

# Hyungjin Chung

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Research interests	Generative models, Diffusion models, Inverse problems, Computational Imaging	
Work Experience	<b>EverEx</b>	2024.08 – Current
	Research Advisor	
	<b>NVIDIA Research</b>	2023.11 – 2024.01
	Research Scientist Intern, AI4Science	
	<b>Google Research</b>	2023.07 – 2023.10
	Student Researcher, team LUMA (perception)	
	<b>Alphasignal</b>	2023.03 – 2023.12
Education	Technical writer	
	<b>Los Alamos National Laboratory</b>	2022.06 – 2022.08
	Research intern, Applied math & Plasma physics (T-5)	
	<b>KAIST</b>	Daejeon, Korea
	Ph.D., Bio & Brain Engineering	2019.03 – 2025.02(expected)
	Advisor: Jong Chul Ye	
	<b>Korea University</b>	Seoul, Korea
Awards	B.S., Biomedical Engineering	2015.03 – 2019.02
	<b>Google Conference Scholarship</b> (\$3000)	2024.5
	<b>30<sup>th</sup> Samsung Humantech Gold Award</b> (\$20000)	2024.2
	- 1st prize in Signal Processing	
	<b>Bronze Prize, IPIU 2024</b>	2024.2
	<b>29<sup>th</sup> Samsung Humantech Gold Award</b> (\$10000)	2023.2
	- 1st prize in Signal Processing	
Professional Service	<b>2020-2023 BISPL Best Researcher Award</b> (\$4000)	2020-2023.12
	<b>Research Advisor</b>	2023.07 – 2023.12
	<i>Team Learners</i>	
	<b>Advisory board member</b>	2021.05 – Present
Conf. publication	<i>SNUHRad-AICON: SNUH-Radiology AI Collaboration Network</i>	
	<b>[C10]</b> Deep Diffusion Image Prior for Efficient OOD Adaptation in 3D Inverse Problems	
	<a href="#">Hyungjin Chung</a> and Jong Chul Ye	
	<i>ECCV 2024</i>	
	<b>[C9]</b> Prompt-tuning Latent Diffusion Models for Inverse Problems	
	<a href="#">Hyungjin Chung</a> , Jong Chul Ye, Peyman Milanfar, Mauricio Delbracio	
	<i>ICML 2024</i>	
	<b>[C8]</b> Decomposed Diffusion Sampler for Accelerating Large-Scale Inverse Problems	
	<a href="#">Hyungjin Chung</a> , Suhyeon Lee, Jong Chul Ye	
	<i>ICLR 2024</i>	
	<b>[C7]</b> Direct Diffusion Bridge using Data Consistency for Inverse Problems	

Hyungjin Chung, Jeongsol Kim, Jong Chul Ye

*NeurIPS 2023*

[C6] Improving 3D Imaging with Pre-Trained Perpendicular 2D Diffusion Models

Suhyeon Lee\*, Hyungjin Chung\*, Minyoung Park, Jonghyuk Park, Wi-Sun Ryu, Jong Chul Ye

*ICCV 2023*

[C5] Score-based Diffusion Models for Bayesian Image Reconstruction

Michael T. Mccann, Hyungjin Chung, Jong Chul Ye, Marc L. Klasky

*ICIP 2023*

[C4] Parallel Diffusion Models of Operator and Image for Blind Inverse Problems

Hyungjin Chung\*, Jeongsol Kim\*, Sehui Kim, Jong Chul Ye

*CVPR 2023*

[C3] Diffusion Posterior Sampling for General Noisy Inverse Problems

Hyungjin Chung\*, Jeongsol Kim\*, Michael T. Mccann, Marc L. Klasky, Jong Chul Ye

*ICLR 2023 (Notable-top-25%)*

[C2] Improving Diffusion Models for Inverse Problems using Manifold Constraints

Hyungjin Chung\*, Byeongsu Sim\*, Dohoon Ryu, Jong Chul Ye

*NeurIPS 2022*

[C1] Come-Closer-Diffuse-Faster: Accelerating Conditional Diffusion Models for Inverse Problems through Stochastic Contraction

Hyungjin Chung, Byeongsu Sim, and Jong Chul Ye

*CVPR 2022*

## Journal publications

[J12] Dehazing Algorithm for Enhancing Fundus Photographs Using Dark Channel and Bright Channel Prior

