Jonghwan Lee

- Associate Professor of Engineering, Brown University
- Associate Professor of Brain Science, Brown University
- School of Engineering
- Carney Institute for Brain Science
- Institute for Biology, Engineering and Medicine
- Center on the Biology of Aging
- Center for Alternatives to Animals in Testing
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Highlights

Received 4 NIH grants during 6 years of pre-tenure, $6.5M in total.

- **NCI R01.** PI: Lee, $1.7M (Jul 2021 – Jun 2026)
  Label-Free, Longitudinal, Multi-Metric Viability Imaging of 3D Tissue Spheroid Array
- **NIA R01.** PI: Lee, $1.8M (Sep 2020 – May 2025)
  Long-Term Tracking of Cerebral Microvascular Structural and Functional Alterations between Normal and Alzheimer's Aging
- **NEI R01.** PI: Lee, $2.1M (Sep 2019 – Aug 2025)
  Plasmonic Retinal Prosthesis
- **NIBIB R00.** PI: Lee, $0.9M (Dec 2015 – Nov 2018)
  Microscopic Imaging of Neuro-Capillary Coupling in Brain Cortex

First- and last-author h-index: 13. Representative papers include (* indicates corresponding authors):

- K Walek, S Stefan, J-H Lee, P Puttigampala, A Kim, SW Park, P Marchand, F Lesage, T Liu, Y-W Huang, D Boas, C Moore, **J Lee***, "Near-lifespan longitudinal tracking of microvascular morphology, topology, and flow", *Nature Communications* 14:2982 (May 2023).
- J Nie, K Eom, H AlGhosian, A Neifert, A Cherian, G Gerbaka, K Ma, T Liu, **J Lee***, "Intravitreally injected plasmonic nanorods activate bipolar cells with patterned near-infrared laser projection", *ACS Nano* 19 (12) 11823 (Mar 2025). *Featured in the Boston Globe, Hunan TV, Neuroscience News, Science Alert, Retinal Physician, Popular Mechanics, Optics.org, ReachMD, Futurism, and other media.*
- **J Lee***, W Wu, JY Jiang, B Zhu, DA Boas, "Dynamic light scattering optical coherence tomography", *Optics Express* 20, 22262-22277 (Sep 2012). 200+ cited
- **J Lee***, V Srinivasan, H Radhakrishnan, DA Boas, "Motion correction for phase-resolved dynamic optical coherence tomography imaging of rodent cerebral cortex", *Optics Express* 19 (22), 21258-21270 (Oct 2011). 100+ cited

Research Interests

At the intersection of medical photonics, neural engineering, and artificial intelligence, my lab develops technical solutions to imperative medical problems, including risk prediction of Alzheimer's disease, vision restoration in age-related macular degeneration, and personalized cancer medicine.

Education and Training

- B.S. in Physics at **Seoul National University** (Seoul, South Korea), 2000
- Ph.D. in Brain Science at **Seoul National University** (Seoul, South Korea), 2009
  - Supervisor: Sung June Kim, PhD

  - Dissertation: Spectral measurement of fast optical neural signal in *ex vivo* brain tissue and its theoretical origin
- Postdoc in Biomedical Optics at **Harvard Medical School** (Boston, MA), 2014
  - Supervisor: David A. Boas, PhD

Positions

- Software Engineer. Military service, **Republic of Korea Army**, South Korea (2000 – 2003)
- Instructor. Department of Radiology, Massachusetts General Hospital, **Harvard Medical School**, Boston, MA (2014 – 2015)
- Assistant Professor. School of Engineering and Carney Institute for Brain Science, **Brown University**, Providence, RI (2015 – 2024)
- Associate Professor. School of Engineering and Carney Institute for Brain Science, **Brown University**, Providence, RI (2024 – present)

Awards

- Best Paper Award, Korean Society of Medical Biological Engineering (2008)
- Samsung Humantech Thesis Prize (2009)
- Brain & Cognitive Science Research Award, Association of Korean Neuroscientists (2011)
- Poster of Distinction Award, Harvard Medical School MGH Scientific Advisory Council (2013)
- Young Investigator Travel Award, International Society of Cerebral Blood Flow & Metabolism (2013)
- Pathway to Independence Award, National Institute of Health (2013)
- Richard B. Salomon Faculty Research Award, Brown University (2016)
- Tau Beta Pi Excellence in Research Award, Rhode Island Alpha Chapter of Tau Beta Pi (2018)

Peer-Reviewed Grants

Received four NIH grants during six years of pre-tenure, $6.5M in total, all as sole PI.

