Won Hwa Kim

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RESEARCH INTERESTS

My research is focused on various topics in **Machine Learning, Computer Vision** and **Medical Imaging**. I am particularily interested in applied harmonic analysis in non-Euclidean spaces (e.g., signal processing on graphs) and stochastic process (e.g., longitudinal analysis) to develop efficient Deep Learning frameworks to facilitate understanding of neurodegenerative disorders such as Alzheimer's Disease (AD).

APPOINTMENTS

Associate Professor 2023 - present
Assistant Professor 2020 - 2023
Computer Science and Engineering, POSTECH, S. Korea
Graduate School of Artificial Intelligence, POSTECH, S. Korea
Medical Science and Engineering, POSTECH, S. Korea

Assistant Professor 2018 - 2023
Computer Science and Engineering, University of Texas at Arlington, Texas, U.S.A.

Researcher 2017 - 2018
Data Science Team, NEC Labs, America, U.S.A.

Research Engineer 2010 - 2011
Environmental Tech Center, Hyundai Motors Company, S. Korea

EDUCATION

University of Wisconsin - Madison, Madison, Wisconsin, U.S.A. 2011 - 2017
Ph.D, Computer Sciences (Minor in Statistics)
- Thesis: A Multi-resolution Framework for Statistical Analysis of Neuroimaging Data
- Advisor: Vikas Singh

KAIST, Daejon, South Korea 2008 - 2010
M.S., Robotics Program
- Thesis: Diversified Emotions with Mood for Human-like Behaviors of Robots
- Advisor: Myungjin Chung

Sungkyunkwan University, Seoul, South Korea 2001 - 2008
B.S., Electrical Engineering (*Early graduation in 7 semesters*)

HONORS and AWARDS

- Outstanding Paper Award (Bronze), IPIU 2024 2024
- Samsung Humantech Paper Award (Bronze), Samsung 2023
- 3 Outstanding Paper Awards (Silver, Bronze, Encouragement), IPIU 2023 2023
- NSF CISE CAREER Workshop Travel Award, National Science Foundation (NSF) 2019
- Rising STARs Award, University of Texas System [$250,000] 2017
- Doctoral Consortium Travel Award, Computer Vision and Pattern Recognition (CVPR) 2016
- Student Travel Award, Medical Image Computing and Computer Assisted Intervention (MICCAI) 2013
- Machine Learning Summer School (MLSS) Scholarship, University of California, Santa Cruz 2012
- National Fellowship, S. Korea 2008 - 2010
- Finalist for Best Paper in Biomimetics, International Conference on Robotics and Biomimetics 2009
- Merit Based Scholarship, Sungkyunkwan University 2002, 2003, 2005
- 3rd Place in 12th Grade, Utah Math Contest 2001

GRANTS

• *Consulting on VUNO MED Solution for Advanced Research*, VUNO, 2023 - 2024
Role: **PI**, [₩12,000,000 (∼$10,000)]
• *Solder Joint Failure Detection Algorithm Development*, SK Hynics (via AICC), 2023
Role: **PI**, [₩50,000,000 (∼$42,000)]
• NRF 2022R1A2C2092336, *Developing Graph Deep Learning Framework for Analysis for Analysis of Early Diagnosis and Symptoms of Alzheimer's Disease via Brain Connectome*, 2022 - 2026
National Research Foundation (NRF), Role: **PI**, [₩540,000,000 (∼$450,000)]
• HU22C016800 (with Dr. Hwang at SNU), *Development of a K-dementia Bigdata Central HUB Database and Analysis Platform*, 2022 - 2024
Korea Health Industry Development Institute (KHID), Role: **PI**, [₩401,600,000 (∼$334,000)]
• IITP-2202-0-00290 (with Dr. Cho at POSTECH), *Visual Intelligence for Space-Time Understanding and Generation based on Multi-layered Visual Common Sense*, 2022 - 2026
Institute for Information and communication Technology Planning and Evaluation (IITP), Role: **Co-PI**, [₩39,500,000,000 (∼$3.3M)]
• NIH R03 AG070701 (with Dr. Wu at UNC-Chapel Hill), *Continuing Tool Development for Longitudinal Network Analysis: Enriching the Diagnostic Power of Disease-Specific Connectomic Biomarkers by Deep Graph Learning*, 2021 - 2023
National Institute of Health (NIH), Role: **Co-I**, [UTA: $125,353]
• NSF IIS CRII 1948510 (known as "Mini CAREER"), *Learning Novel Multi-resolution Representations of Graphs: Applications to Brain Connectivity Analysis for Alzheimer's Disease*, 2020 - 2022
National Science Foundation (NSF), Role: **PI**, [$175,000]
• NSF IIS SMALL 2008602 (joint work between UTA and NJIT), *An Optimization Framework for Designing Derived Attributes with Humans-in-the-loop*, 2020 - 2022
National Science Foundation (NSF), Role: **Co-PI**, [$498,762]
• NIH R01 AG059312-01A1 (with Dr. Singh at UW-Madison), *Algebraic Formulations for Characterizing Structural Brain Connectivity Changes and Pathology Transmission Networks in Preclinical Alzheimer's Disease*, 2019 - 2021
National Institute of Health (NIH), Role: **Co-I**, [UTA: $150,785]
• IITP-2020-2015-0-00742 (gift from Sungkyunkwan University), *High-Potential Individuals Global Training Program*, 2019 - 2020
Institute for Information and Communications Technology Promotion (IITP), Role: **PI**, [$33,034]
• Research Enhancement Program (REP), *Convolution Neural Network for Graph Data*, 2018 - 2019
University of Texas at Arlington, Role: **PI**, [$10,000]
• CTEDD 018-08 (joint work with Georgia Tech), *Social Media Analysis for Transportation Assessment*, 2018 - 2019
Center for Equity, Diversity and Dollar (C-TEDD), United States Department of Transportation (USDOT), Role: **PI**, [$101,933]

PUBLICATIONS

Note: Top-tier conferences in computer science are valued as prestigious journals in other areas.

