

Call For Book Chapters

<https://labs.ise.ncsu.edu/bci/handbook/>



Title: Brain-Computer Interfaces Handbook: Technological and Theoretical Advances

Publisher: CRC Press: Taylor & Francis Group

Final Book Publication: 2017

1. Synopsis:

This handbook provides a synopsis of key findings, technological and theoretical advances directly applicable to brain-computer interfacing (BCI) technologies, readily understood and applied by individuals with no formal training in BCI research and development.

2. Introduction:

A brain-computer interface (BCI), sometimes called a brain-machine interface, measures and interprets brain signals and uses the results to communicate the intent of its users, in particular those who cannot use their muscles. The degree of communication and control afforded to people with motor disabilities by BCIs helps not only to make numerous simple tasks more convenient but also to reduce the burden of their caregivers. Many BCI applications currently exist, allowing users to perform tasks such as writing sentences by selecting letters, moving a cursor on a computer screen, playing an electronic ping-pong game, and controlling an orthosis that provides a graspable hand. BCIs are also used to study the human brain in relation to performance at work, transportation, and other everyday settings, which can provide important guidelines and constraints for theories of information presentation and task design.

While there are several other resources out there, no handbook exists. We also think that the world is ready for a new handbook that comprehensively addresses the recent and rapid changes in the field of brain-computer interfaces.

3. Features & Benefits:

This handbook would constitute a valuable resource to anyone involved with improvement of people's lives by replacing, restoring, supplementing and improving motor action, and understanding the neural bases of such functions as seeing, hearing, attending, remembering, deciding, and planning in relation to technologies and their functioning in the real world. The reader will surely enjoy this up-to-date presentation of theory, fundamentals, techniques and diverse applications.

In addition, readers should better understand the underlying neural bases of the human brain involved in BCI control, possess new insights into interfacing human brains with computing systems, and subsequently appreciate the opportunities afforded by BCI research and development.

In summary, the main benefits of the book include:

- 1) A uniquely focused review of extensive research on BCI technology;
- 2) An in-depth look at the different methods and techniques used in acquiring and pre-processing brain signals, extracting features, and classifying the user's intention;
- 3) The repository of the open questions and challenges in brain-computer interface research today;
- 4) Various theories, models, and empirical findings about ways in which the human brain can interface with the systems or external environments;
- 5) Applications of BCI technology to understand various aspects of human cognition and behavior such as perception, affect, action;
- 6) Clinical trials and individual case studies of the experimental therapeutic applications of BCI;
- 7) Human factors and human-computer interface (HCI) concerns in the design, development and evaluation of BCIs; and
- 8) Ethical guidelines for the use of BCIs.

4. Benefits for Contributors:

The Publisher agrees that each Contributor (per individual) shall receive credit as the author of the Contribution and **one (1) complimentary eBook copy** of the first edition of the Work in which the Contribution appears. This also means in cases where someone has contributed more than one chapter, that person is only entitled to receive one (1) free e-copy of the book upon publication.

5. Target Audience:

This handbook is intended for researchers, students and practitioners, including those with no formal training in BCI research and development, with a synopsis of key findings, and theoretical and technical advances from BCI-related fields that have direct bearing upon human brain-computer interfacing. Academic researchers, postgraduate students, engineers, clinicians in rehabilitation, neuroscientists, and policy makers in government agencies are also main targeted audience.

6. Recommended Topics:

The scope of the handbook includes but is not limited to the following topics:

- Technological advances in BCI implants
- Studies of neurosurgical techniques relevant to BCIs.
- New invasive and noninvasive methods to monitor and acquire brain signals
- Clinical trials and individual case studies of the experimental therapeutic application of BCIs
- Behavioral studies of BCI use in humans and animals
- Development and evaluation of signal processing methods that extract signal features, classify them, and otherwise translate brain signals into device commands
- BCI, entertainment & art (e.g., neurogaming, touch-based BCIs, BCI & serious games, BCI & virtual reality, etc.)
- Multi-brain BCI
- Medical applications of BCI technologies (e.g., stroke rehabilitation, neurorehabilitation, BCI-driven prosthetics or FES, assessment of locked-in and DOC patients, etc.)
- BCI and neuroplasticity
- Affective computing (e.g., emotional processing, social BCI, neuroergonomics, etc.)
- Human factors and human-computer interaction (HCI) concerns in the design, development and evaluation of BCIs.
- BCI and emerging issues (e.g., ethics and privacy, future of BCIs, etc.)
- A step-by-step approach to developing a BCI in a tutorial fashion

7. Submission Procedure:

Researchers, developers and practitioners are invited to submit their chapter proposals/abstracts (1 page in PDF format) on or before **April 8th, 2016** to bcihandbook2017@gmail.com.

Please provide the following points in your proposals/abstracts:

- 1) Title of the contribution
- 2) Name of author, co-authors, institution, email-address
- 3) Content of the proposed chapter
- 4) How the contribution fits into the book

Authors of accepted proposals will be notified by **April 22nd, 2016** about the status of their proposals.

8. Full Book Chapter:

Complete chapters are expected to be submitted to [easychair](http://easychair.com) by **August 31st, 2016**.

- A book chapter can have up to 30 pages (250 words per page or up to 7,500 words total; typewritten, double-spaced).
- Guidelines on how to prepare the full book chapter will be provided on time.
- All submitted chapters will be reviewed on a double-blind review basis.
- Contributors may also be requested to serve as reviewers for this project.

9. Publisher:

This handbook is scheduled to be published by CRC Press: Taylor & Francis Group. For additional information regarding the publisher, please visit www.crcpress.com. This publication is anticipated to be released in 2017.

10. Important Dates:

The following timeline is anticipated:

- Proposal Submission Deadline: **8 April 2016**
- Notification of Acceptance: **22 April 2016**
- Full Chapter Submission: **31 August 2016**
- Review Results Returned: **31 October 2016**
- Revised Chapter Submission: **15 December 2016**

11. Inquiries:

All inquiries are invited to send an email to bcihandbook2017@gmail.com.

12. Editorial Team:

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