

IEEE SMC 2020

WORKSHOP ON BRAIN-MACHINE INTERFACE SYSTEMS

OCTOBER 11-14, TORONTO, CANADA

#### BMI WORKSHOP COMMITTEE

##### Honorary Chair

Michael H. Smith, UC Berkeley, USA

##### General Co-Chairs

Tiago H. Falk, INRS-EMT, Canada  
Ljiljana Trajković, SFU, Canada  
Christoph Guger, g.tec, Austria

##### Technical Program Co-Chairs

Abdelkader Belkacem, UAE University, UAE  
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##### Special Sessions Co-Chairs

Tim Mullen, Intheon, USA  
Sri Krishnan, Ryerson Univ., Canada  
Francisco Fraga, UFABC, Brazil  
Stefanie Blain-Moraes, McGill, Canada

##### Industry Co-Chairs

Ferdinand Ephrem, Saintrino Tech, Canada  
Ana Maiques, Neuroelectrics, Spain  
Javier Minguez, BitBrain, Spain

##### Publicity, Sponsorship, Exhibits Chair

Yannick Roy, NeuroTechX, Canada

##### Student/Young Professionals Liaisons

Soumiya Sivasathiyath, TKS, Canada  
Behnaz Ghoraani, FAU, USA

##### Media

Sarah Breinbauer, br41n.io, Austria

##### Web

Liviu Ivanescu, INRS-EMT, Canada

#### KEYNOTE SPEAKERS

Ana Maiques (CEO, Neuroelectrics): Helping patients with non-invasive brain stimulation.

Jack L. Gallant (UC Berkeley, USA): Progress and future goals for neuroscience.

#### BR41N.IO BCI HACKATHON COMMITTEE

##### Chair

Christoph Guger, g.tec, Austria

##### Co-Chairs

Tiago H. Falk, INRS-EMT, Canada  
Tim Mullen, Intheon, USA  
Ning Jiang, University of Waterloo, Canada  
Diana Ghinda, University of Ottawa, Canada  
Yannick Roy, NeuroTechX, Canada

## CALL FOR PAPERS AND SPECIAL SESSIONS

### 2020 Workshop on Brain-Machine Interface Systems

The IEEE SMC **10th Workshop on Brain-Machine Interface (BMI) Systems** will be held on October 11-14, 2020 in Toronto, Canada as part of SMC 2020, the flagship annual conference of the IEEE Systems, Man, and Cybernetics Society. The goal of the Workshop is to provide a forum for researchers to present research results, facilitate the interaction and intellectual exchange between researchers, developers and consumers of BMI technology. We invite contributions reporting the latest advances, innovations and applications in BMIs.

The BMI Workshop is organized by the IEEE SMC Technical Committee on Brain-Machine Interface Systems. Participation is free to all registered SMC 2020 attendees. As this year marks the Workshop's 10<sup>th</sup> anniversary, we will review the neurotechnology advances of the past decade, discuss current developments, and discuss innovations that will arise in the next ten years. As such, the theme of this year's Workshop is:

#### *The Past, Present, and Future of Neurotechnology Development: Towards the "Internet of Minds"*

BMIs were originally conceptualized as an assistive technology allowing locked-in individuals to communicate via P300 spellers. Over the last decade, innovative applications have emerged, including the control of exoskeletons to improve locomotion, as well as spinal cord stimulation neurotechnologies that enable voluntary control of walking in individuals with spinal cord injury. Alternate paradigms (SSVEPs, ErrP) have also been perfected to improve communications for non-verbal individuals and new applications in affective computing and human factors have emerged. What will the next decade bring? BMIs are being integrated into virtual reality headsets, headphones, and eyeglasses; being used to diagnose disease; speed up rehabilitation; and for human performance enhancement. With advances in sensors and machine intelligence, what is next for BMIs?

#### Call for Papers and Special Sessions

The goal of the Workshop is to provide a forum for researchers to present research results, facilitate the interaction and intellectual exchange between researchers, developers, and consumers of BMI and other neurotechnologies. **In light of current world events, virtual sessions and virtual participation are currently being planned for those unable to travel.** We invite contributions reporting the latest advances, innovations, and applications in these fields, including the integration of BMIs with virtual/augmented reality, affective BMIs, hybrid BMIs, deep learning for BMIs, neurorehabilitation, new neuroimaging modalities and sensor technologies, serious gaming, and emerging applications. These topics offer tremendous opportunity for collaborative and multi-disciplinary research, involving not only peers with expertise in the field of BMI and other neurotechnologies, but also those with expertise in systems engineering, human-machine systems, cybernetics, neuroscience, robotics, artificial intelligence, amongst other disciplines. The four-day Workshop will feature a series of **tutorials, panels, a brain-computer interface hackathon, industry-led events for students, a hands-on demonstration session**, prominent **invited industry/academia speakers**, and presented **contributed papers**.

This is the fifth year that the IEEE SMC BMI Workshop will host a **br41n.io Brain-Computer Interface Hackathon** with several cash prizes. The BCI Hackathon is a brainstorming and collaborative marathon designed to rapidly produce fully functional BCI prototypes. The Hackathon will take place on October 11-12 and provides an environment for innovation and entrepreneurship. Participation is free for all SMC 2020 participants. Learn more about the IEEE SMC2020 BCI Hackathon projects and teams, how to form/join one, and how to register at <https://www.br41n.io>. **This year we will also host the Annual 2020 BCI Award.**

#### Important Dates

Special Sessions proposal due: February 16, 2020  
Approval of Special Session proposals: March 15, 2020  
Paper submission due: May 31, 2020  
Notification of paper acceptance: June 30, 2020  
BMI Late Breaking Submission: June 30, 2020  
Final manuscript due: July 31, 2020

**Papers:** Prospective authors are invited to submit full-length papers electronically through the conference website. Author instructions and paper templates are available on the conference website.

**Note:** Accepted papers not presented in some form at SMC 2020 will be excluded from IEEE proceedings.