1. Minjae Jeong*, Hyuna Cho*, Sungyoon Jung, **Won Hwa Kim**, "Uncertainty-aware Diffusion-based Adversarial Attack for Realistic Colonoscopy Image Synthesis", *Medical Image Computing and Computer Assisted Intervention* (**MICCAI**), 2024. [**Provisional Accept:** ∼11%, *: equal contribution]
2. Seunghun Baek*, Jaeyoon Sim*, Guorong Wu, **Won Hwa Kim**, "OCL: Ordinal Contrastive Learning for Imputating Features with Progressive Labels", *Medical Image Computing and Computer Assisted Intervention* (**MICCAI**), 2024. [**Provisional Accept:** ∼11%, *: equal contribution]
3. Yanquan Huang, Tingting Dan, Won Hwa Kim, Guorong Wu, "Uncovering Cortical Pathways of Prion-like Pathology Spreading in Alzheimer's Disease by Neural Optimal Mass Transport", *Medical Image Computing and Computer Assisted Intervention* (**MICCAI**), 2024. [**Provisional Accept:** ∼11%]
4. Yechan Hwang, Soojin Hwang, Guorong Wu, Won Hwa Kim, "Multi-order Simplex-based Graph Neural Network for Brain Network Analysis", *Medical Image Computing and Computer Assisted Intervention* (**MICCAI**), 2024.
5. Jaeyoon Sim, Minjae Lee, Guorong Wu, Won Hwa Kim, "Multi-Modal Graph Neural Network with Transformer-Guided Adaptive Diffusion for Preclinical Alzheimer Classification", *Medical Image Computing and Computer Assisted Intervention* (**MICCAI**), 2024.

6. Tingting Dan, Mustafa Dere, **Won Hwa Kim**, Minjeong Kim, Guorong Wu, "TauFlowNet: Revealing latent propagation mechanism of tau aggregates using deep neural transport equations", *Medical Image Analysis* (**MedIA**), 2024.
7. Hyuna Cho, Jaeyoon Sim, Guorong Wu, **Won Hwa Kim**, "Neurodegenerative Brain Network Classification via Adaptive Diffusion with Temporal Regularization", *International Conference on Machine Learning* (**ICML**), 2024.
8. Tingting Dan, Ziquan Wei, **Won Hwa Kim**, Guorong Wu, "Exploring the Enigma of Neural Dynamics Through A Scattering-Transform Mixer Landscape for Riemannian Manifold", *International Conference on Machine Learning* (**ICML**), 2024.
9. Seunghun Baek*, Jaeyoon Sim*, Mustafa Dere, Minjeong Kim, Guorong Wu, **Won Hwa Kim**, "Modality-Agnostic Style Transfer for Holistic Feature Imputation", *International Symposium on Biomedical Imaging* (**ISBI**), 2024. [**Oral presentation**, *: equal contribution]
10. Yujee Song, Donghyun Lee, Rui Meng, **Won Hwa Kim**, "Decoupled Marked Temporal Point Process using Neural Ordinary Differential Equations", *International Conference on Representation Learning* (**ICLR**), 2024.
11. Inhyuk Park, **Won Hwa Kim**, Jongbin Ryu, "Style-KD: Class-imbalanced medical image classification via style knowledge distillation", *Biomedical Signal Processing and Control*, 2024. [Impact factor: 5.1]
12. Jaeyoon Sim, Sooyeon Jeon, Injun Choi, Guorong Wu, **Won Hwa Kim**, "Learning to Approximate Adaptive Kernel Convolution on Graphs", *AAAI Conference on Artificial Intelligence* (**AAAI**), 2024.
13. Hyuna Cho, Yubin Han, Amal Isaiah, **Won Hwa Kim**, "Covariate Correcting Network for Isolating the Impact of Long-term SES Changes on Brain Development", *Annual Meeting of the Organization for Human Brain Mapping* (**OHBM**), 2024.
14. Joonhyuk Park*, Yechan Hwang*, Minjeong Kim, Moo K. Chung, Guorong Wu, **Won Hwa Kim**, "Brain Connectome Analysis for Alzheimer's Disease using Hodge Laplacian-based Edge Convolution", *Annual Meeting of the Organization for Human Brain Mapping* (**OHBM**), 2024. [*: equal contribution]
15. Hyuna Cho, Injun Choi, Suha Kwak, **Won Hwa Kim**, "Interactive Network Perturbation between Teacher and Students for Semi-Supervised Semantic Segmentation", *Winter Conference on Applications of Computer Vision* (**WACV**), 2024. [**First round accepted**: 92/815 = ∼11%]
16. Hyuna Cho, Minjae Jeong, Sooyeon Jeon, Sungsoo Ahn, **Won Hwa Kim**, "Multi-resolution Spectral Coherence for Graph Generation with Score-based DIffusion", *Neural Information Processing Systems* (**NeurIPS**), 2023.
17. Tingting Dan, Jiaqi Ding, Ziquan Wei, Shahar Z Kovalsky, Minjeong Kim, **Won Hwa Kim**, Guorong Wu, "Re-Think and Re-Design Graph Neural Networks in Spaces of Continuous Graph Diffusion Functionals", *Neural Information Processing Systems* (**NeurIPS**), 2023.
18. Hyuna Cho, Guorong Wu, **Won Hwa Kim**, "Mixing Temporal Graphs with MLP for Longitudinal Brain Connectome Analysis", *Medical Image Computing and Computer Assisted Intervention* (**MICCAI**), 2023 [**Oral presentation:** 68/2250 = ∼3%]
19. Hyuna Cho, Yubin Han, **Won Hwa Kim**, "Anti-Adversarial Consistency Regularization for Data Augmentation: Applications to Robust Medical Image Segmentation", *Medical Image Computing and Computer Assisted Intervention* (**MICCAI**), 2023. [**Early accepted:** 14%]
20. Joonhyuk Park*, Yechan Hwang*, Minjeong Kim, Moo K. Chung, Guorong Wu, **Won Hwa Kim**, "Convolving Directed Graph Edges via Hodge Laplacian for Brain Network Analysis", *Medical Image Computing and Computer Assisted Intervention* (**MICCAI**), 2023. [**Early accepted:** 14%, *: equal contribution]
21. Ellen Jieun Oh, Yechan Hwang, Yubin Han, Taegeun Choi, Geunyoung Lee, **Won Hwa Kim**, "RESToring Clarity: Unpaired Retina Image Enhancement using Scattering Transform", *Medical Image Computing and Computer Assisted Intervention* (**MICCAI**), 2023.
22. Tingting Dan, Minjeong Kim, **Won Hwa Kim**, Guorong Wu, "Enhance Early Diagnosis Accuracy of Alzheimer's Disease by Elucidating Interactions between Amyloid Cascade and Tau Propagations", *Medical Image Computing and Computer Assisted Intervention* (**MICCAI**), 2023.
23. Tingting Dan, Minjeong Kim, **Won Hwa Kim**, Guorong Wu, "TauFlowNet: Uncovering Propagation Mechanism of Tau Aggregates by Neural Transport Equation", *Medical Image Computing and Computer Assisted Intervention* (**MICCAI**), 2023.

