

Soo Hyun Lee

Updated: May 2019

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Education

Dec 2008	Ph.D.	University of Cincinnati, OH, USA	Electrical and Computer Engineering and Computer Science (BioMEMS)
Sep 2005	M.S.	University of Cincinnati, OH, USA	Electrical and Computer Engineering and Computer Science (BioMEMS)
Feb 2002	B.S.	Korea University, Seoul, Korea	Electrical Engineering

Experience (Employment)

03/2018- Present	Principal Researcher , Center for BioMicrosystems, Korea Institute of Science and Technology (KIST)
02/2010- Present	Senior Researcher , Center for BioMicrosystems, Korea Institute of Science and Technology (KIST)
03/2012- Present	Associate Professor , Department of Biomedical Engineering, Korea University of Science and Technology (UST)
04/2013-03/2014	Visiting Scholar , BioMiNT (Biomolecular Microsystems and Nano Transducers) lab, University of California, Irvine (Prof. Abraham P. Lee)
10/2006-02/2010	Researcher , Center for BioMicrosystems, Korea Institute of Science and Technology (KIST)
09/2002-09/2006	Graduate Research Assistant , Prof. Chong H. Ahn, Microsystems and Biomems Laboratory, University of Cincinnati, OH

Research Interests

- Ultra-high sensitive nano gap sensor for tau protein and PTM to diagnose Neurodegenerative disease such as AD and PD
- Functional neural electrode for CNS and PNS
- Implantable sensors such as IOP (intraocular pressure) sensor
- Cell chip, Lab-on-a-chip for *in-vitro* blood-brain-barrier (BBB)

- Piezoelectric resonator using PZT material in Nano scale
- RT (Reverse Transcription)-PCR Lab-on-a-chip using polymer materials

Teaching Activities (University of Science & Technology)

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| ● Fundamentals of microsystem technology | 2010~2019 |
| ● Biosensors | 2012, 2017 |

List of Publication

Patents: 17 issued patents (available upon request)

Journal Articles: (in reverse chronological order)

1. Hyungbeen Lee, Min Tack Oh, Kuk Hui Son, Ji Yoon Kang, Nakwon Choi, Byung Chul Lee, **Soo Hyun Lee***, "Highly-efficient, rapid, and easy gDNA extraction *via* an ultrasonic-assisted magnetic system", *Biosensors and Bioelectronics*, (2019) in revision
2. Hyungsub Lee, Dongho Kim, Ji Yoon Kang, Ki Wan Bong, **Soo Hyun Lee***, Rhokyun Kwak*, "Nonlinear dynamics of ion concentration polarization in capacitive T deionization", *Desalination*, 458 (2019) 14-24
3. Kang-Il Song, Sunghye Estelle Park, Seul Lee, Hyungmin Kim, **Soo Hyun Lee**, Inchan Youn*, "Compact Optical Nerve Cuff Electrode for Simultaneous Neural Activity Monitoring and Optogenetic Stimulation of Peripheral Nerves, *Scientific Reports*, (2018) 8:15630
4. Yi Jae Lee, Kyu Shik Eom, Kyeong-Sik Shin, Ji Yoon Kang, **Soo Hyun Lee***, "Enzyme-loaded paper combined impedimetric sensor for the determination of the low-level of cholesterol in saliva", *Sensors and Actuators B: Chemical*, 271 (2018) 73-81
5. Woongsun Choi, Sang Yun Yeoma, Junsun Kim, Seungwon Jung, Seungho Jung, Tae Soup Shim, Sang Kyung Kim, Ji Yoon Kang, **Soo Hyun Lee**, Il-Joo Cho, Jungkyu Choi, Nakwon Choi, "Hydrogel micropost-based qPCR for multiplex detection of miRNAs associated with Alzheimer's disease" *Biosensors and Bioelectronics*, (2018) 235-244
6. Han-Jun Kim, Dong Nyoung Heo, Yi Jae Lee, Sang Jin Lee, Ji Yoon Kang, **Soo Hyun Lee***, Il Keun Kwon & Sun Hee Do, "Biological assessments of multifunctional hydrogel-decorated implantable neural cuff electrode for clinical neurology application" *Scientific Reports*, 20171110
7. Heo, D. N., H.-J. Kim, Y. J. Lee, M. Heo, S. J. Lee, D. Lee, S. H. Do, **S. H. Lee***, I. K. Kwon* (2017). "Flexible and highly biocompatible nanofiber-based electrodes for neural surface interfacing." *ACS NANO*: 201703 (JCR Ranking: 3.082%, IF: **13.334**)
8. Lee, Y. J., H.-J. Kim, J. Y. Kang, S. H. Do and **S. H. Lee*** (2017). "Biofunctionalization of Nerve Interface via Biocompatible Polymer-Roughened Pt Black on Cuff Electrode for Chronic Recording." *Advanced Healthcare Materials*: 1601022, 201703
9. Hwang, D. G., Y. M. Chae, N. Choi, I.-J. Cho, J. Y. Kang and **S. H. Lee*** (2016). "Label-free detection of prostate specific antigen (PSA) using a bridge-shaped PZT resonator." *Microsystem Technologies*: 1-8.
10. Lee, Y. J., H.-J. Kim, S. H. Do, J. Y. Kang and **S. H. Lee*** (2016). "Characterization of nerve-cuff electrode

