

Curriculum Vitae



Yoonkey Nam

Room 1007, CHUNG Moon Soul building(E16)
291 Daehak-ro, Yuseong-gu,
Daejeon, 305-701, Korea

Office: +82-42-350-4322, Fax: +82-42-350-4310
Email: ynam@kaist.ac.kr

Google scholar ([link](#))
Lab webiste (<http://neuros.kaist.ac.kr/>)

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

- 2010 – 2011 Associate Editor, IEEE Transactions on Biomedical Engineering
2018 – present Associate Editor, IEEE Transactions on Biomedical Engineering
2018 – present Associate Editor, Experimental Neurobiology
2008 – present Editorial Board Member, International Neurourology Journal

- 2010 – 2011 Co-Chair, Academic Program Committee, Spring/Fall Meeting of The Korean Society for Medical and Biological Engineering (KOSOMBE)
- 2016 – 2018 Co-Chair, International Relationship Committee, The Korean Society for Medical and Biological Engineering (KOSOMBE)
- 2016 Chair, Academic Program Committee, Spring/Fall Meeting of The Korean BioChip Society
- 2018 Chair, Division of Healthcare, The Korean BioChip Society
- 2015 Local Organization Committee, MicroTAS 2015
- 2017 Organizing Committee, IEEE EMBS Annual International Conference 2017
- 2015 Academic Program Committee, IBEC (International BioEngineering Conference) 2015
- 2018 Organizing Committee, SMIT2018-IBEC2018 Joint International Conference
- 2018 Organizing Committee, The 10th International Symposium on Microchemistry and Microsystems (ISMM)
- 2016 International Scientific Program Committee, 10th International Meeting on Substrate-Integrated Microelectrode Array (MEA Meeting)
- 2018 International Scientific Program Committee, 11th International Meeting on Substrate-Integrated Microelectrode Array (MEA Meeting)

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
- 2012 – present The Korean Society for Brain and Neural Science

HONORS and AWARDS

- 2008 Outstanding Lecturer by Department of Bio and Brain Engineering (also 2012, 2015, 2016)
- 2008 Outstanding Lecturer by KAIST
- 2011 Excellent Collaboration in Research by KAIST
- 2011 Young Investigator Award in Biomedical Engineering by Korean Society of Medical & Biological Engineering (KOSOMBE)
- 2013 Early Career Achievement Award by The Korea BioChip Society
- 2014 Best Paper Award by National Research Foundation & Korean Society of Medical & Biological Engineering
- 2017 'The Top 100 Technologies and Leaders in 2025 Korea' by The National Academy of Engineering of Korea
- 2018 Best Paper Award by Korean Society of Medical & Biological Engineering (KOSOMBE)

PUBLICATIONS

Journal papers (*corresponding author)

1. Yoo S, Park JH*, Nam Y*. Single-Cell Photothermal Neuromodulation for Functional Mapping of Neural Networks. ACS Nano. 2018 Dec 28. doi: 10.1021/acsnano.8b07277.
2. Ryu JR, Kim JH, Cho HM, Jo Y, Lee B, Joo S, Chae U, Nam Y, Cho IJ, Sun W*. A monitoring system for axonal growth dynamics using micropatterns of permissive and Semaphorin 3F chemorepulsive signals. Lab Chip. 2018 Dec 12. doi: 10.1039/c8lc00845k.
3. Joo S, Nam Y*. Slow-wave recordings from micro-sized neural clusters using multi-well type microelectrode arrays. IEEE Trans. Biomedical Engineering. 2018 Jun 4. doi: 10.1109/TBME.2018.2843793.
4. Joo S, Lim J, Nam Y*. Design and fabrication of miniaturized neuronal circuits on microelectrode arrays using agarose hydrogel micro-molding technique. BioChip Journal. 2018 Sept;12(3):193-201.
5. Joo S, Song SY, Nam YS, Nam Y*. Stimuli-responsive neuronal networking via removable alginate masks. Advanced Biosystems, 2018, 1800030.
6. Lee JW, Kang H, Nam Y*. Thermo-plasmonic gold nanofilm for simple and mass-producible photothermal

