

Curriculum Vitae



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RESEARCH AREAS

1. Brain-on-a-Chip technology
2. Biofunctionalization of neural interfaces
3. Microelectrode array technology
4. Large-scale neural data analysis
5. Nano-Neurophotonics

EDUCATION

- Ph. D.** University of Illinois at Urbana-Champaign, Electrical Engineering, 2005. (Advisor: Bruce C. Wheeler)
M.S. University of Illinois at Urbana-Champaign, Electrical Engineering, 2003. (Advisor: Bruce C. Wheeler)
B.S. Seoul National University, Electrical Engineering, 1997.

POSITIONS

- Sept. 2013 – July. 2014** **Visiting Associate Researcher**
Department of Chemistry and Biochemistry
University of California, San Diego
- Sept. 2010 – present** **Associate Professor**
Department of Bio and Brain Engineering
Korea Advanced Institute of Science and Technology (KAIST), South Korea
- Sept. 2006 – Aug. 2010** **Assistant Professor**
Department of Bio and Brain Engineering
Korea Advanced Institute of Science and Technology (KAIST), South Korea
- Sept. 2005 – Aug. 2006** **Postdoctoral Research Associate**
Department of Bioengineering
University of Illinois at Urbana-Champaign, Urbana, Illinois, USA
- Jan. 2000 – Aug. 2005** **Research Assistant**
Department of Electrical and Computer Engineering
University of Illinois at Urbana-Champaign, Urbana, Illinois, USA
- Mar. 1997 – Jun. 1999** **Korean Army**
Artillery officer, South Korea

PROFESSIONAL ACTIVITIES

- 2008 – present Editorial board member, Journal of Biological Engineering Research
2010 – 2011 Editorial board member, IEEE Transactions on Biomedical Engineering
2008 – present Editorial board member, International Neurourology Journal
2010 – 2011 Chair of Academic Program Committee

	(The Korean Society for Medical and Biological Engineering)
2012	Academic Program Committee (The Korean BioChip Society)
2015	MicroTAS 2015 Local Organization Committee
2015	IBEC (International BioEngineering Conference) 2015 Academic Program Committee
2016	Chair of Academic Program Committee (The Korean BioChip Society)
2016	MEA Meeting 2016 International Scientific Program Committee
2016	International Relationship Committee (Korean Society for Medical and Biological Engineering)
2017	IEEE EMBS 2017 (Jeju, Korea) Organizing Committee

PROFESSIONAL MEMBERSHIPS

2001 – present	IEEE Engineering of Medicine and Biology Society (EMBS)
2007 – present	BioMedical Engineering Society (BMES)
2010 – present	Society for Neuroscience (SfN)
2006 – present	The Korea BioChip Society
2007 – present	The Korean Society of Medical & Biological Engineering
2011 – present	The Korean Chemical Society
2012 – present	The Korean Society for Brain and Neural Science

HONORS and AWARDS

Outstanding Lecturer by Department of Bio and Brain Engineering (2008, 2012, 2015, 2016)
 Outstanding Lecturer by KAIST (2008 Fall)
 Excellent Collaboration in Research by KAIST (2011)
 Young Investigator Award in Biomedical Engineering by Korean Society of Medical & Biological Engineering (2011)
 Early Career Achievement Award by The Korea BioChip Society (2013)
 Best Paper Award by National Research Foundation & Korean Society of Medical & Biological Engineering (2014)

PUBLICATIONS

Journal papers (*corresponding author)

