

Hayoung Song

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Cognitive and computational neuroscientist with a PhD and 10 years of experience in human brain and cognitive research. Build machine learning algorithms and artificial intelligence models to understand neuroimaging and behavioral data. Published 11 peer-reviewed articles and 4 preprints. Passionate about building things that can improve our understanding of human beings and benefit society and people. Proven track record of leading independent research projects and cross-disciplinary collaborations.

EDUCATION

Ph.D.	University of Chicago Chicago, IL Psychology, Neuroscience Neubauer Family Foundation Distinguished Scholar Dissertation: Brain-wide dynamics supporting human cognitive experiences	2019-2024
M.S.	Sungkyunkwan University Seoul, South Korea Biomedical Engineering	2017-2019
B.A.	Sungkyunkwan University Seoul, South Korea Psychology Four-year fully funded Samsung Scholar	2013-2017

EXPERIENCE

Postdoctoral Research Associate, Washington University in St. Louis 2024–Present
Center for Theoretical and Computational Neuroscience

- Developed a [dynamical systems model](#) simulating human brain activity. Estimated [geometries](#) of neural dynamics along the attractor landscape to explain mechanisms of attention fluctuations.
- Developed a recurrent neural network (RNN) model augmented with a Transformer-based memory buffer to examine *i)* how humans use memories to make [causal inferences](#), and *ii)* how context modulates working and episodic memories. Trained the model on a complex navigation task (reinforcement learning) and a next-scene prediction task during naturalistic movie watching (supervised learning).
- Mentored 1 PhD student and 2 undergraduate students' research as a senior researcher.

Graduate Student Researcher, University of Chicago 2019-2024

- Built [brain-based predictive models](#) (nonlinear support vector regression) predicting [attention](#), [emotion](#), and [comprehension skills](#) based on functional magnetic resonance imaging (fMRI) activity of humans.
- Used a [hidden Markov model](#) and [graph theoretic metrics](#) to characterize whole-brain activity and explain their differences across time and situations.
- Collaborated with a robotic artist and conducted [human-robot interaction](#) experiments in a gallery.
- Advocated open science and [across-field collaborations](#) through peer-reviewed opinion papers.
- Served as a teaching assistant for five undergraduate courses: led weekly 1.5-hour discussion sections and project-building courses, held weekly office hours, and prepared course materials.

Graduate Student Researcher, Center for Neuroscience Imaging Research 2017-2019

- Collected hundreds of hours of human fMRI and behavioral data. Customized preprocessing pipelines to optimize signal to noise ratio. Designed a novel [MRI scan protocol](#) to improve image quality.
- Worked with a natural language processing (NLP) research team to develop encoding models that best predict neural activity during movie-watching based on written annotations of the movies.
- Led MRI hands-on training workshops and neuroscience forums for researchers and general audiences.

AWARDS AND HONORS

American Psychological Association Dissertation Award (2024), Society for Neuroscience Trainee Professional Development Award (2024), Arts, Science, and Culture Graduate Collaboration Grant (2023-24), Norman H. Anderson Grant (2022-24), Organization for Human Brain Mapping Merit Award (2022), Psychonomic Society Graduate Conference Award (2020)