Hayoung Song

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ACADEMIC APPOINTMENT

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

EDUCATION

2019-24 Ph.D. Psychology, Integrative Neuroscience Program
University of Chicago, Chicago IL
Dissertation: Brain-wide dynamics supporting human cognitive experiences

2017-19 M.S. Biomedical Engineering
Sungkyunkwan University, South Korea

2013-17 B.A. Psychology
B.S. Neuroaesthetics (Self-designed Transdisciplinary Studies)
Sungkyunkwan University, South Korea

GRANTS, AWARDS & HONORS

2024 APA Dissertation Research Award ($5,000), American Psychological Association
2024 Trainee Professional Development Award ($1,000), Society for Neuroscience
2019-24 Neubauer Family Foundation Distinguished Scholar, University of Chicago
2023-24 Arts, Science, and Culture Graduate Collaboration Grant ($3,000), University of Chicago and School of the Art Institute of Chicago [interview]
2024, 22 Norman H. Anderson Travel Fund ($3,000), University of Chicago
2023 Norman H. Anderson Research Fund ($1,000), University of Chicago
2022 Merit Award for an exceptional abstract submission ($2,000), Organization for Human Brain Mapping
2021 Council on Advanced Studies Graduate Student Research Grant ($5,000), University of Chicago
2021 Graduate Council Research & Personal Development Fund, University of Chicago
2020 Psychonomic Society Graduate Conference Award ($1,000), Psychonomics Society
2018 Shimsan scholarship, Sungkyunkwan University
2018 Best poster presentation award, Korean Society for Cognitive Science
2018 Best poster presentation award, Annual Conference of Korean Psychological Association
2013-17 Fully funded 4-year Samsung scholarship, Samsung Scholarship foundation

PREPRINTS (**equal contribution*, *mentee collaborators*)

Song, H., Lu, Q., Nguyen, T. T., Chen, J., Leong, Y. C., Rosenberg, M. D., Ching, S., Zacks, J. M. (2025). A neural network with episodic memory learns causal relationships between narrative events. *bioRxiv*.

Song, H., Chen, R., Botch, T. L., Braver, T. S., Rosenberg, M. D., Zacks, J. M., Ching, S. (2025). Geometry of neural dynamics along the cortical attractor landscape reflects changes in attention. *bioRxiv*.

Song, H., Ke, J., Madhogarhia, R., Leong, Y. C., Rosenberg, M. D. (2025). Cortical reinstatement of causally related events sparks narrative insights by updating neural representation patterns. *bioRxiv* & in revision at *Nature Communications*.

Ke, J., Chamberlain, T. A., **Song, H.**, Corriveau, A., Zhang, Z., Martinez, T., Sams, L., Chun, M. M., Leong, Y. C., Rosenberg, M. D. (2025). Ongoing thoughts at rest reflect functional brain organization and behavior. *bioRxiv*.

PEER-REVIEWED PUBLICATIONS

Park, J., **Song H.**, Shim, W. M. (2025). Hippocampal systems for event encoding and sequencing during ongoing narrative comprehension. *Communications Biology* 8 (1), 954.

Ke, J., **Song, H.**, Bai, Z., Rosenberg, M. D., Leong, Y. C. (2025). Dynamic brain connectivity predicts emotional arousal during naturalistic movie-watching. *PLOS Computational Biology* 21 (4), e1012994.

Song, H.*, Park, J.*, Rosenberg, M. D. (2024). Understanding cognitive processes across spatial scales of the brain. *Trends in Cognitive Sciences* 29 (3), 282-294.

Chamberlain, T., Corriveau, A., **Song, H.**, Kwon, Y. H., Yoo, K., Chun, M. M., Rosenberg, M. D. (2024). High performers demonstrate greater neural synchrony than low performers across behavioral domains. *Imaging Neuroscience* 2, 1-17.

Song, H., Shim, W. M.*, Rosenberg, M. D.* (2023). Large-scale neural dynamics in a shared low-dimensional state space reflect cognitive and attentional dynamics. *eLife* 12, e85487.

Song, H., Finn, E. S., Rosenberg, M. D. (2021). Neural signatures of attentional engagement during narratives and its consequences for event memory. *PNAS* 118 (33), e2021905118.

Song, H., Park, B. -Y., Park, H., Shim, W. M. (2021). Cognitive and neural state dynamics of narrative comprehension. *Journal of Neuroscience* 41 (43), 8972-8990.

Song, H., Rosenberg, M. D. (2021). Predicting attention across time and contexts with functional brain connectivity. *Current Opinion in Behavioral Sciences* 40, 33-44.

Yoo, S.*, **Song, H.***, Kim, S. -G., Shim, W. M., Lee, S. -K. (2020). Feasibility of head-tilted brain scan to reduce susceptibility-induced signal loss in the prefrontal cortex in gradient echo-based imaging. *Neuroimage* 223, 117265.

Rosenberg, M. D., **Song, H.** (2020). Predicting post-stroke aphasia from brain imaging. News & Views, *Nature Human Behavior* 4, 675-676.