24. Tingting Dan, Minjeong Kim, **Won Hwa Kim**, Guorong Wu, "Uncovering Structural-Functional Coupling Alterations for Neurodegenerative Diseases", *Medical Image Computing and Computer Assisted Intervention* (**MICCAI**), 2023.
25. Jinhyeok Jang, Woo-han Yun, **Won Hwa Kim**, Youngwoo Yoon, Jaehong Kim, Jaeyeon Lee, ByungOk Han, "Learning to Boost Training by Periodic Nowcasting Near Future Weights", *International Conference on Machine Learning* (**ICML**), 2023.
26. Rui Meng*, Fan Yang*, **Won Hwa Kim**, "Dynamic Covariance Estimation via Predictive Wishart Process with an Application on Brain Connectivity Estimation", *Computational Statistics and Data Analysis* (CSDA), 2023. [Impact factor: 2.04, Acceptance rate: ∼13%, *: equal contribution]
27. Deunsol Jung, Sanghyun Kim, **Won Hwa Kim**, Minsu Cho, "Devil's on the Edges: Selective Quad Attention for Scene Graph Generation", *Computer Vision and Pattern Recognition* (**CVPR**), 2023.
28. Huan Liu*, Tingting Dan*, Zhuobin Huang, Defu Yang, **Won Hwa Kim**, Minjeong Kim, Paul Laurienti, Guorong Wu, "HoloBrain: A Harmonic Holography for Self-organized Brain Function", *Information Processing in Medical Imaging* (**IPMI**), 2023. [**Oral Presentation**, *: equal contribution]
29. Seunghun Baek, Injun Choi, Mustafa Dere, Minjeong Kim, Guorong Wu, **Won Hwa Kim**, "Learning Covariance-based Multi-scale Representation of NeuroImaging Measures for Alzheimer Classification", *IEEE International Symposium on Biomedical Imaging* (**ISBI**), 2023.
30. Injun Choi, Guorong Wu, **Won Hwa Kim**, "How Much to Aggregate: Learning Adaptive Node-wise Scales on Graphs for Brain Networks", *Medical Image Computing and Computer Assisted Intervention* (**MICCAI**), 2022.
31. Tingting Dan, Hongmin Cai, Zhuobin Huang, Paul Laurenti, **Won Hwa Kim**, Guorong Wu, "Neuro-RDM: An Explainable Neural Network Landscape of Reaction-Diffusion Model for Cognitive Task Recognition", *Medical Image Computing and Computer Assisted Intervention* (**MICCAI**), 2022.
32. Gangin Park, Chunsan Hong, Bohyung Kim, and **Won Hwa Kim**, "What Do Untargeted Adversarial Examples Reveal In Medical Image Segmentation?", *Uncertainty for Safe Utilization of Machine Learning in Medical Imaging* (MICCAI Workshop), 2022.
33. Xin Ma, **Won Hwa Kim**, "Locally Normalized Soft Contrastive Clustering for Compact Clusters", *International Joint Conference on Artificial Intelligence* (**IJCAI**), 2022.
34. Hyuna Cho, Gunwoong Park, Amal Isaiah, **Won Hwa Kim**, "Covariate Correcting Network for Detecting Sole Effect of Socioeconomic Status on Brain in Children", *Annual Meeting of the Organization for Human Brain Mapping* (**OHBM**), 2022.
35. Hyuna Cho*, Feng Tong, Sungyong You, Sungyoung Jung, **Won Hwa Kim**, Jayoung Kim "Prediction of Response to Immunotherapy in Bladder Cancer Patients", *IEEE Open Journal of Engineering in Medicine and Biology*, 2022. [Impact factor: 5.8, *: Kim's student]
36. Fan Yang, Guorong Wu, **Won Hwa Kim**, "Disentangled Representation of Longitudinal β-Amyloid for AD via Sequential Graph Variational Autoencoder with Supervision", *IEEE International Symposium on Biomedical Imaging* (**ISBI**), 2022.
37. Hyuna Cho, Gunwoong Park, Amal Isaiah, **Won Hwa Kim**, "Covariate Correcting Networks for Identifying Associations between Socioeconomic Factors and Brain Outcomes in Children", *Medical Image Computing and Computer Assisted Intervention* (**MICCAI**), 2021.
38. Fan Yang*, Rui Meng*, Hyuna Cho, Guorong Wu, **Won Hwa Kim**, "Disentangled Sequential Graph Autoencoder for Preclinical Alzheimer's Disease Characterizations from ADNI study", *Medical Image Computing and Computer Assisted Intervention* (**MICCAI**), 2021. [*: equal contribution]
39. Xin Ma, Guorong Wu, Seong Jae Hwang, **Won Hwa Kim**, "Learning Multi-resolution Graph Edge Embedding for Discovering Brain Network Dysfunction in Neurological Disorders", *International Conference on Information Processing in Medical Imaging* (**IPMI**), 2021.
40. Debapriya Banerjee, Maria Kyrarini, **Won Hwa Kim**, "Image-Label Recovery on Fashion Data Using Image Similarity from Triple Siamese Network", *Technologies*, 2021. [Impact factor: 3.6]
41. ByungOk Han, Woo-han Yun, Jang-hee Yoo, **Won Hwa Kim**, "Toward Unbiased Facial Expression Recognition in the Wild via Cross-dataset Adaptation", *IEEE Access*, 2020. [Impact factor: 3.9]
42. Gowtham Krishnan Murugesan, Chandan Ganesh, Sahil Nalawade, Elizabeth M. Davenport, Ben Wagner, **Won Hwa Kim**, Joseph A. Maldjian, "BrainNET: Inference of Brain Network Topology using Machine Learning", *Brain Connectivity*, 2020. [Impact factor: 3.4]

