

# Chunyi Peng

Computer Science, Purdue University

## Research Interests

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Cellular networks (4.9G/5G/6G), network intelligence, autonomous and connected drones, 5G/IoT security

## Education

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### University of California, Los Angeles

*Ph.D, Computer Science*

Dissertation: Cellular Network for Mobile Devices and Applications: Infrastructure Limitations and Solutions

**Los Angeles, USA**

*Sep. 2009 – June 2013*

### Tsinghua University

*M.Eng, Automation*

**Beijing, China**

*Sep. 2002 – Jan. 2005*

Graduated with highest honors at Tsinghua university, Best Thesis Paper Award

### Tsinghua University

*B.Eng, Automation*

**Beijing, China**

*Sep. 1998 – July 2002*

Graduated with highest honors at Tsinghua university and in Beijing

## Appointments

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### Computer Science, Purdue University

*Associate Professor*

*Assistant Professor*

**West Lafayette, USA**

*Aug. 2020 – now*

*Aug. 2017 – Aug. 2020*

### Computer Science Engineering, Ohio State University

*Assistant Professor*

**Columbus, USA**

*Aug. 2013 – Aug. 2017*

### Microsoft Research Asia

*Associate/Assistant Researcher on Wireless Networking Group*

**Beijing, China**

*Dec. 2005 – Sep. 2009*

### T3G Ltd.,

*Engineer on 3G TD-SCDMA chipset development*

**Beijing, China**

*Jan. 2005 – Dec. 2005*

## Short-Term Appointments

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### Microsoft Research

*Research Intern on Mobility & Networking Group*

**Redmond, USA**

*Nov. 2012 - Feb. 2013*

### IBM TJ Watson Research Center

*Research Intern on Cloud Computing Group*

**Yorktown Heights, USA**

*June – Sep. 2011*

Research Intern on Wireless Networking Group

*June – Sep. 2012*

## Selected Honors and Awards

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**2021** IEEE INFOCOM distinguished TPC Member

**2019** Award from Google Android Security on reporting WiFi calling's vulnerability

**2018** NSF CAREER Award

**2018** ACM MobiCom Best Demo Award

- 2018 IEEE CNS Best Paper Award
- 2017 ACM MobiCom Best Community Paper Award
- 2017 Facebook's Bounty on reporting a vulnerability on SMS for Facebook
- 2016 ACM MobiCom Best Community Paper Award
- 2016 IEEE INFOCOM distinguished TPC Member
- 2015 Finalist for Qualcomm Innovation Fellowship (Co-mentor)
- 2013 Northrup-Grumman Outstanding Graduate Student Award, UCLA
- 2011 IBM Ph.D. Fellowship Award
- 2009 UCLA Chancellor's Prize with Graduate Fellowship (2009-2011)
- 2008 ACM MobiSys Best Demo Award
- 2007 ACM SenSys Best Demo Award
- 2007 ACM MobiSys Best Demo Award

### **Selected Publications (2017 – Now) (Citations: 4958, H-index: 30, i10-index: 56)**

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All the publications at Google Scholar <http://scholar.google.com/citations?user=7QF1eF4AAAAJ>