INVITED TALKS

2025 Chen & Honey lab meeting, Johns Hopkins University
2023 Princeton Computational Memory lab meeting, Princeton University
2023 Computational Neuroscience Next Generation Symposium, Center for Theoretical and Computational Neuroscience, Washington University in St. Louis
2023 Gradients of Brain Organization 2023 Workshop, Montreal, Canada
2023 Affective and Brain Sciences lab meeting, Northeastern University
2022 Columbia Dynamic Perception and Memory & Aly lab meeting, Columbia University
2022 Annual Neuroscience Cluster Retreat, University of Chicago
2021 Cognition Workshop, University of Chicago
2021 Memory Research lab meeting, University of Chicago
2020 Functional Imaging & Naturalistic Neuroscience lab meeting, Dartmouth College
2020 Language Evolution, Acquisition, & Processing Workshop, University of Chicago
2018 FMRI hands-on training workshop, Center for Neuroscience Imaging Research, IBS
2018 Resting state fMRI pre-processing forum, Center for Neuroscience Imaging Research, IBS

CONFERENCE TALKS

Song, H.*, Park, J.*, Rosenberg, M. D. (2025). Understanding cognitive processes across spatial scales of the brain. Contributed Session at the Society for Philosophy and Neuroscience (SPAN) Annual Meeting, St. Louis, MO.

Song, H., Ke, J., Leong, Y. C., Rosenberg, M. D. (2024). Comprehension of causal structure in narratives. Nanosymposium at the Society for Neuroscience (SfN) 2024 Annual Meeting, Chicago, IL.

Song, H., Shim, W. M., Rosenberg, M. D. (2023). Neural state dynamics in a shared low-dimensional manifold reflect cognitive and attentional dynamics. Graduate Student Symposium at the Chicago Society for Neuroscience 2023 Annual Meeting, Chicago, IL.

Song, H., Shim, W. M., Rosenberg, M. D. (2022). Neural state dynamics in a shared low-dimensional manifold reflect cognitive and attentional dynamics. Nanosymposium at the Society for Neuroscience (SfN) 2022 Annual Meeting, San Diego, CA.

Song, H., Shim, W. M., Rosenberg, M. D. (2022). Neural dynamics in a low-dimensional state space reflect cognitive and attentional dynamics. Oral session at the Organization for Human Brain Mapping (OHBM) 2022 annual meeting, Glasgow, Scotland. [link]

Song, H., Finn, E. S., Rosenberg, M. D. (2021). Neural signatures of narrative immersion. Symposium at the International Association of Empirical Aesthetics (IAEA) Congress on Empirical Aesthetics, Virtual Conference.

Song, H., Finn, E. S., Rosenberg, M. D. (2020). Predicting attentional engagement during narratives and its consequences for event memory. Neuromatch Conference 3.0, Virtual Conference. [link]

Song, H., Park, B., Han, J., Park, H., Shim, W. M. (2018). The dynamic changes in narrative understanding represented in the regional- and network- level state of the human brain. Nanosymposium at the Society for Neuroscience (SfN) 2018 Annual Meeting, San Diego, CA.

Song, H., Park, B., Park, H., Shim, W. M. (2018). Dynamic reconfiguration of global network and regional functional connectivity when comprehending visual narratives. Oral session at the Annual Conference of Korean Psychological Association, Seoul, Korea.

CONFERENCE POSTER PRESENTATIONS (*selected*)

Song, H., Lu, Q., Nguyen, T., Chen, J., Leong, Y. C., Rosenberg, M. D., Ching, S., Zacks, J. (2025). Key-value memory model retrieves causally related past events during narrative comprehension. To present at the Society for Neuroscience (SfN) 2025 Annual Meeting, San Diego, CA.

Ke, J., Madhogarhia, R., Chun, M. M., Rosenberg, M. D., Leong, Y. C., **Song, H.** (2025). Shared impressions track shared neural responses during narrative comprehension. Social & Affective Neuroscience Society (SANS) annual meeting, Chicago, IL.

Song, H., Ke, J., Leong, Y. C., Rosenberg, M. D. (2025). Comprehension of causal event structure through reinstating and updating neural patterns at insight moments. Social & Affective Neuroscience Society (SANS) annual meeting, Chicago, IL.

Song, H., Ke, J., Leong, Y. C., Rosenberg, M. D. (2024). Neural mechanisms of insight during narrative comprehension. Organization for Human Brain Mapping (OHBM) 2024 annual meeting, Seoul, Korea.

Song, H., Shim, W. M., Rosenberg, M. D. (2022). Neural dynamics in a low-dimensional state space reflect cognitive and attentional dynamics. Organization for Human Brain Mapping (OHBM) 2022 annual meeting, Glasgow, Scotland.

Song, H., Shim, W. M., Rosenberg, M. D. (2021). Brain state dynamics reflect generalizable cognitive and attentional state dynamics. Society for Neuroscience (SfN) 2021 Annual Meeting, Chicago, IL.

Song, H., Shim, W. M., Rosenberg, M. D. (2021). Brain state dynamics reflect cognitive and attentional state dynamics. Context and Episodic Memory Symposium (CEMS) 2021, Philadelphia, PA.