43. Tuan Q. Dinh, Yunyang Xiongy, Zhichun Huangy, Tien Voy, Akshay Mishray, **Won Hwa Kim**, Sathya N. Ravi, Vikas Singh, "Performing Group Difference Testing on Graph Structured Data from GANs: Analysis and Applications in Neuroimaging", *IEEE Transactions on Pattern Analysis and Machine Intelligence* (TPAMI), 2020. [Impact factor: 24.314]
44. Fan Yang, Amal Isaiah, **Won Hwa Kim**, "COVLET: Covariance-based Wavelet-like Transform for Statistical Analysis of Brain Characteristics in Children", *Medical Image Computing and Computer Assisted Intervention* (**MICCAI**), 2020. [**Early accepted:** ∼13%]
45. Feng Tong*, Muhammad Shahid, Peng Jin, Sungyong Jung, **Won Hwa Kim**, Jayoung Kim "Classification of the Urinary Metabolome using Machine Learning and Potential Applications to Diagnosing Interstitial Cystitis", *Bladder*, 2020. (*: Kim's student)
46. Jayoung Kim, Peng Jin, **Won Hwa Kim**, Wun-Jae Kim, "Utilizing Machine Learning to Discern Hidden Clinical Values from Big Data in Urology", *Investigative and Clinical Urology*, 2020. [Impact factor: 2.3]
47. Xin Ma, Guorong Wu, **Won Hwa Kim**, "Enriching Statistical Inferences on Brain Connectivity via Latent Space Graph Embeddings', *Organization for Human Brain Mapping* (**OHBM**), 2020.
48. Xin Ma, Guorong Wu, **Won Hwa Kim**, "Multi-resolution Graph Neural Network to Identify Disease Relevant Variations in Brain Connectivity", *Organization for Human Brain Mapping* (**OHBM**), 2020.
49. Xin Ma, Guorong Wu, **Won Hwa Kim**, "Multi-resolution Graph Neural Network for Detecting Variations in Brain Connectivity", *Interaction of Geometry and Topology in Biomedical Imaging* (ISBI Workshop), 2020.
50. Xin Ma, Guorong Wu, **Won Hwa Kim**, "Enriching Statistical Inferences on Brain Connectivity for Alzheimer's Disease Analysis via Latent Space Graph Embedding", *IEEE International Symposium on Biomedical Imaging* (**ISBI**), 2020. [**Oral Presentation**]
51. Anna Philips, Farah Naz, Kate Kyung Hyun, Vivek Patel, Gordon G. Zhang, **Won Hwa Kim**, "Social Media Text Analysis using Multi-kernel Convolution Neural Network for Ride Hailing Service Assessment", *Transportation Research Board (TRB)*, 2020.
52. Seong Jae Hwang, Zirui Tao, **Won Hwa Kim***, Vikas Singh*, "Conditional Recurrent Flow: Conditional Generation of Longitudinal Samples with Applications to Neuroimaging", *International Conference on Computer Vision* (**ICCV**), 2019. (*: senior authorship shared)
53. Seong Jae Hwang, Zirui Tao, **Won Hwa Kim***, Vikas Singh*, "Statistical Analysis of Longitudinally and Conditionally Generated Neuroimaging Measures via Conditional Recurrent Flow", *Statistical Deep Learning in Computer Vision* (ICCV Workshop), 2019. (*: senior authorship shared)
54. Annie M. Racine, Andrew P. Merluzzi, Nagesh Adluru, Derek Norton, Rebecca L. Koscik, Lindsay R. Clark, Sara E. Berman, Christopher R. Nicholas, Sanjay Asthana, Andrew L. Alexander, Kaj Blennow, Henrik Zetterberg, **Won Hwa Kim**, Vikas Singh, Cynthia M. Carlsson, Barbara B. Bendlin, Sterling C. Johnson "Association of longitudinal white matter degeneration and cerebrospinal fluid biomarkers of neurodegeneration, inflammation and Alzheimer's disease in late-middle-aged adults", *Brain Imaging and Behavior*, 2019. [impact factor: 3.39]
55. **Won Hwa Kim**, Annie M. Racine, Nagesh Adluru, Seong Jae Hwang, Kaj Blennow, Henrik Zetterberg, Cynthia M. Carlsson, Sanjay Asthana, Rebecca L. Koscik, Sterling C. Johnson, Barbara B. Bendlin, Vikas Singh, "Cerebrospinal fluid biomarkers of neurofibrillary tangles and synaptic dysfunction are associated with longitudinal decline in white matter connectivity: a Multi-resolution graph analysis", *NeuroImage:Clinical*, 2019. [impact factor: 4.35]
56. Seong Jae Hwang, Nagesh Adluru, **Won Hwa Kim**, Sterling C. Johnson, Barbara B. Bendlin, Vikas Singh, "Associations between PET Amyloid Pathology and DTI Brain Connectivity in Preclinical Alzheimer's Disease", *Brain Connectivity*, 2019. [impact factor: 3.4]
57. **Won Hwa Kim**, Noelle Fields, Ling Xu, and Chen Kan, "Missing Value Imputation via Graph Completion in Questionnaires of Persons with Dementia", *Gerontological Society of America (GSA) Annual Scientific Meeting*, 2019.
58. Zachary Bailey, Xin Ma, Martin Hirsch, **Won Hwa Kim**, Juhyun Lee, "Development of an Auto-segmentation Technique using a Convolution Neural Network for the Segmentation of the Vantricular Cavity in Zebrafish", *Basic Cardiovascular Sciences*, 2019.
59. **Won Hwa Kim**, Hyunwoo J. Kim, Nagesh Adluru, Vikas Singh, "Multi-resolution Analysis for Sparse Inverse Covariance Matrix Estimation", *International Conference on Brain Informatics* (BI), 2018.

