

Seungjae Han

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I am a PhD candidate interested in developing computational technologies to acquire & analyze big data from the brain. My particular interests are fast & scalable processing algorithms and AI-driven microscopy. I received **2023 Trainee Professional Development Award** from Society for Neuroscience (SfN) and **Outstanding Research Award (IBS/AKN Pre-doctoral award)** from Association of Korean Neuroscientists.

EDUCATION

2020-Now	KAIST Ph.D. Candidate in School of Electrical Engineering	Daejeon, South Korea Advisor : Young-Gyu Yoon
2017-20	Yonsei University Bachelor of Science in School of Integrated Technology	Seoul, South Korea Advisor : Jiwon Seo

PUBLICATIONS

* co-first authors, ** co-corresponding authors

- 2025 **Design Principles of Multi-Scale J-invariant Networks for Self-Supervised Image Denoising**
H. Yu*, **S. Han***, Y.-G. Yoon
IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) [🏆 **Oral**]
- Nanoscale Resolution Imaging of Whole Mouse Embryos using Expansion microscopy**
J. Sim*, C. E Park*, I. Cho*, K. Min, M. Eom, **S. Han**, H. Jeon, E.-S. Cho, Y. Lee, Y. H. Yun, S. Lee, D.-H. Cheon, J. Kim, M. Kim, H.-J. Cho, J.-W. Park, A. Kumar, Y. Chong, J. S. Kang, K. D. Piatkevich, E. E. Jung, D.-S. Kang, S.-K. Kwon, J. Kim, K.-J. Yoon, J.-S. Lee, C.-H. Kim, M. Choi, J. W. Kim, M.-R. Song, H. J. Choi, E. S. Boyden, Y.-G. Yoon**, J.-B. Chang**
ACS Nano
- Self-supervised video processing with self-calibration on an analogue selector-less memristor array-based platform**
H. Jeong* , **S. Han***, S.-O. Park, T. R. Kim, J. Bae, T.-H. Jang, Y. Cho, S. Seo, H.-J. Jeong, S. Park, T. Park, J. Oh, J. Park, D. Jeon, I. Kwon , Y.-G. Yoon**, S. Choi**
Nature Electronics [🏆 **Introduced in Nature Electronics News & Views, Nature Electronics Editorial, KAIST News, KAIST Breakthrough**]
- 2024 **In Vivo Optical Clearing of Mammalian Brain**
G. T. Franzesi*, I. Gupta*, M. Hu, K. Piatkevich, M. Yildirim, J.-P. Zhao, M. Eom, **S. Han**, D. Park, H. Andaraarachchi, Z. Li, J. Greenhagen, A. M. Islam, P. Vashishtha, Z. Yaqoob, N. Pak, A. D Wissner-Gross, D. A. Martin-Alarcon, J. J. Veinot, P. T. C. So, U. Kortshagen, Y.-G. Yoon, M. Sur**, E. S. Boyden**
bioRxiv
- From Pixels to Information: Artificial Intelligence in Fluorescence Microscopy**
S. Han, J. Y. You, M. Eom, S. Ahn, E.-S. Cho, Y.-G. Yoon
Advanced Photonics Research
- 2023 **Statistically unbiased prediction enables accurate denoising of voltage imaging data**
M. Eom*, **S. Han***, P. Park*, G. Kim, E.-S. Cho, J. Sim, K.-H. Lee, S. Kim, H. Tian, U. L. Böhm, E. Lowet, H. Tseng, J. Choi, S. E. Lucia, S. H. Ryu, M. Rózsa, S. Chang, P. Kim, X. Han, K. D. Piatkevich, M. Choi, C.-H. Kim, A. E. Cohen, J.-B. Chang, Y.-G. Yoon
Nature Methods [🏆 **Selected as the cover, KAIST News, KAIST Breakthrough**]

***In vivo* whole-brain imaging of zebrafish larvae using three-dimensional fluorescence microscopy**

E.-S. Cho, **S. Han**, G. Kim, M. Eom, K.-H. Lee, C.-H. Kim, Y.-G. Yoon

Journal of Visualized Experiments

Robust and Efficient Alignment of Calcium Imaging Data through Simultaneous Low Rank and Sparse Decomposition

J. Cho*, **S. Han***, E.-S. Cho, K. Shin, Y.-G. Yoon

IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)

2022

IMPASTO: Multiplexed cyclic imaging without signal removal via self-supervised neural unmixing

