



## RESEARCH INTERESTS

### Computer Vision, Generative AI, Human-AI

I aim to understand and generate images, videos, and 3D content, particularly for narrative-driven multimodal media, through a human-centered perspective and real-world representations.

## EDUCATION

[Seoul National University](#), Seoul, South Korea  
M.S. in Brain and Cognitive Sciences (Advisor: [Jiook Cha](#))  
Overall GPA: 3.61/4.3 (94.1%)

Mar 2021 – Aug 2023

[Ewha Womans University](#), Seoul, South Korea  
B.S. in Computer Science and Engineering  
Overall GPA: 3.51/4.3 (92.5%)

Mar 2017 – Feb 2021

## RESEARCH EXPERIENCE

[Connectome Lab](#), Seoul National University

Sep 2023 – Present

*Research Associate with Prof. Jiook Cha*

- Propose a new generation task (**C2**) that reconstructs videos with music contextualized by human affect from brain signals.
- Generate a training-free music style transfer (**P2**) by manipulating the self-attention features of the pre-trained Latent Diffusion Models.

[Brookhaven National Laboratory](#), Upton, NY, USA (remote)

Jun 2021 – Present

Research Associate advised by *Dr. Shinjae Yoo* and *Dr. Yuewei Lin*

- Conduct computer vision research (**C1, C2, P1, P2, P3, P4, P5**) using super-computers supported by [National Energy Research Scientific Computing Center \(NERSC\)](#) in U.S. DOE NERSC Exa-scale Science Application Program (NESAP).

[Connectome Lab](#), Seoul National University

Jun 2020 – Feb 2021

*Undergraduate Researcher with Prof. Jiook Cha*

- Modeled brain connectivity—setting brain regions as nodes and their connections as edges—utilizing Graph Convolutional Networks (GCN) to predict Obsessive Compulsive Disorder (OCD).
- Resulted in a higher Area Under the Curve (AUC) performance than machine learning algorithms like Random Forest.

[NLP & Bioinformatics Lab](#), Ewha Womans University

Jul 2019 – Feb 2020

*Undergraduate Researcher with Prof. Hyunseok Park*

- Developed Java codes and created illustrations for Unified Modeling Language (UML) and wrote as an assistant author for Ewha Womans University Computer Science textbook (**B1**).
- Analyzed NLP algorithms predicting the part of speech of words in Genomics and Informatics research papers using Python.

## WORK EXPERIENCE

[Planningo](#), Seoul, South Korea

Oct 2024 – Present

*AI Researcher*

- Develop image harmonization models (**P5**) for commercial photography by resolving the incongruity between AI-generated backgrounds and original advertising product images.

## RESEARCH IN PROGRESS (\* denotes equal contribution)

**[P5]** An Instance-Adaptive Photorealistic Style Optimization for Relightful Image Harmonization  
Kwon, J.\*, **Kim, S.\***, Kim, S., Shin, J., Yoo, S., Lin, Y., & Cha, J.

**[P4]** Attention Guidance Enables A Composable Brain-To-Text Decoding  
**Kim, S.\***, Kwon, J.\*, Park, M.\*, Seo, J., Ro, W., Yoo, S., Kim, S., Lin, Y., & Cha, J.

**[P3]** An Aesthetically Enhanced Brushstrokes Parameterization for Neural Style Transfer  
Kwon, J.\*, **Kim, S.\***, Lee, S.\*, Yoo, S., Lin, Y.†, & Cha, J.†

## PUBLICATIONS († denotes corresponding author)

**[P2]** [A Training-Free Approach for Music Style Transfer with Latent Diffusion Models](#)  
**Kim, S.\***, Kwon, J.\*, Wang, H.\*, Yoo, S.†, Lin, Y.†, & Cha, J.†  
Preprint.

**[P1]** [Macro2Micro: A Rapid and Precise Cross-modal Magnetic Resonance Imaging Synthesis using Multi-scale Structural Brain Similarity](#)  
**Kim, S.\***, Kwon, J.\*, Kwon, J.\*, Bae S., Yoo, S.†, Lin, Y.†, & Cha, J.†  
Preprint.

**[C2]** [Revisiting Your Memory: Reconstruction of Affect-Contextualized Memory via EEG-guided Audiovisual Generation](#)

**[C1]** [AesFA: An Aesthetic Feature-Aware Arbitrary Neural Style Transfer](#)

Kwon, J.\*, **Kim, S.\***, Yoo, S.†, Lin, Y.†, & Cha, J.†  
AAAI, 2024. 23.75% acceptance rate (2342/12100).

**[B1]** [Designing Software Creation: Using UML Diagrams](#)

Park, H.\*, Kim, Y.\*, Kim, Y.\*, Ji, H.\*, Oh, J., Nam, H., Lee, S., **Kim, S.**, Choi, S., Oh, Y., Huh, J., Song, D.  
Textbook, 2023.

