

Hongki Lim

Curriculum Vitae

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Professional Appointments

Inha University Assistant Professor, Department of Electrical and Electronic Engineering	Mar 2022–present
Siemens Healthineers Senior AI Scientist, Digital Technology & Innovation	Sep 2020–Jan 2022
Qualcomm Intern, Computer Vision Group, Corporate Research & Development	Feb–Jun 2015
Samsung Electronics Associate, Technology Planning Group, Strategic Planning Team, System LSI Division	Jul 2012–Jan 2015

Education

University of Michigan Ph.D., Electrical and Computer Engineering Concentration: Signal Processing and Machine Learning Dissertation: <i>Quantitative Image Reconstruction Methods for Low Signal-to-Noise Ratio Emission Tomography</i> Advisors: Jeffrey A. Fessler and Yuni K. Dewaraja	May 2020
Inha University B.S., Electronic Engineering	Aug 2012

Research Interests

Probabilistic generative modeling and conditional inference; diffusion models and sampling methods for inverse problems; image reconstruction and analysis; reward-guided generation and diverse design.

Conference Papers and Proceedings

[†] Corresponding author.

- [C10] Minwoo Kim, Seunghyeok Shin, Dabin Kim, and **Hongki Lim**[†]. “Tethered Predictive-Inertial Proposals with Objective Verification for Diffusion-Prior Inverse Problems.” *Conference on Neural Information Processing Systems (NeurIPS)*, 2026. Accepted.
- [C9] Seunghyeok Shin, Minwoo Kim, Dabin Kim, and **Hongki Lim**[†]. “Geometry-correct diffusion posterior sampling with denoiser-pullback curvature guidance and manifold-aligned damping.” *Proceedings of the 43rd International Conference on Machine Learning (ICML)*, PMLR 306:112591–112623, 2026.
- [C8] Minwoo Kim, Seunghyeok Shin, and **Hongki Lim**[†]. “FAST-DIPS: Adjoint-free analytic steps and hard-constrained likelihood correction for diffusion-prior inverse problems.” *International Conference on Learning Representations (ICLR)*, 2026.
- [C7] Seunghyeok Shin, Dabin Kim, and **Hongki Lim**[†]. “Adaptive 3D reconstruction via diffusion priors and forward curvature-matching likelihood updates.” *Advances in Neural Information Processing Systems (NeurIPS)*, 38, 2025. **Spotlight**.
- [C6] **Hongki Lim**, Yuni K. Dewaraja, and Jeffrey A. Fessler. “Joint low-count PET/CT segmentation and reconstruction with paired variational neural networks.” *Proceedings of SPIE, Medical Imaging: Physics of Medical Imaging*, 11312:113120U, 2020. Oral presentation.

- [C5] Haowei Xiang, **Hongki Lim**, Jeffrey A. Fessler, and Yuni K. Dewaraja. “SPECT/CT scatter estimation using a deep convolutional neural network: Implementation in Y-90 imaging.” *IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC)*, pp. 1–3, 2019.
- [C4] **Hongki Lim**, Zhengyu Huang, Jeffrey A. Fessler, Yuni K. Dewaraja, and Il Yong Chun. “Application of trained Deep BCD-Net to iterative low-count PET image reconstruction.” *IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC)*, pp. 1–4, 2018. Oral presentation.
- [C3] Se Young Chun, **Hongki Lim**, Jeffrey A. Fessler, and Yuni K. Dewaraja. “On parameter selection for joint spectral reconstruction in Y90 SPECT.” *IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC)*, pp. 1–4, 2018.
- [C2] Il Yong Chun, **Hongki Lim**, Zhengyu Huang, and Jeffrey A. Fessler. “Fast and convergent iterative image recovery using trained convolutional neural networks.” *56th Annual Allerton Conference on Communication, Control, and Computing*, pp. 155–159, 2018.
- [C1] **Hongki Lim**, Yuni K. Dewaraja, and Jeffrey A. Fessler. “Reducing bias in Y-90 PET images by enforcing non-negativity in projection space.” *IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC)*, pp. 1–4, 2017. Oral presentation.

