Seongmin Hong

Postdoctoral Researcher, INMC, Seoul National University

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🌐 Website   🔗 LinkedIn   🎓 Scholar

I am a Postdoctoral Researcher at Seoul National University, currently fulfilling my mandatory alternative military service. My research leverages **first-order optimization** as a unified framework for **Deep Generative Models** and **Computational Imaging**, aiming to transcend the performance limits of traditional feed-forward scaling. By integrating rigorous mathematical foundations with high-efficiency system implementations, I strive to bridge the gap between digital modeling and physical reality—ultimately realizing grounded world models, professional creative ecosystems, and tangible innovations.

Education

Ph.D. in Electrical and Computer Engineering – Seoul National University   03 2020 — 08 2025
Dissertation: Inversion of Deep Generative Models: Structural and Optimization-based Approaches
Award: **Distinguished Ph.D. Dissertation**
Advisor: Se Young Chun, GPA: 4.08/4.3

B.S. in Electrical and Computer Engineering – Seoul National University   03 2016 — 02 2020
GPA: 3.70/4.3

Mathematics and Physics – Gyeonggi Science High School for the Gifted   03 2013 — 02 2016

Experience

Postdoctoral Researcher – Institute of New Media and Communications, SNU   09 2025 — 08 2026

Honors & Fellowships

Apple Scholars in AI/ML PhD fellowship program - Institutional Nominee   2025

Qualcomm Innovation Fellowship Korea 2024 (won 4,000,000 KRW)   12 2024

Brain Korea 21 Four Program   03 2020 — 08 2025

Top-tier Conference Publications (sole first author)

Gradient-free Decoder Inversion in Latent Diffusion Models
Seongmin Hong, Suh Yoon Jeon, Kyeonghyun Lee, Ernest K. Ryu, Se Young Chun
Neural Information Processing Systems (**NeurIPS**), 2024.

Adaptive Selection of Sampling-Reconstruction in Fourier Compressed Sensing
Seongmin Hong, Jaehyeok Bae, Jongho Lee, Se Young Chun
European Conference on Computer Vision (**ECCV**), 2024.

On Exact Inversion of DPM-Solvers
Seongmin Hong, Kyeonghyun Lee, Suh Yoon Jeon, Hyewon Bae, Se Young Chun
Conference on Computer Vision and Pattern Recognition (**CVPR**), 2024.

On the Robustness of Normalizing Flows for Inverse Problems in Imaging
Seongmin Hong, Inbum Park, Se Young Chun
International Conference on Computer Vision (**ICCV**), 2023.

Neural Diffeomorphic Non-uniform B-spline Flows
Seongmin Hong, Se Young Chun
Thirty-Seventh AAAI Conference on Artificial Intelligence (**AAAI**, oral), 2023.

International Journal Publications

Advanced direction of arrival estimation using step-learnt iterative soft-thresholding for frequency-modulated continuous wave multiple-input multiple-output radar
Seongmin Hong, Seong-Cheol Kim, Seongwook Lee
IET Radar, Sonar & Navigation, 2023.

Radar Signal Decomposition in Steering Vector Space for Multi-Target Classification
Seongmin Hong, Seongwook Lee, Byeong-Ho Lee, Jinwook Kim, Yong-Hwa Kim, Seong-Cheol Kim
IEEE Sensors Journal, 2021.

Fidelity-Preserving Zero-shot Diffusion Models for Highly Ill-posed Inverse Problems in Lensless Imaging
Haechang Lee, Dong Ju Mun, Hyunwoo Lee, Kyung Chul Lee, **Seongmin Hong**, Gwanghyun Kim, Seung Ah Lee, Se Young Chun
Accepted at Image and Vision Computing, Volume 165, January 2026.

Robust Watermarks for Audio Diffusion Models by Quadrature Amplitude Modulation
Kyoungryeol Lee*, **Seongmin Hong***, Se Young Chun (*co-first authored)
Pattern Recognition Letters, Vol. 198, pp. 22-28, 2025.

Preprints & Manuscripts under Review

DiffBMP: Differentiable Rendering with Bitmap Primitives
Seongmin Hong*, Junghun James Kim, Daehyeop Kim, Insoo Chung, Se Young Chun, 2025.

