Anduo Wang

Temple University, Computer and Information Sciences
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Research Interest

As a networking researcher, I apply database, formal methods, and programming language techniques to create more flexible, reliable, and provably correct networks.

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 – Assistant professor   1/1/2016 - present

University of Illinois at Urbana-Champaign – Postdoctoral research associate   12/2013 - 12/31/2015

SRI International, Menlo Park – International fellow   Summer 2010, 2011, 2012

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 Policie*, $478,970, Temple University, 2019 – 2022 (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

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

Services

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