

Sooyoung Kim

Website



Homepage: <https://sooyoungkim.github.io/>

Email: rlatndudo513@snu.ac.kr

RESEARCH INTERESTS

Computer Vision, Generative AI, Human-AI

I aim to understand and generate dynamic images, including video and 3D computer vision, especially for story-based multimodal media, with inspiration from human visual perception.

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 IN PROGRESS (* Equal contribution)

P3. Visual Attention Guidance Enables A Composable Brain-To-Image Decoding
[Kim, S.*](#), Kwon, J. *, Park, M. *, Seo, J., Ro, W., Yoo, S., Kim, S., Lin, Y., & Cha, J.

P2. AesPHA: An Aesthetic Physics-Aware Neural Style Transfer
Kwon, J. *, **[Kim, S.*](#)**, Wang, H. *, Lee, J. *, Yoo, S., Lin, Y., & Cha, J.

PUBLICATIONS

P1. 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, 2024.

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](#)
Published textbook, 2023.

WORK EXPERIENCE

[Planningo](#), Seoul, South Korea
AI Researcher (Expected)

Oct 2024 – Present

- Aim: To develop image harmonization models for commercial photography by resolving the incongruity between AI-generated backgrounds and original advertising photography / commercial videography during synthesis.

[Connectome Lab](#), Seoul National University
Research Associate with Prof. Jiook Cha

Sep 2023 – Present

- Develop a new brain-to-image decoding model (**P3**) that considers both objects placement and identity, enabling a composable brain decoding for the first time.
- Generate a physical Neural Style Transfer framework (**P2**) that understands how brushstrokes work physically on the canvas, based on the AesFA (**C1**).

Connectome Lab, Seoul National University Jun 2020 – Feb 2021
Undergraduate Researcher with Prof. Jiook Cha

- Considering brain connectivity, utilized Graph Convolutional Networks (GCN) to predict the diagnosis of Obsessive Compulsive Disorder (OCD) by setting the regions of interest in the brain as nodes and their connectivity as edges.
- Resulted in a higher prediction performance compared to traditional machine learning algorithms such as Random Forest.

NLP & Bioinformatics Lab, Ewha Womans University Jul 2019 – Feb 2020
Undergraduate Researcher with Prof. Hyunseok Park

- As an assistant author for a textbook (**B1**), developed Java codes, drew illustrations, and contributed to the writing to educate Computer Science students at Ewha Womans University based on Java Programming and Unified Modeling Language (UML).
- Studied NLP algorithms predicting the part of speech of words in Genomics and Informatics research papers using Python.

PROJECTS

Affect-Contextualized Perception Decoding with Cross-Species multiscale Neuroscience Foundation Model Sep 2024 – Present

- Lead a team in the decoding project that consists of different laboratories at Seoul National University including Connectome Lab.

AI x Art Hackathon Sep 2024 – Oct 2024

- Designed AI framework that generates video with music using electroencephalogram (EEG) signals for affect, text prompts, and sketches from users recalling memory.

Samsung Advanced Institute of Technology Research Capstone May 2022 – Jun 2022

- Developed a new Image-to-Image Translation model that synthesizes 3D depth maps from 2D Scanning Electron Microscope (SEM) images to ensure that semiconductors are produced as intended leveraging U-Net and Patch GAN.
- Achieved top 20% performance compared to other models measured in Root Mean Squared Error (RMSE).

U.S. DOE National Energy Research Scientific Computing Center (NERSC) Exa-scale Science Application Program (NESAP), remote Jun 2021 – Present

- Advised by Dr. Shinjae Yoo and Dr. Yuewei Lin, conducted multiple computer vision research (**C1, P1, P2, P3**) using super-computers supported by NERSC.

Mitigating Unwanted Background Biases with Background Data Augmentation May 2021 – Nov 2021

- Led a research project that implemented background augmentation techniques using various backgrounds (RGB, black, mean, human-selected) during the training phase to reduce biases in image classification and object detection.
- Achieved 8.49% increasement in accuracy using the mean of backgrounds in classification.

Senior Capstone: A Real-Time Face Detecting AI Surveillance Camera Sep 2019 – Jun 2020

- Designed a capstone project as a leader and developed a smartphone application that identifies individuals' faces in front of a residence and notifies users of the presence of unfamiliar persons in real-time.
- To improve usability and accessibility, utilized Raspberry Pi and Pi camera which are lightweight, inexpensive, and easily attached to the door.

OTHER EXPERIENCE	Server Administrator <i>Seoul National University</i> <ul style="list-style-type: none"> Pioneered the development and management of the lab's first Linux server system at both the user application and operating system levels. Conducted in-depth training, including video sessions and workshops, to educate lab members on how to use Linux server and software such as SLURM and Docker. 	Jan 2021 – Dec 2021
	Tutoring – CS20497: Computer Algorithms <i>Ewha Womans University</i> <ul style="list-style-type: none"> Lectured junior undergraduate students weekly on fundamental and difficult algorithm by preparing supplementary materials and conducting Q&A sessions. 	Mar 2020 – Jun 2020
	Programming Contest for Female High School Students <i>Ewha Womans University & Huawei Korea</i> <ul style="list-style-type: none"> Supervised the programming contest and addressed inquiries from students on code and programming environment. 	Nov 2019
HONORS & AWARDS	Grand Prize at AI x Art Hackathon - \$1,000 USD	Oct 2024
	BrainKorea21 Four Scholarship - \$13,627 USD	2021 – 2022
	2020 4th Seoul Innovation Challenge - \$15,160 USD	Jan 2020 – Sep 2020
	The 9th Business Plan Contest - \$15,160 USD	Mar 2019 – Dec 2019
	EWHA Scholarship - \$586, \$606, \$178, \$303 USD	2018 – 2020
	EWHA Merit-Based Scholarship (full tuition) - Awarded to the top 10% of students upon admission, \$4,267 USD	2017
REFERENCES	Jiook Cha Associate Professor, Department of Psychology, Seoul National University, Seoul, Korea Research Advisor, Email: connectome@snu.ac.kr	
	Shinjae Yoo Deputy Chair, Computational Science Initiative, Brookhaven National Laboratory, Upton, NY, USA Research Advisor, Email: sjyoo@bnl.gov	
	Yuewei Lin Senior Computational Scientist & Foundation Model Group Leader, Computational Science Initiative, Brookhaven National Laboratory, Upton, NY, USA Research Associate Professor, Stony Brook, NY, USA Research Advisor, Email: ywlin@bnl.gov	