BYUNG HYUN LEE

CONTACT INFORMATION

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RESEARCH INTERESTS

My research focuses on forgetting in neural networks — an essential challenge to address for continual learning and machine unlearning in foundation models. I've conducted research on deep neural network architectures that address conflicting objectives and continual learning algorithms. Recently, I've been working on concept erasing for responsible generative AI via continual learning approaches. My work explores two key areas:

- Continual Learning for Foundation Models

- Machine Unlearning and Concept Erasing for Responsible Generative AI

Additionally, I'm interested in model acceleration and image restoration.

EDUCATION

- **Seoul National University (SNU)**   *Mar 2021 - present*
  Combined M.S./Ph.D Program in Electrical and Computer Engineering (ECE)

- **Ulsan National Institute of Science and Technology (UNIST)**   *Mar 2015 - Aug 2018*
  B.S. in Electical Engineering, GPA: 4.04/4.30

RESEARCH ADVISOR

- **Se Young Chun:** Professor, Department of Electrical and Computer Engineering (ECE), SNU

PUBLICATIONS

- Localized Concept Erasure for Text-to-Image Diffusion Models Using Training-Free Gated Low-Rank Adaptation
  B. H. Lee*, S. Lim*, S. Y. Chun (*co-first authors)
  Conference on Computer Vision and Pattern Recognition (CVPR, accepted), 2025

- Concept pinpoint eraser for text-to-image diffusion models via residual attention gate
  B. H. Lee*, S. Lim*, S. Lee, D. U. Kang, S. Y. Chun (*co-first authors)
  International Conference on Learning Representations (ICLR, accepted), 2025

- Continual Test-Time Adaptation for Robust Remote Photoplethysmography Estimation
  H. Lee, H. Lee, **B. H. Lee**, S. Y. Chun
  IEEE Access, 2025

- Selective Concept Erasing for Safe Diffusion Models
  B. H. Lee, S. Lim, S. Y. Chun
  Korea Signal Processing Conference (Best Poster Presentation Award), 2024

- Doubly perturbed task free continual learning
  B. H. Lee, M. Oh, S. Y. Chun
  Proceedings of the AAAI Conference on Artificial Intelligence (AAAI, oral), 2024

- Expert classifier ensemble based post-processing correction for unbiased scene graph generation
  S. Lee, **B. H. Lee**, S. Y. Chun
  Workshop on Image Processing and Image Understanding (IPIU), 2024

- Towards accelerating model parallelism in distributed deep learning systems
  H. Choi*, **B. H. Lee***, S. Y. Chun, J. Lee (*co-first authors)
  PLOS One, 2023

- Online Continual Learning on Hierarchical Label Expansion
  B. H. Lee*, O. Jung*, J. Choi, S. Y. Chun (*co-first authors)
  International Conference on Computer Vision (ICCV), 2023

- All-in-one image restoration for unknown degradations using adaptive discriminative filters for specific degradations
  D. Park, **B. H. Lee**, S. Y. Chun
  Conference on Computer Vision and Pattern Recognition (CVPR), 2023

- Efficient and accurate quantized image super-resolution on mobile npus, mobile ai & aim 2022 challenge: report
  A. Ignatov et al. (including **B. H. Lee**)
  Workshops on European Conference on Computer Vision (ECCV), 2022

- Efficient single-image depth estimation on mobile devices, mobile AI & AIM 2022 challenge: report
  A. Ignatov et al. (including **B. H. Lee**)
  Workshops on European Conference on Computer Vision (ECCV), 2022

- Uncertainty-based dual domain low-dose X-ray CT reconstruction
  S. Lee, D. U. Kang, **B. H. Lee**, S. Y. Chun
  Korean Signal Processing Conference, 2022

- Empirically Accelerating Scaled Gradient Projection Using Deep Neural Network for Inverse Problems in Image Processing
  B. H. Lee, S. Y. Chun
  International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2021

PRINPRINTS / MANUSCRIPTS UNDER REVIEW

- Continual Multiple Instance Learning with Enhanced Localization for Histopathological Whole Slide Image Analysis
  B. H. Lee, W. Jeong, W. Han, K. Lee, S. Y. Chun
  Under review, 2025

- Unlearning the Unpromptable: Prompt-free Instance Unlearning in Diffusion Models
  K. R. Lee*, K. H. Lee*, S. Hong, **B. H. Lee** , S. Y. Chun
  Under review, 2025

- Geometrical Properties of Text Token Embeddings for Strong Semantic Binding in Text-to-Image Generation
  H. Seo*, J. Bang*, H. Lee*, J. Lee, **B. H. Lee** , S. Y. Chun
  Under review, 2025

PATENTS

- **All-in-one image quality improvement model providing method performing image quality restoration for multiple image quality degradation factors**
  S. Y. Chun, D. Park, **B. H. Lee**
  U.S. Patent, Filed, 2023

- **Method for providing all-in-one image quality improvement model that performs image quality restoration for multiple image quality inhibitors**
  S. Y. Chun, D. Park, **B. H. Lee**

Korea Patent, Filed, 2023

PRESENTATIONS

- **Continual Learning and Its Applications in Magnetic Resonance Imaging**
  Advanced neuroimaging and AI workshop, SNU, 2024

RESEARCH EXPERIENCES

Biomedical Medical Image Processing Lab, UNIST   *May 2020 - Feb 2021*
Researcher (Advisor: Prof. Se Young Chun)

Biomedical Medical Image Processing Lab, UNIST   *July 2017 - Aug 2018*
Student Intership (Advisor: Prof. Se Young Chun)

EXTRACURRICULAR EXPERIENCES

Military Service, Republic of Korea Army   *Sep 2018 - Apr 2020*
Discharged as Sergeant

Pinocchio (Robot Club), UNIST   *Mar 2015 - Aug 2018*
Education Director