BRYAN SANGWOO KIM

M.S. Student @ KAIST AI

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bryanswkim
South Korea, United States of America **(Dual Citizenship)**

RESEARCH INTERESTS

I have a broad interest in generative models that work across various modalities (images, video, text) and their applications. Much of my recent research involves using such multimodal systems to drive tangible solutions for practical, real-world challenges. **Keywords: Multi-modal generative models, Image & video diffusion models, Inverse problems**

EDUCATION

3/2024 - 2/2026 **Korea Advanced Institute of Science and Technology (KAIST)** — **Seoul, South Korea**
M.S., Artifical Intelligence (Advisor: **Jong Chul Ye**)
GPA: 4.25/4.3

3/2018 - 2/2024 **Korea Advanced Institute of Science and Technology (KAIST)** — **Daejeon, South Korea**
B.S., Computer Science, Biological Sciences (Double Major)
Leave of Absence: Mandatory Korean Military Service (2021, 2022)
GPA: 3.96/4.3 (Magna Cum Laude)

6/2018 - 8/2018 **University of California, Berkeley** — **Berkeley, CA**
Summer Session
Tuition and stipend fully covered by KAIST Presidential Fellowship

3/2015 - 2/2018 **Daegu Science High School** — **Daegu, South Korea**
High school for gifted students in science and mathematics

PUBLICATIONS & PREPRINTS

NeurIPS 2025
First Author

Chain-of-Zoom: Extreme Super-Resolution via Scale Autoregression and Preference Alignment
Bryan Sangwoo Kim, Jeongsol Kim, Jong Chul Ye
Conference on Neural Information Processing Systems, 2025
Spotlight Presentation (688/21575=3.19%)
Links: **Github Stars: 700+**

ICCV 2025
First Author

FlowDPS: Flow-Driven Posterior Sampling for Inverse Problems
Jeongsol Kim*, **Bryan Sangwoo Kim***, Jong Chul Ye **(*equal contribution)**
IEEE/CVF International Conference on Computer Vision, 2025
Links:

ICCV 2025
Second Author

Free^{2}Guide: Training-Free Text-to-Video Alignment using Image LVLM
Jaemin Kim, **Bryan Sangwoo Kim**, Jong Chul Ye
IEEE/CVF International Conference on Computer Vision, 2025
Links:

CVPR 2025
First Author

VideoGuide: Improving Video Diffusion Models without Training Through a Teacher's Guide
Dohun Lee*, **Bryan Sangwoo Kim***, Geon Yeong Park, Jong Chul Ye **(*equal contribution)**
IEEE/CVF Conference on Computer Vision and Pattern Recognition, 2025
Links:

Preprint
First Author

Align Your Query: Representation Alignment for Multimodality Medical Object Detection
Ara Seo*, **Bryan Sangwoo Kim***, Hyungjin Chung, Jong Chul Ye **(*equal contribution)**
Links:

Preprint
First Author

Extreme Blind Image Restoration via Prompt-Conditioned Information Bottleneck
Hongeun Kim*, **Bryan Sangwoo Kim***, Jong Chul Ye **(*equal contribution)**
Links:

PATENTS

2025 **Method for Image Super-Resolution and Apparatus** **Filed Patent**
Jong Chul Ye, **Bryan Sangwoo Kim**, Jeongsol Kim
Korean Patent, Filed, No. 10-2025-0112631, 2025

AWARDS & HONORS

2024 - 2025 **KAIST Graduate Scholarship,** KAIST
Full scholarship for tuition and stipend

2020 **KAIST Department Honors Scholarship (Department Valedictorian),** KAIST

2020 - 2023 **National Excellence Scholarship (Natural Sciences & Engineering),** Korea Student Aid Foundation
Full scholarship for tuition, living expenses support for undergraduate studies

2018 **KAIST Dean's List,** KAIST

2018 - 2024 **KAIST Presidential Fellowship (KPF),** Honor Society of KAIST

2018 - 2019 **KAIST Undergraduate Scholarship,** KAIST
Full scholarship for tuition

2016 **Hansung Scholarship for Gifted Students ($10,000),** Hansung Son Jae-han Scholarship Foundation

RESEARCH PROJECTS (GOVERNMENT/INDUSTRIAL)

7/2024 - Present **Acquisition of 3D Precise Information of Microstructure and Development of Authoring Technology for Ultra-high Precision Cultural Restoration**
Ministry of Culture, Sports and Tourism (South Korea) **Project Leader & Main Researcher**
: Developed a recursive resolution enhancement algorithm to achieve high resolutions in reconstructed CT images. Incorporated algorithms to further enhance consistency across multiple scales. Conducted experiments to enhance the CT image resolutions of various artifact data.

10/2024 - 3/2025 **Development of a PPG-based Respiratory Rate Prediction Algorithm**
SkyLabs Co. **Project Leader & Main Researcher**
: Labeled respiratory rate segments using sensor data with peak detection algorithms. Developed and applied a template-matching SQI for data preprocessing. Developed a PPG foundation model with low-frequency VQVAE for time series tokenization and BERT for serial analysis. Trained a multi-token classifier with multiple token inputs and proved its effective prediction for a wide range of respiratory rates.

