Yanbing Liu

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Research Interest

My current research interests are in the area of mobile networking, with a focus on 5G/6G networks measurement and design.

Education

Purdue University, West Lafayette, USA *Aug. 2021 - Present*
Ph.D in Department of Computer Science
Advisor: *Prof. Chunyi Peng*

University of Science and Technology of China (*USTC*), Hefei, P.R.China *Sep. 2017 - Jun. 2020*
M.E. in Department of Electronic Engineering and Information Science
Advisor: *Prof. Guo Wei*
National Scholarship (***Top 1%***), 2018

University of Science and Technology of China (*USTC*), Hefei, P.R.China *Sep. 2013 - Jun. 2017*
B.E. in Department of Electronic Engineering and Information Science

Professional Experience

Purdue University, West Lafayette, USA *Aug. 2024 - Present*
Teaching Assistant

Purdue University, West Lafayette, USA *Aug. 2021 - May. 2024*
Research Assistant

AT&T Labs, Bedminster, USA *Jun. - Aug. 2023, 2024, 2025*
Research Intern

Research Experience

5G ON-OFF *Dec. 2024 - May. 2025*
- Uncovered 5G ON-OFF loops where user devices oscillate between 5G activation and deactivation, causing severe throughput degradation.
- Conducted a large-scale measurement study to classify loop types, quantify their prevalence and impact, and reveal how inconsistent triggering conditions between 5G ON and OFF states lead to persistent loops.

Uplink Traffic in 5G *Jun. 2024 - Nov. 2024*
- Characterized the behavior and impact of uplink-heavy traffic in diverse 5G network conditions..
- Quantified the impact of uplink-heavy traffic on performance of different video applications in 5G.

5G in the Sky *Dec. 2023 – Feb. 2024*
- Conducted drone-based field experiments to demonstrate both the high potential and instability of 5G performance in the sky.
- Diagnosed the underlying causes of under-utilized 5G resources and performance variability in the sky.

Failure Handling in 5G RAN *Mar. 2023 – Oct. 2023*
- Revealed three categories of problematic failure handling behaviors in secondary radio access procedures through in-depth 5G measurement studies.
- Identified root causes in radio access configurations and quantified their impact on user performance.

Dependent Misconfigurations in 5G/4.5G *Oct. 2022 – May. 2023*

- Designed and implemented a *Delta State Machine* (*DSM*) model to examine problematic dependencies across varying RRC configurations.
- Applied DSM to large-scale datasets to automatically detect and validate real-world misconfiguration instances.

Enhancing Carrier Aggregation Beyond 5G *Jan. 2022 – Jul. 2022*

- Discovered real-world examples of sequential and sluggish carrier aggregation procedures.
- Performed trace-driven evaluation to show the benefit of our proposed new design CA++.

5G Experience Measurement *Apr. 2021 – Jul. 2022*

- Performed extensive measurement campaigns across major U.S. operators to characterize 5G coverage, availability, and performance in the wild.
- Identified key configuration and policy issues leading to missed 5G performance and analyzed their root causes.
- Designed and validated a patch solution, *5GBoost*, that effectively improves 5G usability and throughput potential.

Selected Publications

- **Yanbing Liu**, Jingqi Huang, Sonia Fahmy and Chunyi Peng, "An In-Depth Look into 5G ON-OFF Loops in the Wild," accepted by *ACM Internet Measurement Conference* (*IMC '25*), 2025.
- **Yanbing Liu**, Jingqi Huang, Ziyu Li and Chunyi Peng, "5G in the Sky: Uplink Throughput Measurement, Analysis and Enhancement," accepted by *IEEE/ACM Transactions on Networking*, 2025.
- **Yanbing Liu**, and Chunyi Peng, "Handling Failures in Secondary Radio Access Failure Handling in Operational 5G Networks," *IEEE Transactions on Mobile Computing*, 2024.
- **Yanbing Liu**, Jingqi Huang and Chunyi Peng, "The Sky is Not the Limit: Unveiling Operational 5G Potentials in the Sky," *IEEE/ACM International Symposium on Quality of Service* (*IWQoS '24*), Jun 2024.
- **Yanbing Liu**, Junpeng Guo and Chunyi Peng, "Demystifying Secondary Radio Access Failures in 5G," *The 25th International Workshop on Mobile Computing Systems and Applications* (*HotMobile '24*), Feb 2024.
- *Zhehui Zhang, ***Yanbing Liu**, Qianru Li, Zizheng Liu, Chunyi Peng, and Songwu Lu, "Dependent Misconfigurations in 5G/4.5G Radio Resource Control," *ACM International Conference on emerging Networking EXperiments and Technologies* (*CoNEXT '23*), Dec 2023.
- *Qianru Li, *Zhehui Zhang, **Yanbing Liu**, Zhaowei Tan, Chunyi Peng and Songwu Lu, "CA++: Enhancing Carrier Aggregation Beyond 5G," *The 29th International Conference on Mobile Computing and Networking* (*MobiCom '23*), Oct 2023.
- **Yanbing Liu** and Chunyi Peng, "A Close Look at 5G in the Wild: Unrealized Potentials and Implications," *IEEE International Conference on Computer Communications* (*INFOCOM '23*), May 2023.
- **Yanbing Liu**, Xiaowei Qin, Ting Zhu, Xiaohui Chen and Guo Wei, "Improve MPTCP with SDN: From the perspective of resource pooling," *Journal of Network and Computer Applications*, vol. 141, pp. 73-85, Sep 2019.
- **Yanbing Liu**, Xiaowei Qin, Tianyi Zhang, Ting Zhu, Xiaohui Chen and Guo Wei, "Decoupled TCP Extension for VLC Hybrid Network," *IEEE/OSA Journal of Optical Communications and Networking*, vol. 10, no. 5, pp. 563-572, May 2018.
- **Yanbing Liu**, Xiaowei Qin, Ting Zhu, Xiaohui Chen and Guo Wei, "BESS: BDP Estimation Based Slow Start Algorithm for MPTCP in mmWave-LTE Networks," *2018 IEEE 88th Vehicular Technology Conference* (*VTC Fall*), 2018.