

Curriculum Vitae

Kyungsik Eom, Ph.D.

Associate Professor

Department of Electronics Engineering at Pusan National University

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PROFESIONAL INTERESTS My research efforts focus on developing an effective neural interface and implementing it to develop neural prostheses to help disabled people suffering from neurodegenerative diseases.

Neural interface using optic, magnetic and electric
Neural prostheses such as retinal prostheses and biodegradable brain stimulators

EDUCATION **Seoul National University** Seoul, S.Korea
Ph.D., Electrical and Computer Engineering, Mar. 2012 ~ Aug. 2016
- Advisor: Prof. Sung June Kim
- Thesis: **Enhanced Neural Stimulation System using Localized Surface Plasmon Resonance of Gold Nanorods**

Seoul National University Seoul, S.Korea
M.S., Electrical and Computer Engineering, Mar. 2010 ~ Feb. 2012
- Advisor: Prof. Sung June Kim
- Thesis: **A Novel Wireless Power Transmission System for Freely Moving Animal**

Korea Advanced Institute of Science and Technology Daejeon, S.Korea
B.S., Electrical Engineering, Mar. 2005 ~ Feb. 2010
- Advisor: Prof. Chang D. Yoo
- Thesis: **Design of Speech Recognition System using Probabilistic Graphical Model**

PROFESIONAL APPOINTMENTS **Pusan National University**
Department of Electronics Engineering Busan, S.Korea
Associate Professor Sep. 2023 ~ Present

Pusan National University Busan, S.Korea
Assistant Professor Sep. 2019 ~ Aug. 2023.

Department of Medicine
Adjunct Professor 2020 ~ Present

Brown University Providence, RI, USA
Postdoctoral Research Associate Nov. 2016 ~ Aug. 2019

SELECTED
PUBLICATIONS

1. Jiarui Nie[†], **Kyungsik Eom[†]**, Hafithe M. AlGhosain, Alexander Neifert, Aaron Cherian, Gaia-Marie Gerbaka, Kristine Y. Ma, Tao Liu, Jonghwan Lee, "Intravitreally Injected Plasmonic Nanorods Activate Bipolar Cells with Patterned Near-infrared Laser Projection", *ACS Nano*, Vol 19:12, 11823–11840, 2025 (Mar. 20) doi/10.1021/acsnano.4c14061. (IF 17.3, JCR 6.6%)
2. **Kyungsik Eom**, Jinhyung Kim, Jong Min Choi, Taekyeong Kang, Jin Woo Chang, Kyung Min Byun, Sang Beom Jun, and Sung June Kim, "Enhanced infrared neural stimulation using localized surface plasmon resonance of gold nanorods", *Small*, Vol. 10, No. 19, pp. 3853-3857, Jun. 2014. (IF: 8.368) (Frontispiece Article).
3. Jeongjoo Moon[†], Kyungmo Seong[†], Hyeon Gyu Kim[†], Wonki Mun, Seung Hyun Min, Sung-Yun Park, Joonsoo Jeong, Chin Su Koh*, Hyun Ho Jung*, and **Kyungsik Eom*** "Battery-Free Dual-Channel Wireless Neurostimulator using Passive Circuitry for Neuropathic Pain Modulation" *Advanced Healthcare Materials*, e02443, doi/10.1002/adhm.202502443 (IF 11.0, JCR 8.8%)
4. **Kyungsik Eom**, Kyung Min Byun, Sang Beom Jun, Sung June Kim, and Jonghwan Lee, "Theoretical Study on Gold Nanorod-Enhanced Near-Infrared Neural Stimulation", *Biophysical Journal*, Vol 115, Issue 8, pp. 1481-1497, Oct. 2018. (IF: 3.665)

