

Yiyang Chang

15226 108th Place NE, Bothell, WA, 98011

yiyangchang1024@gmail.com | (765) 404-4968 | LinkedIn | Homepage | GitHub

Industry Experience

Researcher in System and Networking

Bytedance Inc., Bellevue, WA

Manager: Dr. **Yi Wang**

Aug 2019 – Present

- Built and deployed an SDN traffic engineering system to backbone network. The system has run 7 * 24 for 20 months
- Built real-time network troubleshooting tools which pinpoint packet drops within a network in minutes

Research Intern

Microsoft Research, Redmond, WA

Manager: Dr. **Jin Li**

May 2017 – Aug 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 (#11416)

Software Development Engineer Intern

Microsoft, Redmond, WA

Manager: **Praveen Balasubramanian**

May 2016 – July 2016

- Prototyped and shipped TCP CUBIC congestion control in Windows 10
- Demonstrated a performance improvement in data transfer throughput compared with conventional congestion control algorithm

Research Intern

Futurewei Technologies, 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

Education

Purdue University

West Lafayette, IN

Ph.D. in Computer Engineering, ECE

Aug 2013 – July 2019

- GPA: 3.9/4.0

Peking University

Beijing, China

B.S. in Micro-electronics, EECS

Sept 2009 – July 2013

Research Experience

Global-scale SDN Traffic Engineering

Bytedance Inc., Bellevue, WA

Manager: Dr. **Yi Wang**

Aug 2019 – Present

- Designed routing algorithms to optimize network traffic on Segment Routing enabled switches for improving network performance and availability, under uncertain failures and demands
- Deployed an SDN traffic engineering system to a global-scale backbone network, serving real-world user traffic 7 * 24 for more than 20 months.

Network Performance SLOs Certification

Purdue, West Lafayette, IN

Advisors: Prof. **Sanjay Rao** and Prof. **Mohit Tawarmalani**

Oct 2015 – July 2019

- Designed an optimization framework and algorithms for certifying network performance SLOs, under uncertain failures and demands
- Implemented an SDN testbed emulating linked-based protection routing with Mininet and Open vSwitch.

SDN Application Synthesis with Z3

Purdue, West Lafayette, IN

Advisors: Prof. **Sanjay Rao**

Nov 2014 – Oct 2015

- Proposed a logic programming based approach to compose SDN applications (e.g., middleboxes and traffic engineering)
- Developed a constrained shortest-path algorithm with Microsoft Z3 solver, evaluated the scalability with fat-tree topologies

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
- Extended Floodlight SDN controller source code to conduct performance measurements

App-specific Virtual Machine (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 workload and online measurement, with cost controlled by machine learning and pruning algorithms
- Investigated the root cause of performance variation on AWS EC2

Publications

- **Yiyang Chang**, Chuan Jiang, Ashish Chandra, Sanjay Rao, and Mohit Tawarmalani. "Lancet: Better network resilience by designing for pruned failure sets", **ACM SIGMETRICS**, 2020. (Acceptance rate: $17/72 = 23.6\%$)
- **Yiyang Chang**, Sanjay Rao, and Mohit Tawarmalani. "Robust Validation of Network Designs under Uncertain Demands and Failures", pp. 347–362, **USENIX NSDI**, 2017. (Acceptance rate: $46/253 = 18.2\%$)

