



(국문/영문)이름: 추남선/Namsun Chou

(국문/영문)직위: 선임연구원/Senior Researcher

(국문/영문)소속: 한국뇌연구원/KBRI

(국문/영문)기타소속: 정서인지질환연구그룹/Emotion, Cognition & Behavior Research Group

(국문/영문)강연제목: 세포특이적 전기생리신호 측정을 위한 뉴럴 프로브/
A fluorescence neural probe for cell-type-specific electrophysiology

Abstract(영문):

The investigation of the cell-type-specific neural activity in neural circuits is important for the understanding of the mechanism behind brain functions. To date, optical devices, combined with cell-type-specific protein expression of fluorescence indicator, allowed monitoring cell-type-specific activities. However, the temporal resolution of fluorescence monitoring was significantly low. Herein, we present a multimodal fluorescence neural probe that enables cell-type-specific electrophysiology in the neural circuit with a high spatiotemporal resolution. To conduct the cell-type-specific electrophysiology, a photodiode and an electrode-array pair were monolithically integrated on tip of a minimal-form-factor silicon probe. We successfully conduct cell-type-specific electrophysiology by performing cell-type identification of neurons under investigation with the fluorescence signals and monitoring the electrical activities of the identified neurons in the in vivo neural circuit. We believe the proposed device would enable the in-depth study of neural circuits, especially those consisting of neurons of various cell types participating in a number of different roles.

Brief Biosketch

Dr. Namsun Chou is currently a senior researcher at Emotion, Cognition & Behavior Research Group at Korea Brain Research Institute since 2021. Dr. Chou received the B.S. in mechanical engineering from Konkuk University in 2009, and M.S. and Ph.D. in Mechatronics from Gwangju institute of Science and Technology (GIST) in 2011 and 2016, respectively. From 2016 to 2017, he worked in the Department of Robotics Engineering, Daegu Gyeongbuk Institute of Science and Technology (DGIST) as a Postdoctoral Fellow. From 2017 to 2021, he worked with the Center for BioMicrosystems, Brain Science Institute, Korea Institute of Science and Technology (KIST) as a Postdoctoral Fellow. His current research interests include MEMS neural probe system for recording neural activity with various stimulation, miniaturized fluorescence detection system in vivo, and miniaturized ultrasound stimulation system for neuromodulation.