H. Kim*, S. Bae*, J. Cho, H. Nam, J. Seo, **S. Han**, E. Yi, E. Kim, Y.-G. Yoon**, J.-B. Chang**

bioRxiv

Three-dimensional fluorescence microscopy through virtual refocusing using a recursive light propagation network

C. Shin*, H. Ryu*, E.-S. Cho, **S. Han**, K.-H. Lee, C.-H. Kim, Y.-G. Yoon

Medical Image Analysis

2021

3DM: Deep decomposition and deconvolution microscopy for rapid neural activity imaging

E.-S. Cho*, **S. Han***, K.-H. Lee, C.-H. Kim, Y.-G. Yoon

Optics Express [🏆 **Selected as Editor's pick, Image of the Week**]

Efficient Neural Network Approximation of Robust PCA for Automated Analysis of Calcium Imaging Data

S. Han, E.-S. Cho, I. Park, K. Shin, Y.-G. Yoon

International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)

2019

Smartphone Application to Estimate Distances from LTE Base Stations Based on Received Signal Strength Measurements

S. Han, T. Kang, J. Seo

International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC)

2018

Observation of Human Trajectory in Response to Haptic Feedback from Mobile Robot

H.-S. Moon, W. Kim, **S. Han**, J. Seo

International Conference on Control, Automation and Systems (ICCAS)

AWARDS AND HONORS

2024	2024 KAIST Graduate Student Outstanding Paper Award	KAIST
	Top reviewer of NeurIPS 2024 & Complimentary registration	NeurIPS
2023	Trainee Professional Development Award	Society for Neuroscience
	AKN Outstanding Research Award (IBS/AKN Pre-doctoral award)	Association of Korean Neuroscientists
	Best Teaching Assistant Award (Course: Signals and Systems)	KAIST EE
2020-2025	Government-sponsored scholar	KAIST
2019	Undergraduate Research Program (Research fund) & Outstanding Project Award	
	Korea Foundation for the Advancement of Science & Creativity	
2019	Short-term visiting researcher to Boğaziçi University, Turkey (Travel and lodging cost)	Yonsei University
2019	Excellence Award (START-UP102: Enterprise and Entrepreneurship)	Yonsei University
2017-19	IT Consilience Creative Program (Tuition waiver & stipend)	Ministry of Science, ICT and Future Planning

TALKS

2023 **SUPPORT: Versatile denoising AI for microscopy data**
Korea Institute of Science and Technology (KIST) (2023. 10.)

PROFESSIONAL SERVICE

Reviewer **NeurIPS** 2023 (5 papers), 2024 (6 papers, **Selected as Top reviewer**), 2025 (5 papers)
ICLR 2024 (3 papers), **AAAI** 2025 (4 papers)
MICCAI 2022 (5 papers), 2023 (3 papers), 2024 (4 papers)

MENTORING EXPERIENCE

2024 **Hayeong Yu** (Undergraduate Student - M.S. student at KAIST)
Self-supervised learning, Image processing, Denoising (paper published on WACV)

2021 **Eunsu Kim** (Undergraduate Student at KAIST) - M.S. student at KAIST
Machine learning basics, Processing multiplexed images ([preprint](#) released on bioRxiv)

TEACHING EXPERIENCE

Teaching assistant (TA)

2023 **Machine learning and Big data (Expert course)**, Seongnam-KAIST Center For Next Generation ICT
*Course for general public and office workers, about Reinforcement Learning, **Head TA***
Signals and Systems (EE205), KAIST
*Introductory level course, **Head TA**, [ **Best Teaching Assistant Award**]*

2022 **Electronics Design Lab (EE305)**, KAIST
Undergraduate level course, about Circuits
Special Topics in Electrical Engineering <AI Capston Design> (EE488), KAIST
*Senior level course, about Reinforcement Learning, **Head TA***

2021 **Electronics Design Lab (EE405A)**, KAIST
Senior level course, about Robotics
Basics of Artificial Intelligence (CoE202A), KAIST
Introductory level course, about Computer Vision

2020 **Basics of Artificial Intelligence (CoE202A)**, KAIST
Introductory level course, about Computer Vision

REFERENCES

available upon request

Representative publications

Number	Title	Journal	Year	Authorship	Impact factor	JCR	Citation
1	Self-supervised video processing with self-calibration on an analogue selector-less memristor array-based platform	<i>Nature Electronics</i>	2025	Co-First	34.5	0.1%	12
2	Statistically unbiased prediction enables accurate denoising of voltage imaging data	<i>Nature Methods</i>	2023	Co-First	48.0	0.6%	53

* Citation counted as of October 2025
** Impact factor on the publication year