

# Workshop on Brain-Machine Interfaces

## IEEE SMC 2018

IEEE INTERNATIONAL CONFERENCE ON SYSTEMS, MAN, AND CYBERNETICS

Miyazaki, JAPAN, Oct 7-10, 2018



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Michael H. Smith, UC Berkeley, USA

#### General Co-Chairs

Tiago H. Falk, INRS-EMT, Canada  
Christoph Guger, g.tec, Austria  
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Masayuki Hirata, Osaka Univ., Japan  
Jun Morimoto, ATR, Japan

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Riki Matsumoto, Kyoto Univ. Japan  
Yingxu Wang, Univ. of Calgary, Canada

#### Special Sessions Chairs

Kyosuke Kamada, AMU, Japan  
Keiichi Kitajo, RIKEN BSI, Japan

#### Special Sessions Co-Chairs

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Ivan Volosyak, HSRW, Germany  
Fei-Yue Wang, CAS, China  
Dongrui Wu, DataNova, USA

#### Publicity Chairs, Sponsorship, Exhibits

Yufei Huang, UTSA, USA  
Margaret Thompson, UW, USA

#### Media

Sarah Breinbauer, br41n.io, Austria

#### Secretary

S. Mason Dambrot, AGIS and BMIC, USA

#### BMI WORKSHOP INVITED SPEAKERS

Andrzej Cichocki, Skoltech, Russia  
Mitsuo Kawato, ATR, Japan

#### 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

Merging Minds and Machines: Integrating BMI with AI, VR, and AR – Hype or Hope

What Have We Learned, Where Do We Go From Here?

#### TUTORIALS

BMI systems - overview, applications and research challenges

Designing BMIs for ALS and other users with motor and cognitive disabilities

#### BRAIN HACKATHON COMMITTEE

##### Chair

Christoph Guger, g.tec, Austria

##### Co-Chairs

Tiago H. Falk, INRS-EMT, Canada  
Kyosuke Kamada, Asahikawa Univ Japan  
Tim Mullen, Intheon, USA

##### Chairs, Hackathon Student Competition

Kojiro Matsushita, Gifu Univ., Japan  
Takeshi Ogawa, ATR, Japan

## CALL FOR PAPERS AND SPECIAL SESSIONS

### 2018 Workshop on Brain-Machine Interface Systems

The IEEE SMC 2018 **8th Workshop on Brain-Machine Interface Systems (BMI)** will be held on October 7-10, 2018 in Miyazaki, Japan as part of the program of SMC 2018 – 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 the field of BMI.

The workshop is organized by the **IEEE SMC Technical Committee on Brain-Machine Interfaces Systems** and is technically co-sponsored by the IEEE Brain Initiative. Participation is free to all registered SMC 2018 attendees. The theme of this year's workshop is:

### *Innovations in Systems, (Hu)Man, and Cybernetics, and their Interplay as the Driving Forces for Next-Generation BMI Systems*

Brain-machine interfaces rely on innovations across a number of disciplines (and their interplay), and in particular within the fields of systems engineering, human factors analysis, and cybernetics. In order to develop the next-generation BMI systems that are envisioned today, such as brain-to-brain interfaces, "neural dust", optical imaging, non-invasive neurostimulation, and BMI systems to sense, assess, and augment human capabilities, researchers across different fields will need to come together and join forces. Recent advances seen in neuroimaging, artificial intelligence, virtual/augmented reality, human-machine interaction, cloud computing, and nanotechnology suggest we are at a prime time for such interdisciplinary exploration.

### 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 technology. We invite contributions reporting the latest advances, innovations, and applications in the field of BMI, including affective BMIs, hybrid BMIs, deep learning for BMIs, BMI-controlled robots, neurorehabilitation, and BMI for VR/AR applications. These and other 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 those with expertise in systems engineering, human-machine systems, cybernetics, neuroscience, medicine, robotics, amongst other disciplines. The four-day workshop will feature **tutorials, panels, a brain-computer interface hackathon**, a number of prominent **invited speakers** from industry and academia, and **presentations of contributed papers**.

This is the third year that the IEEE SMC BMI Workshop is hosting a **Brain-Computer Interface (BCI) Hackathon** with over \$4,000 in prizes. The BCI Hackathon is a brainstorming and collaborative marathon designed to rapidly produce fully functional BCI prototypes. The BCI Hackathon will take place on October 7-8, 2018 and provides an environment for innovation and entrepreneurship. Learn more about the IEEE SMC2018 BCI Hackathon projects and teams, how to form or join one, and how to register at [br41n.io/Miyazaki-2018](http://br41n.io/Miyazaki-2018).

### Important Dates

Special Sessions proposal due: February 23, 2018  
Approval of Special Session proposals: March 16, 2018  
Paper submission due: March 31, 2018  
Notification of acceptance: June 1, 2018  
Author registration deadline: July 10, 2018  
Camera-ready deadline: July 20, 2018  
Conference dates: October 7-10, 2018

**Papers:** Prospective authors are invited to submit full-length papers electronically through the conference website. Papers should be concise, but contain sufficient detail and references to allow critical review.

**Note:** Accepted papers that are not physically presented at SMC 2018 will be excluded from the IEEE proceedings.