Active

1. NIH/NCI, R01. "Label-Free, Longitudinal, Multi-Metric Viability Imaging of 3D Tissue Spheroid Array." $1,750K. Jul 2021 – Jun 2026. Role: PI.
2. Brown University, Research Seed Award. "Artificial Intelligence for Enhanced Stroke Patient Care." $50K. Mar 2025 – Jun 2026. Role: PI.

Completed

1. NIH/NIBIB, Pathway to Independence Award, K99/R00. "Microscopic Imaging of Neuro-Capillary Coupling in Brain Cortex." $922K. Aug 2013 – Nov 2018. Role: PI.
2. Rhode Island Foundation, Medical Research Fund, 20154265. "Microscopic In Vivo Imaging of Cerebral Dynamics in Ischemic Stroke." $25K. Jun 2016 – May 2017. Role: PI.
3. Brown University, Richard B. Salomon Faculty Research Award. "Cellular Viability Imaging with Dynamic Light Scattering Optical Coherence Tomography." $15K. Jul 2016 – Jun 2017. Role: PI.
4. NIH/NEI, R01. "Plasmonic Retinal Prosthesis." $2,147K. Sep 2019 – Aug 2025. Role: PI.

5. Brown University, Research Seed Award. "Computational Modeling of Blood Flow to Understand Microvascular Dysfunction in Alzheimer's Disease." $49K. Jan 2020 – Jun 2021. Role: PI.
6. NIH/NIA, R01. "Long-Term Tracking of Cerebral Microvascular Structural and Functional Alterations between Normal and Alzheimer's Aging." $1,837K. Sep 2020 – May 2025. Role: PI.
7. Brown University, Carney Zimmerman Innovation Award. "The Intelligent Topology Hypothesis of Late-onset AD: Early Failure in Vascular Graph Fitness Driven by Impaired Endothelial Calcium Dynamics." $100K. Mar 2025 – Feb 2026. Role: PI.

Pending

1. NIH/NIA, R01. "Multimodal Optical Imaging and AI Analytics to Uncover APOE4 Etiology and Therapeutic Targets in Late Onset Alzheimer's Disease." Role: PI.
2. NIH/NEI R01. "Plasmonic Retinal Prosthesis: Selective ON-Pathway Activation." Role: PI.

Peer-Reviewed Publications

First- and last-author h-index: 13 out of 26 first- or last-authored original research papers

* Corresponding author: to be responsible during review process as the point of contact for editors.
§ Last author (senior author): to conceive and supervise the research.
† Graduate students I directly advised.
‡ Postdocs I directly advised.
◇ Undergraduate students I directly advised.

1. SA Kim, KM Byun, **J Lee**, JH Kim, DA Kim, H Baac, ML Shuler, SJ Kim, "Optical measurement of neural activity using surface plasmon resonance", *Optics Letters* 33, 914-916 (May 2008).
2. **J Lee**, SJ Kim, "Finite-difference time-domain study on birefringence changes of the axon during neural activation", *Journal of Optical Society Korea* 13, 272-278 (Jun 2009).
3. **J Lee***, SJ Kim, "Spectrum measurement of fast optical signal of neural activity in brain tissue and its theoretical origin", *Neuroimage* 51, 713-722 (Jun 2010).
4. **J Lee***, DA Boas, SJ Kim, "Multiphysics neuron model for cellular volume dynamics", *IEEE Transactions on Biomedical Engineering* 58, 3000-3003 (Oct 2011).
5. **J Lee*,** VJ Srinivasan, H Radhakrishnan, DA Boas, "Motion correction for phase-resolved dynamic optical coherence tomography imaging of rodent cerebral cortex", *Optics Express* 19, 21258-21270 (Oct 2011). 100+ cited
6. **J Lee***, W Wu, JY Jiang, B Zhu, DA Boas, "Dynamic light scattering optical coherence tomography", *Optics Express* 20, 22262-22277 (Sep 2012). 100+ cited
7. **J Lee***, H Radhakrishnan, W Wu, A Daneshmand, M Climov, C Ayata, DA Boas, "Quantitative imaging of cerebral blood flow velocity and intracellular motility using dynamic light scattering–optical coherence tomography", *Journal of Cerebral Blood Flow & Metabolism* 33, 819-825 (Jun 2013).
8. **J Lee***, W Wu, F Lesage, DA Boas, "Multiple-capillary measurement of RBC speed, flux, and density with optical coherence tomography", *Journal of Cerebral Blood Flow & Metabolism* 33, 1707-1710 (Nov 2013). Cover article
9. **J Lee***, JY Jiang, W Wu, F Lesage, DA Boas, "Statistical intensity variation analysis for rapid volumetric imaging of capillary network flow", *Biomedical Optics Express* 5, 1160-1172 (Apr 2014).
10. S Sakadzic, **J Lee**, DA Boas, C Ayata, "High-resolution in vivo optical imaging of stroke injury and repair", *Brain Research* 1623, 174-192 (Oct 2015).
11. **J Lee***, W Wu, DA Boas, "Early capillary flux homogenization in response to neural activation", *Journal of Cerebral Blood Flow & Metabolism* 36, 375-380 (Feb 2016).