- [1] Yuanjie Li, Chunyi Peng, Zhehui Zhang, Zhaowei Tan, Haotian Deng, Jinghao Zhao, Qianru Li, Yunqi Guo, Kai Ling, Boyan Ding, Hewu Li, and Songwu Lu. Experience: A Five-Year Retrospective of MobileInsight. In *ACM International Conference on Mobile Computing and Networking (MobiCom)*, Oct. 2021.
- [2] Amit Sheoran, Sonia Fahmy, Matthew Osinski, Chunyi Peng, Bruno Ribeiro and Jia Wang. Experience: Towards Automated Customer Issue Resolution in Cellular Networks. In *ACM International Conference on Mobile Computing and Networking (MobiCom)*, Sep. 2020.
- [3] Haotian Deng, Qianru Li, Jingqi Huang and Chunyi Peng. iCellSpeed: Increasing Cellular Data Speed with Device-Assisted Cell Selection. In *ACM International Conference on Mobile Computing and Networking (MobiCom)*, Sep. 2020.
- [4] Haotian Deng, Kai Ling, Junpeng Guo and Chunyi Peng. Unveiling the Missed 4.5G Performance In the Wild. In *ACM International Workshop on Mobile Computing Systems and Applications (HotMobile)*, March. 2020.
- [5] Tian Xie, Guan-Hua Tu, Bangjie Yin, Chi-Yu Li, Chunyi Peng, Mi Zhang, Hui Liu and Xiaoming Liu. The Untold Secrets of WiFi-Calling Services: Vulnerabilities, Attacks, and Countermeasures. *IEEE Transactions on Mobile Computing (TMC)*, 2020.
- [6] Tian Xie, Guan-Hua Tu, Chi-Yu Li and Chunyi Peng. How Can IoT Services Pose New Security Threats In Operational Cellular Networks? *IEEE Transactions on Mobile Computing (TMC)*, 2020.
- [7] Amit Sheoran, Sonia Fahmy, Chunyi Peng, and Navin Modi. NASCENT: Tackling Caller-ID Spoofing in 4G Networks via Efficient Network-Assisted Validation. In *IEEE Conference on Computer Communications (INFOCOM)*, April 2019.
- [8] Jiao Zhang, Zenan Wang, Chunyi Peng, Linqun Zhang, Tao Huang, and Yunjie Liu. RABA: Resource-Aware Backup Allocation for a Chain of Virtual Network Functions. In *IEEE Conference on Computer Communications (INFOCOM)*, April 2019.
- [9] Haotian Deng, Chunyi Peng, Ans Fida, Jiayi Meng, and Charlie Hu. Mobility Support in Cellular Networks: A Measurement Study on Its Configurations and Implications. In *ACM Internet Measurement Conference (IMC)*, November 2018. (received "Artifacts Evaluated Functional" badge and the "Artifacts Available" badge)
- [10] Haotian Deng, Weicheng Wang, and Chunyi Peng. CEIVE: Combating Caller ID Spoofing on 4G Mobile Phones Via Callee-Only Inference and Verification. In *ACM International Conference*

