven Policy Management: Bringing Discipline to Internet Routing, Anduo Wang, ACM Symposium on Software-Defined Networking Research, March, 2020

Rethinking Network Policy Coordination: A Database Perspective, **Anduo Wang**, Seungwon Shin, Eduard Dragut, ACM APNet 2019

Internet Routing and Non-monotonic Reasoning **Anduo Wang**, Zhijia Chen, 15th International Conference on Logic Programming and Nonmonotonic Reasoning, 2019

A Logical Approach to Representing and Reasoning About Interdomain Routing Policies **Anduo Wang**, Zhijia Chen, DATALOG 2.0 2019

Enabling Policy Innovation in Interdomain Routing: A Software-Defined Approach **Anduo Wang**, Zhijia Chen, Tony Yang, Minlan Yu, ACM SOSR 2019

Towards Example-Guided Network Synthesis Haoxian Chen, *Anduo Wang*, Boon Thau Loo, ACM APNet 2018

A Semantic Approach to Modularizing SDN Software *Anduo Wang* Poster, NSDI 18

Database Criteria for Network Policy Chain *Anduo Wang*, ACM SDN-NFV Security 2018

Automating SDN Composition: A Database Perspective *Anduo Wang*, Jason Croft, ACM SOSR 2017

Reflections on Data Integration for SDN. **Anduo Wang**, Jason Croft, Eduard Dragu, invited paper, ACM SDN-NFV Security 2017

Ravel: A Database-Defined Network. **Anduo Wang**, Xueyuan Mei, Jason Croft, Matthew Caesar, Brighten Godfrey., ACM Symposium on Software-Defined Networking Research, March, 2016

Ravel: Orchestrating Software-Defined Networks. **Anduo Wang**, Brighten Godfrey, Matthew Caesar., Symposium on Software-Defined Networking Research: Demos, June, 2015

Software-Defined Networks as Databases. **Anduo Wang**, Wenchao Zhou, Brighten Godfrey, Matthew Caesar., Open networking summit, March, 2014

Automated Synthesis of Reactive Controllers for Software-Defined Networks. **Anduo Wang**, Salar Moarref, Ufuk Topcu, Boon Thau Loo, Andre Scedrov., 3rd International Workshop on Rigorous Protocol Engineering (**WRiPE**), October 2013

On the Feasibility of Automation for Bandwidth Allocation Problems in Data Centers. Yifei Yuan, **Anduo Wang**, Rajeev Alur, Boon Thau Loo., 13th Conference on the Theory and Applications of Formal Methods in Hardware and System Verification (**FMCAD**), October 2013

A Reduction-based Approach Towards Scaling Up Formal Analysis of Internet Configurations. **Anduo Wang**, Alexander J.T. Gurney, Xianglong Han, Jinyan Cao, Boon Thau Loo, Carolyn Talcott and Andre Scedrov., The 33rd Annual IEEE International Conference on Computer Communications (**INFOCOM**), April 27th - May 2nd, 2014, Canada

Reduction-based Formal Analysis of BGP Instances. **Anduo Wang**, Carolyn Talcott, Alexander J.T. Gurney, Boon Thau Loo and Andre Scedrov., 18th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (**TACAS**), Mar 2012

Reduction-based analysis of BGP systems with BGPVerif **Anduo Wang**, Alexander J.T. Gurney, Xianglong Han, Jinyan Cao, Carolyn Talcot, Boon Thau Loo, Andre Scedrov., ACM Special Interest Group on Data Communication (**ACM SIGCOMM**) **demonstration**, Helsinki, Finland, Aug, 2012

Brief announcement: a calculus of policy-based routing systems, **Anduo Wang**, Carolyn Talcott, Alexander Gurney, Boon Thau Loo, Andre Scedrov., ACM symposium on Principles of distributed computing (**PODC**), 2012

Analyzing BGP Instances in Maude **Anduo Wang**, Carolyn Talcott, Limin Jia, Boon Thau Loo, Andre Scedrov., 13th Formal Methods for Open Object-Based Distributed Systems and 31th Formal Techniques for Networked and Distributed Systems (**FMOODS/FORTE**), 2011

Partial Specifications of Routing Configurations. Alexander J. T. Gurney, Limin Jia, **Anduo Wang**, and Boon Thau Loo., 1st International Workshop on Rigorous Protocol Engineering (**WRiPE**), co-located with ICNP 2011, Vancouver, Canada, Oct 2011

FSR: Formal Analysis and Implementation Toolkit for Safe Inter-domain Routing. **Anduo Wang**, Limin Jia, Wenchao Zhou, Yiqing Ren, Boon Thau Loo, Jennifer Rexford, Vivek Nigam, Andre Scedrov, Carolyn L. Talcott., IEEE/ACM Transactions on Networking (**ToN**), 2012

Recent advances in declarative networking, Boon Thau Loo, Harjot Gill, Changbin Liu, Yun Mao, William R. Marczak, Micah Sherr, **Anduo Wang**, Wenchao Zhou., 14th international conference on Practical Aspects of Declarative Languages, (**PADL**), 2012

