

CURRICULUM VITAE

HOJIN JANG

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▪ EDUCATION AND ACADEMIC APPOINTMENTS

Mar. 2008 – Aug. 2014	B.Sc. in Computer Science	Korea University, South Korea Advisor: Prof. Hee-Jo Lee
Sep. 2014 – Aug. 2016	M.E. in Brain and Cognitive Engineering	Korea University, South Korea Advisor: Prof. Jong-Hwan Lee
Sep. 2016 – Aug. 2021	Ph.D. in Psychology	Vanderbilt University, United States Advisor: Prof. Frank Tong
Sep. 2021 – Aug. 2022	Postdoctoral Researcher in Psychology	Vanderbilt University, United States Advisor: Prof. Frank Tong
Sep. 2022 – Present	Postdoctoral Researcher in Brain and Cognitive Sciences	Massachusetts Institute of Technology, United States Advisors: Prof. Pawan Sinha & Dr. Xavier Boix

▪ PUBLICATIONS

- Jang, H., Plis, S. M., Calhoun, V. D., & Lee, J. H. (2017). Task-specific feature extraction and classification of fMRI volumes using a deep neural network initialized with a deep belief network: Evaluation using sensorimotor tasks. *Neuroimage*, 145, 314-328.
- Rane, S., Jolly, E., Park, A., Jang, H., & Craddock, C. (2017). Developing predictive imaging biomarkers using whole-brain classifiers: Application to the ABIDE I dataset. *Research Ideas and Outcomes*, 3, e12733.
- Jang, H., Kim, H. C., & Lee, J. H. (2020). Test-retest reliability of spatial patterns from resting-state functional MRI using the restricted Boltzmann machine and hierarchically organized spatial patterns from the deep belief network. *Journal of Neuroscience Methods*, 330, 108451.
- Jang, H., McCormack, D., & Tong, F. (2021). Noise-trained deep neural networks effectively predict human vision and its neural responses to challenging images. *PLoS biology*, 19(12), e3001418.
- Jang, H., & Tong, F. (2021). Convolutional neural networks trained with a developmental sequence of blurry to clear images reveal core differences between face and object processing. *Journal of vision*, 21(12), 6-6.
- Jang, H., & Tong, F. (in prep). Potential benefits of blurry visual experiences in the development of robust object recognition systems in the biological brain.
- Jang, H., & Tong, F. (in prep). Convolutional neural networks optimized for face recognition reveal a computational basis for holistic face processing.

▪ CONFERENCE TALKS

- Jang, H., & Lee, J. H. (2016, May). Reproducibility and hierarchical organization of extracted weight features from resting fMRI using deep belief network [Oral presentation]. Korean Society for Cognitive Science, South Korea.
- Jang, H., & Tong, F. (2018, May). Can deep learning networks acquire the robustness of human recognition when faced with objects in visual noise? [Oral presentation]. Vision Sciences Society, St. Pete Beach, Florida, United States.

Jang, H., & Tong, F. (2020, May). Do noise-trained DNNs process noisy visual images in a more human-like manner? [Oral presentation]. Vision Sciences Society, Virtual Meeting.

Jang, H., & Tong, F. (2022, May). Lack of experience with blurry visual input may cause CNNs to deviate from biological visual systems [Oral presentation]. Vision Sciences Society, St. Pete Beach, Florida, United States.

▪ CONFERENCE POSTERS

Jang, H., & Lee, J. H. (2016, February). Functional connectivity-based age prediction using deep neural network [Poster presentation]. Brain and Artificial Intelligence Symposium, Brain Engineering Society of Korea, South Korea.

Jang, H., & Lee, J. H. (2016, June). Deep neural network for age prediction using resting-state fMRI data [Poster presentation]. Organization for Human Brain Mapping, Geneva, Switzerland.

Jang, H., & Lee, J. H. (2016, June). Reproducibility and hierarchy of weight features from resting fMRI using deep belief network [Poster presentation]. Pattern Recognition in Neuroimaging, Trento, Italy.

Jang, H., McCormack, D., & Tong, F. (2017, May). Evaluating the robustness of object recognition to visual noise in humans and convolutional neural networks [Poster presentation]. Vision Sciences Society, St. Pete Beach, Florida, United States.

