

# BRYAN SANGWOO KIM

M.S. Student @ KAIST AI

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 bryanswkim.github.io

 [github.com/bryanswkim](https://github.com/bryanswkim)

 bryanswkim

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

## RESEARCH INTERESTS

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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

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2/2024 - 2/2026	<b>Korea Advanced Institute of Science and Technology (KAIST)</b> M.S., Artificial Intelligence (Advisor: <b>Jong Chul Ye</b> ) GPA: 4.25/4.3	Seoul, South Korea
2/2018 - 2/2024	<b>Korea Advanced Institute of Science and Technology (KAIST)</b> 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)	Daejeon, South Korea
6/2018 - 8/2018	<b>University of California, Berkeley</b> Summer Session Tuition and stipend fully covered by KAIST Presidential Fellowship	Berkeley, CA
2/2015 - 2/2018	<b>Daegu Science High School</b> High school for gifted students in science and mathematics	Daegu, South Korea

## PUBLICATIONS & PREPRINTS

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NeurIPS 2025 First Author	<b>[C4] Chain-of-Zoom: Extreme Super-Resolution via Scale Autoregression and Preference Alignment</b> <b>Bryan Sangwoo Kim</b> , Jeongsol Kim, Jong Chul Ye <i>Conference on Neural Information Processing Systems, 2025</i> <b>Spotlight Presentation (688/21575=3.19%)</b> Links:    <b>Github Stars: 700+</b>
ICCV 2025 First Author	<b>[C3] FlowDPS: Flow-Driven Posterior Sampling for Inverse Problems</b> Jeongsol Kim*, <b>Bryan Sangwoo Kim</b> *, Jong Chul Ye (*equal contribution) <i>IEEE/CVF International Conference on Computer Vision, 2025</i> Links:  
ICCV 2025 Second Author	<b>[C2] Free<sup>2</sup>Guide: Training-Free Text-to-Video Alignment using Image LVLM</b> Jaemin Kim, <b>Bryan Sangwoo Kim</b> , Jong Chul Ye <i>IEEE/CVF International Conference on Computer Vision, 2025</i> Links:  
CVPR 2025 First Author	<b>[C1] VideoGuide: Improving Video Diffusion Models without Training Through a Teacher's Guide</b> Dohun Lee*, <b>Bryan Sangwoo Kim</b> *, Geon Yeong Park, Jong Chul Ye (*equal contribution) <i>IEEE/CVF Conference on Computer Vision and Pattern Recognition, 2025</i> Links:  
Preprint First Author	<b>[P2] Align Your Query: Representation Alignment for Multimodality Medical Object Detection</b> Ara Seo*, <b>Bryan Sangwoo Kim</b> *, Hyungjin Chung, Jong Chul Ye (*equal contribution) Links:  
Preprint First Author	<b>[P1] Extreme Blind Image Restoration via Prompt-Conditioned Information Bottleneck</b> Hongeun Kim*, <b>Bryan Sangwoo Kim</b> *, Jong Chul Ye (*equal contribution) Links: 

## PATENTS

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2025	<b>Method for Image Super-Resolution and Apparatus</b> Jong Chul Ye, <b>Bryan Sangwoo Kim</b> , Jeongsol Kim Korean Patent, Filed, No. 10-2025-0112631, 2025	Filed Patent
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## AWARDS & HONORS

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2025	<b>BISPL Best Master Student Award</b> , KAIST BISPL
2025	<b>Best Poster Presentation Award</b> , Korean Society of Artificial Intelligence in Medicine (KoSAIM) Awarded in the Multimodal division for preprint [P2].
2024 - 2025	<b>KAIST Graduate Scholarship</b> , KAIST Full scholarship for tuition and stipend.
2020	<b>KAIST Department Honors Scholarship (Department Valedictorian)</b> , KAIST
2020 - 2023	<b>National Excellence Scholarship (Natural Sciences &amp; Engineering)</b> , Korea Student Aid Foundation Full scholarship for tuition, living expenses support for undergraduate studies.
2018	<b>KAIST Dean's List</b> , KAIST
2018 - 2024	<b>KAIST Presidential Fellowship (KPF)</b> , Honor Society of KAIST
2018 - 2019	<b>KAIST Undergraduate Scholarship</b> , KAIST Full scholarship for tuition.
2016	<b>Hansung Scholarship for Gifted Students (\$10,000)</b> , Hansung Son Jae-han Scholarship Foundation

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## RESEARCH PROJECTS (GOVERNMENT/INDUSTRY)

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7/2024 - Present	<b>Acquisition of 3D Precise Information of Microstructure and Development of Authoring Technology for Ultra-high Precision Cultural Restoration</b> <i>Ministry of Culture, Sports and Tourism (South Korea)</i>	<b>Project Leader &amp; Main Researcher</b>
: 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	<b>Development of a PPG-based Respiratory Rate Prediction Algorithm</b> <i>Sky Labs Inc.</i>	<b>Project Leader &amp; Main Researcher</b>
	: 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	<b>Development of ECG-based Seizure Prediction, Detection, Post-Detection Models</b> <i>Sky Labs Inc.</i>	<b>Project Leader &amp; Main Researcher</b>
	: 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.	