INTERNATIONAL
JOURNAL

23. Ali Rahmani, Joonsoo Jeong* and **Kyungsik Eom*** "Dual-Resonance Metamaterial-Enhanced Thin-Film Transistor Photodetectors for UV–Vis–NIR Broadband Detection: A Computational Study", *IEEE Sensors Journal*, Vol 26:6, 8499–8508 2026 (Mar. 15) 10.1109/JSEN.2026.3658959
22. Jeongjoo Moon[†], Kyungmo Seong[†], Hyeon Gyu Kim[†], Wonki Mun, Seung Hyun Min, Sung-Yun Park, Joonsoo Jeong, Chin Su Koh*, Hyun Ho Jung*, and **Kyungsik Eom*** "Battery-Free Dual-Channel Wireless Neurostimulator using Passive Circuitry for Neuropathic Pain Modulation" *Advanced Healthcare Materials*, e02443, doi/10.1002/adhm.202502443 (IF 11.0, JCR 8.8%)
21. Minsung Kim, Sangmin Song, Hyunsoo Song, Younghoon Park, **Kyungsik Eom*** and Sung-Yun Park* "Investigation of NIR Light-Reflecting and Shielding Structures in Backside-Illuminated CMOS Photovoltaics for Dense Integration of Energy Source and Circuits" *IEEE Transactions on Electron Devices* (Accepted)
20. Ali Rahmani, Joonsoo Jeong* and **Kyungsik Eom*** "Enhanced Ultraviolet Photodetector Based on Thin Film Transistor Incorporating Plasmonic Aluminum Nanoparticles and Nanohole Array: A Computational Study", *IEEE Sensors Journal*, Vol 25:11, 19477–19488, 2025 (Mar. 20) doi/10.1109/JSEN.2025.3561296 (IF 4.3, Q1)
19. Jiarui Nie[†], **Kyungsik Eom[†]**, Hafithe M. AlGhosain, Alexander Neifert, Aaron Cherian, Gaia-Marie Gerbaka, Kristine Y. Ma, Tao Liu, Jonghwan Lee, "Intravitreally Injected Plasmonic Nanorods Activate Bipolar Cells with Patterned Near-infrared Laser Projection", *ACS Nano*, Vol 19:12, 11823–11840, 2025 (Mar. 20) doi/10.1021/acsnano.4c14061. (IF 17.3, JCR 6.6%)

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18. Dong Hyeon Lee[†], Younghoon Park[†], Yoon Seo, Hyunbeen Jeong, Jong-Mo Seo, Min-Ho Seo, **Kyungsik Eom***, and Joonsoo Jeong*, "MicroElectroThermoForming (uETF): One-step Versatile 3D Shaping of Flexible Microelectronics for Enhanced Neural Interfaces", *npj Flex Electron*, Vol 9:5, 1-13, 2025 (Jan. 22th). (IF 15.4, JCR 1.8%)
 17. Ali Rahmani and **Kyungsik Eom***, "Enhanced organic photovoltaic-based retinal prosthesis using a cathode-modified structure with plasmonic silver nanoparticles: a computational study", *Front. Cell. Neurosci.*, Vol 18, 2024 (May. 30th).
 16. Ji Hoon Choi[†], Jeongju Moon[†], Young Hoon Park, and **Kyungsik Eom***, "Computational Analysis of Electrode Structure and Configuration for Efficient and Localized Neural Stimulation", *Biomed. Eng. Lett.*, Vol 14, 717-726, 2024 (Mar 16th)
 15. Younghoon Park[†], Jaewoo Shin[†], Junwon Park[†], Seulbi Kim, Ji Hun Park, Jaeheung Kim, Chang Seok Kim, Jin Woo Chang, Carol Schuurmans, Isabelle Aubert*, Won Seok Chang*, and **Kyungsik Eom***, "Focused Ultrasound as a Novel Non-Invasive Method for the Delivery of Gold Nanoparticles to Retinal Ganglion Cells", *Transl. Vis. Sci. Technol.*, Vol 13(5) pp: 1-15, 2024 (May 1st).
 14. Ali Rahmani and **Kyungsik Eom***, "Computational Analysis of Efficient Organic Solar Cell-Based Retinal Prosthesis Using Plasmonic Gold Nanoparticles", *Front. Cell. Neurosci.*, Vol 17:1205048, 2023 (Jul. 27th). (IF: 5.3)
 13. Kyungmo Sung, Seonghoon Jo, Jaewook Lee, Jeong Hoan Park, Young Hoon Park, Jeongjoo Moon, Sung June Kim, Joonsoo Jeong, Jonghwan Lee, and **Kyungsik Eom***, "Computational Analysis of Multichannel Magnetothermal Neural Stimulation using Magnetic Resonator Array", *Biomed. Eng. Lett.*, Vol 13, pp. 209–219, 2023 (Feb. 10th). (IF: 3.920)
 12. Seunghyeon Yun, Chin Su Koh, Jungmin Seo, Shinyong Shim, Minkyung Park, Hyun Ho Jung, **Kyungsik Eom***, Jin Woo Chang *, Sung June Kim, "A Fully Implantable Miniaturized Liquid Crystal Polymer (LCP)-based Spinal Cord Stimulator for Pain Control", *Sensors*, Vol 22, Issue 2, pp. 501, 2022 (Jan 10th). (IF: 3.576)
 11. Hyeon-June Kim, Younghoon Park, **Kyungsik Eom***, and Sung-Yun Park *, "An Area- and Energy-Efficient 16-Channel, AC-Coupled Neural Recording Analog Frontend for High-Density Multichannel Neural Recordings", *Electronics*, Vol 10, Issue 16, Aug. 2021. (IF: 2.110)
 10. Younghoon Park, Sung-Yun Park*, and **Kyungsik Eom***, "Current Review of Optical Neural Interfaces for Clinical Applications", *Micromachines*, Vol 12, Issue 925, pp. 1-25, Aug. 2021. (IF: 2.523)
 9. Shinyong Shim, **Kyungsik Eom***, Joonsoo Jeong* and Sung June Kim*, "Retinal Prosthetic Approaches to Enhance Visual Perception for Blind Patients", *Micromachines*, Vol 11, Issue 535, pp. 1-26, May 2020. (IF: 2.523)

