

SEO-YOON MOON

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EDUCATION

Seoul National University

Mar 2019 - Aug 2024

B.S. in Computer Science & Engineering

B.S. in Cognitive Neural Computation (student-designed major)

University of Washington

Mar 2023 - Jun 2023

Exchange Student

PUBLICATIONS

Peer-reviewed

- **(2022) Association of genome-wide polygenic scores for multiple psychiatric and common traits in preadolescent youths at risk of suicide**
Yoonjung Yoonie Joo, Seo-Yoon Moon, Hee-Hwan Wang, Hyeonjin Kim, Eun-Ji Lee, Jong Hun Kim, Jonathan Posner, Woo-Young Ahn, Incheol Choi, Jae-Won Kim, Jiok Cha
JAMA network open [paper]
- **(2022) The sexual brain, genes, and cognition: A machine-predicted brain sex score explains individual differences in cognitive intelligence and genetic influence in young children**
Kakyeong Kim, Yoonjung Yoonie Joo, Gun Ahn, Hee-Hwan Wang, Seo-Yoon Moon, Hyeonjin Kim, Woo-Young Ahn, Jiok Cha
Human Brain Mapping [paper]
- **(2021) Learning ECG Representations for Multi-Label Classification of Cardiac Abnormalities**
Jangwon Suh, Jimyeong Kim, Eunjung Lee, Jaell Kim, Duhun Hwang, Jungwon Park, Junghoon Lee, Jaeseung Park, Seo-Yoon Moon, Yeonsu Kim, Min Kang, Soonil Kwon, Eue-Keun Choi, Wonjong Rhee
2021 Computing in Cardiology [paper]

Preprint

- **(2021) The Impact of Early Life Stress on the Genetic Influence on Brain and Cognitive Development in Children**
Seo-Yoon Moon*, Hee-Hwan Wang*, Hyun-Jin Kim, KaKyeong Kim, Woo-Young Ahn, Yoonjung Yoonie Joo, Jiok Cha
medRxiv [paper]

Poster Presentation

- **(2023) Scalable embedding model for spatially-resolved transcriptomics data**
Seo-Yoon Moon*, Ethan Weinberger*, Su-In Lee
Allen School Undergraduate and Master's Research Showcase [poster]
- **(2021) Genes, Early Life Stress, Brains, and Cognition: A Moderated Mediation Analysis**
Hee-Hwan Wang, Seo-Yoon Moon, Yoonjung Yoonie Joo, Eunji Lee, Jiok Cha
Biological Psychiatry [abstract]

Patent

- **(2019) Folding billboard**
Seo-Yoon Moon, Minsik Hwang, Geun Woo Shin
Korea Patent [detail]

*: equal contribution

RESEARCH EXPERIENCE

AIMS Lab, School of Computer Science and Engineering, UW
Research Intern (Advisor: Su-In Lee)

Mar 2023 - Present
Seattle, WA

- Developed scalable graph neural network for spatial transcriptomics
- Applied variational autoencoder into denoising and imputation for spatial transcriptomics
- Poster presentation at Allen School Undergraduate and Master's Research Showcase

Connectome Lab, Department of Psychology, SNU
Research Intern (Advisor: Jiook Cha)

Jun 2020 - Dec 2022
Seoul, Korea

- Calculated Genome-wide polygenic score via PRSice-2 for 25 phenotypes
- Designed and conducted machine learning experiments to investigate the correlation between DNA and suicidality
- Conducted moderated mediation analysis to investigate the impact of early life stress on children's intelligence score
- Trained machine learning models (Random Forest, SVM, etc.) to predict intelligence scores from genetic data
- Conducted various data analyses (i.e., GLM)

Artificial Society, Start-up Company
AI Researcher (Part-time)

Mar 2022 - Jul 2022
Seoul, Korea

- Artificial Society is a start-up company developing a mobile application for people with difficulties in reading
- Developed deep learning model for detecting face landmarks while reading an article on mobile devices
- Developed metric for evaluating concentration level while reading

Applied Data Science Lab, Department of Intelligence and Information, SNU
Research Intern (Advisor: Wonjong Rhee)

Jul 2021 - Aug 2021
Seoul, Korea

- Joined the 2021 PhysioNet Challenge, predicting cardiac problems using ECG data
- Performed feature extraction, using Fourier transformations to catch peaks and calculate the entropy of waves
- Conducted deep learning experiments using transformers (i.e., BERT) and CNNs

PROJECTS

Digital Barrier Free

Jan 2023 - Present

- Developing Chrome extension for blinded and low-vision people
- Applied optical character recognition (OCR) and image captioning technology to accommodate enhanced web accessibility to visually impaired people
- Sponsored by Korea Foundation for Advanced Studies

Reading and the Brain Study Group

Mar 2022 - Aug 2022

- Organized *Reading and the Brain* study group of seven SNU students
- Discussed brain network involved when reading [poster]
- Awarded for the best study group at a student association, Brain Cognitive Science Community

Data Augmentation Using Feature Attribution in NLP

Sep 2022 - Dec 2022

- Refined Cutoff algorithm (Shen, 2020) using 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 the UI & UX using Figma
- Developed front-end (React) and back-end (Django) features

SNU Fast MRI Challenge

Jul 2021 - Aug 2021

- Joined Fast MRI Challenge (a challenge for generating full MRI images from under-sampled MRI) at SNU
- Preprocessed k-space data
- Developed MRI super-resolution model using U-Net, CNN, and Vision Transformer

SCHOLARSHIP AND AWARDS

Forest of Talent, Korea Foundation for Advanced Studies

Mar 2022 - Feb 2024

- Scholarship and training program for future leaders
- Total \$4,000 of scholarship and \$8,000 for 1-year project

Best study group, Brain Cognitive Science Community

Aug 2022

- Awarded for the best study group with the *Reading and the brain* journal club

Undergraduate Scholarship, Korea Foundation for Advanced Studies

Sep 2020 - Feb 2022

- Scholarship for undergraduate students who are willing to study further
- Total \$6,000 of scholarship

Merit-based scholarship, Seoul National University

Three semesters

- Partial tuition waiver

4th prize, Samsung Humantech Paper Awards

Feb 2018

- Presented research about purifying the environment contaminated by bird feces using tannins

LEADERSHIP, MENTORING AND OUTREACH

Volunteer Career Mentoring for North Korean Defectors

Aug 2022

- Mentored computer science career and toured the campus together

Brain Cognitive Science Community

Sep 2021 - Jun 2022

- Participated in study group for *Synesthesia and cross-modality*
- Organized journal club for *Reading and the brain*
- Participated as a presenter at the poster session

Woori Narae, Student Association for Volunteer Tutoring North Korean Defectors

Mar 2019 - Feb 2021

- 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
- Awarded for the best volunteering student at SNU

SKILLS

Computer Languages

Python, R, C, Java, Java Script, Type Script

Frameworks

Pytorch, Tensorflow, Scikit-learn, React, Django

Data Processing

Genetic data (GWAS, Spatial Transcriptomics), MRI data

Tools

VS code, Git, Figma, Photoshop

Research

Deep Learning, Data science, Signal processing, Genetic data, MRI processing

Languages

Native Korean, English (TOEFL 104)