3/2024 - 8/2024 **Development of ECG-based Seizure Prediction, Detection, Post-Detection Models**
SkyLabs Co. **Project Leader & Main Researcher**
: Developed an ECG foundation model with VQVAE for time series tokenization and BERT for serial analysis. Applied techniques (*e.g.*, contrastive learning) to improve representations. Leveraged the ECG foundation model on the downstream tasks of seizure prediction/detection/post-detection by training classifiers on `[CLS]` token outputs. Final evaluation demonstrated 100% accuracy on seizure detection.

RESEARCH EXPERIENCE

6/2023 - 8/2023 **KAIST AI Research Internship (KAIRI)** **Daejeon, South Korea**
Bioimaging, Signal Processing, & Learning Lab, KAIST (Advisor: Prof. Jong Chul Ye)
: Studied/implemented diffusion models and their various applications, especially regarding inverse problems. Conducted research into generative modeling of protein sequences.

3/2023 - 4/2023 **Research Service** **Seoul, South Korea**
Innerverz Co.
: Created a framework for accurate eye control (*e.g.*, eye blink, gaze redirection) consisting of two distinct modules: a blink control module and a gaze redirection module. Used a novel data augmentation method to train each module, leveraging style mixing to obtain images with desired features. Work is organized and presented in the technical report 'EyeBAG: Accurate Control of Eye Blink and Gaze Based on Data Augmentation Leveraging Style Mixing' available on ArXiv. Link:

9/2020 - 2/2021 **Undergraduate Research Internship** **Daejeon, South Korea**
Systems Neuroscience Laboratory, KAIST (Advisor: Prof. Min Whan Jung)
: Analyzed oscillatory neural activities (ripples) in the mouse brain hippocampus with the Allen Mouse Brain Atlas dataset. Leveraged machine learning techniques to explore patterns and anomalies in mouse neural activities.

6/2019 - 12/2019 **Undergraduate Research Internship** **Daejeon, South Korea**
Brain x Machine Intelligence Lab, KAIST (Advisor: Prof. Sang Wan Lee)
: Developed software code for multi-voxel pattern analysis of fMRI neuroimaging data with MATLAB.

TEACHING EXPERIENCE & OUTREACH

9/2025 - Present **Teaching Assistant @KAIST** **Seoul, South Korea**
KAIST - AI618: Generative Models and Unsupervised Learning

7/2025 - 8/2025 **Teaching Assistant @SK mySUNI Education Platform** **Seoul, South Korea**
SK mySUNI Sunny C Undergraduate Future-Competence Program
: Provided online mentorship for 'Business Applications of AI & Generative AI'. Coached participants on identifying high-ROI AI use cases and building hands-on LLM-driven workflows.

7/2025 **Teaching Assistant @Samsung Financial Networks** **Seoul, South Korea**
Samsung Fire & Marine Insurance AI Business Expert Training Program
: Assisted hands-on workshop lectures on LLM basics, RAG, LangChain, and Streamlit prototyping.

8/2020 - 12/2020 **Teaching Assistant & Mentor @KSOP (KAIST Science Outreach Program)** **Daejeon, South Korea**
KAIST Science Outreach Program Online Academic Mentorship
: Provided online academic mentorship during the semester and intensive camp training during school break for socially disadvantaged students interested in mathematics and science.

8/2019 **Teaching Assistant & Mentor @Hansung Scholarship Summer Camp** **Seoul, South Korea**
6th Hansung Nobel Young Talent Scholarship Summer Camp
: Assisted a project on the transformation of traditional industries through blockchain technology. Participated as a mentor for high school students on the field of bioengineering.

OTHER EXPERIENCE

9/2025 **A Roundtable with Former Prime Minister Justin Trudeau: Global Governance and Democratic Values for AI Innovation @National AI Research Lab (NAIRL)** **Seoul, Korea**
Hosted by National AI Research Lab & Maeil Business Newspaper
: Engaged in a roundtable discussion with former Canadian Prime Minister Justin Trudeau, with a focus on Responsible AI (*e.g.*, current AI models; global governance and partnerships on AI innovations; innovative AI applications for people's everyday lives and societal impacts).

1/2020 **Academic Collaboration Forum @Indian Institute of Technology, Madras** **Chennai, India**
2020 KAIST-IITM Academic Collaboration Forum
: Participated in the 2020 KAIST-IITM Joint Research Challenge, organized between the KAIST Presidential Fellowship (KPF) group and the Centre for Innovation (CFI) group. Awarded 2nd place for proposing a solution to the challenge of 'Food Waste Management in Student Messes'.

8/2019 **Exploratory Research in Southeast Asia @Malaysia** **Kuala Lumpur, Malaysia**
Group Leadership Activity (GLA) Program
: Awarded 1st place in the Group Leadership Activity (GLA) program for interviewing experts in dementia-related work and sharing their messages with the world. Conducted additional exploratory research in the AACC (Atria-ADFM Community Corner) of Malaysia, fully funded by the KAIST Global Leadership Center.

IT SKILLS

Programming Languages - Python, C, MATLAB

Programming Languages (Minor) - Java, Kotlin, C++, Rust

Technical Skills - HTML, JavaScript, CSS, LaTeX

Libraries - PyTorch, Tensorflow, NumPy, Pandas, Matplotlib, Scikit-learn

LANGUAGES

Korean - native, **English** - native

REFERENCES

3/2024 - Present **Jong Chul Ye,** Endowed Chair Professor of KAIST **jong.ye@kaist.ac.kr**
M.S. Advisor (KAIST)