Seungjae Han

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🏠 stevejayh.github.io   ♂ Google Scholar

I am a PhD candidate interested in developing novel technologies to acquire & analyze big data from brain. My particular interests are fast & scalable processing algorithm and AI-driven microscopy.
I am developing **ultimate pipeline** to **understand the whole brain activity**!
Rapid image acquisition → Image alignment → Denoising → Activity extraction → In progress...

Keywords

Neuroengineering
Computational imaging
Computer vision
Optimization
Signal processing

EDUCATION

2020-Now	**KAIST**	Daejeon, South Korea

Ph.D. Candidate in School of Electrical Engineering
Advisor : Young-Gyu Yoon

2017-20	**Yonsei University**	Seoul, South Korea

Bachelor of Science in School of Integrated Technology
Advisor : Jiwon Seo

PUBLICATIONS

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

2023   **Statistically unbiased prediction enables accurate denoising of voltage imaging data**
Minho Eom*, **Seungjae Han***, Pojeong Park*, Gyuri Kim, Eun-Seo Cho, Jueun Sim, Kang-Han Lee, Seonghoon Kim, He Tian, Urs L. Böhm, Eric Lowet, Hua-an Tseng, Jieun Choi, Stephani Edwina Lucia, Seung Hyun Ryu, Márton Rózsa, Karel Svoboda, Sunghoe Chang, Pilhan Kim, Xue Han, Kiryl D. Piatkevich, Myunghwan Choi, Cheol-Hee Kim, Adam Cohen, Jae-Byum Chang, Young-Gyu Yoon
Nature Methods (Accepted)

    ***In vivo* whole-brain imaging of zebrafish larvae using three-dimensional fluorescence microscopy**
Eun-Seo Cho, **Seungjae Han**, Gyuri Kim, Minho Eom, Kang-Han Lee, Cheo-Hee Kim, Young-Gyu Yoon
Journal of Visualized Experiments

    Robust and Efficient Alignment of Calcium Imaging Data through Simultaneous Low Rank and Sparse Decomposition
Junmo Cho*, **Seungjae Han***, Eun-Seo Cho, Kijung Shin, Young-Gyu Yoon
*IEEE/CVF Winter Conference on Applications of Computer Vision (**WACV**)*

2022   **IMPASTO: Multiplexed cyclic imaging without signal removal via self-supervised neural unmixing**
Hyunwoo Kim*, Seoungbin Bae*, Junmo Cho, Hoyeon Nam, Junyoung Seo, **Seungjae Han**, Euiin Yi, Eunsu Kim, Young-Gyu Yoon**, Jae-Byum Chang**
Advanced Science (Under review)

    Three-dimensional fluorescence microscopy through virtual refocusing using a recursive light propagation network
Changyeop Shin*, Hyun Ryu*, Eun-Seo-Cho, **Seungjae Han**, Kang-Han Lee, Cheol-Hee Kim, Young-Gyu Yoon
Medical Image Analysis

2021   **Nanoscale resolution imaging of the whole mouse embryos and larval zebrafish using expansion microscopy**
Jueun Sim*, Chan E Park*, In Cho*, Kyeongbae Min, Minho Eom, **Seungjae Han**, Hyungju Jeon, Hyun-Ju Cho, Eun-Seo Cho, Ajeet Kumar, Yosep Chong, Jeong Seuk Kang, Kiryl D. Piatkevich, Erica E. Jung, Du-Seock Kang, Seok-Kyu Kwon, Jinhyun Kim, Ki-Jun Yoon, Jeong-Soo Lee, Edward S. Boyden, Young-Gyu Yoon**, Jae-Byum Chang**
Nature Biotechnology (In revision)

    3DM: Deep decomposition and deconvolution microscopy for rapid neural activity imaging
Eun-Seo Cho*, **Seungjae Han***, Kang-Han Lee, Cheol-Hee Kim, Young-Gyu Yoon
Optics Express [🏆 Editor's pick, Image of the Week]

Efficient Neural Network Approximation of Robust PCA for Automated Analysis of Calcium Imaging Data
Seungjae Han, Eun-Seo Cho, Inkyu Park, Kijung Shin, Young-Gyu 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**
Seungjae Han, Taewon Kang, Jiwon Seo
*International Technical Conference on Circuits/Systems, Computers and Communications (**ITC-CSCC**)* [Oral]

2018 **Observation of Human Trajectory in Response to Haptic Feedback from Mobile Robot**
Hee-Seung Moon, Woohyun Kim, **Seungjae Han**, Jiwon Seo
*International Conference on Control, Automation and Systems (**ICCAS**)*

PUBLICATIONS (Domestic)

2019 **Machine Learning Based Sound Source Localization in the Indoor Environment**
Seungjae Han, Sanghyeon Kim, Jiwon Seo
Korean Navigation Institute (KONI) Conference

Sound Source Localization in the Indoor Environment Based on Time Difference of Arrival Measurements
Sanghyeon Kim, **Seungjae Han**, Jiwon Seo
Korean Navigation Institute (KONI) Conference

2018 **Development of Human Following Mobile Robot Utilizing Haptic Signals**
Seungjae Han, Hee-Seung Moon, Jiwon Seo
Korean Navigation Institute (KONI) Conference

AWARDS AND HONORS

2020-Now **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 & monthly stipend)**,
        Ministry of Science, ICT and Future Planning

TALKS

2022 **Efficient methods to analyze big data from the brain**, Songlim high school (2022. 8)

PROFESSIONAL SERVICE

Reviewer **MICCAI** 2022 (5 papers), 2023 (3 papers)

MENTORING EXPERIENCE

2021 **Eunsu Kim** (Undergraduate Student at KAIST)
Machine learning basics, Processing multiplexed images (preprint released on bioRxiv)

TEACHING EXPERIENCE

Teaching assistant (TA)

2023   **Signals and Systems (EE205)**, KAIST
                           Introductory level course, **Head TA**

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

Young-Gyu Yoon, Assistant professor at KAIST

Ph.D. advisor at KAIST

✉ ygyoon@kaist.ac.kr

🏠 Lab homepage

Kijung Shin, Associate Professor at KAIST

✉ kijungs@kaist.ac.kr

🏠 Lab homepage

Design of this CV is based on Mina Lee's CV