Feixiong Zhang

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Expertise

- **Languages:** C/C++(proficient), Java/Python/shell(extensive experience), Perl/PHP/SQL/MATLAB/CUDA

- **Domain knowledge:** HTTP/TCP/IP protocol stack, SDN/OpenFlow, Wi-Fi, multiple future Internet architectures, distributed system, network socket programming, multi-threaded programming

- **OS and Platform:** Linux, Android, GPU, FPGA

- **Tools:** Git, gdb, valgrind, jdb, adb

Education

- **WINLAB, Rutgers University** North Brunswick, NJ
  Ph.D. candidate in Computer Engineering; GPA: 3.90/4 *Sep 2010 - present*
  - Advisor: Prof. Yangyong Zhang and Prof. Dipankar Raychaudhuri
  - Research topic: future Internet architecture, network protocol and algorithm for mobile network and content-centric network, SDN

- **Tsinghua University** Beijing, China
  B.S. in Electrical Engineering *Aug 2006 - June 2010*
  - Best EE undergraduate program in China
  - Thesis: Research and Development of Cognitive Radio Platform based on USRP

Work Experience

- **Google Inc.** Mountain View, CA
  Software Engineering PhD Intern *May 2015 to August 2015*
  - **Keep connection alive across network change:** Responsible for design and development of methods to keep network connection alive when Android device switches among different networks. Extend Google's QUIC transport protocol and chromium's Cronet network stack to support such functionality. Also investigate Android's Multi-networking API for the purpose.
  - Implemented a running system with persistent transport connection remained across network migration. Contributed to Android and Chromium open source project. Worked with multiple teams at google including Project Fi team, Android team, and Chromium team.

- **Bell Labs, Alcatel-Lucent.** Holmdel, NJ
  Research Intern, Bell Labs *Jun 2013 to August 2013*
  - **Accelerate packet classification using GPU:** Worked with other engineers to design and implement several packet classification algorithms for GPU. Led the integration of GPU-based packet classification and Open vSwitch. Closely involved in the prototype of a high-speed GPU-accelerated software switch (GSwitch).
  - GSwitch achieves a forwarding rate of 30 Gbps with 64-byte packets under a real dataset, and the GPU-accelerated vSwitch outperforms classic Open vSwitch by a factor of 10.

- **InterDigital Inc.** King of Prussia, PA
  Research Intern, Corporate R&D *May 2011 to August 2011*
  - Designed and proposed a chunk-based receiver-driven hop-by-hop transport protocol for multi-homed mobile hosts, and designed corresponding algorithms.
  - The transport protocol works efficiently on both traditional IP network architecture and the clean-slate content-centric network architecture.

Research Projects

- **Content delivery in MobilityFirst future Internet architecture** 2010 to present

- Worked on the design and development of multiple components in the mobility-centric architecture including content delivery, caching, name resolution, etc. Actively involved in system prototype of the whole architecture. Led field trial of the architecture on video distribution use case. Worked with a satellite company to prototype a content distribution system utilizing satellite multicast and MobilityFirst's caching design.
  - Analyzed and compared different content caching scheme (pervasive caching or edge caching) and request forwarding method (shortest path routing or nearest replica routing) under the architecture. Proposed framework that adopts edge caching and supports nearest replica routing based on comparison results.
  - Designed and developed an edge caching/prefetching framework to facilitate content delivery in mobility scenario. The framework design includes separating the edge buffer into a popularity-based cache buffer and a mobility-prediction based prefetch buffer, and using a network level prediction method to guide prefetch. Detailed evaluation shows that our approach brings additional performance gain over cache only approach.

- **Transport control in content-centric networking**   2011 to 2013
  - Designed protocol and algorithm on transport control and traffic engineering for content-centric networking(CCN). The transport design includes random early marking based explicit congestion control, AIMD-based receiver Interest control, and fair share Interest shaping at each hop.
  - Implemented the whole CCN protocol stack, and evaluated the transport protocol on a real-world testbed.

- **Measurement of network mobility on mobile device**   2015 to 2016
  - Developed Android application that measures network connection changes of the devices. Such measurements are used to model user's transition among networks.

- **Applying statistical machine learning in pervasive computing**   2012
  - Worked on the design and implementation of machine learning algorithms for indoor device-free subjects counting and tracking using radio signal strength and camera recalibration.

Selected Publications

- Yi Hu, **Feixiong Zhang**, K. K. Ramakrishnan, Dipankar Raychaudhuri. GeoTopo: A PoP-level Topology Generator for Evaluation of Future Internet Architectures. In *IEEE ICNP 2015*.

- **Feixiong Zhang**, Chenren Xu, Yanyong Zhang, K. K. Ramakrishnan, Shreyasee Mukherjee, Roy Yates, Thu Nguyen. EdgeBuffer: Caching and Prefetching Content at the Edge in the MobilityFirst Future Internet Architecture. In *IEEE WoWMoM 2015*.

- Matteo Varvello, Rafael Laufer, **Feixiong Zhang**, T.V. Lakshman. Multi-Layer Packet Classification with Graphics Processing Units. In *ACM CoNEXT 2014*.

- **Feixiong Zhang**, Yi Hu, Yanyong Zhang, Dipankar Raychaudhuri. Enabling Mobile Content-Oriented Networking in the MobilityFirst Future Internet Architecture. In *ACM MobiHoc 2014*.

- **Feixiong Zhang**, Yanyong Zhang, Alex Reznik, Hang Liu, Chen Qian and Chenren Xu. A Transport Protocol for Content-Centric Networking with Explicit Congestion Control. In *IEEE ICCCN 2014*.

- **Feixiong Zhang**, Kiran Ngaraja, Yanyong Zhang and Dipankar Raychaudhuri. Content Delivery in the MobilityFirst Future Internet Architecture. In *35th IEEE Sarnoff Symposium*, 2012.

Honors and awards

- *ECE Research Excellence Award,* Rutgers University, 2015

- *Best Poster Award,* ACM MobiHoc 2014

- *Student Travel Grant,* ACM SIGCOMM 2014, ACM MobiHoc 2014, ACM CoNEXT 2014

- *Excellent Study Record Scholarship,* Tsinghua University, 2008, 2009

Professional Service

- **Reviewer for Conference Paper:**   IEEE SECON 2016, INFOCOM 2015 2014 2013, ICPP 2015, IWQoS 2014, SIMPLEX 2014, GI 2014, ICC 2012

- **Reviewer for Journal Paper:**   IEEE Transactions on Mobile Computing, IEEE Transactions on Services Computing, Transactions on Emerging Telecommunications Technologies, IEEE Network Magazine