1. H. Jung, H. Kang, Y. Nam*, "Digital Micromirror based Near-infrared Illumination System for Plasmonic Photothermal Neuromodulation", Biomedical Optics Express 2017;8(6):2866-78.
2. H. Kang, J.Y. Kim, Y.K. Choi*, Y. Nam* "Feasibility Study of Extended-gate Type Silicon Nanowire Field-Effect Transistors for Neural Recording", Sensors 2017;17(4):705.
3. N. Hong, S. Joo, Y. Nam*, "Characterization of axonal spikes in cultured neuronal networks using microelectrode arrays and micro channel devices", IEEE Trans. Biomed Eng 2017 Feb;64(2):492-98.
4. M. J. Jang, W. R. Kim, S. Joo, J. R. Ryu, E. Lee, Y. Nam*, W. Sun*, "Cell-type dependent effect of surface-patterned microdot arrays on neuronal growth", Front. Neurosci. 2016 May 02; 10:217.
5. J.R. Ryu, M. J. Jang, Y. Jo, S. Joo, D.H. Lee, B.Y. Lee, Y. Nam*, W. Sun*, "Synaptic compartmentalization by micropatterned masking of a surface adhesive cue in cultured neurons", Biomaterials 2016 March 19; 92:46-56.
6. Yoo S, Kim R, Park JH*, Nam Y*, "Electro-optical neural platform integrated with nanoplasmonic inhibition interface", ACS Nano 2016 (Accepted)
7. Kang K, Park YS, Park M, Jang MJ, Kim SM, Lee J, Choi JY, Jung DH, Chang YT, Yoon MH*, Lee JS*, Nam Y*, and Choi IS*, "Axon-First Neuritegenesis on Vertical Nanowires", Nano Lett. 2016 Jan 13;16(1):675-80.
8. Joo S, Kim JY, Lee E, Hong M, Sun W*, Y. Nam*. Effects of ECM protein micropatterns on the migration and differentiation of adult neural stem cells. Scientific Reports. 2015 Aug 12;5:13043.
9. Jang MJ and Nam Y*. NeuroCa: Integrated framework for systematic analysis of spatio-temporal neuronal activity patterns from large-scale optical recording data. Neurophotonics. 2015 Jul;2(3):035003.
10. Joo J, Liu X, Kotamraju VR, Rouslahti E, Nam Y, and Sailor MJ*. Gated Luminescence Imaging of Silicon Nanoparticles. ACS Nano, 2015 Jun 23;9(6):6233-41.
11. Joo S, Kang K, Nam Y*. In vitro neurite guidance effects induced by polylysine pin-stripe micropatterns with

- polylysine background. *J Biomed Mater Res:Part A*. 2015 Aug;103(8):2731-39.
12. Jang M.J. and Nam Y*. Agarose-assisted micro-contact printing for high-quality biomolecular micro-patterns. *Macromolecular Bioscience*, 2015 May;15(5):613-21. **[Cover article]**
 13. Kim R, Nam Y*. Electrochemical layer-by-layer approach to fabricate mechanically stable platinum black microelectrodes using a mussel-inspired polydopamine adhesive. *J Neural Eng*. 2015 Mar 4;12(2):026010.
 14. Lee J.W., Kim D., Yoo S, Lee H, Lee G, Nam Y*. Emerging Neural Stimulation Technologies for Bladder Dysfunctions. *Int. Neurourol J* 2015;19:3-11.
 15. Kang K, Joo S, Choi JY, Geum S, Hong S, Lee S, Kim YH, Kim S, Yoon M, Nam Y*, Lee K*, Lee H*, Choi IS*. Tissue-based metabolic labeling of polysialic acids in living primary hippocampal neurons. *Proc Natl Acad Sci USA*, 2015 Jan 20;112(3):E241-8.
 16. Kim. R, Joo SH, Jung H, Hong N, Nam Y*. Recent trends in microelectrode array technology for in vitro neural interface platform. *Biomedical Engineering Letters*. 2014 June; 4(2): 129–141.
