Seohui Bae

CONTACT INFORMATION
LG AI Research
E-MAIL: seohuibae73@gmail.com
LINKS: WEBSITE, GOOGLE SCHOLAR

RESEARCH INTERESTS
My research centers on the scientific exploration of learning, the emergence of intelligence, and the evolution of decision-making through embodied interactions in complex environments. Recently, my work has focused on LLM agents reasoning, out-of-distribution extrapolation, and parameter space. My past work has also drawn inspiration from cognitive science.

CURRENT EMPLOYMENT
LG AI Research, South Korea
AI SCIENTIST(FULL-TIME) **Nov 2022 - Present**
- Research Area: Artificial Intelligence [**P1-P3,W2-W4**]
- Supervisor: Dr. Woohyung Lim

EDUCATION
KAIST, South Korea
M.S., Graduate School of Artificial Intelligence Mar 2020 - Feb 2022
- Research Area: Machine Learning [**C1**]
- Advisor: Prof. Eunho Yang (KAIST AI)

B.S., Biological Science, Computer Science(minor) Mar 2015 - Feb 2020
- Area of Interest: Neuroscience [**J1-J2,W1**], Machine Learning [**J3**]
- Advisor: Prof. Jinhee Han (KAIST BS)

Korea Science Academy of KAIST, South Korea
High School Diploma Mar 2012 - Feb 2015

PUBLICATIONS
(C: conference, W: workshop, J: journal, P: preprint/reviewing/working paper, * equal contribution)

Machine Intelligence

[P3] Assimilate Your Neuron: Decision Tree-Based Optimization for Training LLM Agents in Dynamic Action Spaces
Seohui Bae*, Jeonghye Kim*, Kanghoon Lee, Youngchul Sung, Woohyung Lim
In submission

[P2] Learning to Extrapolate Implicit Neural Representation in Parameter Manifold
Seohui Bae, Jaehoon Lee, Jun Seo, Wonbin Ahn, Woohyung Lim
In submission

[W4] Adaptive Information Routing for Multimodal Time Series Forecasting
Jun Seo, Hyeokjun Choe, **Seohui Bae**, Soyeon Park, Jinseok Yang, Dongwan Kang, Woohyung Lim
NeurIPS 2024 Workshop on Time Series in the Age of Large Models [pdf]

[W3] ShERPA: Shifting basin for Enhanced Robustness via Permuted Activations
Dong Kyu Cho, Jinseok Yang, Jun Seo, **Seohui Bae**, Dongwan Kang, Soyeon Park, Hyeokjun Choe, Woohyung Lim
ICLR 2024 Workshop on Mathematical and Empirical Understanding of Foundation Models [pdf]

[W2] Gradient Surgery for One-shot Unlearning on Generative Model
Seohui Bae, Seoyoon Kim, Hyemin Jung, Woohyung Lim
ICML 2023 Workshop on Generative AI and Law [pdf]

[P1] Towards True Deletion of Group Influence in Deep Network
Seohui Bae, Woohyung Lim
Under review

[C1] GTA: Graph Truncated Attention for Retrosynthesis
Seung-woo Seo, You Young Song, June Yong Yang, **Seohui Bae**, Hankook Lee, Jinwoo Shin, Sung Ju Hwang, Eunho Yang
AAAI 2021 [pdf]

[J3] Community Assessment of the Predictability of Cancer Protein and Phosphoprotein Levels from Genomics and Transcriptomics
Mi Yang, Francesca Petralia,.., Bora Lee, **Seohui Bae**, Eunji Heo, .., Julio Saez-Rodriguez
Ranked **Top-3** in NCI-CPTAC DREAM **Global ML Challenge** 2018

Cell Systems 2020, 11(2), 186-195 [pdf]

Human Intelligence

[J2] Exploration driven by a medial preoptic circuit facilitates fear extinction in mice
Anna Shin, Jia Ryoo, Kwanho Shin, Junesu Lee, **Seohui Bae**, Dae-Gun Kim, Sae-Geun Park, Daesoo Kim
Communications Biology, 6, 106, 2023 [pdf]