Se Hie Park, Hyungjin Chung, Jong Chul Ye, Kayoung Yi

*Journal of the Korean Ophthalmological Society, 2024*

[J11] MR Image Denoising and Super-Resolution Using Regularized Reverse Diffusion

Hyungjin Chung, Eun Sun Lee, Jong Chul Ye

*IEEE TMI, 2022*

[J10] Low-dose sparse-view HAADF-STEM-EDX tomography of nanocrystals using unsupervised deep learning

Eunju Cha\*, Hyungjin Chung\*, Jaeduck Jang, Junho Lee, Eunha Lee, Jong Chul Ye

*ACS Nano, 2022*

[J9] Score-based diffusion models for accelerated MRI

Hyungjin Chung and Jong Chul Ye

*Medical Image Analysis, 2021*

[J8] Unsupervised Deep Learning Methods for Biological Image Reconstruction and Enhancement

Mehmet Akçakaya, Burhaneddin Yaman, Hyungjin Chung, Jong Chul Ye

*IEEE SPM, 2021*

[J7] A Deep Learning Model for Diagnosing Gastric Mucosal Lesions Using Endoscopic Images: Development, Validation, and Method Comparison

Joon Yeul Nam\*, Hyungjin Chung\*, Kyu Sung Choi\*, Hyuk Lee\* et al.

*Gastrointestinal Endoscopy, 2021*

[J6] Feature Disentanglement in generating three-dimensional structure from two-dimensional slice with sliceGAN

Hyungjin Chung, Jong Chul Ye

*Nature Machine Intelligence, 2021*

[J5] Missing Cone Artifacts Removal in ODT using Unsupervised Deep Learning in Projection Domain

	<p><a href="#">Hyungjin Chung*</a>, Jaeyoung Huh*, Geon Kim, Yong Keun Park, Jong Chul Ye  <i>IEEE Transactions on Computational Imaging</i>, 2021</p> <p><b>[J4]</b> Two-Stage Deep Learning for Accelerated 3D Time-of-Flight MRA without Matched Training Data  <a href="#">Hyungjin Chung</a>, Eunju Cha, Leonard Sunwoo, Jong Chul Ye  <i>Medical Image Analysis</i>, 2021</p> <p><b>[J3]</b> Deep learning STEM-EDX tomography of nanocrystals  Yoseb Han*, Jaeduck Jang*, Eunju Cha*, Junho Lee*, <a href="#">Hyungjin Chung*</a> et al.  <i>Nature Machine Intelligence</i>, 2021 (March Issue cover)</p> <p><b>[J2]</b> Unpaired training of deep learning tMRA for flexible spatio-temporal resolution  Eunju Cha, <a href="#">Hyungjin Chung</a>, Eung Yeop Kim, Jong Chul Ye  <i>IEEE Transactions on Medical Imaging</i>, 2020</p> <p><b>[J1]</b> Unpaired deep learning for accelerated MRI using optimal transport driven cycleGAN  Gyutaek Oh, Byeongsu Sim, <a href="#">Hyungjin Chung</a>, Leonard Sunwoo, Jong Chul Ye  <i>IEEE Transactions on Computational Imaging</i>, 2020</p>
Workshop publication	<p><b>[W1]</b> Progressive Deblurring of Diffusion Models for Coarse-to-Fine Image Synthesis  Sangyun Lee, <a href="#">Hyungjin Chung</a>, Jaehyeon Kim, Jong Chul Ye  <i>NeurIPS Workshop on score-based methods (SBM)</i>, 2022</p>
Books	<p><b>[B1]</b> Deep Learning for Biomedical Image Reconstruction  Chapter 12: Image Synthesis in Multi-Contrast MRI with Generative Adversarial Networks  Tolga Çukur, Mahmut Yurt, Salman Ul Hassan Dar, <a href="#">Hyungjin Chung</a>, Jong Chul Ye</p>
Reviewer (Conference)	<p>ICLR 2024  NeurIPS 2022-2024  NeurIPS Datasets&amp;Benchmarks 2023-2024  CVPR 2023-2024  ECCV 2022, 2024  ICCV 2023  MICCAI 2022-2023</p>
Reviewer (Journal)	<p>NEJM AI  Nature Communications  Medical Image Analysis  IEEE TMI (<b>Distinguished reviewer</b>), TPAMI, TCI, TSP, TIP, SPS  <a href="#">See full list</a></p>
Invited talks & Lectures	<p><b>Tutorial on Denoising Diffusion Model: Fundamentals &amp; Applications</b>  - LG AI Research 2024.08  - IEIE: Winter School on Biomedical Signal Processing: <a href="#">site</a> 2024.02</p> <p><b>Adapting diffusion models for inverse problems</b>  - UCLA, Caltech: <a href="#">Grundfest Memorial Lecture Series in Graphics and Imaging</a> 2024.02  - <a href="#">2023 NeurIPS Workshop on diffusion models</a> 2023.12  - Google Research 2023.10</p> <p><b>Advances in diffusion models and their applications to inverse problems</b>  - Guest Lecture, Korea University 2023.11</p> <p><b>Generative (diffusion) models for medical imaging</b>  - <a href="#">International Congress on Magnetic Resonance Imaging (ICMRI) 2023</a> 2023.11  - Michigan State University 2023.09</p>

