Yiyang Chang

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Education

Purdue University — West Lafayette, IN
Ph.D. student in Computer Engineering, ECE — *Aug 2013 – Present*
- GPA: 3.9/4.0 (updated to Spring 2017)

Peking University — Beijing, China
B.S. in Micro-electronics, EECS — *Sept 2009 – July 2013*
- GPA: 3.8/4.0 (Major), 3.6/4.0 (Overall)

Research Experience

Robust Validation of Network Design — Purdue, West Lafayette, IN
Advisors: Prof. Sanjay Rao and Prof. Mohit Tawarmalani — *Oct 2015 – Present*
- Designed a generic optimization framework for validating network designs, under uncertain failures and demands
- Implemented the framework in GAMS and Pyomo, and evaluated with real-world traffic matrices

Scalable Distributed SDN Controller — Purdue, West Lafayette, IN
Advisors: Prof. Sanjay Rao and Prof. T. N. Vijaykumar — *Nov 2014 – July 2015*
- Designed a framework to optimize distributed SDN controllers with functional partition instead of conventional topological partition
- Hacked Floodlight SDN controller source (Java, sloc: 100k) to design experiments for evaluation

App-specific VM Selection in the Cloud — Purdue, West Lafayette, IN
Advisors: Prof. Sanjay Rao and Prof. T. S. Eugene Ng — *Sept 2013 – Aug 2014*
- VM selection based on historical data and online measurement, with cost controlled by machine learning and pruning algorithms
- Investigated the root cause of performance variation on EC2

Industry Experience

Research Intern — Microsoft Research, Redmond, WA
Manager: Dr. Jin Li — *May 2017 – August 2017*
- Prototyped a distributed deep learning training system over RDMA, which accelerated a production-level model training speed by 6.5x

- Contributed to TensorFlow open source project

Software Development Engineer Intern Microsoft, Redmond, WA
Manager: Praveen Balasubramanian *May 2016 – July 2016*

- Prototyped and shipped TCP CUBIC congestion control in Windows
- Demonstrated a performance improvement in data transfer throughput compared with conventional congestion control algorithm

Research Intern Huawei, Santa Clara, CA
Mentors: Dr. Shuo Yang and Dr. Haoyu Song *May 2014 – Aug 2014*

- Prototyped an SDN-based cloud monitoring system with OpenStack
- Deployed a physical SDN with Pica8 switches and Ryu controller

Publications

- **Yiyang Chang**, Sanjay Rao, and Mohit Tawarmalani. "Robust Validation of Network Designs under Uncertain Demands and Failures", **NSDI**, 2017.
- **Yiyang Chang**, Ashkan Rezaei, Balajee Vamanan, Jahangir Hasan, Sanjay Rao, and T. N. Vijaykumar. "Hydra: Leveraging Functional Slicing for Efficient Distributed SDN Controllers", **IEEE COMSNETS**, 2017.
- **Yiyang Chang**, Gustavo Petri, Sanjay Rao, and Tiark Rompf. "Composing Middlebox and Traffic Engineering Policies in SDNs", **INFOCOM Workshop SWFAN**, 2017.
- Mohammad Hajjat, Ruiqi Liu, **Yiyang Chang**, T. S. Eugene Ng, and Sanjay Rao. "Application-Specific Configuration Selection in the Cloud: Impact of Provider Policy and Potential of Systematic Testing", **IEEE INFOCOM**, 2015.

Research Interests

- Traffic Engineering
- SDN and NFV
- Optimization
- Cloud Computing
- Distributed Systems

Course Projects

Linux Kernel Hacking ECE 695: Operating System

- Developed a usage-limiting CPU scheduler based on Linux Complete Fair Scheduler
- Visualized the memory page reference count in a Linux-ARM kernel

- Developed a basic shell featuring pipe, background, zombie process cleanup, etc.

Paxos, Reliable Multicast, and Byzantine Generals CS 505: Distributed System

- Implemented a Paxos-based replication protocol, a total-ordering multicast service, and the Byzantine Generals algorithm in C

Compiler for LITTLE ECE 573: Compiler

- Developed a full-fledged compiler for a lightweight language, LITTLE, with flex and bison in C++

Web Application ECE 595: Computer Network Systems

- Optimized the performance of a web application with a multi-tier design on Amazon EC2

Socket Programming ECE 463: Intro to Computer Networking

- Developed an event-driven concurrent web server using select()
- Implemented a simple version of distance-vector routing protocol

Honors, Awards and Grants

NSDI 2017 Travel Grant	*Mar 2017*
Sigcomm 2015 Travel Grant	*Aug 2015*
SOSR 2015 Travel Grant	*June 2015*
National Scholarship, Peking University	*Dec 2012*
Google Excellence Scholarship, Google Inc.	*May 2012*
Outstanding Student Award, Peking University	*Dec 2012*

Technical Skills

Programming	Python (proficient), C/C++, Java, Linux Shell Script, Matlab
Software-Defined Network	ONOS, Floodlight, Ryu, Mininet, Open vSwitch, Wireshark
Deep learning	TensorFlow
Cloud Computing	Docker, Kubernetes, Amazon Web Services, OpenStack
Software Development	Git, GDB, Valgrind, Bazel, Vim, LaTeX
Kernel Debugging	WinDbg, QEMU, Hyper-V, VirtualBox
Optimization	GAMS, Pyomo, CPLEX, Gurobi, BARON

Teaching Experience

TA for ECE 595: Computer Network Systems	*Spring 2017*
TA for ECE 463: Introduction to Computer Networking	*Fall 2015*

TA for ECE 201: Linear Circuit Analysis I *Spring 2014 to Spring 2015*

TA for ECE 270: Introduction to Digital System Design *Fall 2013*

References

Sanjay Rao (advisor)

Associate Professor

Electrical and Computer Engineering

Purdue University

Email: sanjay@ecn.purdue.edu

Mohit Tawarmalani

Professor and Allison and Nancy Schleicher Chair of Management

Krannert School of Management

Purdue University

Email: mtawarma@purdue.edu

Jin Li

Partner Research Manager

Microsoft Research

Email: Li.Jin@microsoft.com

Praveen Balasubramanian

Software Engineering Lead

Microsoft

Email: pravb@microsoft.com