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PROJECTS	<b>Brain Decoding with Foundation Model</b> <span style="float: right;">Sep 2024 – Present</span>
	<ul style="list-style-type: none"><li>Propose a new brain-to-text decoding task (<b>P4</b>) and develop model enabling a composable brain decoding for the first time in the decoding project at Seoul National University.</li></ul>
	<b>AI x Art Hackathon</b> <span style="float: right;">Sep 2024 – Oct 2024</span>
	<ul style="list-style-type: none"><li>Designed AI framework that generates videos with music based on a user's memory recollection by using text prompts, sketches, and electroencephalogram (EEG) signals for affect.</li><li>Achieved grand prize at 'AI x Art Hackathon' and received \$700.</li></ul>
	<b>Samsung Advanced Institute of Technology Research Capstone</b> <span style="float: right;">May 2022 – Jun 2022</span>
	<ul style="list-style-type: none"><li>Developed a new Image-to-Image Translation model that synthesizes 3D depth maps from 2D Scanning Electron Microscope (SEM) images leveraging U-Net and Patch GAN.</li><li>Ranked in the top 20% for Root Mean Squared Error (RMSE) compared to other models.</li></ul>
<b>Mitigating Unwanted Background Biases with Background Data Augmentation</b> <span style="float: right;">May 2021 – Nov 2021</span>	
<ul style="list-style-type: none"><li>Led a research project that implemented various backgrounds (RGB, black, mean, human-selected) for training in image classification and object detection.</li><li>Achieved 8.49% increasement in accuracy using the mean of backgrounds in classification.</li></ul>	
<b>Recommender Application for Programming Lecture</b> <span style="float: right;">Jan 2020 – Sep 2020</span>	
<ul style="list-style-type: none"><li>Collected data of online programming lectures and created a recommender system smartphone application that tailored video content to meet consumer needs.</li><li>Entered '2020 4<sup>th</sup> Seoul Innovation Challenge' and won the grand prize.</li></ul>	
<b>A Real-Time Face Detecting AI Surveillance Camera</b> <span style="float: right;">Sep 2019 – Jun 2020</span>	
<ul style="list-style-type: none"><li>Designed a senior capstone project as a leader and developed a smartphone application that identifies individuals' faces in front of a residence and notifies the presence of unfamiliar persons in real-time, using Raspberry Pi and Pi camera- powered device that can be affixed to the door.</li></ul>	
<b>A Real-Time Commercial Discount Application</b> <span style="float: right;">Mar 2019 – Dec 2019</span>	
<ul style="list-style-type: none"><li>Developed location-based real-time commercial discount smartphone application by contributing to the project ideation and developing the backend of the application using JAVA.</li><li>Awarded at 'The 9<sup>th</sup> Ewha Festival for Business Plan', receiving a benefit of \$1,560.</li></ul>	
TEACHING EXPERIENCE	<b>Tutoring – CS20497: Computer Algorithms</b> <span style="float: right;">Mar 2020 – Jun 2020</span> <i>Ewha Womans University</i>
	<ul style="list-style-type: none"><li>Lectured junior undergraduate students weekly on fundamental and difficult algorithm by preparing supplementary materials and conducting Q&amp;A sessions.</li></ul>
	<b>Programming Contest for Female High School Students</b> <span style="float: right;">Nov 2019</span> <i>Ewha Womans University &amp; <a href="#">Huawei Korea</a></i>
	<ul style="list-style-type: none"><li>Supervised the programming contest and addressed inquiries from students on code and programming environment.</li></ul>
PROFESSIONAL SERVICE	<b>Server Administrator</b> <span style="float: right;">Jan 2021 – Dec 2021</span> <i>Connectome Lab, Seoul National University</i>
	<ul style="list-style-type: none"><li>Developed and managed the connectome lab's first Linux server system, providing training sessions for lab members on how to use Linux server and software like SLURM and Docker.</li></ul>
HONORS & AWARDS	<b>Grand Prize at AI x Art Hackathon</b> - \$700 USD <span style="float: right;">Oct 2024</span>
	<b>BrainKorea21 Four Scholarship</b> - \$14,000 USD <span style="float: right;">2021 – 2022</span>
	<b>2020 4<sup>th</sup> Seoul Innovation Challenge</b> - \$15,000 USD <span style="float: right;">Jan 2020 – Sep 2020</span>
	<b>The 9<sup>th</sup> Ewha Festival for Business Plan</b> - \$1,560 USD <span style="float: right;">Mar 2019 – Dec 2019</span>
	<b>EWHA Scholarship</b> - \$1,700 USD <span style="float: right;">2018 – 2020</span>
	<b>EWHA Merit-Based Scholarship (full tuition)</b> - Top 10% upon admission <span style="float: right;">2017</span>