12. B Li, **J Lee**, DA Boas, F Lesage, "Contribution of low and high flux capillaries to slow hemodynamic fluctuations in the cerebral cortex of mice", *Journal of Cerebral Blood Flow & Metabolism* 36, 1351-1356 (Aug 2016).
13. EJ Gutiérrez, C Cai, I Mikkelsen, P Rasmussen, H Angleys, M Merrild, K Mouridsen, S Jespersenn, **J Lee**, S Sakadzic, N Iversen, L Østergaard, "Effect of electrical forepaw stimulation on capillary transit time heterogeneity (CTH)", *Journal of Cerebral Blood Flow & Metabolism* 36, 2072-2086 (Dec 2016).
14. **J Lee***, Y Gursoy-Ozdemir, B Fu, DA Boas, T Dalkara, "Optical coherence tomography imaging of capillary reperfusion after ischemic stroke", *Applied Optics* 55, 9526-9531 (Nov 2016).
15. J Tang, SE Erdener, B Li, B Fu, S Sakadzic, SA Carp, **J Lee**, DA Boas, "Shear-induced diffusion of red blood cells measured with dynamic light scattering-optical coherence tomography", *Journal of Biophotonics* 11, e201700070 (Feb 2018).
16. S Stefan†, KS Jeong†, C Polucha, N Tapinos, SA Toms, **J Lee*§**, "Determination of confocal profile and curved focal plane for OCT mapping of the attenuation coefficient", *Biomedical Optics Express* 9(10), 5084-5099 (Oct 2018).
17. K Eom‡, KM Byun, SB Jun, SJ Kim, **J Lee*§**, "Theoretical study on gold nanorod-enhanced near-infrared neural stimulation", *Biophysical Journal* 115(8), 1481-1497 (Oct 2018).
18. JS Lee†, K Eom‡, C Polucha, **J Lee*§**, "Standard-unit measurement of cellular viability using dynamic light scattering optical coherence microscopy", *Biomedical Optics Express* 9(11), 5227-5239 (Nov 2018).
19. A Akif◇, K Walek◇, C Polucha, **J Lee*§**, "Doppler OCT clutter rejection using variance minimization and offset extrapolation", *Biomedical Optics Express* 9(11), 5340-5352 (Nov 2018).
20. TD Yang‡, K Park, J-S Park, J-H Lee†, E Choi, **J Lee**, W Choi, Y Choi, KJ Lee, "Two distinct actin waves correlated with turns-and-runs of crawling microglia", *PLoS ONE* 14(9), e0222692 (Aug 2019).
21. F Xing‡, J-H Lee†, C Polucha, **J Lee§**, "Three-dimensional imaging of spatio-temporal dynamics of small blood capillary network in the cortex based on optical coherence tomography: A review", *Journal of Innovative Optical Health Sciences* 13(1), 2030002 (Jan 2020).
22. K Park, JH Kim, T Kong, W Sun, **J Lee**, TD Yang‡, Y Choi, "Label-free microendoscopy using a micro-needle imaging probe for in vivo deep tissue imaging", *Biomedical Optics Express* 11(9), 4976-4988 (Sep 2020).
23. S Stefan†, **J Lee*§**, "Deep learning toolbox for automated enhancement, segmentation, and graphing of cortical optical coherence tomography microangiograms", *Biomedical Optics Express* 11 (12), 7325 (Dec 2020).
24. F Xing‡, J-H Lee†, C Polucha, **J Lee*§**, "Design and optimization of line-field optical coherence tomography at visible wavebands", *Biomedical Optics Express* 12 (3), 1351 (Mar 2021).
25. J Tang, X Cheng, K Kilic, A Devor, **J Lee**, DA Boas, "Imaging localized fast optical signals of neural activation with optical coherence tomography in awake mice", *Optics Letters* 46 (7), 1744 (Apr 2021).
26. N-R Im, TD Yang‡, K Park, J-H Lee†, **J Lee**, YH Kim, J-S Lee, B Kim, K-Y Jung, Y Choi, S-K Baek, "Application of M1 macrophage as a live vector in delivering nanoparticles for in vivo photothermal treatment", *Journal of Advanced Research* 31, 155 (Jul 2021).
27. S Stefan†, A Kim◇, PJ Marchand, F Lesage, **J Lee*§**, "Deep learning and simulation for the estimation of red blood cell flux with optical coherence tomography", *Frontiers in Neuroscience* 16, 835773 (Feb 2022).
28. **J Lee***, "Near-lifespan tracking of cerebral microvascular degeneration in aging to Alzheimer's continuum", *Advances in Geriatric Medicine and Research* 4(1), e220003 (Mar 2022).
29. N Sun, F Xing‡, J Nie†, Y Di, C Liu, Z Gan, **J Lee§**, "Micron-resolution high-performance line field optical coherence tomography and its application", *Optical Engineering* 61(3), 033102 (Mar 2022).
30. F Xing‡, S Ge, Y Wang, J Nie†, Y Di, Z Gan, C Liu, **J Lee§**, "Simultaneously reconfigurable multispectral microscopic imaging based on a digital micromirror device", *IEEE Photonics Technology Letters* 34(8), 417 (Apr 2022).
31. Y Chen, F Xing‡, S Ge, J Nie†, N Sun, Z Ma, **J Lee§**, "Design and demonstration of ultrafast holographic microscopic system based on time stretching", *Optics Communications* 514, 128153 (Jul 2022).