Journal Papers

- [J12] Minwoo Kim and **Hongki Lim**[†]. “SURE Guided Posterior Sampling: Trajectory Correction for Diffusion-Based Inverse Problems.” *IEEE Access*, 14:141413–141427, 2026.
- [J11] Dabin Kim and **Hongki Lim**[†]. “Noise-aware adaptive diffusion sampling for accelerated knee MRI reconstruction.” *Physics in Medicine & Biology*, 71(10):105029, 2026.
- [J10] Kyeongkyu Lee, Seonghwan Yoon, and **Hongki Lim**[†]. “CLARIFID: Improving radiology report generation by reinforcing clinically accurate impressions and enforcing detailed findings.” *Expert Systems with Applications*, 303:130633, 2026.
- [J9] **Hongki Lim**. “Direct conditional score modeling for accelerated MRI reconstruction.” *IEEE Access*, 12:163914–163923, 2024.
- [J8] Je-I Yang, Kwang Sub Yoon, and **Hongki Lim**[†]. “A 12-bit SAR ADC with binary search calibration algorithm for a split capacitor.” *Electronics*, 13(2):414, 2024.
- [J7] **Hongki Lim**. “Transformer-based integrated framework for joint reconstruction and segmentation in accelerated knee MRI.” *Electronics*, 12(21):4434, 2023.
- [J6] **Hongki Lim**[†], Yuni K. Dewaraja, and Jeffrey A. Fessler. “SPECT reconstruction with a trained regularizer using CT-side information: Application to ¹⁷⁷Lu SPECT imaging.” *IEEE Transactions on Computational Imaging*, 9:846–856, 2023.
- [J5] Il Yong Chun, Zhengyu Huang, **Hongki Lim**, and Jeffrey A. Fessler. “Momentum-Net: Fast and convergent iterative neural network for inverse problems.” *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 45(4):4915–4931, 2023.
- [J4] Haowei Xiang, **Hongki Lim**, Jeffrey A. Fessler, and Yuni K. Dewaraja. “A deep neural network for fast and accurate scatter estimation in quantitative SPECT/CT under challenging scatter conditions.” *European Journal of Nuclear Medicine and Molecular Imaging*, 47:2956–2967, 2020.
- [J3] **Hongki Lim**[†], Il Yong Chun, Yuni K. Dewaraja, and Jeffrey A. Fessler. “Improved low-count quantitative PET reconstruction with an iterative neural network.” *IEEE Transactions on Medical Imaging*, 39(11):3512–3522, 2020.
- [J2] **Hongki Lim**, Jeffrey A. Fessler, Scott J. Wilderman, Allen F. Brooks, and Yuni K. Dewaraja. “Y-90 SPECT ML image reconstruction with a new model for tissue-dependent bremsstrahlung production using CT information: A proof-of-concept study.” *Physics in Medicine & Biology*, 63(11):115001, 2018.
- [J1] **Hongki Lim**, Yuni K. Dewaraja, and Jeffrey A. Fessler. “A PET reconstruction formulation that enforces non-negativity in projection space for bias reduction in Y-90 imaging.” *Physics in Medicine & Biology*, 63(3):035042, 2018.

