

# IEEE EMBS: Brain Initiative Activities

**Paul Sajda, Silvestro Micera,  
Jose Carmena, Metin Akay**

Advanced NeuroTechnologies for



**BRAIN**



Initiatives

# Engineering in Medicine and Biology (EMBS)

The IEEE Engineering in Medicine and Biology Society (EMBS) is *the world's largest international society of biomedical engineers*

- 11,000 members
- 97 countries

EMBS provides its members with access to the people, practices, information, ideas and opinions that are shaping biomedical engineering and medicine.

# EMBS Technical Committees

**Technical Committee On  
Biomedical And Health Informatics**



**Technical Committee On  
Neurongineering (TCNE)**



**Technical Committee On  
Biomedical Imaging And Image  
Processing (BIIP)**



**Technical Committee On  
Therapeutic Systems And  
Technologies**



**Technical Committee On  
Biomedical Signal Processing**



**Technical Committee On  
BioRobotics**

**Technical Committee On  
Cardiopulmonary Systems**



**Technical Committee On  
Bionanotechnology And BioMEMS**

**Technical Committee On  
Computational Biology And The  
Physiome**



**Technical Committee On  
Translational Engineering And  
Healthcare Innovation**



**Technical Committee On Wearable  
Biomedical Sensors And Systems**

# IEEE TNSRE

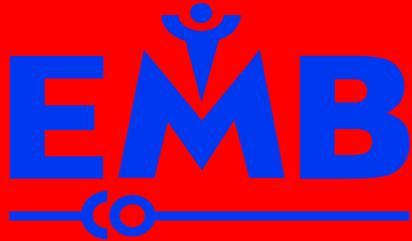


**Paul Sajda**  
**Editor-in-Chief**

*IEEE Transactions on Neural Systems and Rehabilitation Engineering* focuses on the neural engineering and rehabilitative aspects of biomedical engineering.

## Select Special Issues over the last few years

- DARPA Special Issue on NeuroEngineering Science and Technology (NEST)
- Motor Skill Learning and Neuro-Rehabilitation
- Closing the Loop via Advanced Neurotechnologies
- Select Papers from Neural Engineering (NER) 2015
- Non-invasive Electromagnetic Brain Stimulation
- State-of-the-art in Brain Machine Interfaces



# IEEE EMBS Technical Committee on NeuroEngineering

**Metin Akay, Chair**

**Silvestro Micera, Chair-Elect**

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Initiatives



# Goal

- promote the development of novel electronic and photonic devices and techniques for experimental probing, neural simulation studies,
- promote the design and development of human--machine interface systems, artificial vision sensors, and neural prosthesis to restore and enhance the impaired sensory functions and motor systems.

- promote advanced technologies that monitor and control brain activities to treat neurological diseases, including Alzheimer's, Epilepsy, Depression, etc., from the molecular to systemic levels
- promote neural engineering research and engineering programs globally

# Focus Areas

- *Advanced Technologies for BRAIN initiative*
- *Translational Neural Engineering*
- *Neural Interfacing*
- *Neural Modulation*
- *Neural Imaging and Computation*

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# Focus Areas

- **Developing new tools to interrogate and manipulate brain circuits**
- **New frontiers in NE: the functional and dysfunctional mind**
- **Big Data in Neuroscience.**
- **Brain computer interfacing (bidirectional)**
- **High fidelity EEG sensors**
- **Brain diseases biomarkers**

# **Activities (2014-2015)**

- Members of the TCNE organized the 7<sup>th</sup> International IEEE EMBS Conference on Neural Engineering, in Montpellier, France.

- Members of the TCNE team were involved in organizing the NIH Sponsored 41<sup>st</sup> Neural Interface Conference, June 23-26, 2014, Dallas, TX.
- Members of the TCNE team were involved in organizing the 2<sup>nd</sup> Neurorehabilitation Engineering Conference, Interface Conference, June 24-26, 2014, Aalborg, Denmark

# Conference Activities (2014-2105)

- 1<sup>st</sup> IEEE EMBS ANTBI Workshop 2014
- IEEE EMBS Brain Challenge Conference 2014
- 2<sup>nd</sup> IEEE EMBS ANTBI Workshop 2015
- IEEE EMBS NE Conference 2015
- IEEE EMBS NE Summer School 2015

# Conference Activities (2014-2105)

- 3<sup>rd</sup> IEEE EMBS ANTBI Workshop 2015
- Summer School on NeuroRehab 2015

# Publication Activities (2014-2105)

- Special issues from selected papers from ANTBI Workshop 2014-2016.

# Award Activities (2014-2105)

- Nominated DLs and Fellows
- Nominated members for the IEEE EMB Awards
- Involved in selecting the Student Paper Awardees for the 7<sup>TH</sup> Neural Engineering Conference

# Beyond 2015

- **Actively involve with the IEEE Brain Initiatives and the Working Group**
- **Joint NER Conferences and Workshops with other IEEE Societies**

# Beyond 2015

- Organize the 4<sup>th</sup> IEEE EMBS Workshop on ANTBI, April 8-9, 2016 in collaboration with the SBMT
- Help to organize the tracks, workshops, symposiums and invite track chairs of theme “Neural Engineering & Rehabilitation Engineering” of the IEEE EMBS 2016 conference.

# Beyond 2015

- **Help to organize the 3<sup>rd</sup> Neurorehabilitation Engineering Conference, Interface Conference, 2016, Valencia, Spain.**
- **Help to organize the 8<sup>th</sup> International IEEE EMBS Conference on Neural Engineering, 2017, Shanghai, China.**

# Goals wrt IEEE Brain Initiative

- Team with other S/Cs to co-sponsor activities and develop new activities, particularly in BMI
- Develop proposals for technical seedling projects that span EMB and two or more S/Cs
- Work with other S/Cs to promote IEEE into the engineering focused broader BRAIN Initiative Communities (e.g. funding agencies)