- neural interfaces. *Nanoscale*, 2018 May 17;10(19):9226-9235.
7. Jung H, Kim J, Nam Y*. Recovery of early neural spikes from stimulation electrodes using a DC-coupled low gain high resolution data acquisition system. *Journal of Neuroscience Methods*, 2018 Apr 27;304:118-125.
 8. Kang H, Lee GH, Jung H, Lee JW, Nam Y*. Inkjet-Printed Bio-Functional Thermo-Plasmonic Interfaces for Patterned Neuromodulation. *ACS Nano* 2018;12(2):1128-38.
 9. Kang H, Lee JW, Nam Y*. Inkjet-printed multi-wavelength thermo-plasmonic images for anti-counterfeiting applications. *ACS Applied Materials & Interfaces* 2018;10(7):6764-71.
 10. Lee JW, Jung H, Cho HH, Lee JH, Nam Y*. Gold nanostar-mediated neural activity control using plasmonic photothermal effects. *Biomaterials*. 2018 Jan;153:59-69.
 11. Jung H, Kang H, Nam Y*. Digital Micromirror based Near-infrared Illumination System for Plasmonic Photothermal Neuromodulation. *Biomedical Optics Express* 2017;8(6):2866-78.
 12. Kang H, Kim JY, Choi YK*, Nam Y*. Feasibility Study of Extended-gate Type Silicon Nanowire Field-Effect Transistors for Neural Recording. *Sensors* 2017;17(4):705.
 13. Hong N, Joo S, Nam Y*. 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.
 14. Jang MJ, Kim WR, Joo S, Ryu JR, Lee E, Nam Y*, Sun W*. Cell-type dependent effect of surface-patterned microdot arrays on neuronal growth. *Front. Neurosci.* 2016 May 02; 10:217.
 15. Ryu JR, Jang MJ, Jo Y, Joo S, Lee DH, Lee BY, Nam Y*, Sun W. Synaptic compartmentalization by micropatterned masking of a surface adhesive cue in cultured neurons. *Biomaterials* 2016 March 19; 92:46-56.
 16. Yoo S, Kim R, Park JH*, Nam Y*. Electro-optical neural platform integrated with nanoplasmonic inhibition interface. *ACS Nano* 2016 Apr 26;10(4):4274-81.
 17. 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 Neurite Outgrowth on Vertical Nanowires. *Nano Lett.* 2016 Jan 13;16(1):675-80.
 18. 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.
 19. 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.
 20. 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.
 21. 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.
 22. 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]**
 23. 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.
 24. 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.
 25. 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.
 26. 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.
 27. 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.
 28. 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.
 29. 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]**
30. 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.
 31. 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.
 32. Kim R, Hong N, Nam Y*. Gold nanograin microelectrodes for neuroelectronic interfaces. *Biotechnol J.* 2013 Feb;8(2):206-14. **[Cover article]**
 33. 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.
 34. 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.
 35. Nam Y. Material considerations for in vitro neural interface technology. *MRS Bulletin* 2012 June;37(6): 566-72.
 36. 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.
 37. 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.
 38. 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]**
 39. Yoo SJ, Nam Y*, Neurons on Parafilm: Versatile elastic substrates for neuronal cell cultures. *J Neurosci Methods.* 2012 Feb 15;204(1):28-34.
 40. 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.
 41. 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]
 42. Kang K, Choi IS*, Nam Y*. A biofunctionalization scheme for neural interfaces using polydopamine polymer. *Biomaterials.* 2011 Sep;32(27):6374-80.
 43. 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.
 44. Goyal G, Nam Y*. Neuronal micro-culture engineering by microchannel devices of cellular scale dimensions. *Biomed. Eng. Lett.* 2011 May;1(2):89 - 98.
 45. Nam Y*, Wheeler BC. In vitro microelectrode array technology and neural recordings. *Crit Rev Biomed Eng.* 2011;39(1):45-61. [Review article]
 46. 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.
 47. 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.
 48. 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. **[Cover article]**
 49. 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.

50. 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.
51. 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.
52. Jung S, Nam Y*, Lee D*. Inference of combinatorial neuronal synchrony with Bayesian networks. *J Neurosci Methods.* 2010 Jan 30;186(1):130-9.
53. 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.
54. 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.
55. 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.
56. Nam Y*. Neuron-on-a-Chip technology: Microelectrode Array System and Neuronal Patterning. *J. Biomed. Eng. Res.* 2009 Apr;30:103-112. [Korean]
57. 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.
58. 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.
59. Nam Y. Brain on a Chip 구현을 위한 MEA 기술의 현황과 전망. *대한전자공학회지 (IEEK Magazine)*, Sep. 2007. [Korean]
60. Nam Y, Brewer GJ, Wheeler BC*. Development of astroglial cells in patterned neuronal cultures. *J Biomater Sci Polym Ed.* 2007;18(8):1091-100.
61. 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.
62. 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.
63. 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.
64. 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.
65. 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).
66. 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.