Zhenyu Zhou

zzy@cs.duke.edu • cs.duke.edu/~zzy • github.com/zhenyu-zhou

Education

Duke University   Durham, NC

Ph.D., Department of Computer Science   *2014 – 2020*
- Advised by Prof. Xiaowei Yang.
- Cumulative GPA: 3.940/4.0
- Research Interests: System availability, network performance, software-defined networks, data center networks, network architecture and design, network protocols and other related topics.
- Selected Classes: Network Security, Distributed System, Software Defined Networking.

M.S., Department of Computer Science   *2020*
En route to the Ph.D.

Peking University   Beijing, China

B.S., School of Electronics Engineering & Computer Science   *2010 – 2014*
- Worked with Prof. Ge Li.
- Overall GPA: 3.63/4.0 (18/150)
- Major GPA: 3.77/4.0 (13/150)
- Honor Track Courses: Mathematical Analysis (I, II and III), Database Systems, Computer Networks.

Work Experience

Software Engineer   Google LLC, Sunnyvale, CA

Orion Core Team   *Jul 2020 – Present*
- Developed Google's SDN controller framework used for intent-based management and control for infrastructures including Jupiter and B4.

Internship   Facebook Inc., Menlo Park, CA

Edge & Network Analytics Team   *May 2018 – Aug 2018*
- Designed a new Traceroute tool with in-band data.

Network Platform Team   *Sep 2016 – Nov 2016*
- Implemented the SNMP engine as an important stage for network data collection.
- Realized both SNMP protocol itself and the business logic.

Research Experience

Research Assistant   Duke University, Durham, NC

Proactive Network Management (PNM)   *Mar 2018 – Present*
- Improved cutting-edge techniques using PNM data for anomaly detection.
- Developed a framework for troubleshooting cable networks and generalized the framework.

Tardis   *Jan 2016 – Aug 2021*
- Leveraged Concolic Execution to identify the root cause of crashing and rolled back the SDN controller to recover from both non-deterministic and deterministic failures.

Mozart   *Jan 2019 – Sep 2019*
- Improved SDN architecture by enabling communication between SDNApps and SDNEnhancements.
- Introduced optimization flags with the compiler analogy.

Green Browser in a Red Computer (gBirc)   *Nov 2014 – Feb 2019*
- Implemented a filter inside kernel to redirect the secrets to a green browser.
- Moved the security component down to kernel.

Function Offloading from Controller to Utilize Switch power (FOCUS) *May 2015 – Nov 2016*
- Offloaded the stable local functions from SDN controller to switches to improve controller scalability.
- Summarized the general guidelines for offloading.

Quickly and of course Safely, Too (QoS2)   *Nov 2014 – Nov 2015*
- Discussed the side effects introduced by the Middle-boxes in the encryption age.
- Improved the page loading performance by classifying web contents in finer granularity.

Summer Research Internship (REU Program)   Carnegie Mellon University, Pittsburgh, PA

Voice over XIA (VoXIA)   *Jul 2013 – Sep 2013*
- Worked with Prof. Peter Steenkiste and Prof. Srinivasan Seshan.
- Implemented XIA in a practical application (Linphone) for the first time.
- VoXIA is implemented on Linux and is mainly based on oRTP, Belle-SIP and Mediastreamer2.

2013 PKU-EECS URTP Workshop PEKING UNIVERSITY, BEIJING, CHINA
    Clone Detector based on Java Byte Code *Mar 2012 – Sep 2013*
- A algorithm for checking code clone based on Java byte code and operating mode, i.e., the operation sequence. We chose byte code because it reveals more essence than source code.
- The sequence matching algorithm is based on scoring matrix and is inspired by bioinformatics.

Publications

1. **Characterizing Physical-Layer Transmission Errors of Cable Broadband Networks**
   Jiyao Hu, **Zhenyu Zhou**, and Xiaowei Yang
   In Proc. of NSDI 2022

2. **Tardis: A Fault-Tolerant Design for Network Control Planes**
   Zhenyu Zhou, Theophilus Benson, Marco Canini and Balakrishnan Chandrasekaran
   In Proc. of SOSR 2021

3. **Speeding Up TCP with Selective Loss Prevention**
   Zhenyu Zhou, Xiaowei Yang
   In Proc. of NIPAA 2021 (Presenter)

4. **A Comprehensive Study of Bugs in Software Defined Networks**
   Ayush Bhardwaj, **Zhenyu Zhou**, Theophilus Benson
   In Proc. of DSN 2021

5. **CableMon: Improving the Reliability of Cable Broadband Networks via Proactive Fault Detection**
   Zhenyu Zhou*, Jiyao Hu*, Xiaowei Yang, Jacob Malone and Jonathan W Williams
   In Proc. of NSDI 2020 (Presenter)
   *These authors contributed equally to this work.