- **Yiyang Chang**, Ashkan Rezaei, Balajee Vamanan, Jahangir Hasan, Sanjay Rao, and T. N. Vijaykumar. “Hydra: Leveraging Functional Slicing for Efficient Distributed SDN Controllers”, pp. 251–258, **IEEE COMSNETS**, 2017. (Acceptance rate: 49/192 = 25.5%. The paper was one of ten selected papers invited to submit an extended version for a Special volume of Springer Lecture Notes in Computer Science (LNCS) series)
- **Yiyang Chang**, Ashkan Rezaei, Balajee Vamanan, Jahangir Hasan, Sanjay Rao, and T. N. Vijaykumar. “Exploring Functional Slicing in the Design of Distributed SDN Controllers”, vol. 10340, pp. 177–199, **Communication Systems and Networks. COMSNETS 2017, Revised Selected Papers and Invited Papers. Lecture Notes in Computer Science (LNCS)**, Springer, 2017.
- **Yiyang Chang**, Gustavo Petri, Sanjay Rao, and Tiark Rompf. “Composing Middlebox and Traffic Engineering Policies in SDNs”, pp. 396–401, **IEEE INFOCOM Workshop SWFAN**, 2017. (Acceptance rate: 10/20 = 50%)
- 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”, pp. 873–881, **IEEE INFOCOM**, 2015. (Acceptance rate: 316/1640 = 19.3%)
- **Y. Chang**, C. Chen, P. Liu, J. Zhang. “A Betavoltaic Microcell Based on Au/s-SWCNTs/Ti Schottky Junction”, **Sensors and Actuators A: Physical**, 2013.
- P. Liu, **Y. Chang**, J. Zhang. “A betavoltaic microcell based on Au/s-SWCNTs/Ti Schottky junction”, **Journal of Micromechanics and Microengineering**, 2013.
- P. Liu, **Y. Chang**, J. Zhang. “The SWCNTs film-silicon vertical heterojunction fabricated by drop-casting technique”, **IEEE NEMS**, 2013.
- **Y.Y. Chang**, C.C. Chen, P. Liu, J.W. Zhang. “A Single-Walled Carbon Nanotubes Betavoltaic Microcell”, **IEEE MEMS**, 2013. (Acceptance rate: 33%)
- **Y. Chang**, P. Liu, J. Zhang. “A Single-walled Carbon Nanotube Thin Film Solar Microcell with V-groove Array Structure” **Proceedings of the Institution of Mechanical Engineers, Part N: Journal of Nanoengineering and Nanosystems**, 2013
- C.C. Chen, **Y.Y. Chang**, J.W. Zhang. “A Novel Betavoltaic Microbattery Based on Single-Walled Carbon Nanotubes Thin Film-Silicon Heterojunction”, **IEEE MEMS**, 2012. (Acceptance rate: 25%)
- C.C. Chen, **Y.Y. Chang**, J.W. Zhang. “A SWNTs Thin Film Solar Microcell Prepared by Simple Solution-Evaporation Method”, **IEEE NEMS**, 2012.

Honors, Awards and Grants

Facebook Fellowship Finalist, Facebook Inc.	Jan 2018
Bilsland Dissertation Fellowship, Purdue University	Jan 2018
NSDI 2017 Travel Grant	Mar 2017

Sigcomm 2015 Travel Grant	<i>Aug 2015</i>
SOSR 2015 Travel Grant	<i>June 2015</i>
National Scholarship, Peking University	<i>Dec 2012</i>
Google Excellence Scholarship, Google Inc.	<i>May 2012</i>
Outstanding Student Award, Peking University	<i>Dec 2012</i>
May Fourth Scholarship, Peking University	<i>Dec 2011</i>

Technical Skills

Programming	Python (proficient), C/C++, Golang, Linux Shell Script
Optimization	Gurobi, GAMS, Pyomo, CPLEX, BARON
Cloud Computing	Amazon Web Services, Docker, Kubernetes, OpenStack
Software-Defined Network	ONOS, Mininet, Open vSwitch, Wireshark, Floodlight, Ryu
Deep Learning	TensorFlow
Software Development	Git, GDB, Valgrind, Vim, L ^A T _E X
Kernel Debugging	WinDbg, QEMU, Hyper-V, VirtualBox

Teaching Experience

Teaching Fellow, ECE 595: Computer Network Systems	<i>Spring 2017</i>
Teaching Fellow, ECE 463: Introduction to Computer Networking	<i>Fall 2015</i>
Teaching Assistant, ECE 201: Linear Circuit Analysis I	<i>Spring 2014 to Spring 2015</i>
Teaching Assistant, ECE 270: Introduction to Digital System Design	<i>Fall 2013</i>