60. **Won Hwa Kim**, Mona Jalal, Seong Jae Hwang, Sterling C. Johnson, Vikas Singh, "Online Graph Completion: Multivariate Signal Recovery in Computer Vision", *Computer Vision and Pattern Recognition* (**CVPR**), 2017.
61. Tuan Dinh, Sathya Ravi, **WonHwa Kim**, Nagesh Adluru, Rebecca Koscik, Cynthia Carlsson, Sterling C. Johnson, Vikas Singh, "Graph Imputation techniques for estimating amyloid positivity from longitudinal cognitive and MRI measurements for efficient secondary prevention trials", *Clinical Trials on Alzheimer's Disease* (CTAD), 2017
62. **Won Hwa Kim**, Seong Jae Hwang, Nagesh Adluru, Stering C. Johnson, Vikas Singh, "Graph Completion: a generalization of Netflix prize problem to design cost-effective neuroimaging trials in preclinical AD", *Alzheimer's Association International Conference* (AAIC), 2017.
63. **Won Hwa Kim**, "A Multi-resolution Framework for Statistical Analysis of Neuroimaging Data", *Doctoral Thesis*, 2017.
64. **Won Hwa Kim**, Seong Jae Hwang, Nagesh Adluru, Sterling C. Johnson, Vikas Singh, "Adaptive Signal Recovery on Graphs via Harmonic Analysis for Experimental Design in Neuroimaging", *European Conference on Computer Vision* (**ECCV**), 2016.
65. Seong Jae Hwang, **Won Hwa Kim**, Barbara B. Bendlin, Nagesh Adluru, Vikas Singh, "Multi-Resolution Analysis of DTI-Derived Brain Connectivity and the Influence of PET-Derived Alzheimer's Disease Pathology in a Preclinical Cohort", *Alzheimer's Association International Conference* (AAIC), 2016.
66. **Won Hwa Kim***, Hyunwoo J. Kim*, Nagesh Adluru, Vikas Singh, "Latent Variable Graphical Model Selection using Harmonic Analysis: Applications to the Human Connectome Project (HCP)", *Computer Vision and Pattern Recognition* (**CVPR**), 2016. [**SPOTLIGHT**: 9.7%] (*: First authorship shared)
67. **Won Hwa Kim**, Sathya Ravi, Sterling C. Johnson, Ozioma C. Okonkwo, Vikas Singh, "On Statistical Analysis of Neuroimages with Imperfect Registration", *International Conference on Computer Vision* (**ICCV**), 2015.
68. **Won Hwa Kim**, Nagesh Adluru, Moo K. Chung, Ozioma C. Okonkwo, Sterling C. Johnson, Barbara B. Bendlin, Vikas Singh, "Multi-resolution Statistical Analysis of Brain Connectivity Graphs in Preclinical Alzheimer's Disease", *NeuroImage*, 2015. [impact factor: 5.9]
69. **Won Hwa Kim**, Nagesh Adluru, Moo K. Chung, Ozioma C. Okonkwo, Sterling C. Johnson, Barbara B. Bendlin, Vikas Singh, "A Framework for Performing Multi-Resolution Statistical Analysis of Brain Connectivity Graphs for Preclinical Alzheimer's Disease", *Alzheimer's Association International Conference* (AAIC), 2015
70. **Won Hwa Kim**, Barbara B. Bendlin, Moo K. Chung, Sterling C. Johnson, Vikas Singh, "Statistical Inference Models for Image Datasets with Systematic Variations", *Computer Vision and Pattern Recognition* (**CVPR**), 2015.
71. **Won Hwa Kim**, Vikas Singh, Moo K. Chung, Nagesh Adluru, Barbara B. Bendlin, Sterling C. Johnson, "Multi-resolution Statistical Analysis on Graph Structured Data in Neuroimaging", *IEEE International Symposium on Biomedical Imaging* (**ISBI**), 2015. [Invited paper/ **Oral presentation**]
72. **Won Hwa Kim**, Vikas Singh, Moo K. Chung, Chris Hinrichs, Deepti Pachauri, Ozioma C. Okonkwo, Sterling C. Johnson, "Multi-resolutional Shape Features via non-Euclidean Wavelets: Applications to Statistical Analysis of Cortical thickness", *NeuroImage*, 93:107-123, 2014. [impact factor: 5.9]
73. A. Pasha Hosseinbor, **Won Hwa Kim**, Nagesh Adluru, Amit Acharya, Houri K. Vorperian, Moo K. Chung, "The 4D Hyperspherical Diffusion Wavelet: a New Method for the Detection of Localized Anatomical Variation", *Medical Image Computing and Computer Assisted Intervention* (**MICCAI**), 2014.
74. **Won Hwa Kim**, Nagesh Adluru, Moo K. Chung, Sylvia Charchut, Johnson J. GadElkarim, Lori Altshuler, Teena Moody, Anand Kumar, Vikas Singh, and Alex D. Leow, "Multi-resolutional Brain Network Filtering and Analysis via Wavelets on Non-Euclidean Space", *Medical Image Computing and Computer Assisted Intervention* (**MICCAI**), 2013.
75. **Won Hwa Kim**, Moo K. Chung, Vikas Singh, "Multi-resolution Shape Analysis via Non-Euclidean Wavelets: Applications to Mesh Segmentation and Surface Alignment Problems", *Computer Vision and Pattern Recognition* (**CVPR**), 2013.
76. **Won Hwa Kim**, Deepti Pachauri, Charles Hatt, Moo K. Chung, Sterling C. Johnson, Vikas Singh, "Wavelet Based Multi-scale Shape Features on Arbitrary Surfaces for Cortical Thickness Discrimination", *Advances in Neural Information Processing Systems* (**NeurIPS**), 2012.