Song, H., Finn, E. S., Rosenberg, M. D. (2020). Characterizing Engagement Dynamics during Narrative Comprehension. Object Perception, Attention, & Memory (OPAM) 28, Virtual Conference.

Song, H., Finn, E. S., Rosenberg, M. D. (2020). Changes in Attentional Engagement during Narrative Comprehension. Psychonomic Society 61th Annual Meeting, Virtual Conference.

Song, H., Ko, H., Lee, J., Shim, W. M. (2019). Decoding narratives from fMRI responses of the present and causally related past events during movie-watching. Society for Neuroscience (SfN) 2019 Annual Meeting, Chicago, IL.

Song, H., Ko, H., Lee, J., Shim, W. M. (2019). Decoding narrative contents from fMRI responses by incorporating causally related previous events. Organization for Human Brain Mapping 2019 annual meeting (OHBM), Rome, Italy.

Song, H., Ko, H., Lee, J., Shim, W. M. (2019). Context-aware decoding of the narrative contents in fMRI responses. Korean Society for Cognitive Science, Seoul, Korea.

Song, H., Park, B., Park, H., Shim, W. M. (2018). The changes in narrative understanding represented in the time-resolved large-scale network- and regional- level states of the human brain. Korean Society for Cognitive Science 2018 Annual Meeting, Seoul, Korea.

Song, H., Park, B., Park, H., Shim, W. M. (2018). Dynamic reconfiguration of global network and regional functional connectivity when comprehending visual narratives. Vision Sciences Society (VSS) 2018 Annual Meeting, St. Pete Beach, FL.

Kang, M. -S., **Song, H.** (2017). Successful movement inhibition boosts the inhibition of distractors in visual working memory. Vision Sciences Society (VSS) 2017 Annual Meeting, St. Pete Beach, FL.

TEACHING

2023	Social Psychology, TA, Department of Psychology, University of Chicago
2023	Biological Psychology, TA, Department of Psychology, University of Chicago
2022	Sensation and Perception, TA, Department of Neuroscience and Psychology, University of Chicago
2021	Psychological Research Methods, TA, Department of Psychology, University of Chicago
2021	Cognitive Psychology, TA, Department of Psychology, University of Chicago
2018	Mind, Brain, and Computer, TA, Department of Biomedical Engineering, Sungkyunkwan University

MENTORING

2025-	Reece Gray (Computer Engineering undergraduate student, Washington University in St. Louis)
2023-	Jin Ke (Psychology PhD student, Yale University)
2024-25	Rhea Madhogarhia (Cognitive Science & Computer Science undergraduate student, University of Chicago)
2022-23	Alisa Schutz (Psychology master's student, University of Chicago)
2017, 18	Mentor for the Summer Internship Program, Center for Neuroscience Imaging Research (CNIR), IBS

SUMMER WORKSHOP

2023	Methods in Neuroscience at Dartmouth summer course on Interacting Minds, Psychological & Brain Sciences Department, Dartmouth College, Hanover, NH

2022 Brains, Minds, and Machines (BMM) summer course, Center for Brains, Minds, and Machines, MIT. Woods Hole, MA

SCIENCE EDUCATION & OUTREACH

2025 Invited talk "Career and Life in Cognitive Neuroscience Research" at the Korean American Scientists and Engineers Association (KSEA) student organization

2025 Volunteer for the Amazing Brain Carnival SciFest, Saint Louis Science Center

2022 Multilingual Kids Review session (Korean), "The scientists of today meet the scientists of tomorrow", as a part of Diversity & Inclusivity event at the Organization for Human Brain Mapping (OHBM) 2022 annual meeting, Glasgow, Scotland. [link]

2020 Tutorial "Decoding natural language from functional MRI" for the educational session, Analysis Methods for Naturalistic Data, Organization for Human Brain Mapping (OHBM) 2020 annual meeting, Virtual Conference. [link]

UNIVERSITY/DEPARTMENTAL SERVICE

2025- Postdoc Representative for the Department of Neuroscience Seminar Committee, Washington University in St. Louis

2025 Judge for the Graduate Research Symposium, Washington University in St. Louis

2025 Organizer for the Computational Neuroscience Next Generation Symposium, Washington University in St. Louis

2024 Panelist for the PhD dissertation proposal/defense panel, Department of Psychology, University of Chicago

2021-23 Organizer for the Cognition Workshop, hosted by the Department of Psychology and supported by the Council on Advanced Studies, University of Chicago

2022 Host for the Neuroscience Seminar Series, Neuroscience Institute, University of Chicago

2019-23 Member of the Travel and Research committee, Graduate Students Organization, Department of Psychology, University of Chicago

AD HOC REVIEWER

Biological Psychology, Brain Structure and Function, Cerebral Cortex, Cognition, ELife, Human Brain Mapping, Imaging Neuroscience, Journal of Neuroscience, Nature Communications, Network Neuroscience, Neurobiology of Language, Neuroimage, Psychophysiology, PLOS Computational Biology, PLOS Biology, PLOS One, Scientific Reports