

INTEREST	Artificial Systems Aligned with Natural Intelligence - Short-term and long-term memory systems in Transformer - Machine vision representational alignment with brain - Understanding and developing an intelligent behavior system	
EDUCATION	Ph.D. in NBIT(Nano-Bio-Information-Technology) Korea University, Korea ◇ Advisor : C. Justin Lee	2014.03 - 2022.02
	B.E. in Electrical and Electronic System Saitama University, Japan	2008.04 - 2012.03
POSITIONS	Institute for Basic Science (IBS) , Daejeon, Korea Postdoctoral Researcher, Center for Cognition and Sociality Researcher, Center for Cognition and Sociality	2022.01 - present 2018.12 - 2020.11
	Korea Institute of Science and Technology (KIST) , Seoul, Korea Student Researcher, Center for Functional Connectomics	2014.03 - 2018.11
ACHIEVEMENTS	Excellent Paper Award , 2023, <i>Korean Artificial Intelligence Association (JKAIA)</i> Brain-inspired Lp-Convolution benefits large kernels and aligns better with visual cortex Patent Application & Technology Transfer , 2023-02-28, <i>Application Number : 10-2023-0027219</i> , 인간 및 동물의 행동 분류를 위한 장치 및 방법 (Device and Method for Classification of Human and Animal Behavior), Patent Contribution=35% ◇ Finalized a technology transfer with ACTNOVA Inc. Best Presentation Award , 2022, <i>Korean Society for Brain and Neural Sciences (KSBNS)</i> ABCD-analysis : Mapping animal behavior and differential analysis of kinematic features without selection bias Young Investigator Award , 2022, <i>Korean Society for Molecular and Cellular Biology (KSMCB)</i> Retina-attached slice recording reveals light-triggered tonic gaba signaling in suprachiasmatic nucleus Best Poster Award , 2021, <i>Center for Cognition and Sociality (CCS) Workshop</i> Mapping Behavior with DECLARE : Deep Embedded Clustering of Action REpresentation Full-Ride Scholarship for Doctoral studies , 2014-2022, <i>Korea University - Korea Institute of Science and Technology (KU-KIST) Graduate School of Converging Science and Technology</i> Full-Ride Scholarship for Bachelor's Studies , 2007-2012, <i>Korea - Japan Governments Joint Scholarship Program for Science and Engineering Students</i>	
TALKS	Transformer as a hippocampal memory consolidation model based on NMDAR-inspired nonlinearity , 2023, <i>IBS-CCS Symposium</i> , Oral Presentation (In person). From human mind to artificial intelligence - Is ChatGPT a bridge , 2023, <i>Reading Festival at Jeonil High School</i> , Invited Public Lecture (In person). Memory editing in the brain , 2023, <i>IBS Science in the Cinema Roof - Eternal Sunshine of the Spotless Mind</i> , Invited Public Lecture (In person). Resolving clustering bias during animal behavior mapping and kinematic profiling , 2022, <i>IBS Data Science Group seminar</i> , Invited talk (Online). Age-dependent motor coordination analysis by 3D pose-estimation using AVATAR , 2021, <i>IBS 2021 2nd workshop</i> , Oral Presentation (In person). Backpropagation and the Brain , 2020, <i>KAIST-NeuroAI Journal Club</i> , Oral Presentation (Hybrid). Deep learning with NMDA receptor inspired activation function , 2020, <i>IBS 2019 year-end workshop</i> , Oral Presentation (In person).	

PUBLICATIONS

Kwon J*, Song KW and Lee CJ (2023). Brain-inspired L_p -Convolution benefits large kernels and aligns better with visual cortex. *Twelfth International Conference on Learning Representations (ICLR)*. (Under review)

<https://openreview.net/forum?id=jz35igczhm>.

Kim DK*, **Kwon J***, Cha M and Lee CJ (2023). Transformer as a hippocampal memory consolidation model based on NMDAR-inspired nonlinearity. *Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS)*. (Acceptance Rate=26.1%)

<https://openreview.net/forum?id=vKpVJxplmB>.

Kwon J*, Kim S*, Kim DK, Joo J, Kim S, Cha M and Lee CJ (2023). SUBTLE : An unsupervised platform with temporal link embedding that maps animal behavior. *bioRxiv*.

<https://doi.org/10.1101/2023.04.12.536531>.