interface for biocompatible and chronic stimulating application." *Sensors and Actuators B: Chemical* 237: 924-934.

11. Ji, J.-h., K.-s. Shin, S. Kang, **S. H. Lee**, J. Y. Kang, S. Kim and S. C. Jun (2016). "Fundamental monomeric biomaterial diagnostics by radio frequency signal analysis." *Biosensors and Bioelectronics* 82: 255-261.
12. Heo, D. N., S.-J. Song, H.-J. Kim, Y. J. Lee, W.-K. Ko, S. J. Lee, D. Lee, S. J. Park, L. G. Zhang J. Y. Kang, S. H. Do, **S. H. Lee***, I. K. Kwon* (2016). "Multifunctional hydrogel coatings on the surface of neural cuff electrode for improving electrode-nerve tissue interfaces." *Acta Biomaterialia*.
13. Jang, C.-I., K.-S. Shin, M. J. Kim, K.-S. Yun, K. H. Park, J. Y. Kang and **S. H. Lee*** (2016). "Effects of inner materials on the sensitivity and phase depth of wireless inductive pressure sensors for monitoring intraocular pressure." *Applied Physics Letters* 108(10): 103701.
14. Lee, Y. J., S. J. Park, K.-S. Yun, J. Y. Kang and **S. H. Lee*** (2016). "Enzymeless glucose sensor integrated with chronically implantable nerve cuff electrode for in-situ inflammation monitoring." *Sensors and Actuators B: Chemical* 222: 425-432.
15. Kim, Y. W., M. J. Kim, K. H. Park, J. W. Jeoung, S. H. Kim, C. I. Jang, **S. H. Lee**, J. H. Kim, S. Lee and J. Y. Kang (2015). "Preliminary study on implantable inductive-type sensor for continuous monitoring of intraocular pressure." *Clinical & experimental ophthalmology* 43(9): 830-837.
16. Shin, K.-S., C.-I. Jang, M. J. Kim, K.-S. Yun, K. H. Park, J. Y. Kang and **S. H. Lee*** (2015). "Development of Novel Implantable Intraocular Pressure Sensors to Enhance the Performance in in vivo Tests." *Journal of Microelectromechanical Systems* 24(6): 1896-1905.
17. Park, S. J., Y. J. Lee, D. N. Heo, I. K. Kwon, K.-S. Yun, J. Y. Kang and **S. H. Lee*** (2015). "Functional nerve cuff electrode with controllable anti-inflammatory drug loading and release by biodegradable nanofibers and hydrogel deposition." *Sensors and Actuators B: Chemical* 215: 133-141.
18. Chae, M.-S., S.-M. Lee, Y. K. Yoo, **S. H. Lee**, J. Kim, T. S. Kim, D. J. Ahn, J. H. Lee and K. S. Hwang (2014). "Fabrication and characterization of piezoelectric driven microdiaphragm resonating sensor for a biosensing application." *Journal of Electroceramics* 32(4): 383-389.
19. Hwang, H., B. Kang, **S. H. Lee**, C.-I. Jang, J. Y. Kang and C. Park (2014). "Resonance frequency effects of an external coil for IOP sensor applications." *Journal of Electromagnetic Waves and Applications* 28(7): 790-801.
20. Chu, J.-U., K.-I. Song, A. Shon, S. Han, **S. H. Lee**, J. Y. Kang, D. Hwang, J.-K. F. Suh, K. Choi and I. Youn (2013). "Feedback control of electrode offset voltage during functional electrical stimulation." *Journal of neuroscience methods* 218(1): 55-71.
21. Chu, J.-U., K.-I. Song, S. Han, **S. H. Lee**, J. Y. Kang, D. Hwang, J.-K. F. Suh, K. Choi and I. Youn (2013). "Gait phase detection from sciatic nerve recordings in functional electrical stimulation systems for foot drop correction." *Physiological measurement* 34(5): 541.
22. Kang, B., H. Hwang, **S. H. Lee**, J. Y. Kang, J.-H. Park, C. Seo and C. Park (2013). "A wireless intraocular pressure sensor with variable inductance using a ferrite material." *JSTS: Journal of Semiconductor Technology and Science* 13(4): 355-360.
23. Hwang, D. G., Y. M. Chae, K. S. Hwang, J. Y. Kang and **S. H. Lee*** (2012). "Fabrication and characterization of PZT (lead zirconate titanate) bridge-shaped resonator for mass sensing application." *Journal of electroceramics* 29(3): 225-234.