77. **Won Hwa Kim**, Jeong Woo Park, Woo Hyun Kim, Won Hyong Lee, Myung Jin Chung, "Proposal of 2D Mood Model for Human-like Behaviors of Robot", *The Journal of Korea Robotics Society*, 2010.
78. **Won Hwa Kim**, Jeong Woo Park, Won Hyong Lee, Woo Hyun Kim, Myung Jin Chung, "Stochastic Approach on a Simplified OCC Model for Uncertainty and Believability", *IEEE International Conference on Computational Intelligence in Robotics and Automation* (CIRA), 2009.
79. Jeongwoo Park, **Won Hwa Kim**, Won Hyong Lee, Myung Jin Chung, "A Robot Simulator 'FRESi' for Dynamic Facial Expression", *International Conference on Ubiquitous Robots and Ambient Intelligence (URAI)*, 2009.
80. Jeongwoo Park, Woo Hyun Kim, Won Hyong Lee, **Won Hwa Kim**, Myung Jin Chung, "Lifelike Facial Expression of Mascot-type Robot based on Emotional Boundaries", *International Conference on Robotics and Biomimetics (ROBIO)*, 2009. [Finalist for the best paper]
81. Woo Hyun Kim, Jeongwoo Park, Won Hyong Lee, **Won Hwa Kim**, Myung Jin Chung, "Synchronized Multimodal Expression Generation using Editing Toolkit for a Human-friendly robot", *International Conference on Robotics and Biomimetics (ROBIO)*, 2009.