 17. Yoo S, Hong S, Choi Y, Park JH*, Nam Y*. Photothermal inhibition of neural activity with near-infrared-sensitive transducers. *ACS Nano*. 2014 Aug 26;8(8):8040-9.
 18. Hong D, Bae K, Yoo S, Kang K, Jang B, Kim J, Kim S, Jeon S, Nam Y, Kim YG, Choi IS*. Generation of cellular micropatterns on a single-layered graphene film. *Macromol. Biosci*. 2014 Mar;14(3):314-9.
 19. Kang K, Yoon SY, Choi SE, Kim MH, Park M, Nam Y*, Lee JS*, Choi IS*. Cytoskeletal actin dynamics are involved in pitch-dependent neurite outgrowth on bead monolayers. *Angew Chem Int Ed Engl*. 2014 Jun 10;53(24):6075-9. **[Cover article]**
 20. Kim WR, Jang MJ, Joo S, Sun W*, Nam Y*. Surface-printed microdot array chips for the quantification of axonal collateral branching of a single neuron in vitro. *Lab Chip*. 2014 Feb 21;14(4):799-805.
 21. Moon Y, Kim JY, Kim WR, Kim HJ, Jang MJ, Nam Y, Kim K, Kim H, Sun W*. Function of ezrin-radixin-moesin proteins in migration of subventricular zone-derived neuroblasts following traumatic brain injury. *Stem Cells*. 2013 Aug;31(8):1696-705.
 22. Kim R, Hong N, Nam Y*. Gold nanograin microelectrodes for neuroelectronic interfaces. *Biotechnol J*. 2013 Feb;8(2):206-14. **[Cover article]**
 23. Kang K, Lee S, Kim R, Choi IS*, Nam Y*. Electrochemically Driven, Electrode-Addressable Formation of Functionalized Polydopamine Films for Neural Interfaces. *Angew Chem Int Ed Engl*. 2012 Dec 21;51(52):13101-4.
 24. Jang MJ, Nam Y*. Geometric effect of cell adhesive polygonal micropatterns on neuritogenesis and axon guidance. *J Neural Eng*. 2012 Jul 19;9(4):046019.
 25. Nam Y. Material considerations for in vitro neural interface technology. *MRS Bulletin* 2012 June;37(6): 566-72.
 26. Jang MJ, Nam Y*. Aqueous micro-contact printing of cell-adhesive biomolecules for patterning neuronal cell cultures. *BioChip J*. 2012 June;6(2): 107-13.
 27. Dong CY, Shin D, Joo S, Nam Y, Cho KH*. Identification of feedback loops in neural networks based on multi-step Granger causality. *Bioinformatics*. 2012 Aug 15;28(16):2146-53.
 28. Kang K, Choi SE, Jang HS, Cho WK, Nam Y*, Choi IS*, Lee JS*. In-Vitro Developmental Acceleration of Hippocampal Neurons on Nanostructures of Self-Assembled Silica Beads in Filopodium-Size Ranges. *Angew Chem Int Ed Engl*. 2012 Mar 19;51(12):2855-8. **[Cover article]**
 29. Yoo SJ, Nam Y*. Neurons on Parafilm: Versatile elastic substrates for neuronal cell cultures. *J Neurosci Methods*. 2012 Feb 15;204(1):28-34.
 30. Yoo SJ, Kim J, Lee CS, Nam Y*. Simple and Novel Three Dimensional Neuronal Cell Culture Using a Micro Mesh Scaffold. *Exp. Neurobiol*. 2011 Jun;20(2):110 - 115.
 31. Lee S, Nam Y*. Automatic switching system for the impedance analysis of multichannel microelectrode arrays: limits and improvement scheme. *J. Biomed. Eng. Res*. 2011 Sept;32(3). [Korean]
 32. Kang K, Choi IS*, Nam Y*. A biofunctionalization scheme for neural interfaces using polydopamine polymer. *Biomaterials*. 2011 Sep;32(27):6374-80.