32. J-H Lee†, S Stefan†, K Walek◇, J Nie†, K Min, TD Yang, **J Lee*§**, "Investigating the correlation between early vascular alterations and cognitive impairment in Alzheimer's disease in mice with SD-OCT", *Biomedical Optics Express* 14(4), 1494 (Mar 2023).
33. K Walek◇, S Stefan†, J-H Lee†, P Puttigampala, A Kim◇, SW Park◇, P Marchand, F Lesage, T Liu, Y-W Huang, D Boas, C Moore, **J Lee*§**, "Near-lifespan longitudinal tracking of microvascular morphology, topology, and flow", *Nature Communications* 14:2982 (May 2023).
34. RJ Kant, KD Dwyer, J-H Lee†, C Polucha, M Kobayashi, S Pyon, AH Soepriatna, **J Lee**, KLK Coulombe, "Patterned arteriole-scale vessels enhance engraftment, perfusion, and vessel branching hierarchy of engineered human myocardium for heart regeneration", *Cells* 12(13), 1698 (June 2023).
35. HJ Kwon, YJ Cho, KM Yuk, **J Lee**, SH Choi, KM Byun, "Development of nanogap-rich hybrid gold nanostructures by use of two non-lithographic deposition techniques for a sensitive and reliable SERS biosensor", *Biomedical Engineering Letters* 14(4), 859 (May 2024).
36. A Zein-Sabatto†, K St. Angelo, SJ Madnick, D Hoffman-Kim, JR Morgan, **J Lee*§**, "Multi-assay assessment of cytotoxicity reveals multiple mechanisms of action in 3D microtissues", *Scientific Reports* 15, 3090 (Jan 2025).
37. J Nie†, K Eom‡, H AlGhosian†, A Neifert†, A Cherian†, G Gerbaka◇, K Ma†, T Liu, **J Lee*§**, "Intravitreally injected plasmonic nanorods activate bipolar cells with patterned near-infrared laser projection", *ACS Nano* 19 (12), 11823 (Mar 2025). *Featured in the Boston Globe, Hunan TV, Neuroscience News, Science Alert, Retinal Physician, Popular Mechanics, Optics.org, ReachMD, Futurism, and other media.*
38. J Assi◇, S Stefan†, R Tang, G Küreli, S Kura, E Long, J Jiang, D Boas, **J Lee*§**, "Machine learning-based method to detect capillary stalling using optical coherence tomography", *Biomedical Optics Express* 16 (5), 1807 (Apr 2025).
39. HM AlGhosain†, J Nie†, T Liu, **J Lee*§**, "The systemic toxicity of intravitreally injected gold nanorods in mice: Effects of size, surface conjugation, and post-injection period", *Toxicological Research* 41, 489 (May 2025)

Patents

1. **J Lee**, SJ Kim, "Methods and device for neural user interface and brain activity measuring device for the same", *Korea Patent* 10-1028949 (2010).
2. **J Lee**, SJ Kim, "Device and method for measuring neural signal using optical fiber", *Korea Patent* 10-1045866 (2010).
3. **J Lee**, CJ Lee, SJ Kim, "Optical brain response monitoring device for closed-loop deep brain stimulation", *Korea Patent* 10-1069153 (2011).

Book Chapters

1. **J Lee**, DA Boas, "OCT and coherence imaging for the neurosciences", *OCT: Technology and Applications 2nd Edition*, edited by W Drexler and JG Fujimoto, Springer (2015).
2. K Kilic, H Uhlirova, P Tian, PA Saisan, MA Yaseen, **J Lee**, SA Vinogradov, DA Boas, S Sakadzic, A Devor, "Tools for high-resolution in vivo imaging of cellular and molecular mechanisms in cortical spreading depression and spreading depolarization", *Neurobiological Basis of Migraine*, edited by T Dalkara and MA Moskowitz, Wiley (2017).
3. **J Lee**, "OCT and coherence imaging for the neurosciences", OCT: Technology and Applications 3rd Edition, edited by W Drexler and JG Fujimoto, Springer (in print).