Conference Abstracts and Presentations

- [A7] **Hongki Lim**, Il Yong Chun, Jeffrey A. Fessler, and Yuni K. Dewaraja. “Improved low count quantitative SPECT reconstruction with a trained deep learning based regularizer.” *Journal of Nuclear Medicine*, 60(suppl. 1):42, 2019. Oral presentation.
- [A6] **Hongki Lim**, Jeffrey A. Fessler, and Yuni K. Dewaraja. “Joint dual photopeak image reconstruction in Lu-177 SPECT.” *European Journal of Nuclear Medicine and Molecular Imaging*, 45:S95–S96, 2018. Oral presentation.
- [A5] **Hongki Lim**, Kyungsang Kim, Quanzheng Li, Jeffrey A. Fessler, and Yuni K. Dewaraja. “Bias reduction in Y-90 PET with reconstruction that relaxes the non-negativity constraint.” *Journal of Nuclear Medicine*, 59(suppl. 1):580, 2018. Oral presentation.
- [A4] Jeremy Niedbala, **Hongki Lim**, Robert Ackermann, David Hubers, Nancy A. Obuchowski, John Dickson, and Yuni K. Dewaraja. “The impact of total counts on iodine-123 ioflupane SPECT quantification.” *Radiological Society of North America (RSNA) Annual Meeting*, scientific abstract SSE16-05, November 2017. Oral presentation; presenter: Jeremy Niedbala.
- [A3] **Hongki Lim**, Neal Clinthorne, Maurizio Conti, Jeffrey A. Fessler, and Yuni K. Dewaraja. “Quantitative Y-90 PET for dosimetry in radioembolization.” *European Journal of Nuclear Medicine and Molecular Imaging*, 44(suppl. 2):S398, 2017.
- [A2] **Hongki Lim** and Yuni K. Dewaraja. “Impact of Tc-99m SPECT reconstruction methods on lung shunt and lesion/normal liver activity quantification in radioembolization.” *Journal of Nuclear Medicine*, 58(suppl. 1):1032, 2017. Poster presentation.
- [A1] **Hongki Lim**, Yuni K. Dewaraja, Scott J. Wilderman, and Jeffrey A. Fessler. “Y-90 SPECT maximum likelihood image reconstruction with a new model for tissue-dependent bremsstrahlung production.” *Journal of Nuclear Medicine*, 58(suppl. 1):746, 2017. Oral presentation.

Research Datasets

- [D2] **Hongki Lim** and Yuni K. Dewaraja. “Y-90 patients PET/CT & SPECT/CT and corresponding contours dataset.” University of Michigan, Deep Blue Data, 2019.
- [D1] **Hongki Lim** and Yuni K. Dewaraja. “Lu-177 patients CT images and contours dataset for medical image segmentation.” University of Michigan, Deep Blue Data, 2019.

Research Funding

Principal Investigator

Joint Distribution Modeling of Discrete-Continuous Mixed Variables Using Multiple Medical Datasets

National Research Foundation of Korea (NRF), RS-2026-25476632; PI: Hongki Lim

Mar 2026–Feb 2029

Diffusion Models in Gaussian Space for 3D Medical Imaging Reconstruction

National Research Foundation of Korea (NRF), RS-2025-24683103; PI: Hongki Lim

Sep 2025–Aug 2026

GPU Server for Research on Medical Image Report Generation Using Diffusion Model-based Image Synthesis

Korea Basic Science Institute (KBSI), RS-2024-00401899; PI: Hongki Lim

May 2024–Apr 2025

Unifying Image Restoration and Analysis Tasks with Iterative Neural Networks

National Research Foundation of Korea (NRF), 2022R1F1A1069055; PI: Hongki Lim

Jun 2022–Feb 2024

*Participating Grants***Pioneer Program in Next-generation Artificial Intelligence for Industrial Convergence**

BK21 FOUR; PI: Byung Cheol Song, Inha University

Sep 2024–Aug 2027

Developing Multimodal Generative AI Talent for Industrial Convergence

Institute of Information & Communications Technology Planning & Evaluation (IITP), RS-2024-00360227;

PI: Donghwan Kim, 42Maru

Apr 2024–Dec 2027

Graduate School of Digital-based Sustainable Energy Process Innovation Convergence

Korea Institute of Energy Technology Evaluation and Planning (KETEP), RS-2023-00243974;

PI: Sungwon Hwang, Inha University

Apr 2023–Dec 2027

Artificial Intelligence Convergence Innovation Human Resources Development

Institute of Information & Communications Technology Planning & Evaluation (IITP), RS-2022-00155915;