33. Goo YS*, Ye JH, Lee S, Nam Y, Ryu SB, Kim KH. Retinal ganglion cell responses to voltage and current stimulation in wild-type and rd1 mouse retinas. *J Neural Eng.* 2011 Jun;8(3):035003.
34. Goyal G, Nam Y*. Neuronal micro-culture engineering by microchannel devices of cellular scale dimensions. *Biomed. Eng. Lett.* 2011 May;1(2):89 - 98.
35. Nam Y*, Wheeler BC. In vitro microelectrode array technology and neural recordings. *Crit Rev Biomed Eng.* 2011;39(1):45-61. [Review article]
36. Oh YJ, Park SG, Kang MH, Choi JH, Nam Y, Jeong KH*. Beyond the SERS: Raman enhancement of small molecules using nanofluidic channels with localized surface plasmon resonance. *Small.* 2011 Jan 17;7(2):184-8.
37. Yook JY, Kim MJ, Son MJ, Lee S, Nam Y, Han YM, Cho YS*. Combinatorial Activin Receptor-Like Kinase/Smad and Basic Fibroblast Growth Factor Signals Stimulate the Differentiation of Human Embryonic Stem Cells into the Cardiac Lineage. *Stem Cells Dev.* 2011 Sep;20(9):1479-90.
38. Cho WK, Kang K, Kang G, Jang MJ, Nam Y*, Choi IS*. Pitch-dependent acceleration of neurite outgrowth on nanostructured anodized aluminum oxide substrates. *Angew Chem Int Ed Engl.* 2010 Dec 27;49(52):10114-8.
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39. Jang MJ, Namgung S, Hong S*, Nam Y*. Directional neurite growth using carbon nanotube patterned substrates as a biomimetic cue. *Nanotechnology.* 2010 Jun 11;21(23):235102.
40. Kang K, Kang G, Lee BS, Choi IS*, Nam Y*. Generation of patterned neuronal networks on cell-repellant poly(oligo(ethylene glycol) methacrylate) films. *Chem Asian J.* 2010 Aug 2;5(8):1804-9.
41. Kim JH, Kang G, Nam Y*, Choi YK*. Surface-modified microelectrode array with flake nanostructure for neural recording and stimulation. *Nanotechnology.* 2010 Feb 26;21(8):85303.
42. Jung S, Nam Y*, Lee D*. Inference of combinatorial neuronal synchrony with Bayesian networks. *J Neurosci Methods.* 2010 Jan 30;186(1):130-9.
43. Kang G, Lee JH, Lee CS, Nam Y*. Agarose microwell based neuronal micro-circuit arrays on microelectrode arrays for high throughput drug testing. *Lab Chip.* 2009 Nov 21;9(22):3236-42.
44. Dong CY, Lim J, Nam Y*, Cho KH*. Systematic analysis of synchronized oscillatory neuronal networks reveals an enrichment for coupled direct and indirect feedback motifs. *Bioinformatics.* 2009 Jul 1;25(13):1680-5.
45. Hwang H, Kang G, Yeon JH, Nam Y*, Park JK*. Direct rapid prototyping of PDMS from a photomask film for micropatterning of biomolecules and cells. *Lab Chip.* 2009 Jan 7;9(1):167-70.
46. Nam Y*. Neuron-on-a-Chip technology: Microelectrode Array System and Neuronal Patterning. *J. Biomed. Eng. Res.* 2009 Apr;30:103-112. [Korean]
47. Nam Y*, Brown EA, Ross JD, Blum RA, Wheeler BC, DeWeerth SP. A retrofitted neural recording system with a novel stimulation IC to monitor early neural responses from a stimulating electrode. *J Neurosci Methods.* 2009 Mar 30;178(1):99-102.
48. Brown EA, Ross JD, Blum RA, Nam Y, Wheeler BC, DeWeerth SP*. Stimulation-artifact elimination in a multi-electrode system. *IEEE Trans. Biomed Circuits and Systems* 2008 Mar;2(1):10 - 21.
49. Nam Y. Brain on a Chip 구현을 위한 MEA 기술의 현황과 전망. *대한전자공학회지 (IEEK Magazine)*, Sep. 2007. [Korean]
50. Nam Y, Brewer GJ, Wheeler BC*. Development of astroglial cells in patterned neuronal cultures. *J Biomater Sci Polym Ed.* 2007;18(8):1091-100.
51. Rowe L, Almasri M, Lee K, Fogleman N, Brewer GJ, Nam Y, Wheeler BC, Vukasinovic J, Glezer A, Frazier AB*. Active 3-D micro scaffold system with fluid perfusion for culturing in vitro neuronal networks. *Lab Chip.* 2007 Apr;7(4):475-82.
52. Nam Y, Musick K, Wheeler BC*. Application of a PDMS microstencil as a replaceable insulator toward a single-use planar microelectrode array. *Biomed Microdevices.* 2006 Dec;8(4):375-81.
53. Nam Y, Branch DW, Wheeler BC*. Epoxy-silane linking of biomolecules is simple and effective for patterning neuronal cultures. *Biosens Bioelectron.* 2006 Dec 15;22(5):589-97.

54. Nam Y, Wheeler BC*, Heuschkel MO. Neural recording and stimulation of dissociated hippocampal cultures using microfabricated three-dimensional tip electrode array. *J Neurosci Methods*. 2006 Sep 15;155(2):296-9.
55. Nam Y, Chang JC, Khatami D, Brewer GJ, and Wheeler BC*. Patterning to enhance the activity of cultured neuronal network. *IEE Proc. - Nanobiotechnol*. 2004;151(3).
56. Nam Y, Chang JC, Wheeler BC*, Brewer GJ. Gold-coated microelectrode array with thiol linked self-assembled monolayers for engineering neuronal cultures. *IEEE Trans Biomed Eng*. 2004 Jan;51(1):158-65.

Book Chapters

1. Kang H, Nam Y(2016) “In Vitro Neural Recording by Microelectrode Arrays,” book chapter in *Stretchable Bioelectronics for Medical Devices and Systems*, Rogers JA, Ghaffari R, and Kim DH (Eds), Springer.