Invited Talks

1. International Symposium on Optical Neural Recording, *Seoul National University*, South Korea (2009).
2. International Workshop on Nano-Photonics, *Gwangju Institute of Science and Technology*, South Korea (2009).

3. International Conference on Functional Optical Imaging, *University of Nottingham Ningbo*, China (2011).
4. Brain & Brain PET, *International Society of Cerebral Blood Flow & Metabolism*, China (2013).
5. Department of Bio and Brain Engineering, *Korea Advanced Institute of Science and Technology*, South Korea (2013).
6. Samsung Advanced Institute of Technology, *Samsung*, South Korea (2013).
7. Department of Biomedical Engineering, *Seoul National University Hospital*, South Korea (2013).
8. Department of Physics and Photon Science, *Gwangju Institute of Science and Technology*, South Korea (2013).
9. Photonics West, *SPIE – International Society for Optics and Photonics*, USA (2014).
10. New England Symposium on Biomedical Optics, *Harvard Medical School*, USA (2014).
11. Aarhus CTH Meeting, *Aarhus University*, Denmark (2014).
12. Neurotalk, *BIT Congress*, China (2015).
13. "Optical Coherence Tomography as a Novel Tool for Neuroscience," Carney Institute for Brain Science, *Brown University*, USA (2015).
14. "Optical Coherence Tomography: Potential Application for Orthopedic," Department of Orthopedics, *Rhode Island Hospital*, USA (2015).
15. "Label-free Microscopic Imaging of Biodynamics with Optical Coherence Tomography," Biomedical Engineering Seminar, *Brown University*, USA (2015).
16. "Optical Coherence Tomography: An Emerging Tool for Microscopic in vivo Imaging of Tissue Dynamics," Advanced Microscopy Techniques in Biomedical Research Symposium, *Brown University*, USA (2015).
17. "Optical Coherence Tomography: Potential for Pathology," Department of Pathology, *Rhode Island Hospital*, USA (2016).
18. "Label-Free In Vivo Imaging of Vascular and Cellular Dynamics with Optical Coherence Tomography," Department of Surgery, *Rhode Island Hospital*, USA (2016).
19. "Label-Free Imaging and Genetics-Free Modulation of Brain," *Northeast Symposium on Biomedical Optics*, Cambridge, USA (2018).
20. "Label-Free Imaging and Genetics-Free Modulation of Brain," *Boston University*, Boston, USA (2019).
21. "Label-Free Imaging and Genetics-Free Modulation of Brain," BMES Annual Meeting, *Biomedical Engineering Society*, Philadelphia, USA (2019).
22. "Longitudinal OCT imaging of microvascular properties in aging mouse brain," Photonics North, *SPIE – International Society for Optics and Photonics*, Montreal, Canada (2023).
23. "Artificial Intelligence for Microvascular Image Analysis to Predict Alzheimer's Disease," Houston Methodist Weill Cornell Medicine Joint Radiology Symposium, *Houston Methodist Research Institute*, Houston, USA (2024).
24. "Near-lifespan longitudinal tracking of brain microvascular morphology, topology, and flow in male mice," Aarhus CTH Meeting, *Aarhus University*, Denmark (2024).
25. "Deep learning toolbox for optical coherence tomography angiogram analysis," Brain & Brain PET, *International Society of Cerebral Blood Flow & Metabolism*, South Korea (2025).

Press Releases

1. National TV Interview. "Future of brain-computer interfaces", *Korean Broadcasting System* (11/21/2009). KBS interview page (Korean)
2. National TV Interview. "Brain communication", *Munhwa Broadcasting Corporation* (2009).

3. Featured Research. "Assistant Professor Jonghwan Lee receives an early-career grant from NIH", *Brown University Center for Biomedical Engineering* (2015).
4. News Article. Alumni News, *Seoul National University* (2/5/2016). Seoul National University alumni news page (Korean)
5. Featured Research. "Researchers seek to catch Alzheimer's early by peeking into the eyes", *Brown University* (8/28/2017). Brown University news article
6. Local Podcast Interview. "Episode 18 – Medtech Monday", *The Rhode Pod* (3/30/2020). The Rhode Pod episodes page
7. Featured Research. "Brown researchers awarded five-year, $1.8M grant from National Cancer Institute," *Brown University School of Engineering* (9/7/2021). Brown Engineering news article
8. National TV Interview. "What are gold nanoparticles?", *Hunan TV* (10/22/2025). Hunan TV interview page

