Jea (Jay) Kwon

Postdoctoral Researcher | Max Planck Institute for Security and Privacy (MPI-SP), Bochum, Germany
onlytojay@gmail.com

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

Ph.D. in Brain and Cognitive Engineering 2014 - 2022
Korea University, Seoul, South Korea
– Advisor: Prof. C. Justin Lee
– Dissertation: Deep learning approaches for animal behavior analysis

B.E. in Electrical and Electronic Engineering 2008 - 2012
Saitama University, Saitama, Japan

Professional Experience

Postdoctoral Researcher 2024 - Present
Max Planck Institute for Security and Privacy (MPI-SP), Bochum, Germany

Postdoctoral Researcher 2022 - 2024
Center for Cognition and Sociality, Institute for Basic Science (IBS), Daejeon, South Korea

Research Intern 2018 - 2020
Center for Cognition and Sociality, Institute for Basic Science (IBS), Daejeon, South Korea

Research Assistant 2014 - 2018
Korea Institute of Science and Technology (KIST), Seoul, South Korea

Invited Talks

Brain-inspired Lp-Convolution 2025
ICLR 2025, Singapore

SUBTLE: Unsupervised Animal Behavior Mapping 2023
CVPR CV4Animals Workshop 2023

Deep Learning for Animal Behavior Analysis 2022
Institute for Basic Science (IBS), Daejeon

Publication Summary

Conference: ICLR-W (2), CVPR-W (2), AAAI (1), ICLR (1), NeurIPS (1), NeurIPS-W (1)
Journal: Exp. Neurobiol. (7), Nat. Commun. (2), Mol. Brain (2), IJCV (1), Nat. Metab. (1), Brain (1), Cell Metab. (1), J. Neurosci. (1), Curr. Biol. (1), PNAS (1)
Total: 26 publications

Publications

1. **Jea Kwon***, Luiz Felipe Vecchietti, Sungjoon Park, Meeyoung Cha, "Dropouts in Confidence: Moral Uncertainty in Human-LLM Alignment," *AAAI Conference on Artificial Intelligence*, 2026.

2. **Jea Kwon***, SungJun Lim, Kyungwoo Song, C. Justin Lee, "Brain-inspired Lp-Convolution Benefits Large Kernels and Aligns Better with Visual Cortex," *International Conference on Learning Representations*, 2025.

3. **Jea Kwon***, Moonsun Sa, Hyewon Kim, Yejin Seong, C. Justin Lee, "Egocentric 3D Skeleton Learning in Identity-Aware Deep LSTM Network Encodes Obese-Like Motion Representations," *ICLR TS4H Workshop*, 2024.

4. **Jea Kwon***, SungJun Lim, Kyungwoo Song, C. Justin Lee, "Brain-inspired Lp-Convolution Benefits Large Kernels and Aligns Better with Visual Cortex," *ICLR Re-Align Workshop*, 2024.

5. **Jea Kwon***, Sunpil Kim, Dong-Kyum Kim, Jinhyeong Joo, SoHyung Kim, Meeyoung Cha, C. Justin Lee, "SUBTLE: An Unsupervised Platform with Temporal Link Embedding that Maps Animal Behavior," *International Journal of Computer Vision*, 2024.

6. **Jea Kwon***, Moonsun Sa, Hyewon Kim, Yejin Seong, C. Justin Lee, "Egocentric 3D Skeleton Learning in a Deep Neural Network Encodes Obese-like Motion Representations," *Experimental Neurobiology*, 2024.

7. Hyunji Kang, Ah-reum Han, Aihua Zhang, Heejin Jeong, Wuhyun Koh, Jung Moo Lee, Hayeon Lee, Hee Young Jo, Miguel A Maria-Solano, Mridula Bhalla, **Jea Kwon**, et al., "GolpHCat (TMEM87A), a Unique Voltage-Dependent Cation Channel in Golgi Apparatus, Contributes to Golgi-pH Maintenance and Hippocampus-Dependent Memory," *Nature Communications*, 2024.

8. Dong-Kyum Kim, **Jea Kwon**, Meeyoung Cha, C. Justin Lee, "Transformer as a Hippocampal Memory Consolidation Model Based on NMDAR-Inspired Nonlinearity," *Advances in Neural Information Processing Systems*, 2023.

9. Moonsun Sa, Eun-Seon Yoo, Wuhyun Koh, Mingu Gordon Park, Hyun-Jun Jang, Yong Ryoul Yang, Mridula Bhalla, Jae-Hun Lee, Jiwoon Lim, Woojin Won, **Jea Kwon**, et al., "Hypothalamic GABRA5-Positive Neurons Control Obesity via Astrocytic GABA," *Nature Metabolism*, 2023.

10. **Jea Kwon***, Sunpil Kim, Dong-Kyum Kim, Jinhyeong Joo, SoHyung Kim, Meeyoung Cha, C. Justin Lee, "SUBTLE: An Unsupervised Platform with Temporal Link Embedding that Maps Animal Behavior," *CVPR CV4Animals Workshop*, 2023.

11. Min-Ho Nam, Hae Young Ko, Dongwoo Kim, Sangwon Lee, Yongmin Mason Park, Seung Jae Hyeon, Woojin Won, Jee-In Chung, Seon Yoo Kim, Han Hee Jo, Kyeong Taek Oh, Young-Eun Han, Gwan-Ho Lee, Yeon Ha Ju, Hyowon Lee, Hyunjin Kim, Jaejun Heo, Mridula Bhalla, Ki Jung Kim, **Jea Kwon**, et al., "Visualizing Reactive Astrocyte-Neuron Interaction in Alzheimer's Disease Using 11C-Acetate and 18F-FDG," *Brain*, 2023.

