Heejong Kim

CONTACT INFORMATION

Weill Cornell Medicine
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RESEARCH INTERESTS

Biomedical Image Analysis: Medical Vision, and Longitudinal Analysis.
Applications: Prostate Cancer, Brain Development, and Neurodegenerative Diseases.

ACADEMIC APPOINTMENTS

Instructor of AI in Radiology, Weill Cornell Medical College 06/2024 – present
Advisor: Prof. Mert Sabuncu

Postdoctoral Associate, Weill Cornell Medical College 09/2021 – 06/2024
Advisor: Prof. Mert Sabuncu

EDUCATION

New York University, New York, USA 09/2016 – 08/2021
PhD in Computer Science
Advisor: Prof. Guido Gerig
Thesis: Spatiotemporal Modeling of Orientation Distribution Functions for Longitudinal High Angular Resolution Diffusion MRI atlas

Korea University, Seoul, South Korea 09/2014 – 08/2016
MEng in Bioconvergence Engineering
Advisor: Prof. Joon-kyung Seong
Thesis: Network analysis of gray matter atrophy: from co-atrophy to transneuronal spread of Alzheimer's disease

Korea University, Seoul, South Korea 03/2010 – 08/2014
BEng in Biomedical Engineering
Advisor: Prof. Joon-kyung Seong
Thesis: Effect of education years on Alzheimer's disease from a network point of view

INDUSTRIAL EXPERIENCE

Nokia Bell Labs, New Jersey, USA 06/2019 – 08/2019
PhD Internship

Boston Scientific, Seoul, South Korea 06/2013 – 08/2013
Undergraduate Internship

GRANTS

Awarded

[1] Principal Investigator, "Robust and Interpretable Multimodal Machine Learning Models for Diagnosis and Prognosis of Prostate Cancer", NIH NCI K25, 2024-2029.

[2] Principal Investigator, "Robust and Interpretable Multimodal Machine Learning Models for Diagnosis and Prognosis of Prostate Cancer", Postdoctoral Researcher Seed Grant, Weill Cornell Medicine, 2023

AWARDS

NIH Travel Award, MICCAI 2020
Best Oral Presentation, MICCAI CDMRI workshop 2019
Best Student Paper Finalist, SPIE Medical Imaging 2019
Dean's PhD Fellowship, Tandon School of Engineering, New York University 2016
Best Biomedical Image Award, Korea Society of Medical and Biological Engineering 2015
Best Poster Presentation, Korea Society of Medical and Biological Engineering 2014
BrainKorea21 PLUS Scholarship 2014 – 2015

Woodeok Foundation Scholarship 2011 – 2014

JOURNAL PAPERS

[1] Wang, A. Q., Karaman, B. K., **Kim, H.**, Rosenthal, J., Saluja, R., Young, S. I., and Sabuncu, M. R. A Framework for Interpretability in Machine Learning for Medical Imaging. *IEEE Access*, 2024. doi:10.1109/ACCESS.2024.3387702

[2] **Kim, H.**, Kang, S. W., Kim, J. H., Nagar, H., Sabuncu, M. R., and Margolis, D. J. The role of AI in prostate MRI quality and interpretation: Opportunities and challenges. *European Journal of Radiology*, 110887, 2023. doi:10.1016/j.ejrad.2023.110887

[3] **Kim, H.**, Margolis, D. J., Nagar, H., and Sabuncu, M. R. Pulse Sequence Dependence of a Simple and Interpretable Deep Learning Method for Detection of Clinically Significant Prostate Cancer Using Multiparametric MRI. *Academic Radiology*, Preliminary Investigation. 2022. doi:10.1016/j.acra.2022.10.005

[4] Shah, S., Yu, C. N., Zheng, M., **Kim, H.**, and Eggleston, M. S. Microparticle-based biochemical sensing using optical coherence tomography and deep learning. *ACS nano*, 15(6), 9764-9774. 2021. doi:10.1021/acsnano.1c00497

[5] **Kim, H. J.**, Shin, J. H., Han, C. E., Kim, H. J., Na, D. L., Seo, S. W., ... and Alzheimer's Disease Neuroimaging Initiative. Using individualized brain network for analyzing structural covariance of the cerebral cortex in Alzheimer's patients. *Frontiers in neuroscience*, 10, 394. doi:10.3389/fnins.2016.00394

[6] Jung, N. Y., Han, C. E., Kim, H. J., Yoo, S. W., **Kim, H. J.**, Kim, E. J., ... and Seo, S. W. Tract-specific correlates of neuropsychological deficits in patients with subcortical vascular cognitive impairment. *Journal of Alzheimer's Disease*, 50(4), 1125-1135. doi:10.3233/JAD-150841

CONFERENCE PAPERS

*Co-first author

[7] Nguyen, M., Wang A. Q., **Kim, H.**, Sabuncu, M. R. Adapting to Shifting Spurious Correlations with Unlabeled Data Calibration In *European Conference on Computer Vision*. Milan, 2024.

[8] Nguyen, M., Wang A. Q., **Kim, H.**, Sabuncu, M. R. Robust Learning via Conditional Prevalence Adjustment In *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*. HAWAII, 2024.