- on *Mobile Computing and Networking (MobiCom)*, October 2018. (along with Best Demo Award)
- [11] Zengwen Yuan, Qianru Li, Yuanjie Li, Songwu Lu, Chunyi Peng, and George Varghese. Resolving Policy Conflicts in Multi-Carrier Cellular Access. In *ACM International Conference on Mobile Computing and Networking (MobiCom)*, October 2018.
  - [12] Kai Zhang, Chenshu Wu, Chaofan Yang, Yi Zhao, Kehong Huang, Chunyi Peng, Yunhao Liu, and Zheng Yang. ChromaCode: A Fully Imperceptible Screen-Camera Communication System. In *ACM International Conference on Mobile Computing and Networking (MobiCom)*, October 2018.
  - [13] Li Li, Ke Xu, Tong Li, Kai Zheng, Chunyi Peng, Dan Wang, Xiangxiang Wang, Meng Shen, and Rashid Mijumbi. A Measurement Study on Multi-path TCP with Multiple Cellular Carriers on High-speed Rails. In *ACM International Conference on Data Communication (SIGCOMM)*, August 2018.
  - [14] Zengwen Yuan, Yuanjie Li, Chunyi Peng, Songwu Lu, Haotian Deng, Zhaowei Tan, and Taqi Raza. A Machine Learning Based Approach to Mobile Network Analysis. In *IEEE International Conference on Computer Communication and Networks (ICCCN)*, July 2018. (Invited Paper)
  - [15] Tian Xie, Guan-Hua Tu, Chi-Yu Li, Chunyi Peng, Jiawei Li, and Mi Zhang. The Dark Side of Operational Wi-Fi Calling Services. In *IEEE Conference on Communications and Network Security (CNS)*, May 2018. (Best Paper Award)
  - [16] Yuanjie Li, Chunyi Peng, Haotian Deng, Zengwen Yuan, Guan-Hua Tu, Jiayao Li, Songwu Lu, and Xi Li.  
Device-customized Multi-carrier Network Access on Commodity Smartphones. *IEEE/ACM Transactions on Networking (TON)*, 26(6):2542–2555, 2018.
  - [17] Xu Wang, Zimu Zhou, Fu Xiao, Kai Xing, Zheng Yang, Yunhao Liu, and Chunyi Peng. Spatio-temporal Analysis and Prediction of Cellular Traffic in Metropolis. *IEEE Transactions on Mobile Computing (TMC)*, 2018.
  - [18] Jingyu Zhang, Zhi-Jie Wang, Song Guo, Dingyu Yang, Gan Fang, Chunyi Peng, and Minyi Guo. Power consumption analysis of video streaming in 4g lte networks. *Wireless Networks*, 24(8):3083–3098, 2018.
  - [19] Li Li, Ke Xu, Dan Wang, Chunyi Peng, Kai Zheng, Rashid Mijumbi, and Xiangxiang Wang. A Longitudinal Measurement Study of TCP Performance and Behavior in 3G/4G Networks Over High Speed Rails. *IEEE/ACM Transactions on Networking*, 25(4):2195–2208, 2017.
  - [20] Qiang Zhai, Fan Yang, Adam Champion, Chunyi Peng, Jingchuan Wang, Dong Xuan, and Wei Zhao. BridgeLoc: Bridging Vision-Based Localization for Robots. In *IEEE International Conference on Mobile Ad Hoc and Sensor Systems (MASS)*, October 2017.
  - [21] Yuanjie Li, Zengwen Yuan, and Chunyi Peng. A Control-Plane Perspective on Reducing Data Access Latency in LTE Networks. In *ACM International Conference on Mobile Computing and Networking (MobiCom)*, October 2017.
  - [22] Haoyang Wu, Tao Wang, Zengwen Yuan, Chunyi Peng, Zhiwei Li, Zhaowei Tan, Boyan Ding, Xiaoguang Li, Yuanjie Li, Jun Liu, and Songwu Lu.  
The TICK Programmable Low-Latency SDR System. In *ACM International Conference on Mobile Computing and Networking (MobiCom)*, October 2017. (35/185= 18.9% acceptance ratio for full papers). **(Best Community Paper Award)**
  - [23] Xu Wang, Zimu Zhou, Zheng Yang, Yunhao Liu, and Chunyi Peng. Spatio-Temporal Analysis and Prediction of Cellular Traffic in Metropolis. In *IEEE International Conference on Network Protocols (ICNP)*, October 2017.
  - [24] Kun Jin, Si Fang, Chunyi Peng, Zhiyang Teng, Xufei Mao, Lan Zhang, and Xiang-Yang Li. ViViSnoop: Someone is Snooping Your Typing Without Seeing It!. In *IEEE Conference on Communications and Network Security (CNS)*, October 2017.
  - [25] Haotian Deng, Qianru Li, Yuanjie Li, Songwu Lu, Chunyi Peng, Taqi Raza, Zhaowei Tan,

- Zengwen Yuan, and Zhehui Zhang. Towards Automated Intelligence in 5G Systems. In *IEEE International Conference on Computer Communication and Networks (ICCCN)*, July 2017. (Invited Paper)
- [26] Li Li, Ke Xu, Dan Wang, Chunyi Peng, Kai Zheng, Haiyang Wang, Rashid Mijumbi, and Xiangxiang Wang. A Measurement Study on Skype Voice and Video Calls in LTE Networks on High Speed Rails. In *IEEE/ACM 25th International Symposium on Quality of Service (IWQoS)*, June 2017.
- [27] Zenghua Zhao, Jiankun Wang, Xingya Zhao, Chunyi Peng, Qian Guo, and Bin Wu. NaviLight: Indoor Localization and Navigation under Arbitrary Lights. In *IEEE International Conference on Computer Communications (INFOCOM)*, May 2017.
- [28] Han Xu, Zheng Yang, Zimu Zhou, Ke Yi, and Chunyi Peng. TUM: Towards Ubiquitous Multi-Device Localization for Cross-Device Interaction. In *IEEE International Conference on Computer Communications (INFOCOM)*, May 2017.

