JEA (JAY) KWON

RESEARCH INTERESTS

- Brain-inspired machine intelligence, deep learning for pose estimation and action recognition
- Neural decoding, computational neuroscience, memory-driven learning
- Privacy and security in AI systems, human-AI alignment

EDUCATION

- Korea University, Seoul, South Korea • Ph.D. in Brain and Cognitive Engineering • 2014 - 2022
  Advisor: Prof. C. Justin Lee
  Dissertation: Deep learning approaches for animal behavior analysis
- Saitama University, Saitama, Japan • B.E. in Electrical and Electronic Engineering • 2008 - 2012

PROFESSIONAL EXPERIENCE

- Max Planck Institute for Security and Privacy (MPI-SP), Bochum, Germany • Postdoctoral Researcher • 2024 - Present
- Center for Cognition and Sociality, Institute for Basic Science (IBS), Daejeon, South Korea • Postdoctoral Researcher • 2022 - 2024
- Center for Cognition and Sociality, Institute for Basic Science (IBS), Daejeon, South Korea • Research Intern • 2018 - 2020
- Korea Institute of Science and Technology (KIST), Seoul, South Korea • Research Assistant • 2014 - 2018

INVITED TALKS

- ICLR 2025, Singapore • Brain-inspired Lp-Convolution • 2025
- CVPR CV4Animals Workshop 2023 • SUBTLE: Unsupervised Animal Behavior Mapping • 2023
- Institute for Basic Science (IBS), Daejeon • Deep Learning for Animal Behavior Analysis • 2022

PUBLICATIONS

26. Dropouts in Confidence: Moral Uncertainty in Human-LLM Alignment (with **J. Kwon**, L. F. Vecchietti, S. Park, M. Cha)
    AAAI Conference on Artificial Intelligence • 2026
25. Brain-inspired Lp-Convolution Benefits Large Kernels and Aligns Better with Visual Cortex (with **J. Kwon**, S. Lim, K. Song, C. J. Lee)
    International Conference on Learning Representations • 2025

24. Egocentric 3D Skeleton Learning in Identity-Aware Deep LSTM Network Encodes Obese-Like Motion Representations (with **J. Kwon**, M. Sa, H. Kim, Y. Seong, C. J. Lee)
ICLR TS4H Workshop • 2024

23. Brain-inspired Lp-Convolution Benefits Large Kernels and Aligns Better with Visual Cortex (with **J. Kwon**, S. Lim, K. Song, C. J. Lee)
ICLR Re-Align Workshop • 2024

22. SUBTLE: An Unsupervised Platform with Temporal Link Embedding that Maps Animal Behavior (with **J. Kwon**, S. Kim, D. Kim, J. Joo, S. Kim, M. Cha, C. J. Lee)
International Journal of Computer Vision • 2024

21. Egocentric 3D Skeleton Learning in a Deep Neural Network Encodes Obese-like Motion Representations (with **J. Kwon**, M. Sa, H. Kim, Y. Seong, C. J. Lee)
Experimental Neurobiology • 2024

20. GolpHCat (TMEM87A), a Unique Voltage-Dependent Cation Channel in Golgi Apparatus, Contributes to Golgi-pH Maintenance and Hippocampus-Dependent Memory (with H. Kang, A. Han, A. Zhang, H. Jeong, W. Koh, J. M. Lee, H. Lee, H. Y. Jo, M. A. Maria-Solano, M. Bhalla, **J. Kwon**, et al.)
Nature Communications • 2024

19. Transformer as a Hippocampal Memory Consolidation Model Based on NMDAR-Inspired Nonlinearity (with D. Kim, **J. Kwon**, M. Cha, C. J. Lee)
Advances in Neural Information Processing Systems • 2023

18. Hypothalamic GABRA5-Positive Neurons Control Obesity via Astrocytic GABA (with M. Sa, E. Yoo, W. Koh, M. G. Park, H. Jang, Y. R. Yang, M. Bhalla, J. Lee, J. Lim, W. Won, **J. Kwon**, et al.)
Nature Metabolism • 2023

17. SUBTLE: An Unsupervised Platform with Temporal Link Embedding that Maps Animal Behavior (with **J. Kwon**, S. Kim, D. Kim, J. Joo, S. Kim, M. Cha, C. J. Lee)
CVPR CV4Animals Workshop • 2023

16. Visualizing Reactive Astrocyte-Neuron Interaction in Alzheimer's Disease Using 11C-Acetate and 18F-FDG (with M. Nam, H. Y. Ko, D. Kim, S. Lee, Y. M. Park, S. J. Hyeon, W. Won, J. Chung, S. Y. Kim, H. H. Jo, K. T. Oh, Y. Han, G. Lee, Y. H. Ju, H. Lee, H. Kim, J. Heo, M. Bhalla, K. J. Kim, **J. Kwon**, et al.)
Brain • 2023