[9] **Kim, H.**, Butoi, V. I., Dalca, A. V., and Sabuncu, M. R. Empirical Analysis of a Segmentation Foundation Model in Prostate Imaging In *Medical Image Computing and Computer Assisted Intervention – MICCAI 2023 Workshops*. Vancouver, 2023.

[10] **Kim, H.**, and Sabuncu, M. R. Learning to Compare Longitudinal Images. In *Medical Imaging with Deep Learning (MIDL)*. Nashville, 2023.

[11] *Ren, M., ***Kim, H.**, Dey, N., and Gerig, G. Q-space conditioned translation networks for directional synthesis of diffusion weighted images from multi-modal structural mri. In *Medical Image Computing and Computer Assisted Intervention–MICCAI 2021: 24th International Conference*. Strasbourg, France, September 27–October 1, 2021, Proceedings, Part VII 24 (pp. 530-540). doi:10.1007/978-3-030-87234-2_50

[12] Elaldi, A., Dey, N., **Kim, H.**, and Gerig, G. Equivariant spherical deconvolution: learning sparse orientation distribution functions from spherical data. In *Information Processing in Medical Imaging: 27th International Conference, IPMI 2021*, Virtual Event, June 28–June 30, 2021, Proceedings 27 (pp. 267-278). doi:10.1007/978-3-030-78191-0_21

[13] **Kim, H.**, Yu, C. N., Kennedy, W., Eggleston, M., and Shah, S. Automated Monitoring for Optical Coherence Tomography-based Biosensing Using Deep Learning. In *2020 IEEE Photonics Conference (IPC)* (pp. 1-2). IEEE. doi:10.1109/IPC47351.2020.9252523

[14] **Kim, H.**, Hong, S., Styner, M., Piven, J., Botteron, K., and Gerig, G. Hierarchical geodesic modeling on the diffusion orientation distribution function for longitudinal DW-MRI analysis. In *Medical Image Computing and Computer Assisted Intervention–MICCAI 2020: 23rd International Conference*, Lima, Peru, October 4–8, 2020, Proceedings, Part VII 23 (pp. 311-321). doi:10.1007/978-3-030-59728-3_31

[15] **Kim, H.**, Styner, M., Piven, J., and Gerig, G. A framework to construct a longitudinal dw-mri infant atlas based on mixed effects modeling of dodf coefficients. In *Computational Diffusion MRI: MICCAI Workshop*, Shenzhen, China, October 2019 (pp. 149-159). doi:10.1007/978-3-030-52893-5_13

[16] **Kim, H.**, Piven, J., and Gerig, G. Longitudinal structural connectivity in the developing brain with projective non-negative matrix factorization. In *Medical Imaging 2019: Image Processing* (Vol. 10949, pp. 189-196). doi:10.1117/12.2512830

Invited Talks /Presentations

[17] "Artificial Intelligence in Medicine." Annual Symposium for Evolving Therapies and Drug Development in Oncology, Fairfax, USA, 2024.

[18] "Foundation Models for Medical Image Segmentation: Case Study for Prostate Imaging." Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, USA, 2023.

[19] "Artificial Intelligence in Medicine." Annual Symposium for Evolving Therapies and Drug Development in Oncology, Dulles, USA, 2023.

[20] "Longitudinal modeling of the diffusion profile from higher-order diffusion MRI." BME Department Seminar, Korea University, Seoul, South Korea, 2021.

[21] "Q-space conditioned translation networks for directional synthesis of diffusion weighted images from multi-modal structural mri." MICCAI, Remote, 2021"

[22] "A framework to construct a longitudinal dw-mri infant atlas based on mixed effects modeling of dodf coefficients." CDMRI: MICCAI Workshop, Shenzhen, China, 2019

[23] "Longitudinal structural connectivity in the developing brain with projective non-negative matrix factorization." SPIE, San Diego, USA, 2019.

Academic Service

Journal Review

- Imaging Neuroscience
- IEEE Transactions on Medical Imaging (TMI)
- British Journal of Radiology (BJR)
- Medical Image Analysis (MedIA)
- NeuroImage: Clinical

Conference Review

- Winter Conference on Applications of Computer Vision (WACV)
- Medical Imaging Meets NeurIPS
- IEEE International Symposium on Biomedical Imaging (ISBI)
- Medical Image Computing and Computer Assisted Interventions (MICCAI)

Program Committee

- IJCAI special track AI and Social Good, Member 2024

Roundtable Chair

- NeurIPS Workshop (ML4H Symposium), Junior Chair 2022

ACADEMIC REFERENCES

Prof. Mert R. Sabuncu, Full Professor of School of Electrical and Computer Engineering (ECE) at Cornell Tech and Department of Radiology at Weill Cornell Medicine, Cornell University. *Prof. Sabuncu is my current advisor.*

Prof. Guido Gerig, Institute Professor of Computer Science and Engineering Department (CSE) at NYU Tandon School of Engineering. *Prof. Gerig was my PhD advisor.*

Prof. Joon-kyung Seong, Professor of School of Biomedical Engineering and Department of Artificial Intelligence at Korea University. *Prof. Seong was my academic advisor during my undergraduate and master's studies*

Updated: 09/2024