

CS590 Reading List (Spring 2019)

Chunyi Peng

1. Reference list (not used for in-class presentation)

1.1. 5G White Papers, Tutorials and Technologies

- [NGMN 5G White Paper](#), 2015
- [5G Americas whitepaper, LTE to 5G: Cellular and Broadband Innovation](#), 2017
- [Tutorial on 5G SDN and NFV](#), SIGCOMM, 2016.
- List of 5G KPIs (webpage): <http://www.rfwireless-world.com/Terminology/5G-KPIs-Key-Performance-Indicators.html>
- Overview of 3GPP Release 15 (July 2018, the first 5G standard): – <https://spectrum.ieee.org/telecom/wireless/3gpp-release-15-overview>
- 3GPP technical specifications (release 15): <http://www.3gpp.org/specifications> (<ftp://ftp.3gpp.org/specs/2018-12/Rel-15/>)
 - 38 series: 5G RAN with new Radio (5G NR): ftp://ftp.3gpp.org/specs/2018-12/Rel-15/38_series/
 - many technical specifications and reports (e.g., release-16, other series)
- [Network Slicing to Enable Scalability and Flexibility in 5G Mobile Networks](#), 2017
- [\(Presentation\): Mobile critical communications Standards, Feb 2017](#) (topic: critical communication)

1.2. 4G Mobile Networks: recent research for 4G background and study

- LTE tutorial website: <https://www.tutorialspoint.com/lte/>
- **[Mobicom'16]** MobileInsight: Extracting and Analyzing Cellular Network Information on Smartphones
(topic: On-phone tools to cellular network protocol monitor and analytics)
- **[SIGCOMM'14]**: Control-Plane Protocol Interactions in Cellular Networks, Guanhua Tu, Yuanjie Li, Chunyi Peng, Chiyu Li, Hongyi Wang, Songwu Lu.
(topic: control-plane protocol interactions)
- **[CCS'14]** Real Threats to Your Data Bills: Security Loopholes and Defense in Mobile Data Charging, Chunyi Peng, Chiyu Li, Hongyi Wang, Guanhua Tu, Songwu Lu
(topic: mobile data charging and its security loopholes in AAA)
- **[CCS'15]**: Insecurity of Voice Solution VoLTE in LTE Mobile Networks, Chiyu Li, Guanhua Tu, Chunyi Peng, Zengwen Yuan, Yuanjie Li, Songwu Lu, Xinbing Wang.
(topic: VoLTE (4G voice solution) and its security loopholes)
- **[Mobicom'18]** CEIVE: Combating Caller ID Spoofing on 4G Mobile Phones Via Callee-Only Inference and Verification, Haotian Deng, Weicheng Wang, and Chunyi Peng
(topic: caller ID spoofing and signaling inference for detection)
- **[CCS'16]** New Security Threats Caused by IMS-based SMS Service in 4G LTE Networks, Guan-Hua Tu, Chi-Yu Li, Chunyi Peng, Yuanjie Li and Songwu Lu

(topic: SMS over 4G LTE and its caller ID spoofing)

- **[SIGMETRICS'16]:** Instability in Distributed Mobility Management: Revisiting Configuration Management in 3G/4G Mobile Networks, by Yuanjie Li, Haotian Deng, Jiayao Li, Chunyi Peng and Songwu Lu.
(topic: 4G mobility and configuration verification)
- **[IMC'18]:** Mobility Support in Cellular Networks: A Measurement Study on Its Configurations and Implications, Haotian Deng, Chunyi Peng, Ans Fida, Jiayi Meng, and Y Charlie Hu. **(topic: 4G mobility configuration measurement)**
- **[MobiCom'17]** A Control-Plane Perspective on Reducing Data Access Latency in LTE Networks, Yuanjie Li, Zengwen Yuan, Chunyi Peng
(topic: access latency in control-plane operations)
- **[NSDI'16]** iCellular: Define Your Own Cellular Network Access on Commodity Smartphone, Yuanjie Li, Haotian Deng, Chunyi Peng, Guan-Hua Tu, Jiayao Li, Zengwen Yuan, Songwu Lu
(topic: Multi-Carrier Access)

2. Reading list (used for in-class presentation)

Other decent papers (out of the below list) is also allowed upon the approval of the instructor in advance. Most decent papers appear at top conference venues like SIGCOMM, NSDI, MobiCom, IMC, SIGMETRICS, Oakland (S&P), NDSS, CCS etc.

