Hyungjin Chung

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Research interests

Generative models, Inverse problems, Multimodal/Motion Representation

Work Experience

EverEx *Seoul, Korea*
AI Research Scientist 2024.08 – Current
NVIDIA Research *San Jose, USA (remote)*
Research Scientist Intern, AI4Science 2023.11 – 2024.01
Google Research *Mountain View, USA*
Student Researcher, team LUMA (perception) 2023.07 – 2023.10
Los Alamos National Laboratory *Los Alamos, USA*
Research intern, Applied math & Plasma physics (T-5) 2022.06 – 2022.08

Education

KAIST *Daejeon, Korea*
Ph.D., Bio & Brain Engineering 2019.03 – 2025.02
Advisor: Jong Chul Ye
Thesis: *Practical approximations of posterior sampling in diffusion model-based inverse problems*
Korea University *Seoul, Korea*
B.S., Biomedical Engineering 2015.03 – 2019.02

Awards

31st Samsung Humantech Silver Award ($10000) 2024.2
Google Conference Scholarship ($3000) 2024.5
30th Samsung Humantech Gold Award ($20000) 2024.2
Bronze Prize, IPIU 2024 2024.2
29th Samsung Humantech Gold Award ($10000) 2023.2
2020-2024 BISPL Best Researcher Award ($4000×5) 2020-2024.12

Conf. publications

[C12] CFG++: Manifold-constrained Classifier Free Guidance for Diffusion Models
Hyungjin Chung*, Jeongsol Kim*, Geon-Yeong Park*, Hyelin Nam*, Jong Chul Ye
ICLR 2025

[C11] Regularization by texts for latent diffusion inverse solvers
Jeongsol Kim*, Geon-Yeong Park*, Hyungjin Chung, Jong Chul Ye
ICLR 2025 (spotlight)

[C10] Deep Diffusion Image Prior for Efficient OOD Adaptation in 3D Inverse Problems
Hyungjin Chung and Jong Chul Ye
ECCV 2024

[C9] Prompt-tuning Latent Diffusion Models for Inverse Problems
Hyungjin Chung, Jong Chul Ye, Peyman Milanfar, Mauricio Delbracio
ICML 2024

[C8] Decomposed Diffusion Sampler for Accelerating Large-Scale Inverse Problems
Hyungjin Chung, Suhyeon Lee, Jong Chul Ye
ICLR 2024

[C7] 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

[J13] Steerable Conditional Diffusion for Out-of-Distribution Adaptation in Medical Image Reconstruction
Alexander Denker*, Riccardo Barbano*, Hyungjin Chung*, Tae Hoon Roh, Simon Arrdige, Peter Maass, Bangti Jin, Jong Chul Ye
IEEE TMI, 2025

[J12] Fundus image enhancement through direct diffusion bridges
Sehui Kim*, Hyungjin Chung*, Se Hie Park, Eui-Sang Chung, Kayoung Yi, Jong Chul Ye
IEEE JBHI, 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
Hyungjin Chung*, Jaeyoung Huh*, Geon Kim, Yong Keun Park, Jong Chul Ye
IEEE Transactions on Computational Imaging, 2021

[J4] Two-Stage Deep Learning for Accelerated 3D Time-of-Flight MRA without Matched Training Data
Hyungjin Chung, Eunju Cha, Leonard Sunwoo, Jong Chul Ye
Medical Image Analysis, 2021

[J3] Deep learning STEM-EDX tomography of nanocrystals
Yoseob Han*, Jaeduck Jang*, Eunju Cha*, Junho Lee*, Hyungjin Chung* et al.
Nature Machine Intelligence, 2021 (March Issue cover)

[J2] Unpaired training of deep learning tMRA for flexible spatio-temporal resolution
Eunju Cha, Hyungjin Chung, Eung Yeop Kim, Jong Chul Ye
IEEE Transactions on Medical Imaging, 2020

[J1] Unpaired deep learning for accelerated MRI using optimal transport driven cycleGAN
Gyutaek Oh, Byeongsu Sim, Hyungjin Chung, Leonard Sunwoo, Jong Chul Ye
IEEE Transactions on Computational Imaging, 2020

Books

[B1] 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, Hyungjin Chung, Jong Chul Ye

Reviewer (Conference)

ICLR 2024-2025
NeurIPS 2022-2024
NeurIPS Datasets&Benchmarks 2023-2024
CVPR 2023-2025
ECCV 2022, 2024
ICCV 2023
MICCAI 2022-2023

Reviewer (Journal)

NEJM AI
Nature Communications
Medical Image Analysis
IEEE TMI (*Gold Distinguished reviewer 2024*, *Bronze Distinguished reviewer 2023*)
IEEE TPAMI, TCI, TSP, TIP, SPS, SPL
See full list

Invited talks & Letures

Texts in inverse problem solving using diffusion models
- *University of Michigan* 2024.10

Tutorial on Denoising Diffusion Model: Fundamentals & Applications
- *IEIE: Winter School on Biomedical Signal Processing* 2024.02

Adapting diffusion models for inverse problems
- *UCLA, Caltech: Grundfest Memorial Lecture Series in Graphics and Imaging* 2024.02
- *2023 NeurIPS Workshop on diffusion models* 2023.12
- *Google Research* 2023.10

Advances in diffusion models and their applications to inverse problems
- *Guest Lecture, Korea University* 2023.11