PI: In Kyu Park, Inha University

Completed Dec 2025

Innovative Human Resource Development for Local Intellectualization Support Program

Institute of Information & Communications Technology Planning & Evaluation (IITP), RS-2023-00259678;

PI: Jaehyun Park, Inha University

Jul 2023–Dec 2024

Patents

Granted Patents

- [G2] Mahmoud Mostapha, Boris Mailhe, Dorin Comaniciu, Nirmal Janardhanan, Simon Arberet, **Hongki Lim**, and Mariappan S. Nadar. “Global tractography based on machine learning.” US 12,507,959 B2, granted December 30, 2025. Assignee at grant: Siemens Healthineers AG.
- [G1] Boris Mailhe, Dorin Comaniciu, Simon Arberet, Nirmal Janardhanan, Mariappan S. Nadar, **Hongki Lim**, and Mahmoud Mostapha. “Reconstruction in magnetic resonance imaging with image representations as implicit functions in time.” US 11,835,613 B2, granted December 5, 2023. Assignee at grant: Siemens Healthcare GmbH.

Patent Applications

Republic of Korea. Applicant: Inha University Industry-Academic Cooperation Foundation.

- [P6] **Hongki Lim**, Seunghyeok Shin, Minwoo Kim, and Dabin Kim. “Method and Hardware Device for Signal Reconstruction Using Curvature-Aware Likelihood Correction.” Application 10-2026-0145821, filed August 5, 2026.
- [P5] **Hongki Lim**, Seunghyeok Shin, and Dabin Kim. “Point Cloud Reconstruction Method and Hardware Apparatus Using Forward Curvature-Matching.” Application 10-2026-0112052, filed June 19, 2026.
- [P4] **Hongki Lim**, Seonghwan Yoon, and Kyeongkyu Lee. “Method and Hardware Device for Automated Medical Image Report Generation.” Application 10-2026-0112051, filed June 19, 2026.
- [P3] **Hongki Lim**, Minwoo Kim, and Seunghyeok Shin. “Signal Restoration Method and Hardware Apparatus Using Pre-trained Diffusion Model as Prior.” Application 10-2026-0112050, filed June 19, 2026.
- [P2] **Hongki Lim** and Minwoo Kim. “Method for Medical Image Reconstruction.” Application 10-2025-0000786, filed January 3, 2025.

- [P1] **Hongki Lim**, Minwoo Kim, and Hwan Lee. “Integrated Imaging System and Method for High-Quality Reconstruction and Region Segmentation of Undersampled MRI Data.” Application 10-2024-0200661, filed December 30, 2024.

Teaching

Inha University

Undergraduate Courses

Linear Algebra: Spring 2022–2026

Introduction to Machine Learning: Fall 2022–2024; Spring 2025–2026

Deep Learning: Fall 2022–2026

Random Variables: Fall 2025–2026

Electromagnetics: Spring 2022–2024

Electrical and Electronic Engineering Capstone Design: Fall 2025–2026

Graduate Courses

Deep Generative Models: Fall 2023, 2025

Generative Artificial Intelligence: Fall 2024

AI Project III (co-taught): Spring 2025

Deep Learning: Modern Research Topics: Spring 2026

AI Convergence Project 2: Fall 2026

Machine Learning for Energy Process Innovation: Fall 2024, Fall 2026

Research Supervision

Current Graduate Students

Minwoo Kim (Ph.D.); Seunghyeok Shin (integrated M.S.–Ph.D.); Dabin Kim, Kyeongkyu Lee, Jinhyoung Woo, Sangjun An, and Chang Gi Min (M.S.).

Completed Master’s Students

Seonghwan Yoon: M.S., August 2026

Minwoo Kim: M.S., February 2026; continuing as a Ph.D. student in the lab

Hwan Lee: M.S., February 2026

Student Recognition

Seunghyeok Shin: Excellence in Research Award, BK21 FOUR, Inha University, for 2025 research; awarded February 2026.