24. Kim, C., J. H. Bang, Y. E. Kim, **S. H. Lee** and J. Y. Kang (2012). "On-chip anticancer drug test of regular tumor spheroids formed in microwells by a distributive microchannel network." *Lab on a chip* 12(20): 4135-4142.
25. Chu, J.-U., K.-I. Song, S. Han, **S. H. Lee**, J. Kim, J. Y. Kang, D. Hwang, J.-K. F. Suh, K. Choi and I. Youn (2012). "Improvement of signal-to-interference ratio and signal-to-noise ratio in nerve cuff electrode systems." *Physiological measurement* 33(6): 943.
26. Kim, C., K. S. Lee, J. H. Bang, Y. E. Kim, M.-C. Kim, K. W. Oh, **S. H. Lee** and J. Y. Kang (2011). "3-Dimensional cell culture for on-chip differentiation of stem cells in embryoid body." *Lab on a Chip* 11(5): 874-882.
27. Kim, C., S. Chung, Y. E. Kim, K. S. Lee, **S. H. Lee**, K. W. Oh and J. Y. Kang (2011). "Generation of core-shell microcapsules with three-dimensional focusing device for efficient formation of cell spheroid." *Lab on a Chip* 11(2): 246-252.
28. **Lee, S. H***, J. H. Jung, Y. M. Chae, J.-K. F. Suh and J. Y. Kang (2010). "Fabrication and characterization of implantable and flexible nerve cuff electrodes with Pt, Ir and IrOx films deposited by RF sputtering." *Journal of Micromechanics and Microengineering* 20(3): 035015.
29. Su-Kyoung Chae, Chang-Ha Lee, **Soo Hyun Lee**, Tae-Song Kim and Ji Yoon Kang, "Oil droplet generation in PDMS microchannel using an amphiphilic continuous phase", *Lab Chip*, 2009, 9, 1957–1961
30. Choong Kim, Kang Sun Lee, Young Eun Kim, Kyu-Jung Lee, **Soo Hyun Lee**, Tae Song Kim and Ji Yoon Kang, "Rapid exchange of oil-phase in microencapsulation chip to enhance cell viability", *Lab Chip*, 2009, 9, 1294–1297
31. **Soo Hyun Lee***, Sung-Woo Kim, Ji Yoon Kang and Chong H. Ahn, "A polymer lab-on-a-chip for reverse transcription (RT)-PCR based point-of-care clinical diagnostics", *Lab Chip*, 2008, 8, 2121–2127
32. Z. Zou, **S. Lee**, and C.H. Ahn, "A Polymer Microfluidic Chip with Interdigitated Electrodes Arrays for Simultaneous Dielectrophoretic Manipulation and Impedimetric Detection of Microparticles", *IEEE Sensors Journal*, VOL. 8, 527-534, (2008)
33. Chunyan Li, **Soohyun Lee**, Andrew Gorton, Mark J. Schulz and Chong H. Ahn, "Flexible Dome and Bump Shape Piezoelectric Tactile Sensors using PVDF-TrFE Copolymer", *Journal of Microelectromechanical Systems*, VOL. 17, 334-340, (2008)

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