Conference Presentations (Selected)

1. J Lee, SJ Kim, *International Commission for Optics 2008 Congress*, Sydney, Australia (2008).
2. J Lee, SJ Kim, *The 38th Conference of the Korean Society of Medical and Biological Engineering*, Seoul, South Korea (2008).
3. J Lee, SJ Kim, *The 11th Conference of the Korean Society of Brain and Neural Science*, Seoul, South Korea (2008).
4. J Lee, J Kim, SJ Kim, *SPIE Photonics West 2009*, San Jose, CA, USA (2009).
5. J Lee, SJ Kim, *SPIE Photonics West 2009*, San Jose, CA, USA (2009).
6. J Lee, SJ Kim, *The 20th Annual Meeting of the Optical Society of Korea*, Seoul, South Korea (2009).
7. J Lee, SJ Kim, *The 4th Asian and Pacific Rim Symposium on Biophotonics*, Jeju, South Korea (2009).
8. J Lee, SJ Kim, *The 8th Annual IEEE Conference on Sensors*, Christchurch, New Zealand (2009).
9. J Lee, VJ Srinivasan, H Radhakrishnan, W Wu, DA Boas, *UKC 2010 Conference*, Seattle, WA, USA (2010).
10. J Lee, DA Boas, *The 34th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, San Diego, CA, USA (2012).
11. J Lee, DA Boas, *The 2014 IEEE International Symposium on Biomedical Imaging*, Beijing, China (2014).
12. JS Lee, C Polucha, J Lee, *The OSA Biophotonics Congress*, Miami, FL, USA (2018).
13. K Eom, H Alghosain, K Ma, GM Gerbaka, C Polucha, H Kim, V Colvin, J Lee, *SPIE Photonics West 2019*, San Francisco, CA, USA (2019).
14. A Zein-Sabatto, JS Lee, M Kuhn, I Aponte, B Felalaga, J Sevetson, B Ip, D Hoffman-Kim, J Morgan, J Lee, *SPIE Photonics West 2019*, San Francisco, CA, USA (2019).
15. K Walek, JH Lee, K Min, C Polucha, J Lee, *SPIE Photonics West 2019*, San Francisco, CA, USA (2019).

Advising

Postdoctoral Fellow Advisor

1. Fangjian Xing, PhD Biomedical Optics (Oct 2016 – Sep 2018)
2. Kyungsik Eom, PhD Neural Engineering (Nov 2016 – Aug 2019)
3. Taeseok Yang, PhD Biomedical Optics (Sep 2018 – Feb 2022)
4. Jang-Hoon Lee, PhD Biomedical Optics (Jun 2023 – May 2025)

PhD Thesis Advisor

1. Julia Lee, Biomedical Engineering (Feb 2016 – May 2018)
2. Sabina Stefan, Biomedical Engineering (Sep 2016 – May 2022)
3. Jang-Hoon Lee, Biomedical Engineering (Sep 2016 – May 2023)
4. Jiarui Nie, Biomedical Engineering (Jan 2019 – Nov 2024)
5. Ahbid Zein-Sabatto, Biomedical Engineering (Sep 2019 – May 2025)
6. Hafithe AlGhosain, Biomedical Engineering (Sep 2019 – Aug 2025)
7. Robyn Logan, Biomedical Engineering (Sep 2021 – May 2026)
8. Kuan-Min Lee, Electrical and Computer Engineering (Sep 2022 – May 2027)
9. Akshay Nagar, Electrical and Computer Engineering (Sep 2022 – May 2027)

PhD Thesis Committee

1. Songtao Chen, advisor: Arto Nurmikko (2018)
2. Priyanka Miranda, advisor: David Borton (2023)
3. Mitchell Harling, advisor: Kimani Toussaint (2024)
4. Ning Zhang, advisor: Arto Nurmikko (2025)
5. Krishangi Krishna, advisor: Kimani Toussaint (2025)