Best Paper Award, IEEE/IEIE International Conference on Consumer Electronics-Asia (ICCE-Asia) 2025, for coauthored work presented by Hwan Lee.

Undergraduate Research Mentoring

Undergraduate Research Opportunity Program (UROP), University of Michigan, 2016–2017. Medical image reconstruction and MATLAB.

Invited Talks and Academic Outreach

- Inha University** Oct 12, 2026
Invited alumni address, Graduate School Information Session, Department of Electrical and Computer Engineering
- Korean Institute of Broadcast and Media Engineers Summer Conference** Jun 19, 2026
Jeju, South Korea. “Adaptive 3D reconstruction via diffusion priors and forward curvature-matching likelihood updates.” Invited PI presentation
- Electronics and Telecommunications Research Institute (ETRI)** Feb 20, 2025
Daejeon, South Korea. Invited seminar on deep-learning-based image reconstruction
- 32nd Joint Conference on Signal Processing** Sep 29, 2022
Ewha Womans University. “Deep-learning based image reconstruction and analysis methods for low signal-to-noise ratio emission tomography.” Invited talk
- Michigan State University** Feb 28, 2020
Department of Computational Mathematics, Science and Engineering. “Machine learning based image reconstruction and analysis methods for low signal-to-noise ratio emission tomography.”
- Massachusetts General Hospital** Dec 6, 2019
Gordon Center for Medical Imaging. “Quantitative image reconstruction and analysis methods for low signal-to-noise ratio emission tomography.”

Honors and Awards

- Silver Reviewer Award, International Conference on Machine Learning (ICML) 2026
- IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC) Trainee Grant 2017, 2018
- Rackham Conference Travel Grants, University of Michigan 2017, 2018

Professional Service

Academic and Conference Service

Curriculum Committee: Member, Department of Electrical and Electronic Engineering, Inha University, 2025–present

Thesis Examination Committees: Inha University; excluding own advisees

2026 6 master's theses; doctoral dissertation: Hyunjun Jo (advisor: Deok-Hwan Kim)
 2025 9 master's theses; doctoral dissertation: Srinidhi Kanagachalam (advisor: Deok-Hwan Kim)
 2024 9 master's theses; doctoral dissertation: S. I. M. M. Raton Mondol (advisor: Sangmin Lee)
 2023 Doctoral dissertation: Shan Ullah (advisor: Deok-Hwan Kim)
 2022 5 master's theses

Institute of Electronics and Information Engineers (IEIE): Executive Board Member, 2025–2026

IEEE/IEIE International Conference on Consumer Electronics-Asia (ICCE-Asia): Financial Chair, Special Session Organizer, and Tutorial Session Chair, 2025

Joint Summer School on Image Understanding and Image Processing: Organizing Committee Member, Institute of Electronics and Information Engineers (IEIE), 2022

Conference Reviewing and Program Committees

2026 reviewer service: IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR); European Conference on Computer Vision (ECCV); International Conference on Machine Learning (ICML); Conference on Neural Information Processing Systems (NeurIPS)

Ongoing 2027 cycle: AAAI Conference on Artificial Intelligence (AAAI), Program Committee; International Conference on Learning Representations (ICLR), Reviewer

Research Funding Review

Grant Proposal Reviewer, National Research Foundation of Korea (NRF), 2026.

Journal Reviewing

IEEE Transactions on Medical Imaging; IEEE Transactions on Computational Imaging; IEEE Transactions on Radiation and Plasma Medical Sciences; IEEE Journal of Biomedical and Health Informatics; IEEE Access; Pattern Recognition; Journal of Mathematical Imaging and Vision; Quantitative Imaging in Medicine and Surgery. Ongoing reviewer appointment: *Transactions on Machine Learning Research*, 2026.

Military Service

Republic of Korea Air Force

Jul 2009–Aug 2011

Compulsory military service; Sergeant, Avionics Maintenance Battalion