



WORKSHOP ORGANIZERS

- Michael H. Smith, Chair
University of California Berkeley, USA
- Seong-Whan Lee, Co-Chair
Korea University, Korea
- Vinod A Prasad, Co-Chair
NTU, Singapore
- Ricardo Chavarriaga Lozano, Co-Chair
EPFL, Switzerland

Lilijana Trajković, Technical Program Chair, *SFU, Canada*

SMC 2016 KEYNOTE ON BMI

Jose Carmena
Vice Chair, IEEE Brain Initiative

BMI WORKSHOP KEYNOTES

Commercialization of Technology
Featuring Founders Behind Innovative Companies Worth Over \$5 Billion

INVITED SPEAKERS

- Andrew Laine
President, EMB Society
- José del R. Millán
EPFL, Switzerland
- Paul Sajda
Chair, IEEE Brain Initiative

PANELS

- Important Topics in Designing and Building Real World BMI Systems: What is New?
- How Research and Methodologies in Systems, Human-Machine Systems, and Cybernetics can be applied to BMI
- What Have We Learned, Where Do We Go From Here?

TUTORIALS

- BMI Systems - State of the Art
- New Applications in BMI Systems

IEEE BRAIN INITIATIVE MEETING

With 15+ IEEE Societies & Councils

IEEE STANDARDS MEETING

Clinical and Non-Clinical BMI/BCI

BRAIN HACKATHON

Planned to be World's Largest - Free



IEEE SMC 2016's 6th **Workshop on Brain-Machine Interface Systems** will be held October 8-12, 2016 in Budapest as part of **SMC 2016** - the flagship annual conference of the IEEE Systems, Man, and Cybernetics Society. The BMI Workshop, organized by the *IEEE SMC Technical Committee on Brain-Machine Interface Systems*, will also host the *IEEE Brain Initiative Annual Meeting*. The *IEEE Standards Association* will have a standards meeting on clinical and non-clinical BMI/BCI. Also, a two-day Brain Hackathon, planned to be the world's largest to date, will be held October 8-9th. The BMI Workshop is technically co-sponsored by the *IEEE Brain Initiative, IEEE Consumer Electronic Society, IEEE Computational Intelligence Society, IEEE Council on Electronic Design Automation, IEEE Engineering in Medicine and Biology Society, IEEE Magnetics Society, IEEE Robotics & Automation Society, IEEE Sensors Council, IEEE Signal Processing Society, IEEE Society on Social Implications of Technology, IEEE Solid-State Circuits Society, IEEE Standards Association, and the IEEE Systems Council*. While the Brain Hackathon is free to all participants, the BMI Workshop will require a paid SMC2016 registration; hence the BMI Workshop is free to all registered SMC 2016 attendees.

The theme of this year's BMI Workshop, involving the integration of concepts from Systems, Human-Machine Systems, and Cybernetics, and from other IEEE Societies and Councils at large, is:

New Research Opportunities and Industrial Applications in BMI Systems Arising from the IEEE Brain Initiative

Brain-Machine Interface (BMI) systems offer the possibility of a new generation of multidisciplinary technologies that allow users to directly control devices via the nervous system. Successful realization of such approaches encompass several challenges including seamless interaction of the human and the machine, robust systems to chronically measure brain activity, reliable decoding of the (neural) control signals, and efficient means to provide information back to the user. Development of robust BMI systems suitable for chronic, independent use demands special efforts for developing adaptive intelligent algorithms and low-power wearable invasive or non-invasive recording techniques.

The goal of the BMI Workshop is to facilitate the interaction and intellectual exchange between all researchers, developers and consumers of this technology. This international forum is a unique opportunity for reporting the latest advances, innovations, and applications in these fields. Also of interest will be the report and evaluation of complete systems considering aspects such as multidimensional performance metrics reflecting decoding accuracy, task performance, human factors, decoding algorithms, and feedback. These topics represent both challenges to the field and a tremendous opportunity for collaborative and multidisciplinary research, involving not only peers with expertise in the field of BMI, but also expertise in systems engineering, human-machine systems, cybernetics, and/or other IEEE disciplines.

As previous SMC workshops, the focus is on practical applications of BMI theory and methodologies leading to tangible systems, products, and service technologies. At the core of BMI systems is the coordination of sensing, computation, communication, control, and actuation of dynamic systems. Collaboration between experts from many research areas within SMC, IEEE, and from other related technical communities is needed to further progress the creation of reliable real-world BMI systems with significant and lasting impact on people and society. Advances in SMC's and other Societies' and Councils' fields of interest as they relate to BMI are expected to empower future research and development to achieve this goal. Hence, the workshop is of special interest to experts in topics related to Systems, Human-Machine Systems, Cybernetics, and other IEEE areas, who are interested in learning how their research areas can be applied to solving various research problems necessary for the development of real-world invasive and non-invasive BMI systems.

The four-day BMI workshop features tutorials, panels, discussions with the audience, a number of prominent invited speakers from industry and academia, and presentations of accepted papers.

A highlight of the workshop is a session on "Moving Research Out of the Lab Into the Real World: How Science and Technology Become Commercialized" with speakers Reese Jones, Founder Farallon, Netopia, BMUG; Jack McCauley, Co-founder Oculus; Joel Libove, Founder Furaxa, Ultraview; Stephen Pieraldi, Founder Fail Pro, 2BClear; Stuart M. Dambrot, Founder Critical Thought Media; and Bernt R. Wahl, Founder Factice, Datahunt, Dynamic Software. This will be followed by a reception with the Founders, sponsored by the IEEE Brain Initiative, open to all SMC2016 registered attendees.

The *IEEE Brain Initiative Best Paper Award* will be given to the best paper at this workshop, and five IEEE Brain Initiative student travel grants will be awarded. All papers will be eligible the *SMC Franklin V. Taylor Memorial Award* and the *SMC Best Student Paper Award*.

Tentative Schedule:

Brain Hackathon: October 8-9 th	BMI Tutorials: October 9 th
IEEE Standards Meeting: October 9 th	Opening Reception: October 9 th
BMI Workshop: October 9-12 th	IEEE Brain Initiative Meeting: October 11 th

Early discounted registration ends July 09, 2016.

If you have any questions, please contact Michael H. Smith (m.h.smith@ieee.org).