

## Standards for Neurotechnologies Driving Innovation: Strategic Vision 2025

Significant efforts have been devoted in the development of technologies that allow measurement and stimulation of neural activity, both at central and peripheral levels. The advent of better neuroimaging and neurostimulation techniques, as well as brain-machine interfacing (BMI) systems, is expected to pave the way for new diagnostic and therapeutic tools to improve mental health, to counter age-related cognitive decline, and to enhance cognitive performance.

Currently, these neurotechnology-based systems are reaching maturity levels to be evaluated in real-life scenarios for their intended use applications. New therapies, diagnostics or medical procedures designed to improve health outcomes will require consistent methods to assess device safety and effectiveness prior to market commercialization. There is increased interest to define appropriate metrics in evaluating product performance as well as in developing good practices and standards.

Such endeavor is not trivial and requires all stakeholders to join efforts to identify priority areas that require standardization, and to devise incentives for adopting these standards early in the development process. As a result, in 2017 the IEEE EMBS [Technical Committee on Standards](#), the IEEE [Standards Association](#), and the IEEE Future Directions [Brain Initiative](#) started an [Industry Connections](#) activity on [neurotechnologies for brain-machine interfacing](#). Nearly three years later, diverse stakeholders across neurotechnologies, research institutions, industry, and government agencies developed the **Neurotechnologies for Brain-Machine Interface Standards Roadmap**, and will be presented in this workshop.

This workshop aims at discussing specific challenges related to the standardization of neurotechnologies. Another objective is identifying concrete ways in which these challenges take into account economic, regulatory and ethical considerations for effective technological translation. Entities like UNESCO, OECD, INCF, Government Agencies, and Industry will present their perspectives about standardization and may cover related topics such as, neuro-ethical aspects, responsible innovation, and the neuroscience of inclusion.

Workshop participants will engage in a hands-on exercise on writing a **Project Authorization Request** [“**PAR-a-thon**” – **Who wants to develop a standard? How to start?**] (see abstract below).

At the end of the workshop, participants will further enhance their knowledge in research, development and translation of neurotechnologies; appreciate the importance of developing quality and reliable standards; know how to participate in open, consensus standards development projects; and, learn the standards development lifecycle --- a cradle to grave pipeline *from an idea*, in which there exists a need for a standard, recommended practice, or guide, *to a globally-recognized consensus standard*.

**Continuing Education Credits.** This workshop is eligible for CEUs and a Certificate of Completion.

**Product Demonstrations:** We invite manufacturers and entrepreneurs to showcase their latest innovative products during breaks and lunch. Contact organizers.

### **Organizers:**

Carole C. Carey, IEEE EMBS Standards Committee Chair

Ricardo Chavarriaga, Zürich University of Applied Sciences, Switzerland

**Abstract for PAR-a-thon:** *In this practicum, partakers will take ideas for creating standards around neuro- and related technologies, draft a Project Authorization Request (defining the Scope, Purpose, Need), and get ready to submit it to IEEE! Participants will learn about why standards are important, what make good topics for standardization, and how IEEE standards are created. The first step in this process is writing and submitting a PAR. PARs need not be complicated or long, but can be intimidating to the newcomer. Have no fear – we will look at examples of successful PARs and have experts and current Standards Development Working Group Members on hand to answer questions. People who have ideas for standards will give brief pitches for their idea, and then participants will form groups to help write PARs for those ideas. The goal is to have PARs ready to submit by the end of the session. Even if you don't submit a PAR, you will learn the steps involved and have the confidence to submit one.*