12. Dong-Kyum Kim, **Jea Kwon**, Meeyoung Cha, C. Justin Lee, "Transformer Needs NMDA Receptor Nonlinearity for Long-Term Memory," *NeurIPS Memory in Artificial and Real Intelligence Workshop*, 2022.

13. Daegun Kim, Jineun Kim, Wongyo Jung, Jungoon Park, Mingyu Kim, Anna Shin, Yong-Cheol Jeong, Seahyung Park, Gwanhoo Shin, Ye Won Lee, **Jea Kwon**, Daesoo Kim, "AVATAR: AI Vision Analysis for Three-Dimensional Action in Real-Time," *CVPR CV4Animals Workshop*, 2022.

14. Sunpil Kim, **Jea Kwon**, Mingu Gordon Park, C. Justin Lee, "Dopamine-Induced Astrocytic Ca2+ Signaling in mPFC is Mediated by MAO-B in Young Mice, but by Dopamine Receptors in Adult Mice," *Molecular Brain*, 2022.

15. Yeon Ha Ju, Mridula Bhalla, Seung Jae Hyeon, Ju Eun Oh, Seonguk Yoo, Uikyu Chae, **Jea Kwon**, Wuhyun Koh, Jiwoon Lim, Yongmin Mason Park, et al., "Astrocytic Urea Cycle Detoxifies A{$\{}beta$}-Derived Ammonia While Impairing Memory in Alzheimer's Disease," *Cell Metabolism*, 2022.

16. Jung Moo Lee, Moonsun Sa, Heeyoung An, Jong Min Joseph Kim, **Jea Kwon**, Bo-Eun Yoon, C. Justin Lee, "Generation of Astrocyte-Specific MAOB Conditional Knockout Mouse with Minimal Tonic GABA Inhibition," *Experimental Neurobiology*, 2022.

17. **Jea Kwon***, Minwoo Wendy Jang, C. Justin Lee, "Retina-Attached Slice Recording Reveals Light-Triggered Tonic GABA Signaling in Suprachiasmatic Nucleus," *Molecular Brain*, 2021.

18. Minwoo Wendy Jang, Tai Young Kim, Kushal Sharma, **Jea Kwon**, Eunyoung Yi, C. Justin Lee, "A Deafness Associated Protein TMEM43 Interacts with KCNK3 (TASK-1) Two-Pore Domain K+ (K2P) Channel in the Cochlea," *Experimental Neurobiology*, 2021.

19. Joungha Won, Hasan H{\{}"u}seyin Kazan, **Jea Kwon**, Myungsun Park, Mehmet Ali Ergun, Sureyya Ozcan, Byung Yoon Choi, Won Do Heo, C. Justin Lee, "Ultimate COVID-19 Detection Protocol Based on Saliva Sampling and qRT-PCR with Risk Probability Assessment," *Experimental Neurobiology*, 2021.

20. Kayoung Han, Myunghee Lee, Hyun-Kyoung Lim, Minwoo Wendy Jang, **Jea Kwon**, C. Justin Lee, Seong-Gi Kim, Minah Suh, "Excitation-Inhibition Imbalance Leads to Alteration of Neuronal Coherence and Neurovascular Coupling Under Acute Stress," *Journal of Neuroscience*, 2020.

21. Soo-Jin Oh, Jung Moo Lee, Hyun-Bum Kim, Jungpyo Lee, Sungmin Han, Jin Young Bae, Gyu-Sang Hong, Wuhyun Koh, **Jea Kwon**, Eun-Sang Hwang, et al., "Ultrasonic Neuromodulation via Astrocytic TRPA1," *Current Biology*, 2019.

22. Young-Eun Han, **Jea Kwon**, Joungha Won, Heeyoung An, Minwoo Wendy Jang, Junsung Woo, Je Sun Lee, Min Gu Park, Bo-Eun Yoon, Seung Eun Lee, et al., "Tweety-Homolog (Ttyh) Family Encodes the Pore-Forming Subunits of the Swelling-Dependent Volume-Regulated Anion Channel (VRACswell) in the Brain," *Experimental Neurobiology*, 2019.

23. Junsung Woo, Joo Ok Min, Dae-Si Kang, Yoo Sung Kim, Guk Hwa Jung, Hyun Jung Park, Sunpil Kim, Heeyoung An, **Jea Kwon**, Jeongyeon Kim, et al., "Control of Motor Coordination by Astrocytic Tonic GABA Release Through Modulation of Excitation/Inhibition Balance in Cerebellum," *Proceedings of the National Academy of Sciences*, 2018.

24. **Jea Kwon***, Min Gu Park, Seung Eun Lee, C. Justin Lee, "Development of a Low-Cost, Comprehensive Recording System for Circadian Rhythm Behavior," *Experimental Neurobiology*, 2018.

25. **Jea Kwon***, Heeyoung An, Moonsun Sa, Joungha Won, Jeong Im Shin, C. Justin Lee, "Orai1 and Orai3 in Combination with Stim1 Mediate the Majority of Store-Operated Calcium Entry in Astrocytes," *Experimental Neurobiology*, 2017.

26. Go Eun Ha, Jaekwang Lee, Hankyul Kwak, Kiyeong Song, **Jea Kwon**, Soon-Young Jung, Joohyeon Hong, Gyeong-Eon Chang, Eun Mi Hwang, Hee-Sup Shin, et al., "The Ca2+-Activated Chloride Channel Anoctamin-2 Mediates Spike-Frequency Adaptation and Regulates Sensory Transmission in Thalamocortical Neurons," *Nature Communications*, 2016.