

Wonjun Ko

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Work Experience

Sungshin Women's University, Assistant Professor, School of AI Convergence
Seoul, Republic of Korea
Sept 2023 – present

SK hynix Inc., Data Scientist (Senior Researcher)
Icheon, Republic of Korea
Aug 2022 – Aug 2023

- R&D/M&T Data Analytics, Division of Data Intelligence, DT

Education

PhD Korea University, Brain and Cognitive Engineering
Seoul, Republic of Korea
Sept 2017 – Aug 2022

- Dissertation: Deep Representation Learning in Biomedicine
- Advisor: Prof. Heung-Il Suk

Research Interests

Large Language Models for Data-Oriented Representation

- Retrieval-augmented generation-inspired feature representation learning
- Service-specialized generative language models for biomedical applications

Deep Learning Algorithms and Neural Network Structures for Biomedical Data Analysis

- Optimization algorithms based on reinforcement learning (J7, J8), semi-supervised (C11), unsupervised (J6), and self-supervised learning (J1, J2, C3)
- Novel deep architectures for spectro-spatio-temporal feature representation (J12, C7, C9, C12)
- Neurodegenerative disease-related brain region discovery via graph neural networks (J11)
- Bayesian- and topology-grounded machine/deep learning methods (J3)

Multi-modal Data Representation and Decision-Making

- Neuroimaging-genetic data association mining via deep generative-discriminative learning (C1, C6, J5)
- Deep learning for industrial problems: synthetic device image generation, yield prediction, and job scheduling

Publications - International Journals

- (J1) **W. Ko**, J. Choe, and J. Kang, "SLEEP-SAFE: Self-supervised Learning for Estimating Electroencephalogram Patterns with Structural Analysis of Fatigue Evidence," *IEEE Access*, vol. 13, pp. 35805-35817, 2025. (JCR-IF 3.400; CS-Information Systems 87/250) [link](#)
- (J2) **W. Ko**, S. Jeong, S.-K. Song, and H.-I. Suk, "EEG-Oriented Self-Supervised Learning with Triple Information Pathways Network," *IEEE Trans. Cybernetics*, vol. 54, no. 11, pp. 6495-6508, 2024. (JCR-IF 11.800; CS-Cybernetics 1/24) [link](#)
- (J3) S. Jeong, **W. Ko**, A. W. Mulyadi, and H.-I. Suk, "Deep Efficient Continuous Manifold Learning for Time Series Modeling," *IEEE Trans. Pattern Analysis and Machine Intelligence*, vol. 46, no. 1, pp. 171-184, 2023. (JCR-IF 23.600; CS-Artificial Intelligence 2/145) [link](#)
- (J4) J. Phyto, **W. Ko**, E. Jeon, and H.-I. Suk, "TransSleep: Transitioning-aware Attention-based Deep Neural Network for Sleep Staging," *IEEE Trans. Cybernetics*, vol. 53, no. 9, pp. 4500-4510, 2023. (JCR-IF 19.118; Automation & Control Systems 1/65) [link](#)
- (J5) **W. Ko**, W. Jung, E. Jeon, and H.-I. Suk, "A Deep Generative-Discriminative Learning for Multi-modal Representation in Imaging Genetics," *IEEE Trans. Medical Imaging*, vol. 41, no. 9, pp. 2348-2359, 2022. (JCR-IF 11.037; Radiology, Nuclear Medicine & Medical Imaging 5/136) [link](#)
- (J6) **W. Ko**, E. Jeon, J. S. Yoon, and H.-I. Suk, "Semi-Supervised Generative and Discriminative Adversarial Learning for Motor Imagery-based Brain-Computer Interface," *Scientific Reports*, vol. 12, no. 1, pp. 1-14, 2022. (JCR-IF 4.997; Multidisciplinary Sciences 19/74) [link](#)
- (J7) **W. Ko**, E. Jeon, and H.-I. Suk, "A Novel RL-assisted Deep Learning Framework for Task-informative Signals Selection and Classification for Spontaneous BCIs," *IEEE Trans. Industrial Informatics*, vol. 18, pp. 1873-1882, 2022. (JCR-IF 11.648; CS-Interdisciplinary Applications 4/112) [link](#)
- (J8) E. Jeon, **W. Ko**, J. S. Yoon, and H.-I. Suk, "Mutual Information-driven Subject-invariant and Class-relevant Deep Representation Learning in BCI," *IEEE Trans. Neural Networks and Learning Systems*, vol. 34, no. 2, pp. 739-749, 2023. (JCR-IF 14.255; CS-Theory & Methods 4/110) [link](#)
- (J9) **W. Ko**[†], E. Jeon[†], S. Jeong, J. Phyto, and H.-I. Suk (†equal contribution), "A Survey on Deep Learning-based Short/Zero-calibration Approaches for EEG-based Brain-Computer Interfaces," *Frontiers in Human Neuroscience*, vol. 15, p. 258, 2021. (JCR-IF 3.473; Psychology 29/80) [link](#)
- (J10) B.-K. Min, H.-S. Kim, **W. Ko**, M.-H. Ahn, H.-I. Suk, D. Pantazis, and R. T. Knight, "Electrophysiological Decoding of Spatial and Color Processing in Human Prefrontal Cortex," *NeuroImage*, vol. 237, p. 118165, 2021. (JCR-IF 7.400; Neuroimaging 2/14) [link](#)
- (J11) J. Lee[†], **W. Ko**[†], E. Kang, and H.-I. Suk (†equal contribution), "A Unified Framework for Personalized Regions Selection and Functional Relation Modeling for Early MCI Identification," *NeuroImage*, vol. 236, p. 118048, 2021. (JCR-IF 7.400; Neuroimaging 2/14) [link](#)
- (J12) **W. Ko**, E. Jeon, S. Jeong, and H.-I. Suk, "Multi-Scale Neural Network for EEG Representation Learning in BCI," *IEEE Computational Intelligence Magazine*, vol. 16, pp. 31-45, 2021. (JCR-IF 9.809; CS-Artificial Intelligence 15/145) [link](#)