Generative (diffusion) models for medical imaging
- *International Congress on Magnetic Resonance Imaging (ICMRI) 2023* 2023.11
- *Michigan State University* 2023.09

- *Stanford MedAI* 2023.08
- *MGH, School of Medicine, Harvard University* 2023.08
- *BRIC academic webinar* 2023.03
- *45th meeting, The Korean Society of Abdominal Radiology, 2022* 2022.06

Diffusion models: foundations and applications in biomedical imaging

- *IEEE International Symposium on Biomedical Imaging (ISBI) 2023* 2023.05

Diffusion models for inverse problems

- *LANL* 2024.11
- *IPA seminar, Korea University* 2024.09
- *Krafton AI* 2024.09
- *DRGem* 2024.08
- *LG AI Research* 2024.08
- *Twelve Labs* 2024.06
- *AI SEOUL 2024* 2024.02
- *Inference & control group seminar, Donders Institute, Radboud Univ.* 2023.01
- *LANL T-CNLS seminar, 2022* 2022.08

Preprints

[P14] A Foundational Brain Dynamics Model via Stochastic Optimal Control

Joonhyeong Park*, Byoungwoo Park*, Chang-Bae Bang, Jungwon Choi, Hyungjin Chung, Byung-Hoon Kim†, Juho Lee†

[P13] Advancing Ultra Low-Field MRI with Synthetic Data and Deep Learning-Based Image Enhancement for Brain Volume Analysis

Peter Hsu, Elisa Marchetto, Hyungjin Chung, Dohun Lee, Jong Chul Ye, Daniel Sodickson, Jelle Veraart, Patricia Johnson

[P12] Advancing Ultra Low-Field MRI with Synthetic Data and Deep Learning-Based Image Enhancement for Brain Volume Analysis

Peter Hsu, Elisa Marchetto, Hyungjin Chung, Dohun Lee, Jong Chul Ye, Daniel Sodickson, Jelle Veraart, Patricia Johnson

[P11] Lesion-Aware Post-Training of Latent Diffusion Models for Synthesizing Diffusion MRI from CT Perfusion

Junhyeok Lee, Hyungwoong Kim, Hyungjin Chung, Heeseong Eom, Jang Joon, Chul-Ho Sohn, Kyu Sung Choi

[P10] ContextMRI: Enhancing Compressed Sensing MRI through Metadata Conditioning

Hyungjin Chung*, Dohun Lee*, Zihui Wu, Byung-Hoon Kim, Katie Bouman, Jong Chul Ye

[P9] Contrastive CFG: Improving CFG in Diffusion Models by Contrasting Positive and Negative Concepts

Jinho Chang, Hyungjin Chung, Jong Chul Ye

[P8] Derivative-Free Diffusion Manifold-Constrained Gradient for Unified XAI

Won Jun Kim*, Hyungjin Chung*, Jemin Kim*, Byeongsu Sim, Sangmin Lee, Jong Chul Ye

[P7] CapeLLM: Support-Free Category-Agnostic Pose Estimation with Multimodal Large Language Models

Junho Kim, Hyungjin Chung, Byung-Hoon Kim

[P6] ACDC: Autoregressive coherent multimodal generation using diffusion correction

Hyungjin Chung*, Dohun Lee*, Jong Chul Ye

[P5] A survey on diffusion models for inverse problems

Giannis Daras, Hyungjin Chung, Chieh-Hsin Lai, Yuki Mitsufuji, Jong Chul Ye, Peyman Milanfar, Alexandros G Dimakis, Mauricio Delbracio

[P4] Amortized Posterior Sampling with Diffusion Prior Distillation

Abbas Mammadov*, Hyungjin Chung*, Jong Chul Ye

[P3] Deep Learning for Deep Learning Performance: How Much Data Is Needed in Biomedical Imaging?

Kyu Sung Choi, Junhyeok Lee, Hyungjin Chung, Jeong-Hoon Lee

[P2] Objective and Interpretable Breast Cosmesis Evaluation with Attention Guided Denoising Diffusion Anomaly Detection Model

Sangjoon Park, Yong Bae Kim, Jee Suk Chang, Seo Hee Choi, Hyungjin Chung, Ik Jae Lee, Hwa Kyung Byun

[P1] Generative AI for Medical Imaging: extending the MONAI Framework

Pinaya *et al.* (Hyungjin Chung: Contributing author)

Patent

US patent application

- Score-based Diffusion Model for Accelerated MRI and Apparatus thereof 2023

Korea patent publication

- Crowd Deep Learning Method of Medical Artificial Intelligence and Apparatus thereof 2025
- Score-based Diffusion Model for Accelerated MRI and Apparatus thereof 2024
- Task-agnostic image processing method and apparatus using transformer and federated split learning 2024
- 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

Korea patent application

- 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

Head TA, KAIST

AI 618: Generative models and unsupervised learning 2024-1

BiS 800: Machine Learning for Medical Image Analysis 2021-2

TA, KAIST

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

Jong Chul Ye 2019.03 - 2025.02

Ph.D. advisor (KAIST) jong.ye@kaist.ac.kr

Michael T. McCann 2022.06 - 2022.08

Host (LANL) mccann@lanl.gov

Mauricio Delbracio 2023.07 - 2023.11

Host (Google) mdelbra@google.com