Goodsol Lee

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RESEARCH INTEREST

High-Quality Real-Time Communications (e.g., VR, AR) over Wireless Networks

- Wireless Networks, WebRTC, Video Analytics, Network measurement, and Congestion Control

EDUCATION

Seoul National University Seoul, South Korea
Ph.D. candidate in Electrical and Computer Engineering *Sep 2018 – Present*
- Advisor: Prof. Kyunghan Lee and Prof. Saewoong Bahk

Seoul National University Seoul, South Korea
B.S. in Electrical and Computer Engineering *Mar 2012 – Aug 2018*

EXPERIENCES

University of Coloardo Boulder Boulder, CO, USA
Visiting Scholar, Host: Prof. Sangtae Ha *June 2024 – Aug 2025*
- **Project QCON**: Seamless QoE-Aware 5G Streaming via Multi-Connectivity.
  - Measured the performance of commercial mobile cloud gaming services over 5G and found that commercial 5G poorly serves these applications by underutilizing link-level multi-path features.
  - Implemented multi-connectivity features on OpenAirInterface5G and developed application QoE-driven link-level multi-path scheduling techniques for mobile cloud gaming, achieving a **2.1× enhancement in video quality and a 5× improvement in the P01 tail frame rate; Accepted to USENIX NSDI 2026.**
- Project: Mitigating non-congestive RAN delay in 5G networks for seamless video calls.
  - Analyzed the video stall of WebRTC applications over 5G caused by non-congestive RAN delays from inefficient 5G transmission procedures.
  - Designed and implemented a RAN intelligent controller on the srsRAN Project to reduce non-congestive RAN delay with RTC-aware transmission procedures, enhancing 1.8× tail frame rates by reducing video stalls 94% ; submitted to IEEE INFOCOM 2026.
- **Project ARMA**: Towards end-to-end latency guarantee in MEC live video analytics with app-RAN mutual awareness.
  - Developed an end-to-end video analytics system that guarantees end-to-end latency through app-RAN mutual awareness, **achieving 97% of service-level agreements.**
  - Implemented a RAN intelligent controller on the srsRAN Project with mutually-aware APIs for both the application and RAN; **Published in ACM MobiSys 2025.**

Purdue University West Lafayette, IN, USA
Visiting Scholar, Host: Prof. Kwang Taik Kim & Prof. Mung Chiang *Dec 2023 – May 2024*

Samsung System LSI Hwaseong, Korea
Software Engineering Intern *Summer 2023*
- Project: Analyze low TCP throughput of Exynos modem
  - Analyzed the low throughput problem of TCP CUBIC over 5G uplink on the Exynos modem.
  - Identified the root cause as a small TCP congestion window size in the initial phase due to inefficient HyStart operation.

Seoul National University Seoul, South Korea
Research Assistant, Advisor: Prof. Kyunghan Lee and Prof. Saewoong Bahk *Sep 2018 – Present*
- **Project C'esar**: Cellular Resource Scheduling-Aware Congestion Control.
  - Designed a novel delay-based congestion control algorithm that effectively tackles non-congestive delay arising from cellular scheduling.
  - Developed a Linux kernel sender-side congestion control that **achieves 1.2× throughput with 82% of the 95th-tail latency compared to BBR; Published in IEEE INFOCOM 2025.**
- Project Prosch: Proxy aided secondary cell handover in ultra-dense mmWave network.
  - Designed and implemented a novel handover algorithm for dual-connectivity 5G to preserve TCP

throughput during handover in **NS3; published in IEEE WCNC 2020**.

SK Hynix Seongnam, Korea
Undergraduate Intern *Summer 2017*

SELECTED PUBLICATIONS

Conference

1. **Goodsol Lee**, Junhong Min, Seyeon Kim, Juheon Yi, Kwang Taik Kim, Mung Chiang, Sangtae Ha, Kyunghan Lee, and Saewoong Bahk, "QCON: Seamless QoE-Aware 5G Streaming via Multi-Connectivity," in *23rd USENIX Symposium on Networked Systems Design and Implementation (NSDI '26)*, Accepted, USENIX, 2026
2. Juheon Yi, **Goodsol Lee**, Seokgyeong Shin, MinKyung Jeong, Daehyeok Kim, and Youngki Lee, "Towards End-to-End Latency Guarantee in MEC Live Video Analytics with App-RAN Mutual Awareness," in *23nd ACM International Conference on Mobile Systems, Applications, and Services (MobiSys)*, ACM, 2025
3. Juhun Shin, **Goodsol Lee**, Jeongyeop Paek, and Saewoong Bahk, "César: Cellular Resource Scheduling-Aware Congestion Control," in *IEEE INFOCOM 2025-IEEE Conference on Computer Communications*, IEEE, 2025
4. **Goodsol Lee**, Siyoung Choi, Junseok Kim, Youngseok Kim, and Saewoong Bahk, "Prosch: Proxy Aided Secondary Cell Handover in Ultra-Dense Mmwave Network," in *2020 IEEE Wireless Communications and Networking Conference (WCNC)*, IEEE, 2020, pp. 1–6
5. Seongjoon Kang, Siyoung Choi, **Goodsol Lee**, and Saewoong Bahk, "A Dual-Connection based Handover Scheme for Ultra-Dense Millimeter-Wave Cellular Networks," in *2019 IEEE Global Communications Conference (GLOBECOM)*, IEEE, 2019, pp. 1–6

Journal

1. Junseok Kim, **Goodsol Lee**, Seongwon Kim, Tarik Taleb, Sunghyun Choi, and Saewoong Bahk, "Two-Step Random Access for 5G System: Latest Trends and Challenges," *IEEE Network*, vol. 35, no. 1, pp. 273–279, 2020

TECHNICAL SKILLS

- **Programming Languages:** C/C++, Java, Python
- **Network Systems:** NS-3 Simulator, srsRAN, Openairinterface5G, XCAL Cellular Analyzer, WebRTC, TCP, QUIC
- **Operating Systems:** Android, Linux
- **ML Frameworks:** Tensorflow, PyTorch
- **Languages:** Korean (native), English (fluent)

AWARDS

- Silver Prize (2nd prize in Communications & Network division) from Samsung HumanTech Paper Awards, Feb. 2025. (As a co-author)

PROFESSIONAL SERVICES

Review

- **Conferences:** WNS3 2021, IEEE Globecom 2020
- **Journals:** IEEE Transactions on Vehicular Technology (2025), IEEE Transactions on Network Science and Engineering (2025), Computer Networks (2025), IEEE Network Letters (2024)

External Review

- **Conferences:** IEEE INFOCOM 2025, ACM MobiCom 2025, ACM MobiHoc 2024, IEEE INFOCOM 2024, WiOpt 2022, ACM MobiHoc 2021
- **Journals:** IEEE Transactions on Networking, Journal of Communications and Networks