Soohyun Jeon

https://jeonshyun.github.io/
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Research interests

Imaging genetics; Neuroimaging; Bioinformatics; Gene-environment interaction; Artificial intelligence

Education

Seoul National University Sept. 2024 – Present
Gratuate Student *Seoul, South Korea*
- Ph.D. of Interdisciplinary Program in Bioinformatics

Korea University Sept. 2021 – Feb. 2024
Greaduate Student *Seoul, South Korea*
- Master of Brain and Cognitive Engineering
- GPA: 4.5 / 4.5

Korea University Mar. 2017 – Aug. 2021
Undergreaduate Student *Seoul, South Korea*
- Bachelor of Life Sciences; Bachelor of Brain and Cognitive Sciences (Dual Degree)
- GPA 3.78 / 4.5 (Major: 3.92 / 4.5)

Publication

- **Jeon, S.**, Park, C., Kim, J., Lee, J. H., Joe, S. Y., Ko, Y. K., Gim, J. A. (2023). Comparing variants related to chronic diseases from genome-wide association study (GWAS) and the cancer genome atlas (TCGA). *BMC Medical Genomics (IF=3.622)*.
- **Jeon, S.**, Kang, J., Hwang, J., Lee, J. Abnormal association between neuronal activations and gene expressions of attention deficit hyperactivity disorder using parallel independent component analysis. (Under revision).
- Hwang, J., Kang, J., **Jeon, S.**, Lee, K., Kim, J., Lee, J. Transfer Learning of Deep Neural Networks Pretrained using the ABCD dataset for General Psychopathology Prediction in Korean Adolescents. (Under revision).
- Kim, H., Choi, M., **Jeon, S.**, Youn, I., Lee, S., Lee, J. Functional Representation of Lower Limb Movement using fMRI with 3D-pose Estimation in Video. (Under review).

Research Experience

Won Lab, Seoul National University Jul. 2024 – Present
Researcher (PI: Sungho Won) *Seoul, South Korea*
- **Alzheimer's Disease**: Found associations between SHARPIN-related variants and structural MRI, diagnosis, and cognitive batteries

Institute of Brain Engineering, Korea University Feb. 2024 – Jul. 2024
Researcher (PI: Jong-Hwan Lee) *Seoul, South Korea*
- **Autism spectral disorder (ASD)**: Preprocessed structural MRI to classify ASD. Cooperated with Cha Hospital.

Brain Signal Processing Laboratory, Korea University Sept. 2021 – Feb. 2024
Graduate Student (PI: Jong-Hwan Lee) *Seoul, South Korea*
- **Imaging genetics**: As a leading researcher, constructed an end-to-end research pipeline. Used multivariate data-driven machine learning model with input of functional MRI and gene expression data to determine the association between them and link impulsive phenotypes.
- **General psychopathology factor (*p*-factor)**: Predicted major depressive disorder patients' *p*-factor based on resting state functional connectivity using transfer learning. Cooperated with Seoul National University Hospital.

Brain Signal Processing Laboratory, Korea University Jan. 2021 – Aug. 2021
Researcher (PI: Jong-Hwan Lee) *Seoul, South Korea*

- **Neurorehabilitation**: Assisted fMRI experiment and built the ResNet model to predict the lower limb body parts from the recorded video. Cooperated with Korea Institute of Science and Technology.

Neuroscience Laboratory, Korea University Feb. 2020 – Mar. 2021
Research Intern (PI: Bong-june Yoon) *Seoul, South Korea*

- Bachelor's thesis: Behavioral phenotype of ADHD caused by bridging collateral density increase.
- Behavioral experiments: Set up and conducted several tasks (e.g., novel object task, impulsivity measure, open field task, T-maze task) via Arduino. Constructed Python code for further analysis.
- Biological experiments: virus/drug injection, perfusion, and immunohistochemistry.

Interaction of Plant-Environment Laboratory, Korea University Dec. 2018 – Jan. 2019
Research Intern (PI: Eunkyoo Oh) *Seoul, South Korea*

- Plant molecular signaling.
- Biological experiments: Genomic DNA extraction, RNA extraction, and cloning.

Conference

Organization for Human Brain Mapping (OHBM)

- **Jeon, S.**, et al. (2023, Jul). The association between neuronal activation and gene expression in ADHD explains impulsive behavior.
- Park, M., Jo, S., Kim, D., Choi, M., **Jeon, S.**, Youn, I., Lee, S., Lee, J. (2021, Jun). Spatial localization of lower limb movement on whole brain using 3D-pose estimation: an fMRI study.

American Academy of Child and Adolescent Psychiatry (AACAP)

- Hwang, J., Hong, J., Kang, J., **Jeon, S.**, Lee, K., Lee, J., Kim, J. (2022, Oct). Transfer Learning of Scanner-Generalization Neural Networks for Predicting General Psychopathology Factor (p-factor) in Adolescents based on Resting-State Functional Connectivity.

