Exponent®
Engineering & Scientific Consulting

Sang Min Han, Ph.D.

Associate | Electrical Engineering and Computer Science
New York
+1-212-895-8104 | hans@exponent.com

Professional Profile

Dr. Han is trained in electrical engineering, and he is an applied mathematician with a broad background in mathematical modeling, optimization, signal processing, and computational neuroscience. He has considerable experience in conducting interdisciplinary projects, many of which have combined ideas and techniques in statistics, machine learning, control systems, and biology. With his background and experience, he has applied his expertise to various fields ranging from defense and telecommunications to medical technology.

Prior to joining Exponent, Dr. Han was a postdoctoral researcher in the Department of Electrical Engineering and Computer Sciences at University of California, Berkeley, where he also completed his Ph.D. At Berkeley, he worked with experimentalists in both optics and neuroscience to develop a hybrid experimental/computational approach to quickly estimate the causal connectivity among hundreds of neurons in awake and behaving mice. Starting from fundamental biophysical principles, he formulated mathematical models, developed tailored estimation and control algorithms, and collaborated with neuroscientists to carry out experiments involving multiphoton holography optogenetics.

Dr. Han has extensive experience in MATLAB, Linux-based systems, and theoretical and/or computational works including those that incorporate parallel processing and GPU acceleration. He has also worked on multiple projects using C, Java, Mathematica, Python, R, and VB.NET.

Academic Credentials & Professional Honors

Ph.D., Electrical Engineering and Computer Sciences, University of California, Berkeley, 2021

B.S., Electrical & Computer Engineering, Cornell University, 2015

National Science Foundation Graduate Research Fellowship, 2016-2021

Departmental Fellowship, UC Berkeley Electrical Engineering and Computer Sciences, 2015-2016

William S. Einwechter Award, Cornell School of Electrical and Computer Engineering, 2015

Merrill Presidential Scholar, Cornell University, 2015

Hunter R. Rawlings III Cornell Presidential Research Scholarship, Cornell University, 2011-2015

Burckmyer/LaTour Scholarship, Cornell University, 2012-2013

A. L. Frank and Barbara Lippe, M.D. Engineering Scholarship, Cornell University, 2011-2013

Intel Science Talent Search Semifinalist, Society for Science & the Public, 2011

Academic Appointments

Postdoctoral Scholar, Electrical Engineering and Computer Sciences, University of California, Berkeley, 2022-2025

Graduate Student Researcher, Electrical Engineering and Computer Sciences, University of California, Berkeley, 2015-2021

Graduate Student Instructor, Electrical Engineering and Computer Sciences, University of California, Berkeley, 2019

Graduate Student Instructor, Electrical Engineering and Computer Sciences, University of California, Berkeley, 2017

Languages

Korean

Publications

Hernández-Morales M, Morales-Weil K, Han SM, Han V, Tran T, Benner EJ, Pegram K, Meanor J, Miller EW, Kramer RH, Liu C. Electrophysiological mechanisms and validation of ferritin-based magnetogenetics for remote control of neurons. Journal of Neuroscience, 44(30), 2024

Han SM, Land BR, Bass AH, Rice AN. Sound production biomechanics in three-spined toadfish and potential functional consequences of swim bladder morphology in the batrachoididae. The Journal of the Acoustical Society of America, 154(5):3466–3478, 2023

Bae S, Han S, Moura S. Modeling & control of human actuated systems. IFAC-PapersOnLine, 51(34):40–46, 2019

Bae S, Han S, Moura S. System analysis and optimization of human-actuated dynamical systems. In 2018 Annual American Control Conference (ACC), pages 4539–4545. IEEE, 2018

Briczinski SJ, Bernhardt PA, Siefring CL, Han S-M, Pedersen TR, and Scales WA. "Twisted beam" SEE observations of ionospheric heating from HAARP. Earth, Moon, and Planets, 116:55–66, 2015

Bernhardt PA, Briczinski SJ, Han SM, Fliflet AW, Crockett CE, Siefring CL, Gold SH. Visible plasma clouds with an externally excited spherical porous cavity resonator. IEEE Transactions on Plasma Science, 43(6):1911–1918, 2015

Presentations

Han S. Neural circuit dynamics estimation and control using multiphoton holography optogenetics. Invited Talk, 2024 Sculpted Light in the Brain, Paris, France, 202

Han S. Neural circuit estimation and analysis techniques in optogenetics. Invited Talk, Berkeley Center for Computational Imaging Seminar, Berkeley, CA, 2019

Han S. Neural network connectivity estimation using optogenetics. Invited Talk, Berkeley EECS Annual Research Symposium (BEARS) 2019, Berkeley, CA, 2019

Han S. Simple mechanical model reproduces complex calls in a fish vocal system: implications for the evolution of vertebrate acoustic communication systems. Invited Talk, 169th Meeting of the Acoustical Society of America, Pittsburgh, PA, 2015

Peer Reviews

The Thirteenth International Conference on Learning Representations (ICLR 2025)