PATENT

1. **Won Hwa Kim**, Seong Jae Hwang, Nagesh Adluru, Sterling C. Johnson, Vikas Singh, "Computerized System for Efficient Augmentation of Data Sets", *US Patent App. 15/333,688*, 2018

INVITED TALKS

• Graph Methods for Alzheimer Analysis via Brain Connectivity, UNC-EPIC Short Course, University of North Carolina, Chapel Hill — Apr 2024

• Graph Methods from Medical Imaging and Vision (MIV) Lab @ POSTECH, NIRAL Method Meeting, University of North Carolina, Chapel Hill — Jan 2024

• Laplacian-based Graph Machine Learning for Human Connectome Analysis, DGIST — Sep 2023

• Multi-resolution Graph Machine Learning for Brain Connectome Analysis,
1) POSTECH-KBRI Joint Workshop — Jun 2023
2) Korean Society of Imaging Informatics in Medicine (KSIIM) — Jul 2023
3) Aflight Symposium — Jul 2023
4) POSTECH-Tel Aviv University Joint Workshop — Aug 2023

• Graph Machine Learning for Anomaly Detection, SK Hynix Tech Seminar — Jul 2023

• Learning Approximations for Adaptive Kernel Convolution on Graphs, Information and Communication Semiar Series, Sungkyunkwan University — Apr 2023

• Wiring System in Our Brain, World Brain Week Invited Seminar — Mar 2023

• How Much to Aggregate: Learning Adaptive Node-wise Scales on Graphs for Brain Networks, Autumn Annual Conference of IEIE — Nov 2022

• What does AI see in Medical Images?, POSTECH AI Program for Chief Officers — Oct 2022

• Multi-resolution Analysis of Neuroiaging on Graphs, SAIT Invited Seminar, Samsung — Sep 2022

• Analysis of Graph Data in NeuroImaging, CSE Seminar Series, UNIST — Sep 2022

• Learning Adaptive Node-wise Scales on Graphs for Brain Network Analysis
1) Information and Communication Semiar Series, Sungkyunkwan University — Sep 2022
2) Invited Seminar, VUNO — Aug 2022
3) Computational Neuroimage Analysis Lab Seminar, Hanyang University — July 2022
4) University of North Carolina, Chapel Hill — Jun 2022
5) Statistics Seminar Series, Seoul National University (SNU), — Apr 2022

- Brain Connectivity as a Graph, Korean Sleep Research Society — July 2022

- Learning on Graphs for Alzheimer's Disease Analysis, KCC Biohealthcare Workshop — Jun 2022

- Multi-resolution on Brain Network for Characterizing Alzheimer's Disease, Neuroscience Forum on Alzheimer's Disease (NFAD) — Feb 2022

- Multi-resolution Graph Analysis for Graphical Model Selection and Graph Classification, Tutorial, IEEE Big Computing (BigComp) — Jan 2022

- Multi-resolution Methods for Brain Network Analysis, New Faculty Seminar, Korean Computer Vision Society (KCVS) — Nov 2021

- Covariate Correcting Networks for Identifying Associations between Socioeconomic Factors and Brain Outcomes in Children, Biomedical Engineering Seminar, Hanyang University — Nov 2021

- Global Cross Mentoring, Korea Women in Science and Technology Support Center (WISET) — Aug 2021

- Multi-resolution Graphical Model for Graph Classification, Summer Conference, Korean Artificial Intelligence Association (CKIAIA) — Jul 2021

- Enriching Statistical Inferences on Brain Connectivity for Alzheimer's Disease Analysis via Latent Space Graph Embedding, Aslla Symposium (AI & Big Data in Healthcare) — Jul 2021

- Multi-resolution Edge Network (MENET) for Alzheimer's Disease Classification, with Brain Network, Satellite Meeting of 2021 OHBM — Jun 2021

- Enhancing Analysis of Neuroimages on Graphs via Multi-resolution Deep Learning, Spring Conference, Korean Society for AI in Medicine (KOSAIM) — May 2021

- Enhancing Analysis of Brain Connectivity via Multi-resolution, Spring Conference, Korean Society for Human Brain Mapping (KHBM) — May 2021

- Enriching Statistical Inferences on Brain Connectivity for Alzheimer's Disease Analysis via Latent Space Graph Embedding, Spring Seminar Series, Handong University — Apr 2021

- Enhancing Statistical Analysis of Graphs in Neuroimaging for Alzheimer's Disease Bioengineering Seminar, GIST — Mar 2021

- Enhancing Statistical Analysis of Graphs in Neuroimaging for Alzheimer's Disease, Electrical Engineering Seminar Series, POSTECH — Feb 2021

- Enriching Statistical Inferences on Brain Connectivity for Alzheimer's Disease Analysis via Latent Space Graph Embedding, Electrical Engineering Seminar, University of Seoul (UOS) — Dec 2020