ScM Thesis Advisor

1. Ki-Soo Jeong, Biotechnology (Sep 2016 – May 2018)
2. Shannon Crowley, Biomedical Engineering (Sep 2017 – May 2018)
3. Kristine Ma, Biomedical Engineering (Sep 2017 – May 2019)
4. Ahbid Zein-Sabatto, Biomedical Engineering (Sep 2017 – May 2019)
5. Hafithe AlGhosain, Biomedical Engineering (Sep 2017 – May 2019)
6. Adrian Bico, Biomedical Engineering (Sep 2018 – May 2020)
7. Kenzie Magnan, Biomedical Engineering (Sep 2018 – May 2020)
8. Ramisa Fariha, Biomedical Engineering (Sep 2018 – May 2020)
9. Julian Montagut, Biomedical Engineering (Sep 2018 – May 2020)
10. Kareem Hussein, Biomedical Engineering (Sep 2018 – May 2020)
11. Aaron Cherian, Biomedical Engineering (Sep 2018 – May 2020)
12. Swathi Pisupati, Biomedical Engineering (Mar 2019 – May 2020)
13. Madison Woo, Biomedical Engineering (Sep 2019 – May 2020)
14. Paula Choconta, Biomedical Engineering (Sep 2019 – May 2020)
15. Alexandar Neifert, Biotechnology (Sep 2019 – May 2020)
16. Anoop Reddi, Biotechnology (Jan 2021 – Dec 2022)
17. Chenyan Lu, Electrical and Computer Engineering (Feb 2023 – May 2024)
18. Yuhong Zhang, Electrical and Computer Engineering (Mar 2023 – May 2024)
19. Rudy Utzschneider, Biotechnology (Sep 2023 – May 2025)

20. Siyuan Hui, Physics (Sep 2023 – May 2025)
21. Daniel Chait, Biotechnology (Sep 2023 – May 2025)
22. Jinqian Li, Biomedical Engineering (Sep 2023 – May 2025)
23. Nayana Harilal, Biomedical Engineering (Sep 2023 – Aug 2025)
24. Luke Xu, Biomedical Engineering (Sep 2024 – May 2026)
25. Siddhi Tamanekar, Biomedical Engineering (Sep 2024 – May 2026)
26. Yuwei Liu, Biomedical Engineering (Nov 2024 – May 2026)
27. Samir Samadov, Biotechnology (Sep 2025 – May 2027)
28. Siddarth Vinod Kumar, Biotechnology (Sep 2025 – May 2027)
29. Marie-Elise Latorre, Biotechnology (Sep 2025 – May 2027)
30. Sonia Kumar, Biomedical Engineering (Sep 2025 – May 2027)
31. Pratheeka Kakumani, Biotechnology (Sep 2025 – May 2027)
32. Sue Yon Kim, Biomedical Engineering (Sep 2025 – May 2027)
33. Hadley Groom, Biotechnology (Sep 2025 – May 2027)
34. Heran Pradhan, Biomedical Engineering (Sep 2025 – May 2027)
35. Jonathan Sullo, Biomedical Engineering (Sep 2025 – May 2027)
36. Wei Ling, Biotechnology (Sep 2025 – May 2027)
37. Benjamin Nye, Biomedical Engineering (Sep 2025 – May 2027)

BS Thesis Advisor

1. Madison Woo ’17, Biomedical Engineering (Sep 2016 – May 2017)
2. Konrad Walek*† ’18, Neuroscience (PLME) (Sep 2016 – May 2018)
3. Mikayla Tinus* ’18, Biomedical Engineering (Sep 2016 – May 2018)
4. Adil Akif ’18, Biomedical Engineering (Feb 2017 – May 2018)
5. Madison Kuhn† ’18, Biomedical Engineering (Sep 2017 – May 2018)
6. Zachary Ricca ’18, Biomedical Engineering (Sep 2017 – May 2018)
7. Joshua C. Greene ’18, Engineering Physics (Sep 2017 – May 2018)
8. Jose Reyes† ’19, Neurobiology (Jun 2018 – May 2019)
9. Gaia-Marie Gerbaka* ’21, Biomedical Engineering (Nov 2017 – Apr 2021)
10. Esmeralda Montas* ’21, Electrical Engineering (Oct 2018 – Apr 2021)
11. Paul Secchia* ’21, Biomedical Engineering (Nov 2018 – Apr 2021)
12. Carli Langevin* ’21, Biomedical Engineering (Feb 2019 – Apr 2021)
13. Priya Bhanot† ’23, Neuroscience (Feb 2020 – May 2023)
14. Anna Kim*† ’23, Neuroscience (Mar 2020 – May 2023)
15. Joseph Namkung† ’23, Neuroscience (Jan 2021 – May 2023)
16. Justin Rhee* ’23, Electrical Engineering (PLME) (Jan 2021 – May 2023)
17. Joshua Assi† ’24, Neuroscience (May 2021 – May 2024)
18. Yujin Chung ’27, Neuroscience (Sep 2024 – May 2027)

19. Rose Qu ’28, Engineering (Oct 2024 – May 2028)
20. Constantinos Krenteras ’28, Engineering (Jan 2025 – May 2028)
21. Edward Gottfried ’28, Biomedical Engineering (Feb 2025 – May 2028)

