

Teng Liang

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Planned graduation date: 2020 May - looking for job opportunities

Education

Master and Ph.D Student in Computer Science (2014 - Present)

Computer Science Department, The University of Arizona, Tucson, USA

Advisor: Prof. Beichuan Zhang

GPA: 4.0/4.0

B.Eng. in Computer Science (2010 - 2014)

Computer Science and Technology, Beijing Institute of Technology, Beijing, China

Key Skills

Computer network design/engineering, Infrastructure architecture design/engineering

Big open source project contribution/management: Redmine, Gerrit, Github

Object-oriented programming: C++, Python, Javascript, C, Java, etc.

System administration: Linux

Network simulation: NS-3

Data visualization: D3

Engineering Experience

- **NDN Forwarding Daemon and NDN-CXX library development (Open source project in C++)**
The development code is peer-reviewed and high-quality. I have been actively participating in system design and contributing code to these projects. The link of my merged code is here: <https://gerrit.named-data.net/q/owner:philoliang2011%2540gmail.com>
- **Smart Home Networking via NDN (Python & Raspberry Pi)**
I built a NDN-based home network with smart devices, such as sensors, light and camera on Raspberry Pis. Poster link: <https://www2.cs.arizona.edu/people/philoliang/ndn-home.pdf>
- **NDN visualization tools (Javascript & D3)**
Use D3, a javascript library to build visualization to analyze NDN traffic and packets relationship. One demo link: <https://www2.cs.arizona.edu/people/philoliang/ndnviz/>
- **mailSync: a Proxy translates between IMAP and NDN to achieve local email retrieval (Java)**
We design and implement a proxy that translates between IMAP and NDN to achieve local email retrieval in Java and Android.
video demo: <https://www.youtube.com/watch?v=wJIEHJROoiY&feature=youtu.be>
- **NDN-NIC: Name-based Filtering on Network Interface Card (Bloom filter & C)**
The current NIC filters packets by their addresses. This work uses Bloom filter to filter packets by variable-length names.

Research Experience

Aug, 2014 - present Research Assistant, Network Research Lab, The University of Arizona

- **Routes measuring and ranking in forwarding plane of Named Data Networking (NDN)**
Today's IP forwarding process follows a single path chosen by the routing process, with no adaptability of its own. On the contrary, NDN forwarding process is able to detect network problems by observing its two-way traffic, and explore multiple alternative paths without loops. However, NDN routes may indicate a broader namespace than the one of network problems. Inaccurate adaptability leads to worse network performance. This project studies how to accurately and efficiently detect and

the namespace of network problem.

- **On Enabling NDN Forwarder to Work Out-of-the-box at Edge Networks**

NDN has adaptive forwarding plane, making data retrieval more efficient with in-network caching and multipath support capabilities. However, it is unclear how to utilize forwarding behaviors, and reduce the deployment complexity of NDN at edge networks. This work designs, implements and evaluates self-configured adaptive forwarding behaviors of NDN at edge networks.

- **One Path to Deploy NDN Deployment over Internet Infrastructure**

Named Data Networking, proposed as future Internet architecture to address the weakness of today's TCP/IP architecture, has been studied and developed for about 10 years. However, it is still unknown how to roll out NDN architecture. This project draws a big picture of rolling out NDN architecture, and studies a key question that how to deploy NDN on infrastructure routers.

- **On Enabling Existing Applications to Communicate Off-the-grid Over NDN**

Today's applications require a pre-configured server to be functional. However, in many scenarios, servers are unavailable, but local communication connectivity still exists. This project studies how to enable app-to-app communication on existing applications using NDN. We implement an IMAP proxy to allow existing email applications to sync emails among each other directly. In addition, we summarized design patterns and experiences.

Teaching Experience

June - August 2019 **Instructor**

CSc 120 Introduction to Computer Programming II (**Python**)

Department of Computer Science, University of Arizona, Tucson, AZ

System Administrator Experience

2015 - present Being the lab system administrator in charge of eight lab servers.

Publications

Liang, T., & Zhang, B. (2020, June). Enabling Named Data Networking Forwarder to Work Out-of-the-box at Edge Networks. In *2020 IEEE International Conference on Communications Workshops (ICC Workshops)* (pp. 1-6). IEEE.

Liang, T., Pan, J., & Zhang, B. (2018). NDNizing Existing Applications: Research Issues and Experiences. In *Proceedings of the 5th ACM Conference on Information-Centric Networking*. ACM.

Liang, T., & Zhang, B. (2018, May). Enabling Off-the-Grid Communication for Existing Applications: A Case Study of Email Access. In *2018 IEEE International Conference on Communications Workshops (ICC Workshops)* (pp. 1-6). IEEE.

Shi, J., Liang, T., Wu, H., Liu, B., & Zhang, B. (2016, September). Ndn-nic: Name-based filtering on network interface card. In *Proceedings of the 3rd ACM Conference on Information-Centric Networking* (pp. 40-49). ACM.

Shang, W., Bannis, A., Liang, T., Wang, Z., Yu, Y., Afanasyev, A., ... & Zhang, L. (2016, April). Named Data Networking of Things. In *2016 IEEE First International Conference on Internet-of-Things Design and Implementation (IoTDI)* (pp. 117-128). IEEE.

Shang, W., Yu, Y., Liang, T., Zhang, B., & Zhang, L. (2015). NDN-ACE: Access Control for Constrained

Professional Activities

Attended NDN Community Meeting 2019, September 2019, NIST Gaithersburg

Attended 9th NDN Hackathon, September 2019, NIST Gaithersburg

Attended ACM Conference on Information-Centric Networking 2018, September 2018, Boston

Attended IEEE International Conference on Communications 2018, May 2018, Kansas City

Attended 10th NDN Project Retreat, May 2018, FIU

Attended 9th NDN Project Retreat, Dec 2017, UCLA

Attended 8th NDN Project Retreat, Marc 2017, MU

Attended NDN Community Meeting 2017, March 2017, UM

Attended 7th NDN Project Retreat, Nov 2016, CSU

Attended 3rd NDN Hackathon, Nov 2016, CSU

Attended 6th NDN Project Retreat, March 2016, UCSD

Attended 5th NDN Project Retreat, February 2015, UCSD

Attended 2nd NDN Hackathon, March 2016, UCSD

Participated in the implementation of NDNFit-NFN Integration project

Attended 1st NDN Hackathon, September 2015, UCLA

Participated in project NDN over BTLE on the Arduino: Prototype for general Bluetooth support in NFD

Won Best Hack award

Attended NDN Community Meeting 2015, September 2015, UCLA

Attended Future Interest Architecture (FIA) meeting, June 2015, MIT

Attended University of Arizona Coding Competition (host by Microsoft), 2015

Won the first price

Attended Hack Arizona, March 2015, UA

Designed and implemented analysis tools for detecting and monitoring cardiac conditions

Won Sunquest Best Hack in the Health category award

ACM Programming Contest Training in undergraduate