Korean Society for Human Brain Mapping (KHBM)

- **Jeon, S.**, et al. (2023, Oct). Imaging genetics study of attention-deficit/hyperactivity disorder using fMRI and cortical gene expression data. (*Oral Presentation*)
- Hwang, J., Kang, J., **Jeon, S.**, Kim, M., Lee, J. (2023, Oct). Unraveling the Neuroanatomical Signatures of Children with Global Developmental Delay in Comparison to Autistic Spectrum Disorder.
- **Jeon, S.**, et al. (2022, Nov). Identification of the components of attention-deficit/hyperactivity disorder using stop signal task-based fMRI and gene expression data.
- Hwang, J., Kang, J., **Jeon, S.**, Lee, K., Kim, J., Lee, J. (2022, Nov). Transfer Learning to Predict General Psychopathology Factor (p-factor) using Scanner-Generalization Neural Networks in Adolescents based on Resting-State Functional Connectivity.
- Park, M., Jo, S., **Jeon, S.**, Choi, M., Youn, I., Lee, S., Lee, J. (2022, Nov). Analysis of 3D movement parameter with fMRI to identify the pattern of lower-limb movement.

Brain Engineering Society of Korea (BESK)

- **Jeon, S.**, et al. (2024, Feb). Predicting Impulsivity in Children with Attention Deficit Hyperactivity Disorder using Parallel Independent Component Analysis. (*Best Poster Paper Awards*)
- **Jeon, S.**, et al. (2023, Jun). Validation of Different Brain-Gene Relationship Between Healthy Control and ADHD Patients.
- **Jeon, S.**, et al. (2023, Feb). The genetic impact on neuronal activation and impulsive behavior in ADHD.
- Hwang, J., Kang, J., **Jeon, S.**, Lee, K., Kim, J., Lee, J. (2023, Feb). Transfer Learning to Predict General Psychopathology Factor (p-factor) in Korean Adolescents based on Resting-State Functional Connectivity.
- **Jeon, S.**, et al. (2022, Feb). Identification of the independent components of the attention-deficit hyperactivity disorder using fMRI and gene expression data.
- Park, M., Jo, S., Kim, D., Choi, M., **Jeon, S.**, Youn, I., Lee, S., Lee, J. (2021, Aug). Cortical localization of lower-limb movement using 3D-pose with MRI-compatible lowerlimb movement device.

The Korean Society for Brain and Neural Sciences (KSBNS)

- Sohn, S., Lee, Y., Choi, D., **Jeon S.**, Hwang, J., Yoon, B. (2021, May). Control of arkypallidal neurons in the GPe affects impulsivity in mice.
- Choi, D., Lee, Y., Sohn, S., **Jeon, S.**, Yoon, B. (2020, Nov). Increase in the arkypallidal neuron-projecting bridging collaterals in the GPe induces impulsive behavior in mice.

Teaching Experience

Research in Brain and Cognitive Engineering Fall. 2022
Korea University *Seoul, South Korea*

Introduction to Brain and Medical Engineering Spring. 2022
Korea University *Seoul, South Korea*

Awards, Scholarships, and Honors

Best Poster Paper Award Feb. 2024
Brain Engineering Society of Korea (BESK) *Seoul, South Korea*

BK21FOUR PREPARATION SCHOLARSHIP Fall. 2021
Korea University *Seoul, South Korea*

STUDY SCHOLARSHIP 2019, 2020
Kroea University *Seoul, South Korea*

SPECIAL SCHOLARSHIP 2019, 2020
Kroea University *Seoul, South Korea*

WORK SCHOLARSHIP Spring. 2018
Kroea University *Seoul, South Korea*

WORK-STUDY SCHOLARSHIP Spring. 2018
Kroea University *Seoul, South Korea*

Extracurricular Activities

Life Science Study Group Aug. 2022 – Present
Presenter *Seoul, South Korea*

- Established study group dedicated to introducing and discussing research topics spanning molecular biology, ecology, animal and human studies, and immunology.
- Aimed to cultivate diverse perspectives on various research domains and explore collaborative methodologies.
- Presented 4 times of journal review, introduced 3 times of own research.

Kaggle Nov. 2021 – Jan. 2022
Cellgmentation Team *Seoul, South Korea*

- Studied and built various deep learning segmentation models such as U-Net, and submitted the result.

Artificial Intelligence Researcher Dec. 2020 – Aug. 2021
Startup, LikeNot Team *Seoul, South Korea*

- Developed CNN autoencoder model for classification of products.
- Built algorithm to recommend proper products/services.
- Launched the service: Poola
- Grant: Pre-Startup Package, StyleTech, Ewha University StyleTech

Specialized Skills

Programming Languages: Python, R, Matlab, C, C++, LaTeX
Language: Native in **Korean**, Intermediate in **English**, and Beginner in **Japanese**