* Awardees of the UTRA Fund
† Advisees of Independent Study

Other Advising Activity

- Sameer Sajid, Postgraduate intern (Apr 2016 – Aug 2016)
- Sun Uk Kim, Postgraduate intern (May 2016 – Jul 2016)
- Elizabeth Eichorn, Undergraduate intern (Jul 2016 – Aug 2016)
- Kyounghee Min, International undergraduate intern (Jun 2017 – Aug 2017)
- Yesong Kweon, International undergraduate intern (Jun 2017 – Aug 2017)
- Justin Korn, Undergraduate intern (Jun 2017 – Aug 2017)
- Rye Young Kim, International undergraduate intern (Jun 2018 – Aug 2018)
- James Watts, Undergraduate intern (Jul 2018 – Aug 2018)
- Anvitha Addanki, High school student (Jul 2018 – Aug 2018)
- Erick Jara, Postgraduate intern (Jun 2018 – May 2019)
- Noah Korotzer, Undergraduate intern (Jun 2018 – May 2019)
- Christina Nguyen, Undergraduate intern (Jun 2018 – May 2019)
- Dana Leichter, Postgraduate intern (Jul 2018 – May 2019)
- Juyoung Lee, International undergraduate intern (Jun 2019 – Aug 2019)
- Jungin Kong, International undergraduate intern (Jun 2019 – Aug 2019)
- Julia Howarth, High school student (Jul 2019 – Aug 2019)
- Sasha Westrick, High school student (Nov 2019 – Feb 2021)
- Pranav Addanki, High school student (Mar 2023 – present)

Teaching

Courses

- Spring 2016: ENGN 1930B Photonics and Biophotonics (Enrollment: 8)
- Spring 2017: ENGN 1930B Biomedical Optics (7)
- Fall 2017: ENGN 0510 Electricity and Magnetism (with Prof. Beresford) (104)
- Spring 2018: ENGN 1930B Biomedical Optics (10)
- Fall 2018: ENGN 0510 Electricity and Magnetism (with Prof. Mittleman) (90)
- Spring 2019: ENGN 1930B Biomedical Optics (3)
- Spring 2020: ENGN 1930B Biomedical Optics (3)
- Fall 2020: ENGN 0510 Electricity and Magnetism (with Prof. Mittleman) (101)
- Spring 2021: ENGN 1930B Biomedical Optics (9)
- Fall 2021: ENGN 0510 Electricity and Magnetism (with Prof. Zaslavsky) (65)

- Spring 2023: ENGN 1930B Biomedical Optics (7)
- Fall 2023: ENGN 1930B Biomedical Optics (8)
- Spring 2025: ENGN 1930B Biomedical Optics (11)

Guest Lectures

- Spring 2016: ENGN 1220 Neuroengineering, Brown University 03/22/2016
- Spring 2017: ENGN 1220 Neuroengineering, Brown University 03/21/2017
- Spring 2022: ENGN 1220 Neuroengineering, Brown University 04/21/2022

Service

Invited Grant Review

- NIH/NEI ZEY1 VSN (2020)
- NIH ZRG1 BIVT (2021, 2023, 2024)
- NIH ZRG1 IBV (2024, 2025)
- NIH ISB ITD (2025)

Invited Paper Review

- Light: Science & Applications
- Neuroimage
- Journal of Cerebral Blood Flow and Metabolism
- IEEE Transactions on Biomedical Engineering
- Optics Letters
- Optics Express
- Biomedical Optics Express
- Neurophotonics
- Journal of Biomedical Optics
- Investigative Ophthalmology & Visual Science
- Microscopy and Microanalysis
- Journal of Neuroscience Methods
- CNS & Neurological Disorders-Drug Targets

Professional Society

- Technical Program Committee Member, IEEE International Symposium on Biomedical Imaging (2015-2021)

Brown University

- Co-director, Undergraduate Program for Biomedical Engineering (2016 – 2018)
- First-Year & Sophomore Advisor, School of Engineering (2016 – present)
- Organizer, Biomedical Engineering Seminar Series (2018 – 2023)
- Honors Program Advisor (2021 – 2022)

- Affirmative Action Representatives (2022 – 2023)
- SPIE faculty advisor of Brown University Optics Society (BRUNOS) (2022 – present)
- Faculty member, Institutional Animal Care and Use Committee (IACUC) (2024 – present)
- Hibbitt / Hope Street Postdoc Search Committee (2024 – present)
- Biomedical Engineering Master's Program Advisory Board (2024 – present)

Community

- Brown Korean Biomed Scientists (BKBS) (Jan 2016 – Sep 2018)
  Served as one of the founding members for monthly scientific meetings.
- Korean Brown Engineers Meeting (Jul 2018 – May 2019)
  Served as the founder of the monthly technical meeting.
- International Summer Research Internship (Jun 2017 – Aug 2019)
  Established a 12-week program with the Ewha Womans University of South Korea.