Hyungjin Chung

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Research interests

Generative models, Diffusion models, Inverse problems, Computational Imaging

Work Experience

NVIDIA Research 2023.11 – 2024.01
Research Scientist Intern, AI4Science

Google Research 2023.07 – 2023.10
Student Researcher, team LUMA (perception)

Alphasignal 2023.03 – Present
Technical writer

Los Alamos National Laboratory 2022.06 – 2022.08
Research intern, Applied math & Plasma physics (T-5)

Education

KAIST Daejeon, Korea
Ph.D., Bio & Brain Engineering 2019.03 – 2025.02(expected)
Advisor: Jong Chul Ye

Korea University Seoul, Korea
B.S., Biomedical Engineering 2015.03 – 2019.02

Awards

30th Samsung Humantech Gold Award (1st in signal Processing) 2024.2
Bronze Prize, IPIU 2024 2024.2
29th Samsung Humantech Gold Award (1st in signal Processing) 2023.2
2020-2023 BISPL Best Researcher Award 2020-2023.12

Professional Service

Research Advisor 2023.07 – 2023.12
Team Learners

Advisory board member 2021.05 – Present
SNUHRad-AICON: SNUH-Radiology AI Collaboration Network

Conf. publication

[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

Workshop publication

[W0] Progressive Deblurring of Diffusion Models for Coarse-to-Fine Image Synthesis
Sangyun Lee, Hyungjin Chung, Jaehyeon Kim, Jong Chul Ye
NeurIPS Workshop on score-based methods (SBM), 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
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

Reviewer (Conference)

ICLR 2024

NeurIPS 2022-2023

NeurIPS Datasets&Benchmarks 2023

CVPR 2023-2024

ECCV 2022, 2024

ICCV 2023

MICCAI 2022-2023

Reviewer (Journal)

NEJM AI

IEEE TMI (**Distinguised reviewer**)

IEEE TPAMI

IEEE TCI

IEEE TSP

IEEE TIP

Medical Image Analysis

See full list

Invited talks & Letures

Tutorial on Denoising Diffusion Model: Fundamentals & Applications

- *IEIE: Winter School on Biomedical Signal Processing*: site 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: youtube* 2023.08
- *MGH, School of Medicine, Harvard University* 2023.08
- *BRIC academic webinar*: youtube 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 tutorial* 2023.05

Diffusion models for inverse problems

- *AI SEOUL 2024:* site 2024.02
- *Inference & control group seminar, Donders Institute, Radboud Univ.*: youtube 2023.01
- *LANL T-CNLS seminar, 2022* 2022.08

Preprints

[P3] Prompt-tuning latent diffusion models for inverse problems

Hyungjin Chung, Jong Chul Ye, Peyman Milanfar, Mauricio Delbracio

[P2] Steerable Conditional Diffusion for Out-of-Distribution Adaptation in Imaging Inverse Problems

Riccardo Barbano*, Alexander Denker*, Hyungjin Chung*, Tae Hoon Roh, Simon Arrdige, Peter Maass, Bangti Jin, Jong Chul Ye

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

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

Teaching experience

Head TA, KAIST Fall 2021

BiS 800: Machine Learning for Medical Image Analysis

TA, KAIST 2019-2022

AI 618: Generative models and unsupervised learning

MAS 480: Advanced Intelligence

BiS 452: Biomedical Imaging

BiS 301: Bioengineering Laboratory I

References

Jong Chul Ye 2019.03 - current

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 - current

Host (Google) mdelbra@google.com