



## WORKSHOP OVERVIEW

**“Standardization of Neural Interface Research to Accelerate Interoperability, Clinical Integration, and Commercialization of Neurotechnologies”**

**IEEE SMC 2019**

**Sunday, October 6, 2019 – Bari, Italy**

### Workshop Organizers

- Zach McKinney, The BioRobotics Institute (Scuola Superiore Sant’Anna) – [z.mckinney@ieee.org](mailto:z.mckinney@ieee.org)
- Luigi Bianchi, University of Rome Tor Vergata – [luigi.bianchi@uniroma2.it](mailto:luigi.bianchi@uniroma2.it)
- Dennis McBride, Source America, NeuroRx – [dennismcbride@gmail.com](mailto:dennismcbride@gmail.com)

### Contact Information

**Name :** Zach McKinney

**Title:** <sup>1</sup>Post Doctoral Research Fellow; <sup>2</sup>IEEE Working Group Chair, P2794 – Reporting Standards for *in vivo* Neural Interface Research (RSNIR)

**Affiliations:** <sup>1</sup>The BioRobotics Institute (Scuola Superiore Sant’Anna, Pisa); <sup>2</sup>IEEE Standards Association

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### Duration and Format

This is a two-hour workshop, comprising 100 minutes of presentation time, plus 20 minutes for panel discussion/Q&A regarding the themes and critical challenges identified in the presentations.

### Workshop Abstract

Primary Relevance Area: Human-Machine Systems

Continued progress in the fields of neurotechnology and neurorehabilitation demand increasing functional integration between a broad spectrum of human-machine interfacing technologies, neural interfaces chief among them. However, the current lack of broad interoperability between various neural interfacing systems and the multitude of peripheral devices with which they are intended to interact poses an ongoing barrier to research, clinical, and commercial objectives alike. This Workshop will highlight a suite of current IEEE Standards Working Groups as a strategic means of aligning incentives and overcoming barriers to neurotechnology integration and development across a range of neurotech stakeholders, including researchers, commercial technology developers, medical device regulators, and public funding agencies.

In particular, presentations will include detailed overviews of IEEE Working Groups P2794 (Reporting Standards for *in vivo* Neural Interface Research) and P2731 (Unified Terminology for Brain-Machine Interfaces), including the WG objectives, scope of work, preliminary structure of our standard, and current activities. In addition, the workshop will feature a brief overview of IEEE the Standardization process (including how to participate), as well as presentations of several research projects highlighting critical challenges and strategies for system and data integration in multi-modal neural interface systems and studies.

The preliminary list of presenters and titles is as follows:

- **Sumit Soman** (Centre for Development of Advanced Computing (IN)) – “Standardization of biosignals in BCI systems - Need & Challenges”
- **Carole Carey** (C3-Carey Consultants; IEEE EMBS Standards Committee) – “How to participate in IEEE standardization and pre-standardization activities (Overview)”
- **Zach McKinney** (Scuola Superiore Sant’Anna, Pisa) – “Standardization in Action – An Overview of Current IEEE Neuro-Technology standardization activities, progress, and strategies.”
- **Luigi Bianchi** (University of Rome, Tor Vergata) – “Brain-Computer Interfaces: Sharing a Model to Share Methods and Tools”
- **Jorge Cardoso** (iMM Lisboa) - “Principles of Multisensory Dynamics Recorded in Oc2M – the Neural Syntax of Multisensory Integration”
- **Rodolfo Fiorini** (Polytecnico di Milano University) – “Advanced Ontological Uncertainty Management for In Vivo Neural Interface Research”
- **Jean-Louis Divoux** (AIMD) – “Perspectives on the role of Standards in Medical Device Development – EN 45502-2-3 and Cochlear Prostheses”

### Biography of the Contact Organizer



Zach McKinney is a Post-Doctoral Research Fellow in the Wearable Robotics Lab at the BioRobotics Institute, of Scuola Superiore Sant’Anna (Pisa), where he manages the development and clinical evaluation of exoskeletal robotic systems for applications in both industry and neural rehabilitation. In addition, he is the chair of IEEE Working Group P2794, developing a Reporting Standard for in vivo Neural Interface Research (RSNIR), with the primary aims of promoting the use of rigorous experimental methodologies and comprehensive research reporting for a wide variety of neural interfacing modalities, towards the creation of a more open, interoperable ecosystem of multimodal human-machine interfacing technologies. With regard to brain-computer interfaces, he is also the leader of the user needs focus area of the IEEE Industry Connections Activity on Neurotechnologies for Brain-Machine interfacing.

Prior to his current roles, Zach was a co-founder and Chief Science Officer at Spinal Singularity, developing a fully indwelling urinary prosthesis for males with neurogenic bladder dysfunction due to spinal cord injury and other neurological disorders. His PhD in biomedical engineering from the University of California, Los Angeles focused on the optimization of wearable tactile feedback systems for neurological and orthopedic (prosthetic) rehabilitation, prior to which he worked in various roles at Bioness, Inc, on the commercial development of both implantable and non-invasive neuromodulation systems for neural rehab. His undergraduate degree was in mechanical and bioengineering from Princeton University.

Additional Bio: <https://www.linkedin.com/in/z-mckinney/>