Jang, H., & Tong, F. (2017, September). Failure of deep networks at recognizing objects in visual noise: Comparisons with human behavioral performance [Poster presentation]. Cognitive Computational Neuroscience, New York, United States.

Jang, H., & Tong, F. (2019, May). Visual crowding disrupts the cortical representation of letters in early visual areas [Poster presentation]. Vision Sciences Society, St. Pete Beach, Florida, United States.

Jang, H., & Tong, F. (2021, May). Different generalization capabilities of face and object processing in a developmental sequence of blurry to clear images [Poster presentation]. International Conference on Learning Representations Workshop, Virtual Meeting.

Jang, H., & Tong, F. (2021, May). Is initial training with blurry images beneficial for the development of object recognition systems? [Poster presentation]. Vision Sciences Society, Virtual Meeting.

Tong, F., & Jang, H. (2022, May). Convolutional neural networks optimized for face recognition reveal a computational basis for holistic face processing [Poster presentation]. Vision Sciences Society, St. Pete Beach, Florida, United States.

▪ PATENTS

Tong, F., & Jang, H. (2021). Noise-robust neural networks and methods thereof (U.S. Patent No. 11,030,487). U.S. Patent and Trademark Office.

▪ AWARDS AND HONORS

July, 2012	Best Honors Scholarship, Korea University, South Korea
May, 2018	Graduate Student Travel Grant, Vanderbilt University, United States
May, 2022	Jum Nunnally Dissertation Award, Department of Psychology, Vanderbilt University, United States

▪ RESEARCH EXPERIENCES

Jul. 2013 – Aug. 2013	Neurodegeneration Control Research Center, Kyung-Hee University, South Korea Advisor: Professor Sung-Hyun Kim
	· Cultured hippocampal neurons of mice and recorded neural responses to electrical stimulation to investigate the effect of mitochondria on synaptic transmission
Mar. 2014 – Jul. 2014	Mind Brain Laboratory, Korea University, South Korea

Advisor: Professor Byung-Kyung Min

- Assisted EEG/ultrasound experiments and performed basic EEG data analyses

Sep. 2014 – Aug. 2016 Brain Signal Processing Laboratory, Korea University, South Korea
Advisor: Professor Jong-Hawn Lee

- Applied deep learning techniques to classifying task-based fMRI volumes and examined the hierarchical weight representations of deep neural networks
- Investigated the utility of deep neural networks (e.g., restricted Boltzmann machine or deep belief network) in revealing resting-state brain networks employing large functional data (e.g., 1,000 Functional Connectome Project, Human Connectome Project)

Sep. 2016 – Aug. 2022 Tong Laboratory, Vanderbilt University, United States
Advisor: Professor Frank Tong

- Examined the impact of visual crowding on the amplitude of fMRI activity and the object decoding accuracy
- Investigated possible aspects of learning and training experiences needed to attain robustness in object recognition by comparing the performance of convolutional neural networks and humans
- Examined the computational principles underlying holistic processing of faces versus other objects with convolutional neural networks

▪ EXTRA-CURRICULAR ACTIVITIES

Mar. 2008 – Dec. 2008 Korea University Institute of Computer Security Club, Korea University, South Korea
Mar. 2008 – Dec. 2013 Korea WEB Club, Korea University, South Korea
Sep. 2008 – Dec. 2008 Volunteer Teaching Program, Margaret Church, South Korea
Jul. 2009 – May. 2011 Military Service, Fire Direction Center, 36th Artillery Division of Army, South Korea
Dec. 2011 – May. 2012 Global Leadership Center, Korea University, South Korea
Jan. 2013 – Apr. 2013 Exchange Student Program, Laval University, Quebec, Canada
May. 2013 – Jul. 2013 English Academic School, Vancouver, Canada
Sep. 2013 – Dec. 2013 Korea University Buddy Assistant Club, Korea University, South Korea

▪ TECHNICAL SKILLS

Programming languages: C, C++, C#, JAVA, MATLAB, Python, Assembly, HTML, CSS, PHP, JavaScript
Deep learning frameworks: PyTorch, TensorFlow, Keras, Theano
Neuroimaging software toolboxes: FSL, Freesurfer, SPM, Psychtoolbox