2.1. System research on current and next mobile networks

- **[sigmetrics18-ltevr]** Supporting Mobile VR in LTE Networks: How Close Are We? by Z. Tan ,Y. Li ,Q. Li ,Z. Zhang ,Z. Li ,S. Lu **(topic: VR, low-latency)**
- **[mobisys17-web]:** Accelerating Mobile Web Loading Using Cellular Link Information, Xiufeng Xie, Xinyu Zhang, Shilin Zhu, MobiSys'17. **(topic: TCP design, cross-layer optimization, web)**
- **[Mobicom'19-mpH2]:** MP-H2: a Client-only Multipath Solution for HTTP/2, Ashkan Nikraves, Yihua Guo, Xiao Zhu, Feng Qian, Z. Morley Mao **(topic: mutli-path TCP design)**
- **[mobicom'18-raven]:** RAVEN: Improving Interactive Latency for the Connected Car, HyunJong Lee, Jason Flinn, Basavaraj Tonshal **(topic: TCP design, latency)**
- **[mobicom'19-jigsaw]:** Jigsaw: Robust Live 4K Video Streaming, Ghufraan Baig, Jian He, Mubashir Adnan Qureshi, Lili Qiu, Peng Chen, Yinliang Hu **(topic: 4K video streaming, 5G app)**
- **[Mobicom'19-bursttracker]:** Detecting if LTE is the Bottleneck with BurstTracker, Arjun Balasingam, Manu Bansal, Rakesh Misra, Kanthi Nagaraj, Rahul Tandra, Sachin Katti, Aaron Schulman **(topic: LTE scheduling, app optimization)**
- **[NSDI'18-copa]:** Copa: Practical Delay-Based Congestion Control, Venkat Arun and Hari Balakrishnan **(topic: TCP design, Delay-based, not for cellular)**
- **[SIGCOMM'18-HSR]:** A Measurement Study on Multi-path TCP with Multiple Cellular Carriers on High-speed Rails, Li Li, Ke Xu, Tong Li, Kai Zheng, Chunyi Peng, Dan Wang, Xiangxiang Wang, Meng Shen, and Rashid Mijumbi **(topic: Multipath TCP, high-speed mobility, measurement)**