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## RESEARCH EXPERIENCE

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6/2023 - 8/2023	<b>KAIST AI Research Internship (KAIRI)</b> <i>Bioimaging, Signal Processing, &amp; Learning Lab, KAIST (Advisor: Prof. Jong Chul Ye)</i>	<b>Daejeon, South Korea</b>
: Studied/implemented diffusion models and their various applications, especially regarding inverse problems. Conducted research into generative modeling of protein sequences.		
3/2023 - 4/2023	<b>Research Service</b> <i>Innververz Co.</i>	<b>Seoul, South Korea</b>
: 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: <a href="#">[link]</a>		
9/2020 - 2/2021	<b>Undergraduate Research Internship</b> <i>Systems Neuroscience Laboratory, KAIST (Advisor: Prof. Min Whan Jung)</i>	<b>Daejeon, South Korea</b>
: 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	<b>Undergraduate Research Internship</b> <i>Brain x Machine Intelligence Lab, KAIST (Advisor: Prof. Sang Wan Lee)</i>	<b>Daejeon, South Korea</b>
: Developed software code for multi-voxel pattern analysis of fMRI neuroimaging data with MATLAB.		

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## TEACHING EXPERIENCE & OUTREACH

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9/2025 - Present	<b>Teaching Assistant @KAIST</b> <i>KAIST - AI618: Generative Models and Unsupervised Learning</i>	Seoul, South Korea
7/2025 - 8/2025	<b>Teaching Assistant @SK mySUNI Education Platform</b> <i>SK mySUNI Sunny C Undergraduate Future-Competence Program</i> : 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.	Seoul, South Korea
7/2025	<b>Teaching Assistant @Samsung Financial Networks</b> <i>Samsung Fire &amp; Marine Insurance AI Business Expert Training Program</i> : Assisted hands-on workshop lectures on LLM basics, RAG, LangChain, and Streamlit prototyping.	Seoul, South Korea
8/2020 - 12/2020	<b>Teaching Assistant &amp; Mentor @KSOP (KAIST Science Outreach Program)</b> <i>KAIST Science Outreach Program Online Academic Mentorship</i> : Provided online academic mentorship during the semester and intensive camp training during school break for socially disadvantaged students interested in mathematics and science.	Daejeon, South Korea
8/2019	<b>Teaching Assistant &amp; Mentor @Hansung Scholarship Summer Camp</b> <i>6th Hansung Nobel Young Talent Scholarship Summer Camp</i> : Participated as a mentor for high school students in the field of bioengineering.	Seoul, South Korea

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## OTHER EXPERIENCE

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9/2025	<b>A Roundtable with Former Prime Minister Justin Trudeau: Global Governance and Democratic Values for AI Innovation @National AI Research Lab (NAIRL)</b> <i>Hosted by National AI Research Lab &amp; Maeil Business Newspaper</i> : 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).	Seoul, Korea
1/2020	<b>Academic Collaboration Forum @Indian Institute of Technology, Madras</b> <i>2020 KAIST-IITM Academic Collaboration Forum</i> : 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'.	Chennai, India
8/2019	<b>Exploratory Research in Southeast Asia @Malaysia</b> <i>Group Leadership Activity (GLA) Program</i> : 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.	Kuala Lumpur, Malaysia

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## IT SKILLS

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- 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

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## LANGUAGES

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- English** - native, **Korean** - native

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## REFERENCES

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3/2024 - Present	<b>Jong Chul Ye</b> , Endowed Chair Professor of KAIST M.S. Advisor (KAIST)	<a href="mailto:jong.ye@kaist.ac.kr">jong.ye@kaist.ac.kr</a>
3/2024 - Present	<b>Hyungjin Chung</b> , Lead AI Research Scientist at EverEx Mentor and co-author (KAIST)	<a href="mailto:hyungjin.chg@gmail.com">hyungjin.chg@gmail.com</a>
3/2018 - 2/2023	<b>Min Whan Jung</b> , Professor of KAIST Undergraduate Advisor (KAIST)	<a href="mailto:mwjung@kaist.ac.kr">mjung@kaist.ac.kr</a>