Jiwon Sung

jiwonsung00@gmail.com | https://sunione.github.io

Education

Korea Advanced Institute of Science and Technology (KAIST) Feb. 2024 – Present
M.S. in Electrical Engineering | Advisor: Prof. Jinseok Choi | 4.12/4.3 GPA *Daejeon, Korea*

Ulsan National Institute of Science and Technology (UNIST) Feb. 2018 – Feb. 2024
B.S. in Electrical Engineering | Summa Cum Laude | 4.15/4.3 GPA (Ranked 1/51) *Ulsan, Korea*

Research Interests

Wireless Communications, Estimation, Sensing, Statistical Signal Processing, and Machine Learning

Research Experience

TASC Lab Aug. 2025 – Present
Purdue University | Advisor: Prof. David J. Love *West Lafayette, IN, USA*

Near-Field Velocity Sensing on an Extended Target

- Currently working on near-field extended target tracking and comparing it with the point target scenario

SIC-X LAB July 2023 – Aug. 2025
KAIST | Advisor: Prof. Jinseok Choi *Daejeon, Korea*

Power-Efficient Rate-Splitting Multiple Access (RSMA) Precoding

- Developed a power-efficient and low-complexity MIMO-RSMA beamforming design that jointly optimizes the precoder, the set of active antennas, and the transmit power for a given total power budget at a base station
- Numerical results showed a new insight: medium-resolution DACs with $8 \sim 11$ bits may be more power efficient than low-resolution DACs with $3 \sim 5$ bits when utilizing the full potential of the available power at the base station

Time-Interleaved ADC (TI-ADC) Mismatch Error Estimation and Compensation

- Developed a hybrid calibration algorithm for correcting offset, gain, and timing mismatch errors in TI-ADCs using the extended Kalman filter for estimation and a combination of a truncated fractional delay filter and a high-pass filter for compensation
- Our algorithm achieved $10\times$ lower reconstruction error, did not require an FIR filter coefficient optimization, and was the first work in the literature to model time-varying mismatch errors

InfoLab Mar. 2023 – July 2023
KAIST | Advisor: Prof. Si-Hyeon Lee *Daejeon, Korea*

Local Differential Privacy (LDP) in Graph Data

- Applied LDP to decentralized graph data such that privacy is preserved while maintaining local graph statistics
- Proposed a degree-preserving asymmetric bit-flipping scheme that satisfies edge-LDP constraints
- Numerical results showed that the proposed method produced good results for coreness, a metric that quantifies users' influence in a graph
- Our method could be applied to scenarios where the task is to find potential super-spreaders in an epidemic outbreak using people's sensitive data so that the limited supply of vaccines is used on the most influential people

Lab. of Advanced Imaging Tech. Apr. 2022 – Aug. 2022
UNIST | Advisor: Prof. Jaejun Yoo *Ulsan, Korea*

Image-to-Image Translation

- Studied generative adversarial networks (GANs) in the context of image-to-image translation
- Tried to make improvements on *TUNIT*, a multi-domain image-to-image translation paper that uses unlabeled datasets, by eliminating the "number of domains" hyperparameter using the Incremental DBSCAN algorithm

Publications

Journal Articles

- **Jiwon Sung**, Seokjun Park, and Jinseok Choi, "Power-Constrained and Quantized MIMO-RSMA Systems with Imperfect CSIT: Joint Precoding, Antenna Selection, and Power Control", *IEEE Transactions on Wireless Communications* (under minor revision)
- **Jiwon Sung** and Jinseok Choi, "A New Interpretation of the Time-Interleaved ADC Mismatch Problem: A Tracking-Based Hybrid Calibration Approach", *IEEE Signal Processing Letters*, vol. 32, pp. 3710–3714, 2025

International Conference Papers

- **Jiwon Sung**, Seokjun Park, and Jinseok Choi, "Joint Optimization for Power-Constrained MIMO Systems: Is Low-Resolution DAC Still Optimal?," *2025 IEEE 101st Vehicular Technology Conference (VTC2025-Spring)*, Oslo, Norway, 2025, pp. 1-6
- Seokjun Park, **Jiwon Sung**, Jinseok Choi, Jeonghun Park, and Wonjae Shin, "Maximizing Energy and Spectral Efficiency Tradeoff in MISO-RSMA Systems Under Coarse Quantization," *2024 32nd European Signal Processing Conference (EUSIPCO)*, Lyon, France, 2024, pp. 857-861

Work Experience

Air Force Operations Command (AFOC) — Oct. 2020 – Mar. 2022
Military Interpreter (English-Korean) | *Sergeant* — *Pyeongtaek, Korea*

Awards and Scholarships

Government-Sponsored Scholarship — Feb. 2024 – Feb. 2026
- Near-full-tuition & stipend scholarship

National Science and Technology Scholarship — Feb. 2020 – Feb. 2024
- Full-tuition & stipend scholarship

Semester Award — 2018, 2019, 2020-Spring, 2022-Fall
- Awarded to the top students with the highest GPA scores

Academic Performance Scholarship — Feb. 2018 – Feb. 2024
- Full-tuition scholarship

Teaching and Mentoring Experience

Communication Theory (TA) — Feb. 2025 – June 2025
KAIST — *Daejeon, Korea*

Undergraduate Internship Mentor — Sep. 2024 – Dec. 2024
KAIST — *Daejeon, Korea*
- Advised an undergraduate student's thesis research
- Research topic: joint channel and time-interleaved ADC mismatch compensation in OFDM systems

Global Educational Program for Samsung Semiconductor (TA) — June 2024 – June 2025
KAIST — *Daejeon, Korea*

Aramco Coding School — Aug. 2022 – Nov. 2022
Saudi Arabian Oil Company — *Ulsan, Korea*
- Developed an iOS application for protecting the environment with middle school students

A.I. 4.0 Studio — May 2022 – Nov. 2022
UNIST — *Ulsan, Korea*
- Implemented *pix2pix* (image-to-image translation with cGAN) with high school students using TensorFlow

Calculus I (TA) — Mar. 2020 – June 2020
UNIST — *Ulsan, Korea*

Freshman English Camp (TA) — Jan. 2020
UNIST — *Ulsan, Korea*

Contemporary Philosophy (TA) — Sep. 2019 – Dec. 2019
UNIST — *Ulsan, Korea*

Ulju-gun Science Mentoring for the Gifted — Jan. 2019
UNIST — *Ulsan, Korea*
- Taught algebra for middle school students during a 3-week camp