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8. Seonghoon Jo, **Kyungsik Eom***, “A Simple Capillary Blood Cell Flow Monitoring System using Magnetic Micro-Sensor: A Simulation Study” , *Electronics*, Vol 9, Issue 4, pp. 618, Apr. 2020. (IF: 2.110)
 7. Julia S. Lee, **Kyungsik Eom**, Collin Polucha, and Jonghwan Lee, “Standard-unit measurement of cellular viability using dynamic light scattering optical coherence microscopy”, *Biomed. Opt. Express*, Vol 9, Issue 11, page. 5227-5239, Nov. 2018. (IF: 3.910)
 6. **Kyungsik Eom**, Kyung Min Byun, Sang Beom Jun, Sung June Kim, and Jonghwan Lee, “Theoretical Study on Gold Nanorod-Enhanced Near-Infrared Neural Stimulation”, *Biophys. J.*, Vol 115, Issue 8, pp. 1481-1497, Oct. 2018. (IF: 3.665)
 5. **Kyungsik Eom***, Seoyoung Hwang*, Seunghyeon Yun, Kyung Min Byun, Sang Beom Jun, and Sung June Kim, “Photothermal activation of astrocyte cells using localized surface plasmon resonance of gold nanorods”, *J. Biophotonics*, Vol 10, Issue 4, pp. 486-493, Feb. 2017. (IF: 3.768) (* These authors contributed equally to this work.).
 4. **Kyungsik Eom**, Changkyun Im, Seoyoung Hwang, Seyoung Eom, Tae-Seong Kim, Hae Sun Jeong, Kyung Hwan Kim, Kyung Min Byun, Sang Beom Jun, and Sung June Kim, “Synergistic combination of near-infrared irradiation and targeted gold nanoheaters for enhanced photothermal neural stimulation”, *Biomed. Opt. Express*, Vol 7, No 4, pp. 1614-1625, Mar. 2016. (IF: 3.337)
 3. **Kyungsik Eom**, Jinhyung Kim, Jong Min Choi, Taekyeong Kang, Jin Woo Chang, Kyung Min Byun, Sang Beom Jun, and Sung June Kim, “Enhanced infrared neural stimulation using localized surface plasmon resonance of gold nanorods”, *Small*, Vol. 10, No. 19, pp. 3853-3857, Jun. 2014. (IF: 8.368) (*Frontispiece Article*).
 2. **Kyungsik Eom**, Joonsoo Jeong, Junghoon Kim, Jinhyung Kim, Sung Eun Lee, Sung June Kim, “A Wireless Power Transmission System for Implantable Devices in Freely Moving Rodents”, *Med Biol Eng Comput*, Vol. 52, No. 8, pp. 639-651, Jun. 2014. (IF: 1.726)
 1. Jong Min Choi, **Kyungsik Eom**, Seoyoung Hwang, Yena Lee, Sang Beom Jun, Kyung Min Byun, and Sung June Kim, “Multi-color fluorescence imaging based on plasmonic wavelength selection and double illumination of white light”, *Opt. Express*, Vol. 22, No. 5, pp. 5977-5985, Mar. 2014. (IF: 3.488)