- Graph Data Analysis for Bio-data Processing using Machine Learning, Electrical Engineering Seminar, University of Seoul (UOS) — Jan 2020

- Multi-resolution Analysis for Graphs and Images on Graphs,
  1) Gwangju Institute of Science and Technology (GIST) — Dec 2019
  2) Electronics and Telecommunications Research Institute (ETRI) — Jan 2020

- Multi-resolution Analyses of Neuroimaging Data on Graph for AD Studies, Medical Applications of Engineering (BE1105), University of Texas at Arlington — Nov 2019

- Recommendation System using AI, Korean-American Scientists and Engineers Association (KSEA) Seminar - North Texas Chapter — Oct 2018

- Multi-resolution Analysis for Inverse Covariance Matrix Estimation,

1) Electronics and Telecommunications Research Institute (ETRI) Jul 2018
2) NAVER Tech Talk, NAVER Jul 2018

• Online Graph Completion: Multivariate Signal Recovery in Computer Vision,
1) Computer Vision Seminar (EE), Sungkyunkwan University Jul 2017
2) Data Science Seminar (Math), Sungkyunkwan University Jul 2017

• Multi-resolution Analysis for Inverse Covariance Matrix Estimation, Feb 2016
Operator Theory Seminar, Seoul National University

• Statistical Analysis of Neuroimages with Imperfect Registration, Jan 2016
IBS Seminar, Sungkyunkwan University

• Multi-resolution Statistical Analysis on Graph Structured Data in NeuroImaging, Jun 2015
Medical Image Analysis Seminar, Sungkyunkwan University

• Multi-scale Representation of Cortical Thickness using Wavelet for Group Analysis, Mar 2013
Brain Food, Waisman Center

• Wavelet Based Multi-scale Shape Descriptors on Arbitrary Surfaces,
1) Power Electronics Seminar, Sungkyunkwan University Jan 2013
2) Artificial Intelligence Seminar (AISEM), University of Wisconsin - Madison Oct 2012

TEACHING EXPERIENCE

Instructor, Computer Science and Engineering, POSTECH, South Korea
• AIGS/CSED526: Data Mining,
• CSED429F: Signal Processing,
• AIGS/CSED538: Deep Learning

Instructor, Computer Science and Engineering, University of Texas at Arlington, U.S.A.
• CSE4334/5334: Data Mining,
• CSE6367: Computer Vision,
• CSE6363: Machine Learning

Teaching Assistant, Computer Sciences, University of Wisconsin - Madison, U.S.A.
• CS767: Computational Methods in Medical Image Analysis,
• CS638: Statistical Methods for Medical Image Analysis

Teaching Assistant, Robotics Program, KAIST, S. Korea.
• RE510: Intelligent Robot Design Lab.

SERVICES

Editor, ICT Express 2021-present
Reviewer, Medical Image Computing and Computer Assisted Intervention (MICCAI) 2014, 2016, 2019-2024
Reviewer, European Conference on Computer Vision (ECCV) 2012, 2016, 2020-2024
Reviewer, International Conference on Machine Learning (ICML) 2017, 2021-2024
Reviewer, Winter Application for Computer Vision (WACV) 2020-2024
Reviewer, Computer Vision and Pattern Recognition (CVPR) 2018, 2020-2024
Reviewer, International Conference on Representation Learning (ICLR) 2021-2023
Reviewer, Neural Information Processing Systems (NeurIPS) 2018, 2020-2023
Reviewer, International Conference on Computer Vision (ICCV) 2019-2023
Reviewer, IEEE Transactions on Medical Imaging (TMI) 2014, 2020, 2022, 2023
Reviewer, International Workshop on PRedictive Intelligence in MEdicine (PRIME) 2022-2023
Program Committee, IEEE International Conference on Big Data (BigData) 2022
Program Committee, IEEE International Conference on Big Data and Smart Computing (BigComp) 2022
Reviewer, Asian Conference on Computer Vision (ACCV) 2020, 2022
Reviewer, Medical Image Analysis (MEDIA) 2022

Senior Program Committee, AAAI Conference on Artificial Intelligence (AAAI) 2022
Reviewer, International Journal of Computer Vision (IJCV) 2022
Reviewer, IEEE Transactions on Pattern Analysis and Machine Intelligence 2020, 2021
Reviewer, IEEE Access 2020, 2021
Program Committee, AAAI Conference on Artificial Intelligence (AAAI) 2019, 2021
Reviewer, Applied Sciences 2019, 2020
Reviewer, Neurobiology of Aging 2020
Reviewer, Transnational Neurodegeneration 2019
Ad-hoc reviewer, National Science Foundation (NSF) 2019
Reviewer, Brain and Behavior 2019
Reviewer, Entropy 2019
Reviewer, Alzheimer's and Dementia 2019
Review panel, National Science Foundation (NSF) 2018
Reviewer, NeuroImage 2017, 2018

EXTRA ACTIVITIES

Student Representative, Robotics Program, KAIST, S. Korea 2009
Volunteer, International Federation of Automatic Control (IFAC), COEX, S. Korea 2008
Volunteer, International Workshop on Operator Theory and Applications (IWOTA), SNU, S. Korea 2006

PERSONAL REFERENCES

Available upon request.