FSR: Formal Analysis and Implementation Toolkit for Safe Inter-domain Routing. Yiqing Ren, Wenchao Zhou, **Anduo Wang**, Limin Jia, Alexander J.T. Gurney, Boon Thau Loo, and Jennifer Rexford., ACM Special Interest Group on Data Communication (**ACM SIGCOMM**) **demonstration**, Toronto, Canada, Aug, 2011

An Operational Semantics for Network Datalog, Vivek Nigam, Limin Jia, **Anduo Wang**, Boon Thau Loo, and Andre Scedrov., Third International Workshop on Logics, Agents, and Mobility (**LAM**), in conjunction with LICS, July 2010

FSR: Formal Analysis and Implementation Toolkit for Safe Inter-domain Routing. **Anduo Wang**, Limin Jia, Wenchao Zhou, Yiqing Ren, Boon Thau Loo, Jennifer Rexford, Vivek Nigam, Andre Scedrov, Carolyn L. Talcott., IEEE/ACM Transactions on Networking (**ToN**), 2012.

Formally Verifiable Networking, **Anduo Wang**, Limin Jia, Changbin Liu, Boon Thau Loo, Oleg Sokolsky, and Prithwish Basu., 8th Workshop on Hot Topics in Networks (**ACM SIGCOMM HotNets-VIII**), New York, Oct 2009 (16.0% acceptance)

A Theorem Proving Approach Towards Declarative Networking, **Anduo Wang**, Boon Thau Loo, Changbin Liu, Oleg Sokolsky, Prithwish Basu. Theorem Proving in Higher Order Logics (**TPHOLs**) Emerging Trends Section, August, 2009

Formalizing Metarouting in PVS, **Anduo Wang**, Boon Thau Loo., *Automated Formal Methods* workshop (**AFM**), co-located with 21st International Conference on Computer Aided Verification, France, 2009

Declarative Network Verification, **Anduo Wang**, Prithwish Basu, Boon Thau Loo, Oleg Sokolsky., International Symposium on Practical Aspects of Declarative Languages (**PADL**), 2009

Formalizing a Component Model in PVS, Kung-Kiu Lau, **Anduo Wang**., preprint 40, Technical Report, School of Computer Science, The University of Manchester, Nov 2006

A Component Based Approach to Verified Software: What, Why, How And What Next?, Kung-Kiu Lau, Zheng Wang, **Anduo Wang**, Ming Gu. 1st Asian Working Conference on Verified Software, 2006

Verifying Java Programs By Theorem Prover HOL, **Anduo Wang**, Fei He, Ming Gu, Xiaoyu Song., Proceedings of the 30th Annual International Computer Software and Applications Conference, 2006

Teaching

CIS 4319 – Computer Networking and Communication, Temple University Fall 2019, 2021; Spring 2022 2023 2024
CIS 5617 – Computer Networking and Communication, Temple University Spring 2019, 2020; Fall 2022
CIS 3329 – Network Architectures, Temple University Spring/Fall 2017, 2018; Spring 2021; Fall 2023
CIS 5590 – Software-Defined Networking, Temple University Fall 2016, 2020

Services

- INFOCOM 2024 TPC** IEEE International Conference on Computer Communications 2024
- INFOCOM 2023 TPC** IEEE International Conference on Computer Communications 2023
- SIGCOMM ISD** ACM SIGCOMM Information Services Director, Appointed July 2017 to July 2021
- SOSR 2021** Technical Program Committee, ACM ACM Symposium on SDN Research, 2021
- SOSR 2020** General Chair, ACM Symposium on SDN Research, 2020
- SOSR 2020** Technical Program Committee, ACM ACM Symposium on SDN Research, 2020
- ANCS 2019** Technical Program Committee, ACM/IEEE Symposium on Architectures for Networking and Communications Systems, 2019
- SOSR 2019** Technical Program Committee, ACM ACM Symposium on SDN Research, 2019
- HotNets'18** External reviewer, 17th ACM Workshop on Hot Topics in Networks (HotNets 2018)
- CRII'18** NSF Panel, Computer and Information Science and Engineering (CISE) Research Initiation Initiative (CRII)
- CSR small'18** NSF Panel, Computer Systems Research (CSR)
- IoT S&P 2017** Technical Program Committee, First ACM CCS Workshop on Internet-of-Things Security and Privacy (IoT S&P 2017)
- ICDCS 2017** Technical Program Committee, The 37th IEEE International Conference on Distributed Computing
- SOSR 2017** Student Travel Grant Chair, The ACM Symposium on SDN Research (SOSR) 2017
- SDNNFVSEC 2017** Technical Program Committee, ACM International Workshop on Security in Software Defined Networks & Network Function Virtualization
- HotPNS 2016** TPC co-chair, The International Workshop on Hot Topics in Practical Networked Systems
- SDNNFVSEC 2016** Technical Program Committee, ACM International Workshop on Security in Software Defined Networks & Network Function Virtualization
- ICNP 2014** Technical Program Committee (Regular Paper Track), 22nd IEEE International Conference on Network Protocols