PATENT
REGISTERED

Dong Won Yang, Sung June Kim, Kangmoon Seo, **Kyungsik Eom**, Jeong Hoan Park, and Eui-ri Lee “Animal Behavior Control Apparatus using Magnetic Field”, Patent No: 10-1868895, Jun. 2018.

Sang Beom Jun, **Kyungsik Eom**, Sung June Kim, and Kyung Min Byun, “Neural Controlling Apparatus and Method using Surface Plasmon Resonance of Nano Particle”, Patent No: 10-1810763, Jan. 2018.

Sung June Kim, **Kyungsik Eom**, “Multichannel Neural Stimulation Equipment using Magnetic Heating of Nanoparticle”, Patent No: 10-1463036, Nov. 2014.

Kyungsik Eom, Sung June Kim, Joonsoo Jeong, Seung Woo Lee, “Apparatus and System for Wireless Power Transmission Using Dual Transmitter Coil”, Patent No: 10-1230515, Jan. 2013.

AWARD AND
HONOR

우수 젊은 과학자상 Oct. 2024
한국유연인쇄전자학회

Highly-Cited Paper Award (우수 피인용 논문 상) Dec. 2018
Department of Electrical and Computer Engineering, Seoul National University

Distinguished Dissertation Award (Ph.D.) Aug. 2016
Department of Electrical and Computer Engineering, Seoul National University

Best Paper Award Nov. 2012
46th Conference of the Korea Society of Medical and Biological Engineering

Distinguished Dissertation Award (M.S.) Feb. 2012
Department of Electrical and Computer Engineering, Seoul National University

Best Presentation Award Jun. 2011
The 8th Scientific Meeting for the Asian Australasian Society of Stereotactic & Functional Neurosurgery (AASSFN)

RESEARCH
EXPERIENCE

Brown University Providence, RI, USA
Lee Lab for Biomedical Optics and Neuroengineering

- Advisor: Prof. Jonghwan Lee
- Postdoctoral Research Associate Nov. 2016 ~ Aug. 2019

Seoul National University Seoul, S.Korea

Nanobio-electronics & Systems Lab
- Advisor: Prof. Sung June Kim
- BK Postdoctoral Research Associate Sep. 2016 ~ Oct. 2016

Seoul National University Seoul, S.Korea

Nanobio-electronics & Systems Lab
- Advisor: Prof. Sung June Kim
- Graduate Researcher Mar. 2010 ~ Aug. 2016

Korea Advanced Institute of Science and Technology Daejeon, S.Korea
Statistical Learning for Signal Processing Lab

- Advisor: Prof. Chang D. Yoo
- Undergraduate Researcher

Dec. 2007 ~ Jun. 2008

Korea Advanced Institute of Science and Technology
Wave Embedded Integrated Systems Lab

Daejeon, S.Korea

- Advisor: Prof. Hong, Songcheol
- Undergraduate Researcher
- Developing non-contact heartbeat signal detecting sensor.

Dec. 2006 ~ Jun. 2007