Publications - International Conferences

- (C1) C. Park†, M. Cho†, Y. Kim, W. Jung, and **W. Ko** (†equal contribution), "A Novel Self-Supervised Deep Learning Framework for Pattern Recognition of Neurodegenerative Disease via Graph-based Phenotype-Genotype Relation Modeling," in *Proc. ACM/SIGAPP Symposium on Applied Computing (SAC)*, 2026, pp. 219-221. (Acceptance rate 23.4%) [link](#)
- (C2) Y. Kang, C. Park, Y. Kim, and **W. Ko**, "Unsupervised Latent Context Representation of Electroencephalography for Label-Efficient Sleep Apnea Screening," in *Proc. International Conference on Pattern Recognition (ICPR)*, 2026, Accepted. (Acceptance rate 49.6%)
- (C3) **W. Ko** and H.-I. Suk, "EEG-Oriented Self-Supervised Learning and Cluster-Aware Adaptation," in *Proc. ACM Int. Conf. Information and Knowledge Management (CIKM)*, 2022, pp. 4143-4147. (Acceptance rate 27.51%) [link](#)
- (C4) J. Phyto, **W. Ko**, E. Jeon, and H.-I. Suk, "Enhancing Contextual Encoding with Stage-Confusion and Stage-Transition Estimation for EEG-based Sleep Staging," in *Proc. IEEE Int. Conf. Acoustics, Speech and Signal Processing (ICASSP)*, 2022, pp. 1301-1305. (Acceptance rate 45%) [link](#)
- (C5) S. Jeong, **W. Ko**, A. W. Mulyadi, and H.-I. Suk, "Continuous Riemannian Geometric Learning for Sleep Staging Classification," in *Proc. Int. Winter Conf. Brain-Computer Interface (BCI)*, 2022, pp. 1-2. [link](#)
- (C6) **W. Ko**, W. Jung, A. W. Mulyadi, E. Jeon, and H.-I. Suk, "ENGINE: Enhancing Neuroimaging and Genetic Information by Neural Embedding," in *Proc. IEEE Int. Conf. Data Mining (ICDM)*, 2021, pp. 1162-1167. (Acceptance rate 20%) [link](#)
- (C7) **W. Ko**, E. Jeon, and H.-I. Suk, "Spectro-Spatio-Temporal EEG Representation Learning for Imagined Speech Recognition," in *Proc. Asian Conf. Pattern Recognition (ACPR)*, 2021, pp. 335-346. (Acceptance rate 55.1%) [link](#)
- (C8) S. Jeong, E. Jeon, **W. Ko**, and H.-I. Suk, "Fine-grained Temporal Attention Network for EEG-based Seizure Detection," in *Proc. Int. Winter Conf. Brain-Computer Interface (BCI)*, 2021, pp. 1-4. [link](#)
- (C9) **W. Ko**, K. Oh, E. Jeon, and H.-I. Suk, "VIGNet: A Deep Convolutional Neural Network for EEG-based Driver Vigilance Estimation," in *Proc. Int. Winter Conf. Brain-Computer Interface (BCI)*, 2020, pp. 1-3. [link](#)
- (C10) E. Jeon, **W. Ko**, and H.-I. Suk, "Domain Adaptation with Source Selection for Motor-Imagery based BCI," in *Proc. Int. Winter Conf. Brain-Computer Interface (BCI)*, 2019, pp. 1-4. [link](#)
- (C11) **W. Ko**, E. Jeon, J. Lee, and H.-I. Suk, "Semi-Supervised Deep Adversarial Learning for Brain-Computer Interface," in *Proc. Int. Winter Conf. Brain-Computer Interface (BCI)*, 2019, pp. 1-4. [link](#)
- (C12) **W. Ko**, J. S. Yoon, E. Kang, E. Jun, J.-S. Choi, and H.-I. Suk, "Deep Recurrent Spatio-Temporal Neural Network for Motor Imagery based BCI," in *Proc. Int. Winter Conf. Brain-Computer Interface (BCI)*, 2018, pp. 1-3. [link](#)