- **[mobicom'19-hsr]:** An Active-Passive Measurement Study of TCP Performance over LTE on High-speed Rails, Jing Wang, Yufan Zheng, Chenren Xu, Yunzhe Ni, Wangyang Li, Yihua Cheng, Zhuo Cheng, Feng Qian, Yuanjie Li, Xiufeng Xie, Yi Sun, Zhongfeng Wang (**topic: TCP, high-speed mobility, measurement**)
- **[mobicom18-analytics]** Mitigating the Latency-Accuracy Trade-off in Mobile Data Analytics Systems, Anand Padmanabha Iyer, Li Erran Li, Mosharaf Chowdhury, Ion Stoica (**topic: network analytics, machine learning 2.0**)
- **[sigmetrics18-backhaul]:** Predictive Impact Analysis for Designing a Resilient Cellular Backhaul Network, S. Yang, H. Yan, Z. Ge, D. Wang, J. Xu (**topic: network analytics, backhaul**)
- **[mobicom18-skycore]:** SkyCore: Moving Core to the Edge for Untethered and Reliable UAV-based LTE networks, Mehrdad Moradi, Karthik Sundaresan, Eugene Chai, Sampath Rangarajan, Z. Morley Mao (**topic: network architecture, core, drone**)
- **[mobicom'18-echo]:** ECHO: A reliable distributed cellular core network for hyper-scale public clouds, Binh Nguyen, Tian Zhang, Bozidar Radunovic, Ryan Stutsman, Thomas Karagiannis, Jakub Kocur, Jacobus Van der Merwe, (**topic: network architecture, reliability**)
- **[nsdi18-safebricks]:** SafeBricks: Shielding Network Functions in the Cloud, Rishabh Poddar, Chang Lan, Raluca Ada Popa, and Sylvia Ratnasamy (**topic: NFV**)
- **[SIGCOMM'17-CORE]:** A High Performance Packet Core for Next Generation Cellular Networks, by Zafar Ayyub Qazi, Melvin Walls, Aurojit Panda, Vyas Sekar, Sylvia Ratnasamy, Scott Shenker, SIGCOMM'17, 2017. (**topic: network architecture**)
- **[NSDI19-CommunityCellularManager]** Scaling Community Cellular Networks with CommunityCellularManager, Shaddi Hasan, Claire Barela, Matthew Johnson, ; Eric Brewer, Kurtis Heimerl (**topic: community cellular network operation at scale**)
- **[ndss19-privacy]** Privacy Attacks to the 4G and 5G Cellular Paging Protocols Using Side Channel Information, Syed Rafiul Hussain, Mitziu Echeverria, Omar Chowdhury, Ninghui Li and Elisa Bertino (**topic: privacy, paging**)
- **[ndss19-aka]** Component-Based Formal Analysis of 5G-AKA: Channel Assumptions and Session Confusion, Cas Cremers, Martin Dehnel-Wild (**topic: security, formal analysis, AKA**)
- **[sp19-lte]:** Breaking LTE on Layer Two, David Rupprecht, Katharina Kohls, Thorsten Holz, Christina Pöpper (**topic: security, LTE, link layer**)
- **[ndss18-lteinspector]:** LTEInspector: A Systematic Approach for Adversarial Testing of 4G LTE. Syed Rafiul Hussain, Omar Chowdhury, Shagufta Mehnaz, and Elisa Bertino (**topic: security, LTE protocol inspection**)
- **[sp19-ltecontrol]:** Touching the Untouchables: Dynamic Security Analysis of the LTE Control Plane, Hongil Kim, Jiho Lee, Eunkyu Lee, Yongdae Kim (**topic: security analysis, LTE control plane**)
- **[Mobicom'19-LTEtest]:** Systematic way to LTE Testing, Muhammad Taqi Raza, Songwu Lu (**topic: LTE testing**)
- **[Mobicom'18-conflict]:** Resolving Policy Conflicts in Multi-Carrier Cellular Access Zengwen Yuan, Qianru Li, Yuanjie Li, Songwu Lu, Chunyi Peng, and George Varghese (**topic: Multi-Carrier Access, policy verification**)

2.2. Selection from the previous reading list

A full reading list at CS590 (Fall 2017) can be found at

<https://www.cs.purdue.edu/homes/chunyi/teaching/reading.html>

Note: You are encouraged to select the state-of-the-art (the above list) for in-class presentation. You are encouraged to read the below papers for reference and your own study. But if you like, the below papers are still allowed to select for in-class presentation.