6. **Composing SDN Controller Enhancements with Mozart**
   Zhenyu Zhou and Theophilus Benson
   In Proc. of SoCC 2019 (Presenter & Poster Presenter)

7. **SwitchMan: An Easy-to-Use Approach to Secure User Input and Output**
   Shengbao Zheng, **Zhenyu Zhou**, Heyi Tang, and Xiaowei Yang
   In Proc. of IWPE 2019

8. **Delorean: Using Time Travel to Avoid Bugs and Failures in SDN Applications**
   Zhenyu Zhou, Theophilus Benson, Marco Canini and Balakrishnan Chandrasekaran
   In Proc. of SOSR 2017 (Poster)

9. **FOCUS: Function Offloading from a Controller to Utilize Switch Power**
   Zhenyu Zhou*, Ji Yang*, Theophilus Benson, Xiaowei Yang, Xin Wu and Chengchen Hu
   In Proc. of IEEE NFV-SDN 2016 (Presenter)
   *These authors contributed equally to this work.

10. **A View from the Other Side: Understanding Mobile Phone Characteristics in the Developing World**
    Sohaib Ahmad, Abdul Lateef Haamid, Zafar Ayyub Qazi, **Zhenyu Zhou**, Theophilus Benson and Ihsan Ayyub Qazi
    In Proc. of IMC 2016

11. **FOCUS: Function Offloading from a Controller to Utilize Switch Power**
    Zhenyu Zhou*, Ji Yang*, Theophilus Benson, Xiaowei Yang, Xin Wu and Chengchen Hu
    In Proc. of USENIX NSDI 2016 (Poster)
    *These authors contributed equally to this work.

12. **FOCUS: Function Offloading from a Controller to Utilize Switch Power**
    Zhenyu Zhou*, Ji Yang*, Theophilus Benson, Xiaowei Yang, Xin Wu and Chengchen Hu
    Duke University Technical Report (2016)
    *These authors contributed equally to this work.

13. **Towards a Safe Playground for HTTPS and Middle-boxes with QoS2**
    Zhenyu Zhou and Theophilus Benson
    In Proc. of ACM Hot Middleboxes 2015

14. **Web-QoS2: Web-browsing Quickly and of course Safely, Too**
    Zhenyu Zhou and Theophilus Benson
    In Proc. of USENIX NSDI 2015 (Poster)

15. **CAPTCHAs as An Operating System Service**
    Hongze Zhao, **Zhenyu Zhou**, and Xiaowei Yang
    In Proc. of USENIX NSDI 2015 (Poster)

Service Activities

Program Committee Member
CTRQ 2023	*2023*
CoNEXT 2022	*2022*
IMC 2018 (Shadow PC)	*Jul 2018*

PC Meeting Scribe
CoNEXT 2018	*Sep 2018*

Paper Reviewer
Smart Cities	*Nov 2023, Dec 2023*
Journal of Cybersecurity	*Apr 2023*
Information	*Oct 2022, Nov 2022, Dec 2022*
Sustainability	*Sep 2022, Oct 2022 (2)*
Applied Sciences	*Sep 2022 (2)*
Sensors	*Apr 2022, May 2022*
Electronics	*2022 (10), Mar 2023 (2)*
AIIPCC 2022	*Jan 2022*
Mathematics	*Jan 2022, Jun 2022 (2), Jul 2022*
Journal of Cybersecurity and Privacy	*Dec 2021, Feb 2022, Mar 2022 (2)*
Journal of Network and Systems Management	*Jul 2018, Feb 2021, Jun 2021, Jul 2021*
IEEE Transactions on Vehicular Technology	*Jan 2021, Jul 2021*
Computer Networks	*2019 (4), 2020 (4), 2021 (5), 2022 (11), Mar 2023, Apr 2023, Jun 2023, Feb 2024*
Journal of Cyber Security Technology	*Sep 2018*
CCF Transactions on Networking	*Jan 2018, Jun 2018, Dec 2018*
IEEE ICC 2015	*Nov 2014*

Google Corporation Involvement
Recruiter in NSDI'22	*Apr 2022*

Duke Campus Involvement
Grad Student Visit Committee	*Jan 2015, Feb 2016*
Grad Social Committee	*Jan 2017*

Awards

• Outstanding Teaching Award	DUKE UNIVERSITY, DURHAM, NC
Artificial Intelligence with Prof. George Konidaris.	*2015*
• Undergraduate Research Scholarship	PEKING UNIVERSITY, BEIJING, CHINA
86 winners this year.	*2013*
• Founder Group Inc. Scholarship	PEKING UNIVERSITY, BEIJING, CHINA
200 winners (around 10%) every year, graduate school included.	*2013*
• Merit Student	PEKING UNIVERSITY, BEIJING, CHINA
6% winning rate for community involvement.	*2013*
• May 4th Scholarship	PEKING UNIVERSITY, BEIJING, CHINA
5% winning rate for academic performance.	*2011, 2012*

Skills

Programming languages (alphabetical order):

- Professional proficiency in Bash, C/C++/C++17, HTML, Java, LaTeX, MATLAB, Python, Gnuplot.
- Familiarity with CSS, Go, JavaScript, Lua, Mathematica, Objective-C, Perl, PHP, R, Rust, SQL, Swift.

Interests

Badminton, board games, cooking, mathematics (including discrete mathematics and mathematical analysis) and physics.