	- Stanford MedAI: <a href="#">youtube</a>	2023.08
	- MGH, School of Medicine, Harvard University	2023.08
	- BRIC academic webinar: <a href="#">youtube</a>	2023.03
	- 45 <sup>th</sup> meeting, The Korean Society of Abdominal Radiology, 2022	2022.06
	<b>Diffusion models: foundations and applications in biomedical imaging</b>	
	- IEEE International Symposium on Biomedical Imaging (ISBI) 2023 <a href="#">tutorial</a>	2023.05
	<b>Diffusion models for inverse problems</b>	
	- Twelve Labs	2024.06
	- AI SEOUL 2024: <a href="#">site</a>	2024.02
	- Inference & control group seminar, Donders Institute, Radboud Univ.: <a href="#">youtube</a>	2023.01
	- LANL T-CNLS seminar, 2022	2022.08
Preprints	<b>[P2]</b> Steerable Conditional Diffusion for Out-of-Distribution Adaptation in Imaging Inverse Problems Riccardo Barbano*, Alexander Denker*, <a href="#">Hyungjin Chung*</a> , Tae Hoon Roh, Simon Arridge, Peter Maass, Bangti Jin, Jong Chul Ye	
	<b>[P1]</b> Generative AI for Medical Imaging: extending the MONAI Framework Pinaya <i>et al.</i> ( <a href="#">Hyungjin Chung</a> : Contributing author)	
Patent	<b>US patent application</b> Score-based Diffusion Model for Accelerated MRI and Apparatus thereof	2023
	<b>Korea patent publication</b> Tomography image processing method using neural network based on unsupervised learning to remove missing cone artifacts and apparatus therefor	2023
	Two-Stage unsupervised learning method for 3D Time-of-flight MRA reconstruction and the apparatus thereof	2023
	<b>Korea patent application</b> Accelerating method of conditional diffusion models for inverse problems using stochastic contraction and the apparatus thereof	2021
	Extreme condition reconstruction method HAADF-STEM-EDX tomography using unsupervised deep learning and the apparatus thereof	2021
Teaching experience	<b>Head TA, KAIST</b> AI 618: Generative models and unsupervised learning	2024-1
	BiS 800: Machine Learning for Medical Image Analysis	2021-2
	<b>TA, KAIST</b> AI 618: Generative models and unsupervised learning	2022-2
	MAS 480: Advanced Intelligence	2021-1
	BiS 452: Biomedical Imaging	2020-2
	BiS 301: Bioengineering Laboratory I	2019, 2020-1
References	<b>Jong Chul Ye</b>	2019.03 - current
	Ph.D. advisor (KAIST)	<a href="mailto:jong.ye@kaist.ac.kr">jong.ye@kaist.ac.kr</a>
	<b>Michael T. McCann</b>	2022.06 - 2022.08
	Host (LANL)	<a href="mailto:mccann@lanl.gov">mccann@lanl.gov</a>
	<b>Mauricio Delbracio</b>	2023.07 - current
	Host (Google)	<a href="mailto:mdelbra@google.com">mdelbra@google.com</a>