[W1] Brain Functional Connectivity in Language Switching of Bilinguals
Hiroyuki Akama, **Seohui Bae**, Miaomei Lei
The 36th Annual Meeting of Japanese Cognitive Science Society, 2019 [pdf]

[J1] Medial preoptic circuit induces hunting-like actions to target objects and prey
Sae-Geun Park, Yong-Cheol Jeong, Dae-Gun Kim, Min-Hyung Lee, Anna Shin, Geunhong Park, Jia Ryoo, Jiso Hong, **Seohui Bae**, Cheol-Hu Kim, Pill-Seung Lee, Daesoo Kim
Nature Neuroscience 21, 364-372, 2018 [pdf]

Projects

Research Scientist, LG AI Research — Nov 2022 -

- Projects: Building Actionable Forecasting Agent
  - Fine-tuning EXAONE w/ 3B paired data, Benchmark for[W4] Multi-modal Forecasting, Holistic Evaluation on LLM RAG
  - Tech stack: PEFT, NVIDIA Triton, DeepSpeed, pinecone, PyTorch-lightening
- Projects: LLM reasoning and self-evolving [P3]
  - Tech stack: JDK, Xvfb, Minedojo, Gym, PyTorch
- Projects: Generalization in parameter space [W2-3,P1-P2]
  - Tech stack: Jax, Pytorch3D, Open3D, OpenCV

Research Assistant, Consulting Group — Mar 2022 - Jun 2022

- Projects: SCM Optimization
  - Tech stack: SQL

Undergraduate Intern, Graduate student, KAIST — Oct 2019 - Feb 2022

- Projects: Graph transformer, Retrosynthesis [C1]
  - Tech stack: Pytorch-geometric, Neo4j, Jax

Research Scientist Intern(Full-time), Start-up(Deargen) — Dec 2018 - Feb 2019

- Projects: High-dimensional statistical learning
  - Tech stack: Pytorch

Visiting Student Researcher, Tokyo Institute of Technology — Jun 2018 - Sep 2018

- Projects: Brain functional analysis on bilinguals [W1]
  - Tech stack: SPM, MATLAB

Research Scientist Intern(Part-time), Start-up(Deargen) — Aug 2017 - Apr 2018

- Projects: Global ML Competition for tabular classification [J3]
  - Tech stack: Sklearn, Tensorflow, Pandas

Visiting Student, EPFL — Feb 2017 - Aug 2017

- Projects: spiking neuron-inspired neural network
  - Tech stack: SPM, MATLAB, Python

Undergraduate Research Program Intern, KAIST — Apr 2016 - Feb 2017

- Projects: Developing MIDAS system, publication on [J1]
  - Tech stack: Arduino, MATLAB

Honors

Global 3rd Prize, NCI-CPTAC DREAM ML Challenge, NIH, USA, 2018

National Science & Technology Scholarship, Korea, 2015-2018
(National academic scholarship for *top 5%* STEM students; $10,000)

Student Honor Club, Korean Academy of Science and Technology, 2013-Present

Teaching

Lecturer, AI/DX for Samsung Electronics, Elice Inc.	Aug 2022 - Nov 2022
Lecturer AI Mentorship Program, KAIST CT	Mar 2021 - Dec 2021
Academic Mentor, Korea Science Outreach Program, KAIST	Aug 2018 - Dec 2018
Teaching Assistant, Introduction to CS (CS101), KAIST	Aug 2018 - Dec 2018
Academic Mentor, LG-KAIST Sponsoring Program, KAIST	Mar 2016 - Aug 2016

Services

Workshop Co-organizer

- *1st-Workshop on Multi-modal Forecasting* @ ICML 2025 (In submission)

Conference Reviewer

- ICLR 2025, NeurIPS 2024

Short Paper(/Workshop/Tiny Paper) Reviewer

- ICLR 2024
- ICML 2023, AAAI 2023

Journal Reviewer

- ACM Computing Surveys 2024

Skills

Programming Language: Python (C/C++)

Deep Learning Framework: PyTorch, JAX, PyTorch Geometric (PyG)

Languages: Korean(native), English(fluent)