Call-for-Contributions

Electronic Circuits and Systems Challenge in Large-Scale Neural Recording and Stimulation

Understanding the brain function and modulation thereof at multi-scale levels requires large-scale neural interfaces. While paradigm-shifting approaches are being searched to increase the spatiotemporal resolution, a technology bottleneck has emerged in transfer of such massive information to the extracorporeal units. Collecting neural signals through thousands of electrodes/sensing units built into highly compact 2D or 3D structures and interconnecting them to the first stage of amplification has been a major challenge for the microfabrication technology. This special issue of the IEEE Transactions on Biomedical Circuits and Systems will focus on the electronic circuits and systems aspect of the challenge facing the large-scale neural recording and modulation technology. Although these systems are usually designed considering that they will ultimately be implanted in human subjects, they are for the time being mostly designed for animal implantation as an investigational tool for neurosciences. We are inviting papers dealing with all aspects of neural recording and stimulation electronics that can be scaled up to thousands of channels. The papers on wireless electronics for optical, electromagnetic, or acoustic transfer of data to and from outside the body and large-scale digitizing and multiplexing electronics are welcome. Those studies addressing the issue of interconnecting a large number of electrode contacts to the first stage of electronics will also be considered. A list of potential topics includes but not limited to:

- Low-power, high-channel-count implantable neural amplifiers/digitizers/multiplexers,
- Wireless data transfer using optical, electromagnetic, ultrasound and acoustic techniques,
- High-speed, real-time neural data transfer and storage electronics and protocols,
- Micro-fabricated circuits for connecting large-channel-count neural electrodes to electronics,
- Circuits and systems for generation of multi-channel neural stimulation waveforms.

The manuscript for TBioCAS must be submitted online using the IEEE TBioCAS manuscript template and “Information for Authors”, via IEEE Manuscript Central (link). Authors should select “Regular Paper” in Step 1 of submission and the Special Issue manuscript “NeuralRS19” at Step 6. The length of a manuscript must be minimum 8 and maximum 9 pages in IEEE format.

Important Dates

- Manuscript submission deadline: August 15th, 2019
- First decision to authors: September 10th, 2019
- Revision due (if necessary): September 31st, 2019
- Final notification: October 25th, 2019
- Final manuscripts due: November 21st, 2019
- Special Issue publication: December 1st, 2019

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