Seoungbin Bae

Ph.D. Student, Department of Industrial & Systems Engineering, KAIST

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Research Interests

Machine learning for sequential decision-making under uncertainty; online learning, bandit, and reinforcement learning algorithms with provable guarantees; nonlinear contextual bandits; constrained reinforcement learning; bandit algorithms for queueing systems.

Education

KAIST

Ph.D. Student, Department of Industrial & Systems Engineering 2024–Present

- Advisor: Prof. Dabeen Lee

KAIST

M.S. in Electrical Engineering 2022–2024

- Advisor: Prof. Young-Gyu Yoon
- Research topic: self-supervised learning for microscopy image analysis
- Thesis: Self-Supervised Cell Segmentation in Microscopy Images Through Transformation-Equivariance Learning

Department of Cyber Defense, Korea University

B.S. 2017–2021

Experience

Research Intern, Department of Cyber Defense, Korea University 2019–2021

- Advisor: Prof. Wonjun Lee
- Research topic: secure beamforming method in MU-MIMO networks

Publications

(: equal contribution)*

Preprints

1. **Seoungbin Bae** and Dabeen Lee, "Algorithm for Contextual Queueing Bandits with Rate-Optimal Queue Length Regret", arXiv preprint, 2026.
2. Hoyeol Yoon, **Seoungbin Bae**, Nam Ho-Nguyen, and Dabeen Lee, "Chebyshev Center-Based Direction Selection for Multi-Objective Optimization and Training PINNs", arXiv preprint, 2026.
3. **Seoungbin Bae** and Dabeen Lee, "Logistic Bandits with $\tilde{O}(\sqrt{dT})$ Regret Without Context Diversity Assumptions", arXiv preprint, 2026.
4. Kihyun Yu, **Seoungbin Bae**, and Dabeen Lee, "Near-Optimal Primal-Dual Algorithm for Learning Linear Mixture CMDPs with Adversarial Rewards", arXiv preprint, 2026.
5. **Seoungbin Bae**, Junyoung Son, and Dabeen Lee, "Learning to Route and Schedule LLMs from User Retrials via Contextual Queueing Bandits", arXiv preprint, 2026.
6. Hyunwoo Kim*, **Seoungbin Bae***, Junmo Cho, Hoyeon Nam, Junyoung Seo, Seungjae Han, Euiin Yi, Eunsu Kim, Young-Gyu Yoon, and Jae-Byum Chang, "IMPASTO: Multiplexed Cyclic Imaging Without Signal Removal via Self-Supervised Neural Unmixing", bioRxiv preprint, 2022.

Publications

1. **Seoungbin Bae** and Dabeen Lee, "Neural Logistic Bandits", **ICML**, 2026.
2. Woonggi La*, **Seoungbin Bae***, Junyoung Seo*, Hayeong Yu*, Junmo Cho, Hyunwoo Kim, Hoyeon Nam, Seungjae Han, Euiin Yi, Eunsu Kim, Chan Kang, Hyejin Shin, Chang Woo Song, Young-Gyu Yoon, and Jae-Byum Chang, "Abunmix Enables the Simple and Robust Multiplexed Immunofluorescence Imaging", **VIEW**, 2026.

3. Kihyun Yu, **Seoungbin Bae**, and Dabeen Lee, "Primal-Dual Policy Optimization for Linear CMDPs with Adversarial Losses", **ICLR**, 2026.

4. **Seoungbin Bae**, Garyeong Kang, and Dabeen Lee, "Queue Length Regret Bounds for Contextual Queueing Bandits", **ICLR**, 2026.

5. Hyunwoo Kim, Joon-Goon Kim, Jueun Sim, Hoyeon Nam, In Cho, Hyejin Shin, Junyoung Kwon, Dae-Hyeon Song, **Seoungbin Bae**, Young-Gyu Yoon, Taeyun Ku, and Jae-Byum Chang, "Highly Accurate Image Registration for 3D Multiplexed Cyclic Imaging Using Dense Labeling in Expandable Tissue Gels", **PLOS Biology**, 2025.

6. **Seoungbin Bae**, Minwoo Joo, and Wonjun Lee, "Secure Key Exchange Method via Ill-Conditioned Inverse Matrix in Wireless Local Area Networks", **KSC**, 2020.

7. **Seoungbin Bae**, Youngki Kim, Heejun Roh, and Wonjun Lee, "Poster Abstract: Suppressing CSI Leakage in Multi-User MIMO Networks via Precoding", **IEEE INFOCOM Workshops**, 2020.

Patents

- **Seoungbin Bae** et al., Multiplexed Immunofluorescence Imaging via Signal Unmixing, Patent applications.

Teaching Experience

- Advanced Optimization for Data Science (DS801), Spring 2024
- Matrix Computations for Signal Processing (EE548), Spring 2023
- Introduction to Electronics Design Lab (EE305), Fall 2022, 2023
- Wireless Mobile Communication Networks, Fall 2020

Academic Service

- Reviewer, NeurIPS 2026

Awards and Honors

The National Scholarship for Science and Engineering 2017–2021
Korea Student Aid Foundation (KOSAF)

- Full tuition during undergraduate years

Military Scholarship 2017–2021
Ministry of National Defense, Republic of Korea

- Full tuition during undergraduate years