## Software and Datasets

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- [S1] MobileInsight · Version 6.0 · Nov. 2020  
 URL: <http://www.mobileinsight.net>  
 Github: <https://github.com/mobile-insight>
- Make cellular network research accessible on the device side
  - First release in June 2016
  - Dataset (532+GB) released
  - Downloaded over 1600+ times from 30+ countries; Used by 300+ companies and academic institutions including Google, Microsoft, Nokia Bell Lab, AT&T, Verizon, SRI, Huawei, Xiaomi, Simula, Stanford, Berkeley, UIUC, UCSD, UCLA, Michigan, UW-Wisconsin, Purdue, GaTech, Cambridge, KAIST, Waseda, Tsinghua, SJTU, NTU, *etc.*;
  - Empowering 3rd-party research at top venues like MobiCom'19, NDSS'19, NDSS'18, SIGMETRICS'18, Mobisys'17, CoNext'17, TMC'17 *etc.*
- [S2] MI-Lab · Version 5.1 · April 2021  
 URL: <http://milab.cs.purdue.edu/>
- Testbed for crowdsourced on-phone cellular network experimentation and analytics at scale
  - First release in Oct 2017
  - Empower global-scale measurement in operational cellular networks (e.g., handoff configuration: IMC'18, web latency: ICCCN'18) and student training (CS590)
- [S3] MMap · Version 2.1 · Aug. 2019 (migrated to MI-LAB)  
 URL: [http://mssn2.cs.purdue.edu:8080/mmap\\_v2/maps/](http://mssn2.cs.purdue.edu:8080/mmap_v2/maps/)
- An interactive map service to visualize mobility management configuration data used by global carriers.
  - First release in Nov 2018. Integrated to MI-LAB in Aug. 2020
  - Dataset (as of 05/12/2019): 87,443 cells over 26 states in the US (four carriers: AT&T, T-Mobile, Verizon, Sprint) and 18,296 cells in 14 countries and regions (31 carriers).
- [S4] HackCellular · Version 1.0 · Dec 2015  
 A mobile application for All-In-One Demo of Real Attacks in Cellular Networks (CCS'14, CCS'15)
- [S5] CNetVerifier · Version 1.0 · Dec 2014  
 Software to verify cellular network inter-protocol interactions (SIGCOMM'14)

## Selected Talks

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- *Securing Trillions of Cellular Internet of Things (C-IoTs) with  $\delta$ -analysis*, MIT IoT Seminar, May 2021
- *Quality Measurement over Quality Data Reuse in Cellular Networks*, Framing talk at the 2nd NSF Workshop on Overcoming Measurement Barriers to Internet Research (WOMBIR-2), April 2021
- *Reflections of My Career Path: the Good, the Bad, the Ugly*, Keynote at NeTS Early Career Workshop 2019, Alexandria, VA, Aug. 2019
- *AIM: Amplifying Intelligence in Mobile Networks*, MIT, UIUC, UT Austin, Chicago, USC, Notre Dame, Rice, MSU, Indiana, Qualcomm, NEC, AT&T, May. 2018 - Mar. 2019  
A public version is available at <https://www.cs.purdue.edu/homes/chunyi/talks/AIM-summary-public.pdf>, 2019
- *Verifying Cellular Network Operations On Your Phones From Simulation to Practice*, IEEE Globecom'17 Tutorial, Singapore, Dec. 2017
- *A Security Perspective on VoLTE Our Untold Research Story and Lessons*, Invited by GSMA (GSM Association), Toronto, Canada, Sep. 2016 (Audience: 100+ global operators and vendors at GSMA)
- *Internet" of Things: An Architectural Perspective from Mobile Networks*, Keynote at 10th ACM International Workshop on IoT and Cloud Computing, Wuxi, China, Dec. 2015

## Selected Professional Service

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- **Program co-chair** for
  - ACM International Conference on Mobile Computing and Networking (MobiCom) · 2021
  - ACM International Workshop on Wireless Network Testbeds, Experimental evaluation & Characterization (WiNTech, co-located with MobiCom) · 2017
  - ACM Workshop on Visible Light Communication Systems (VLCS, co-located with MobiCom) · 2015
- **Steer Committee Member** for ACM International Workshop on Wireless Network Testbeds, Experimental evaluation & Characterization (WiNTech), 2018 – now
- **TPC Member** for
  - MobiCom (2014 - 2020), NSDI (2022), MobiSys (2014, 2015, 2017, 2020), INFOCOM (2016, 2017, 2021), ICNP (2015, 2016), WWW (2017, 2018), SECON (2015, 2017, 2018), HotMobile (2016, 2017), NDSS (2016, 2017), CNS (2016 - 2020), AsiaCCS (2018-2019), etc.
- **Associate Editor** for Computer Networks (COMNET), 2019 – now; IEEE Transactions on Mobile Computing (TMC), 2020 – now
- **Mentor** of Horizon Program (for first-generation college students), 2019 – now; Co-Chair of N2Women workshop, 2020; Mentor of N2Women (2018-2019)