Ki-Soo Jeong, Ph.D.

2nd Year Postdoctoral Fellow

Cleveland Clinic Research

Department of Biomedical Engineering



Neuroengineer applying biomedical engineering techniques to investigate how neural signals drive behavior in peripheral pain pathways and central sensitization in preclinical models of somatosensory and corneal pain.

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Research Interests

- **Neurotechnology and integrated hardware-software platforms**
  Developing combined platforms for synchronized recording of neural activity and behavioral response
  Applications: *High-throughput multimodal neural recordings and stimulation platforms*
- **Artificial intelligence and machine learning for behavioral and neural analysis**
  Applying machine learning and artificial intelligence to automate detection of behaviors to process high-throughput behavioral data
  Applications: *Pose estimation, binary classification, reflex detection*
- **Somatosensory processing and the neural encoding of pain**
  Identifying distinct neural correlates of pain in primary somatosensory cortex and thalamo-cortico-thalamic circuits
  Applications: *Improved time-locked relationships between gamma events and behavioral response, objective neural markers of pain states*
- **Operant behavioral paradigms for validating sensory perception**
  Validating pain elicited by optogenetic stimuli in preclinical models of somatosensory and corneal pain via entrained lick response
  Applications: *Validation of nociceptor-specific activation, linking gamma events to pain-related behaviors*

Professional Experience

05. 2025 - Present	Postdoctoral Fellow	**Cleveland Clinic Research, Cleveland, OH, USA** Department of Biomedical Engineering
09. 2020 - 05. 2025	Predoctoral Research Fellow	**Cleveland Clinic Research, Cleveland, OH, USA** Department of Biomedical Engineering (Graduate Researcher, PhD Candidate)
09. 2018 - 09.2020	Graduate Researcher	**Brown University, Providence, RI, USA** School of Engineering, Center for Biomedical Engineering
09. 2016 - 05. 2018	Graduate Researcher	**Brown University, Providence, RI, USA** Department of Molecular Pharmacology, Physiology, & Biotechnology
05. 2015 - 06. 2015	Intern	**Samsung Electronics, Seoul, South Korea**
11. 2013 - 03. 2014	Observer	**Seoul St. Mary's Hospital, Seoul, South Korea** Department of Neurosurgery
06. 2011 - 06. 2013	Research Assistant	**University of Washington, Seattle, WA, USA**

Education

05. 2025	Ph.D.	**Brown University, Providence, RI, USA** School of Engineering, Institute of Biomedical Engineering (Thesis title: Bridging Neurophysiology and Behavior: Investigating Pain through Somatosensory and Corneal Nociceptive Models)
05. 2018	Sc.M.	**Brown University, Providence, RI, USA** Department of Molecular Pharmacology, Physiology, & Biotechnology (Thesis title: Optical Coherence Tomography: Mapping of Angiogenesis and Attenuation Coefficient Towards the Intraoperative Imaging of Glioblastoma)
08. 2013	B.S.	**University of Washington, Seattle, WA, USA** Department of Biochemistry

UW Academy at Robinson Center for Young Scholars

06. 2007 **University of Washington, Seattle, WA, USA**

Early Entrance Program at Robinson Center for Young Scholars

Grant

N/A

Awards

2026 Cleveland Clinic Research Alumni Association Postdoctoral Travel Award

2025 Society for Neuroscience Trainee Professional Development Award

Memberships and Professional Services

Postdoctoral Member, Society for Neuroscience

Community Service:

- **Climate Committee:** Biomedical Engineering and Biotechnology (2019-2022)
- **Career Development Committee:** Lerner Graduate Student Association (2021-2022)

Ad Hoc Peer Review

2026 *Journal of Neuroscience Methods*

Supervising and mentoring

Senior mentor of Postdoctoral Researcher: Roxana Florea (2025-Present)

Supervisor of Undergraduate Students: Victoria Rogness (2022), Anagha Chandrasekharan (2023), Ian Beeck (2023, 2024), Aditya Roy (2024, 2025), Ananya Veerubhotla (2025), Kara Wang (2026)

List of Publications

Selected Publications

Jeong, K-S, McPheeters, M.T., Chandrasekharan, A., Beeck, I., Veerubhotla, A., Roy, A., Lu, E.Y., Ghosn, S., Jenkins, M.W., Saab, C.Y (2026). Automated detection of blink reflexes evoked

by optogenetic stimulation of TRPV1-expressing corneal afferents in transgenic mice. *Journal of Neuroscience Methods*. 110952. doi: 10.1016/j.jneumeth.2026.110952

Zhu C*, **Jeong K-S*,** Edhi M, Rogness V, Saab C, and Esteller R (2025) Spinal cord stimulation using time-dynamic pulses achieves longer reversal of allodynia compared to tonic pulses in a rat model of neuropathic pain. Front. Pain Res. 6:1541078. doi: 10.3389/fpain.2025.1541078 [***Co-first author**]

Publications

Florea, R., **Jeong, K.-S.** & Saab, C. Y. Machine learning for discovery of clinical pain biomarkers following spinal cord injury. Experimental Neurology 398, 115649 (2026).

Sheikh, S. R., McKee, Z.A., Ghosn, S., **Jeong, K.-S.**, Kattan, M., Burgess, R.C., Lara, J., Saab, C.Y., (2024). Machine learning algorithm for predicting seizure control after temporal lobe resection using peri-ictal electroencephalography. Sci Rep 14, 21771.

Edhi, M.M., Heijmans, L., Vanent, K.N., Bloye, K., Baanante, A., **Jeong, K.-S.**, Leung, J., Zhu, C., Esteller, R., and Saab, C.Y. (2020). Time-dynamic pulse modulation of spinal cord stimulation reduces mechanical hypersensitivity and spontaneous pain in rats. Sci Rep 10, 20358.

Stefan, S., **Jeong, K.-S.**, Polucha, C., Tapinos, N., Toms, S.A., and Lee, J., "Determination of confocal profile and curved focal plane for OCT mapping of the attenuation coefficient," Biomed. Opt. Express, vol. 9, issue no. 10, pp. 5084-5099, 2018.

Talk

2025 "Time-resolved and optogenetically-induced behavioral model of corneal pain in transgenic mice," *Society for Neuroscience 2025, San Diego, CA, USA.*

Presentation

2026 "Automated detection of blink reflexes evoked by optogenetic stimulation of TRPV1-expressing corneal nociceptors in transgenic mice," *Society for Neuroscience 2026*, *Washington, DC, USA*.

2024 "Neural correlates of nociception in primary somatosensory cortex precede operantly conditioned behavior in self-report paradigm," *Society for Neuroscience 2024, Chicago, IL, USA.*

Teaching and Lectures

Teaching

Graduate Teaching Assistant (Instrumentation Design) Brown University, **2019**.

Undergraduate Teaching Assistant (Intro to Biochemistry) University of Washington, **2012**.

Lectures

- **Guest Lecture** (journal club): "Time-dynamic pulse modulation of spinal cord stimulation reduces mechanical hypersensitivity and spontaneous pain in rats," North American Neuromodulation Society (NANS) Journal Club, *Virtual*, 2021.
- **Guest Lecture** (within curriculum): "Preclinical models of pain," Instrumentation Design, *Brown University, 2019.*