15. Transformer Needs NMDA Receptor Nonlinearity for Long-Term Memory (with D. Kim, **J. Kwon**, M. Cha, C. J. Lee)
NeurIPS Memory in Artificial and Real Intelligence Workshop • 2022

14. AVATAR: AI Vision Analysis for Three-Dimensional Action in Real-Time (with D. Kim, J. Kim, W. Jung, J. Park, M. Kim, A. Shin, Y. Jeong, S. Park, G. Shin, Y. W. Lee, **J. Kwon**, D. Kim)
CVPR CV4Animals Workshop • 2022

13. Dopamine-Induced Astrocytic Ca2+ Signaling in mPFC is Mediated by MAO-B in Young Mice, but by Dopamine Receptors in Adult Mice (with S. Kim, **J. Kwon**, M. G. Park, C. J. Lee)
Molecular Brain • 2022

12. Astrocytic Urea Cycle Detoxifies Aβ-Derived Ammonia While Impairing Memory in Alzheimer's Disease (with Y. H. Ju, M. Bhalla, S. J. Hyeon, J. E. Oh, S. Yoo, U. Chae, **J. Kwon**, W. Koh, J. Lim, Y. M. Park, et al.)
Cell Metabolism • 2022

11. Generation of Astrocyte-Specific MAOB Conditional Knockout Mouse with Minimal Tonic GABA Inhibition (with J. M. Lee, M. Sa, H. An, J. M. J. Kim, **J. Kwon**, B. Yoon, C. J. Lee)
Experimental Neurobiology • 2022

10. Retina-Attached Slice Recording Reveals Light-Triggered Tonic GABA Signaling in Suprachiasmatic Nucleus (with **J. Kwon**, M. W. Jang, C. J. Lee)
Molecular Brain • 2021

9. A Deafness Associated Protein TMEM43 Interacts with KCNK3 (TASK-1) Two-Pore Domain K+ (K2P) Channel in the Cochlea (with M. W. Jang, T. Y. Kim, K. Sharma, **J. Kwon**, E. Yi, C. J. Lee)
Experimental Neurobiology • 2021

8. Ultimate COVID-19 Detection Protocol Based on Saliva Sampling and qRT-PCR with Risk Probability Assessment (with J. Won, H. H. Kazan, **J. Kwon**, M. Park, M. A. Ergun, S. Ozcan, B. Y. Choi, W. D. Heo, C. J. Lee)
Experimental Neurobiology • 2021

7. Excitation-Inhibition Imbalance Leads to Alteration of Neuronal Coherence and Neurovascular Coupling Under Acute Stress (with K. Han, M. Lee, H. Lim, M. W. Jang, **J. Kwon**, C. J. Lee, S. Kim, M. Suh)
Journal of Neuroscience • 2020

6. Ultrasonic Neuromodulation via Astrocytic TRPA1 (with S. Oh, J. M. Lee, H. Kim, J. Lee, S. Han, J. Y. Bae, G. Hong, W. Koh, **J. Kwon**, E. Hwang, et al.)
Current Biology • 2019

5. Tweety-Homolog (Ttyh) Family Encodes the Pore-Forming Subunits of the Swelling-Dependent Volume-Regulated Anion Channel (VRACswell) in the Brain (with Y. Han, **J. Kwon**, J. Won, H. An, M. W. Jang, J. Woo, J. S. Lee, M. G. Park, B. Yoon, S. E. Lee, et al.)
Experimental Neurobiology • 2019

4. Control of Motor Coordination by Astrocytic Tonic GABA Release Through Modulation of Excitation/Inhibition Balance in Cerebellum (with J. Woo, J. O. Min, D. Kang, Y. S. Kim, G. H. Jung, H. J. Park, S. Kim, H. An, **J. Kwon**, J. Kim, et al.)
Proceedings of the National Academy of Sciences • 2018

3. Development of a Low-Cost, Comprehensive Recording System for Circadian Rhythm Behavior (with **J. Kwon**, M. G. Park, S. E. Lee, C. J. Lee)
Experimental Neurobiology • 2018

2. Orai1 and Orai3 in Combination with Stim1 Mediate the Majority of Store-Operated Calcium Entry in Astrocytes (with **J. Kwon**, H. An, M. Sa, J. Won, J. I. Shin, C. J. Lee)
Experimental Neurobiology • 2017

1. The Ca2+-Activated Chloride Channel Anoctamin-2 Mediates Spike-Frequency Adaptation and Regulates Sensory Transmission in Thalamocortical Neurons (with G. E. Ha, J. Lee, H. Kwak, K. Song, **J. Kwon**, S. Jung, J. Hong, G. Chang, E. M. Hwang, H. Shin, et al.)
Nature Communications • 2016