Principled Reframing in Motion Transfer with Video Diffusion Models
Donggyu Lee*, **Seongmin Hong***, Se Young Chun (*co-first authored), 2025

Invited Talks

Inversion of Deep Generative Models: Structural and Optimization-based Approaches
At Chung-Ang University, Seoul, Korea, Oct 22, 2025

Inversion of Deep Generative Models: Structural and Optimization-based Approaches
At ETRI, Daejeon, Korea, Oct 21, 2025

On the Robustness of Normalizing Flows for Inverse Problems in Imaging
In 2024 SIAM Conference on Imaging Science (**SIAM IS24**), Atlanta, Georgia, U.S., May 28-31, 2024

Exhibitions & Art Projects

IPA (Interactive Perspective Art): Ciao, Technology   01 2026
Collaborative kinetic art exhibition at SNU Powerplant. Served as the **lead for software infrastructure and typography** for the signature piece *Ordered Volume*—a robotic sculpture utilizing 160 motors and spherical voxels to translate digital data into physical forms.

ARRCO: Multi-view 3D Crystal Point-Cloud Art   2025
Independent crowd-funded project. Developed the full computational pipeline for high-density point-cloud laser engraving to create multi-view optical illusions where distinct images emerge from different observer perspectives.

Patents

Audio Data Management Device and Method Using A Generative AI Model
Se Young Chun, **Seongmin Hong**, Kyungryeol Lee
Korea Patent Filed (Application No. 10-2025-0046656), 04 2025

Teaching Experience

Head TA, Topics in Signal Processing (Generative Diffusion Model, English Lecture)	2025 Autumn
Head TA, Signals and Systems (English Lecture)	2022 Spring
Head TA, Seminar in Electrical and Computer Engineering 3	2020 Spring
TA, Advanced Electromagnetics 1	2020 Spring

Mentoring & Advising

Research Mentor for 10+ Undergraduate Interns   2022 — Present
Intelligent Computational Imaging Lab (ICL), SNU

- Jaehyeok Bae (Now Ph. D. student at **Stanford University**) — *ECCV 2024*

- Inbum Park (Now Ph. D. student at **University of Maryland**) — *ICCV 2023*

- Insoo Chung (Now Research Scientist at **AIRS Medical**)

- Kyeonghyun Lee (Now Ph.D. student at **Seoul National University**) — *CVPR 2024*

- Kyungryeol Lee (Now Ph.D. student at **Seoul National University**) — *PRL 2025*

- Dohyun Mah (Now M.S. student at **Seoul National University**)

- Donggyu Lee (Undergraduate Intern) — *Preprint 2025*

- **Mentored 3+ additional interns** on their early-stage research and career development.

Academic Services

Technical Research Personnel (Alternative military service)   03 2023 — 02 2025, 09 2025 — 08 2026

Reviewer: NeurIPS (2024, 2025), ICML (2025), ICLR (2025, 2026), CVPR (2025), ICCV (2025),
AAAI (2026), AISTATS (2025, 2026), ACMMM (2025)
IEEE Sensors Journal, ACM TOMM, IEEE TPAMI, IEEE TMM   since 2023

Challenges

AIM 2024 Depth Upsampling Challenge - 3rd place
Woojae Han, Kyeonghyun Lee, **Seongmin Hong**, Se Young Chun

Workshop Papers

Uncertainty-Adaptive Selection of Sampling-Reconstruction for Fourier Compressed Sensing
Seongmin Hong, Jaehyeok Bae, Jongho Lee, Se Young Chun
3rd Workshop on Uncertainty Quantification for Computer Vision in ECCV (extended abstract), 2024.

Domestic Publications

Optimization of 16-QAM Constellations with AWGN Channel
Seongmin Hong, Jeong-Hoon Park, Doyoung Ham, Seong-Cheol Kim
KICS Summer Conference (in Korean), 2020.

Target classification based on point cloud data using automotive imaging radar
Sohee Lim, Jaehoon Jung, **Seongmin Hong**, Byeong-ho Lee, Seong-Cheol Kim
KICS Winter Conference (in Korean), 2021.

Measurement Data Release on 2.4 GHz ISM Band Usage
Doyoung Ham, **Seongmin Hong**, Byonghyo Shim, Seong-Cheol Kim
KICS Winter Conference (in Korean), 2021.

Analysis of CNN Classifier Performance for Segway Data with 77GHz Automotive Radar
Byeong-ho Lee, **Seongmin Hong**, Jinwook Kim, Seongwook Lee, Byonghyo Sim, Seong-Cheol Kim
KICS Winter Conference (in Korean), 2021.

References

Prof. Se Young Chun (Advisor)
Professor, ECE
Seoul National University
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Prof. Ernest K. Ryu
Assistant Professor, Applied Mathematics
UCLA
eryu@math.ucla.edu

Prof. Jongho Lee
Professor, ECE
Seoul National University
jonghoyi@snu.ac.kr