Sa M, Yoo ES, Koh W, Park MG, Jang HJ, Yang YR, Bhalla M, Lee JH, Lim J, Won W, **Kwon J**, Kwon JH, Seong Y, Kim B, An H, Lee SE, Park KD, Suh PG, Sohn JW and Lee CJ (2023). Hypothalamic GABRA5-positive neurons control obesity via astrocytic GABA. *Nature Metabolism*.

<https://doi.org/10.1038/s42255-023-00877-w>.

Nam MH, Ko HY, Kim D, Lee S, Park YM, Hyeon SJ, Won W, Chung JI, Kim SY, Jo HH, Oh KT, Han YE, Lee GH, Ju YH, Lee H, Kim H, Heo J, Bhalla M, Kim KJ, **Kwon J**, Stein TD, Kong M, Lee H, Lee SE, Oh SJ, Chun JH, Park MA, Park KD, Ryu H, Yun M and Lee CJ (2023). Visualizing reactive astrocyte-neuron interaction in Alzheimer's disease using 11C-acetate and 18F-FDG. *Brain*.

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<https://nips.cc/virtual/2022/workshop/49973>

Kim D, Kim J, Jung W, Park J, Kim M, Shin A, Jeong YC, Park S, Shin G, Lee YW, **Kwon J** and Kim D (2022). AVATAR : AI Vision Analysis for Three-dimensional Action in Real-time. *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) cv4animals workshop*.

<https://www.cv4animals.com/2022-accepted-papers>

Kim S, **Kwon J**, Park MG and Lee CJ (2022). Dopamine-induced astrocytic Ca²⁺ signaling in mPFC is mediated by MAO-B in young mice, but by dopamine receptors in adult mice. *Molecular Brain*.

<https://doi.org/10.1186/s13041-022-00977-w>.

Ju YH, Bhalla M, Hyeon SJ, Oh JE, Yoo S, Chae U, **Kwon J**, Koh W, Lim J, Park YM, Lee J, Cho IJ, Lee H, Ryu H and Lee CJ (2022). Astrocytic urea cycle detoxifies A β -derived ammonia while impairing memory in Alzheimer's disease. *Cell Metabolism*.

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Lee JM, Sa M, An H, Kim JM, **Kwon J**, Yoon BE and Lee CJ (2022). Generation of Astrocyte-Specific MAOB Conditional Knockout Mouse with Minimal Tonic GABA Inhibition. *Experimental Neurobiology*.

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Jang MW, Kim TY, Sharma K, **Kwon J**, Yi E and Lee CJ (2021). A Deafness Associated Protein TMEM43 Interacts with KCNK3 (TASK-1) Two-pore Domain K⁺ (K2P) Channel in the Cochlea.

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Won J, Kazan HH, **Kwon J**, Park M, Ergun MA, Ozcan S, Choi BY, Heo WD and Lee CJ (2021). Ultimate COVID-19 Detection Protocol Based on Saliva Sampling and qRT-PCR with Risk Probability Assessment. *Experimental Neurobiology*.

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Han K, Lee M, Lim HK, Jang MW, **Kwon J**, Lee CJ, Kim SG and Suh M (2020). Excitation-Inhibition Imbalance Leads to Alteration of Neuronal Coherence and Neurovascular Coupling under Acute Stress. *The Journal of Neuroscience*.

<https://doi.org/10.1523/jneurosci.1553-20.2020>.

Oh SJ, Lee JM, Kim HB, Lee J, Han S, Bae JY, Hong GS, Koh W, **Kwon J**, Hwang ES, Woo DH, Youn I, Cho IJ, Bae YC, Lee S, Shim JW, Park JH and Lee CJ (2019). Ultrasonic Neuromodulation via Astrocytic TRPA1. *Current Biology*.

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Han YE, **Kwon J**, Won J, An H, Jang MW, Woo J, Lee JS, Park MG, Yoon BE, Lee SE, Hwang EM, Jung JY, Park H, Oh SJ and Lee CJ (2019). Tweety-homolog (Ttyh) Family Encodes the Pore-forming Subunits of the Swelling-dependent Volume-regulated Anion Channel (VRAC_{swell}) in the Brain. *Experimental Neurobiology*.

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Ha GE, Lee J, Kwak H, Song K, **Kwon J**, Jung SY, Hong J, Chang GE, Hwang EM, Shin HS, Lee CJ and Cheong E. (2016). The Ca²⁺-activated chloride channel anoctamin-2 mediates spike-frequency adaptation and regulates sensory transmission in thalamocortical neurons. *Nature Communications*.

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