- **[Varghese]:** Network Design Automation --- Treating Networks like Programs and Chips , G. Varghese, <http://cseweb.ucsd.edu/~varghese/networkdesignautomationvision.pdf>. (**Topic: network design automation, network verification**)
- **[ccr16-open]:** Open network interfaces for carrier networks, Aurojit Panda, James Murphy McCauley, Amin Tootoonchian, Justine Sherry, Teemu Koponen, Syliva Ratnasamy, Scott Shenker, SIGCOMM CCR, 2016. (topic: network architecture)
- **[icnp17-nfv]:** Rethinking LTE Network Function Virtualization, Muhammad Taqi Raza, Dongho Kim, Kyu Han Kim, Songwu Lu, Mario Gerla, ICNP'17. (**topic: network architecture, NFV**)
- **[mobicom'17-orion]:** Orion: RAN Slicing for a Flexible and Cost-Effective Multi-Service Mobile Network Architecture, by Xenofon Foukas and Mahesh K. Marina, Kimon Kontovasilis, MobiCom'17. (**topic: network architecture, RAN slicing**)
- **[mobicom'16-lteu]:** LTE in Unlicensed Spectrum: Are We There Yet?, Eugene Chai, Karthikeyan Sundaresan, Mohammad A. Khojastepour, and Sampath Rangarajan. (**topic: LTE-U, spectrum and physical layer**)
- **[nsdi'15-celliq]:** CellIQ: Real-Time Cellular Network Analytics at Scale, , Anand Padmanabha Iyer, Li Erran Li, Ion Stoica, NSDI'15. (**Topic: mobile network analytics**)
- **[mobicom'17-diagnosis]** Experience: Automating Diagnosis of Cellular Radio Access Network Problems, Anand Padmanabha Iyer, Li Erran Li, Ion Stoica, MobiCom'17. (**topic: mobile network analytics, radio access**)
- **[icnp17-traffic]** Spatio-Temporal Analysis and Prediction of Cellular Traffic in Metropolis, Xu Wang, Zimu Zhou, Zheng Yang, Yunhao Liu, Chunyi Peng (**topic: cellular network analytics, traffic**)

3. Reference: Misc

- **[mobicom'16-quickc]** QuickC: Practical sub-millisecond transport for small cells by Rakesh Misra, Aditya Gudipati, Sachin Katti, MobiCom'16. (**topic: TCP design, low-latency**)
- **[mobicom'16-mptcp]:** An In-depth Understanding of Multipath TCP on Mobile Devices: Measurement and System Design, Ashkan Nikraves, Yihua Guo, Feng Qian, Z. Morley Mao, and Subhabrata Sen, Mobicom 2016
- **[SP16-SMS]** Sending Out an SMS: Characterizing the security of the SMS Ecosystem with Public Gateway, B. Reaves, N. Scaife, D. Tian, L. Blue, P. Traynor, Security and privacy, 2016.
- **[alpernas2017modular]:** Modular Safety Verification for Stateful Networks, Kalev Alpernas, Roman Manevich, Aurojit Panda, Mooly Sagiv, Scott Shenker, Sharon Shoham, Yaron Velner, 2017. (**Topic: network verification**)
- **[panda2017veri]:** Verification in the Age of Microservices, Aurojit Panda, Mooly Sagiv, Scott Shenker, HotOS'17, 2017. (Topic: verification)

- **[elmokashfi2017add]**: Adding the Next Nine: an Investigation of Mobile Broadband Networks Availability, Ahmed Elmokashfi, DongZhou, Dziugas Baltrunas, MobiCom'17. (Topic: reliability, multi-carrier, measurement)
- **[mobicom'17-furion]**: Furion: Engineering high-quality immersive virtual reality on Today's Mobile devices, Zeqi Lai, Y. Charlie Hu, Yong Cui, Linhui Sun, Ningwei Dai, Mobicom'17 (**topic: TCP design, low-latency**)
- **[MobiCom'17-nutshell]**: NutShell: Scalable Whittled Proxy Execution for Low-Latency Web over Cellular Networks, Ashiwan Sivakumar, Chuan Jiang, and Yun Seong Nam, Shankaranarayanan Puzhavakath Narayanan and Vijay Gopalakrishnan, Sanjay G Rao, Subhabrata Sen, Mithuna Thottethodi and Vijaykumar T.N. (**topic: web latency reduction via app-level optimization, not via lower-layer network optimization**)
- **[mobicom'18-roaming]**: Experience: Implications of Roaming in Europe, Anna Maria Mandalari , Andra Lutu, Ana Custura , Ali Safari , Ozgu Alay , Marcelo Bagnulo , Vaibhav Bajpai , Anna Brunstrom, Joerg Ott , Marco Mellia , Gorry Fairhurst (**topic: roaming, measurement**)
- **[mobicom'18-slicing]**: How should I slice my network? A multi-service empirical evaluation of resource sharing efficiency, Cristina Marquez , Marco Gramaglia , Marco Fiore, Albert Banchs, Xavier Costa-Perez (**topic: network slicing**)