Research Projects & Grants

Development of a Unified Diagnostic Framework for Mental Disorder/Brain Disease through User-independent and Protocol-agnostic EEG Representation based on Interpretable Topological Deep Learning Techniques

2025 - 2028

- National Research Foundation of Korea, Outstanding Young Scientist (~\$400,000)

Teaching

Advanced Machine Learning (LH002800) - Spring 2025. [Slides](#) / [Notes & Exams](#)

Introduction to AI Convergence (LH000100) - Spring 2025, Fall 2024

Mathematics for Artificial Intelligence (LH002500) - Fall 2024. [Slides](#) / [Notes & Exams](#)

Artificial Intelligence (LZ001600) - Fall 2024, Spring 2024

Data Structures (LZ000500) - Spring 2024. [Slides](#) / [Notes & Exams](#)

Data Structures and Applications (LH000500) - Fall 2023

C++ Programming (LZ000500) - Fall 2023. [Slides](#) / [Exams](#)

Editorial & Review Service

Editor - Frontiers in Human Neuroscience

Reviewer - IEEE Trans. Neural Networks and Learning Systems; IEEE Trans. Cybernetics; Biomedical Signal Processing and Control; Scientific Reports; Artificial Intelligence in Medicine; Asian Conf. on Pattern Recognition

Advisory

초거대 AI 확산 조성 사업(군 대상품 상태 검사 데이터), (주)에스지앤아이 (2024)

Awards & Honors

Sungshin Excellent Teaching Award, Sungshin Women's University (2024)

Korea University Achievement Award, Korea University (2022)

NAVER Ph.D. Fellowship (~\$5,000), NAVER (2021)

Fundamental Scientist Scholarship (~\$20,000), JW Foundation (2021)

Outstanding Trainee Award, Korean Society for Human Brain Mapping (2021)

Graduate School Junior Research Fellow Grant, Korea University (2021)

Best Paper Award, Korea University (2021)

Student Award, International BCI Society (2021, 2018)

Best Presentation Award, Korean Society for Human Brain Mapping (2019)

Best Paper Award, Korea Computer Congress (2018)

Invited Talks & Seminars

Design and Implementation of Deep Learning Models using PyTorch, Sungshin Women's University (2025, 2024)

Deep Representation Learning in EEG Analysis, Korean Society for EEG and Neurophysiology (2024)

Deep Representation Learning in Biomedicine, The Catholic University of Korea (2024)

SK Winter Data Science Engineer School, SK Inc. (2023)

Deep Reinforcement Learning and Applications, SK hynix Inc. (2022)

Skills

Programming Languages: Python, MATLAB, C, C++

ML/DL Frameworks: TensorFlow, PyTorch, Scikit-Learn

Others: LaTeX, Linux, Git, Microsoft Office