

SEO-YOON MOON

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EDUCATION

Seoul National University, *College of Liberal Studies* Mar 2019 - Aug 2024 (Expected)
B.S. in Computer Science & Engineering Seoul, Korea
B.S. in Cognitive Neural Computation (student-designed major)

University of Washington Mar 2023 - Jun 2023
Exchange Student Seattle, WA

PUBLICATIONS

S. Moon, E. Weinberger, S. Lee, **Towards scalable embedding models for spatial transcriptomics data**, *Machine Learning in Computational Biology*, 2023. [\[paper\]](#)[\[video\]](#)

S. Moon*, H. Wang*, H. Kim, K. Kim, W. Ahn, Y. Y. Joo, J. Cha, **Early Life Stress Modulates the Genetic Influence on Brain Structure and Cognitive Function in Children**, *Heliyon*, 2023. [\[paper\]](#)

Y. Y. Joo, **S. Moon**, H. Wang, H. Kim, E. Lee, J. H. Kim, J. Posner, W. Ahn, I. Choi, J. Kim, J. Cha, **Association of genome-wide polygenic scores for multiple psychiatric and common traits in preadolescent youths at risk of suicide**, *JAMA network open*, 2022. [\[paper\]](#)

K. Kim, Y. Y. Joo, G. Ahn, H. Wang, **S. Moon**, H. Kim, W. Ahn, J. Cha, **The sexual brain, genes, and cognition: A machine-predicted brain sex score explains individual differences in cognitive intelligence and genetic influence in young children**, *Human Brain Mapping*, 2022. [\[paper\]](#)

J. Suh, J. Kim, E. Lee, J. Kim, D. Hwang, J. Park, J. Lee, J. Park, **S. Moon**, Y. Kim, M. Kang, S. Kwon, E. Choi, W. Rhee, **Learning ECG Representations for Multi-Label Classification of Cardiac Abnormalities**, *Computing in Cardiology*, 2021. [\[paper\]](#)

* : equal contribution

POSTER & ABSTRACTS

S. Moon, E. Weinberger, S. Lee, **Scalable embedding model for spatially-resolved transcriptomics data**, *Allen School Undergraduate and Master's Research Showcase*, 2023, Poster Presentation. [\[poster\]](#)

H. Wang, **S. Moon**, Y. Y. Joo, E. Lee, J. Cha, **Genes, Early Life Stress, Brains, and Cognition: A Moderated Mediation Analysis**, *Biological Psychiatry*, 2021, Poster Presentation. [\[abstract\]](#)

RESEARCH EXPERIENCE

AI for Biomedical Sciences Lab, School of Computer Science and Engineering, UW Mar 2023 - Oct 2023
Undergraduate Researcher (Advisor: Su-In Lee) Seattle, WA

- Developed scalable graph neural network for spatial transcriptomics

Connectome Lab, Department of Psychology, SNU Jun 2020 - Dec 2022
Undergraduate Researcher (Advisor: Jiook Cha) Seoul, Korea

- Designed and conducted a moderated mediation analysis to investigate the impact of early life stress on children's genes, brain, and cognitive function. Generated genome-wide polygenic score via PRSice-2 for 25 phenotypes.
- Designed and conducted machine learning experiments to investigate the correlation between DNA and suicidality

- Artificial Society**, Startup Company Mar 2022 - Jul 2022
AI Researcher (Part-time) *Seoul, Korea*
- Trained deep learning model for detecting facial landmarks on mobile devices, created metric for evaluating attention levels while reading, as a part of developing a mobile application for dyslexic people.
- Applied Data Science Lab**, Department of Intelligence and Information, SNU Jul 2021 - Aug 2021
Undergraduate Researcher (Advisor: Wonjong Rhee) *Seoul, Korea*
- Extracted features using Fourier transformations to catch peaks and calculate the entropy from biosignal data
- Conducted deep learning experiments using Transformers and CNNs to predict cardiovascular disease from ECG data

PROJECTS

- Digital Barrier Free** Jan 2023 - Present
- Led developing Chrome extension for blinded and low-vision people
- Employed optical character recognition (OCR) and image captioning to accommodate enhanced web accessibility to visually impaired people
- Data Augmentation Using Feature Attribution in NLP** Sep 2022 - Dec 2022
- Refined Cutoff algorithm (Shen, 2020) using Layer-wise Relevance Propagation (LRP) based feature attribution
- Web Project for Real-time Weather Tweets (NowSee)** Sep 2022 - Dec 2022
- Developed an idea of a real-time weather community
- Designed UI & UX and developed front-end (React) and back-end (Django) features
- SNU Fast MRI Challenge** Jul 2021 - Aug 2021
- Preprocessed fMRI k-space data and developed MRI super-resolution model using U-Net, CNN, and Vision Transformer to generate full MRI images from under-sampled MRI

SCHOLARSHIP & AWARDS

- Forest of Talent, Korea Foundation for Advanced Studies** Mar 2022 - Feb 2024
- Training program for future leaders (\$4,000 for scholarship and \$8,000 for the 1-year project)
- Undergraduate Scholarship, Korea Foundation for Advanced Studies** Sep 2020 - Feb 2022
- Total \$6,000 of scholarship

LEADERSHIP, MENTORING & OUTREACH

- Brain Cognitive Science Community** Sep 2021 - Jun 2022
- Organized and participated study groups Reading and the brain ([poster](#)) and Synesthesia and cross-modality
- Woori Narae, Student Association for Volunteer Tutoring North Korean Defectors** Mar 2019 - Feb 2021
- Formal president (Mar 2020 - Feb 2021), tutored mathematics and English to three students
- Volunteer work at Siloam Center for The Blind** Jan 2020
- Participated in making digital books for the blinds

SKILLS

Computer Languages	Python, R, C, Java, JavaScript
Frameworks	Pytorch, Scikit-learn, Huggingface, PyTorch Geometric, React, Django
Data Processing	ECG, Spatial Transcriptomics, fMRI, Natural Language, Image, GWAS
Mathematics	Multivariate Calculus, Linear Algebra, Differential Equations