One of the TOBI objectives is to provide a common architecture based on a standardized data acquisition module (for EEG and other signals) and several interfaces so that it is easy to connect the BCI transducer to existing software without requiring a specific hardware/software environment. This is particularly important for the BCI community, as it is a multidisciplinary blend of neuropsychologists, neurologists, biomedical engineers, computers scientists, industry and health-care.

The TOBI project pursues its standardization effort on two levels. The first one (internal) translated into the TOBI hybrid BCI platform (hBCI). It is a common implementation platform allowing researchers that work with different BCI platforms and programming tools to easily setup new systems and reuse modules.

The hBCI platform includes:
- the TOBI Interfaces (TiA, TiC, TiD), which describe standardized interfaces to transmit raw biosignals, events and BCI outputs, and
- the TOBI signal server, a program to acquire raw biosignals and distribute them using the above interfaces.

The components of this platform are respectively licensed under the LGPL and GPL license.

The second level (external) disseminates the above results to the BCI community at large. In addition to providing those tools at https://sourceforge.net/p/tools4bci, the TOBI project set up a website (www.bcistandards.org) to stimulate the distribution and discussion of the TOBI standardization effort within the BCI community. This website aims to provide information about the interfaces and encourages the community to give feedback. In addition to the software interfaces/discussion, the www.bcistandards.org website will push for a better defined community jargon, both in terms of terminology and metrics. Both sections will be gradually filled over the coming months. This will be a community effort, so we look forward to your comments and contributions!
TOBI at FET11

During the third year of the TOBI project the main objective has been to demonstrate the degree of robustness of our work and prototypes to all our target audiences. To do so, we have invested a large amount of resources in giving a number of demos of our prototypes in different settings - twelve live demos in this third year.

Altogether, these extensive live demonstrations of our prototypes show the progress in the state of the art achieved by TOBI.

As a highlight, we participated in the opening of the European Future Technologies Conference and Exhibition (FET11) in Budapest on 4-6 May 2011. “The European Future Technologies Conference and Exhibition 2011 was the second installment of a new forum dedicated to frontier research in information and communication technologies, a unique conference on visionary, high-risk and long-term research in information science and technology. Featuring an exceptionally broad range of scientific fields the event will seed new ideas across disciplines that will reshape the future.”[1]

TOBI’s brain-controlled telepresence robot brought to the Commission Vice-President’s Ms. Neelie Kroes a red push button for her to press and officially open the FET11 conference. The robot is mentally driven by Ben Hammer, in the background.

The Opening of FET11 with the Commissioner Neelie Kroes and the TOBI brain-controlled telepresence robot bringing the buzzer to open the conference.

Members of the TOBI team also demonstrated this and several other brain-controlled devices during the 3 days of the exhibition, which received a large media coverage with a journalist even trying them.

The TOBI and the Washington Press Release

One of the dissemination highlight of the TOBI project in its third year was the TOBI Press Release, released in the highly valued framework of the Annual Meeting of the American Association for the Advancement of Science (AAAS), held in Washington DC on February 17-21, 2011. Researchers from EPFL and TUG participated in the event and were supported by a professional media team from EPFL and Swissnex to ensure the best dissemination.

The theme of the AAAS 2011 was “Science Without Borders”, which perfectly fitted the research done in TOBI. TOBI members gave invited talks and, more importantly, AAAS organizers invited TOBI to participate and give a live demo at the Opening Press Briefing of the meeting. The TOBI Press Release was distributed at this time, thus benefiting from the meeting high press coverage, as well as scientific exposure among peer and decision makers. Indeed, it got a large coverage in USA and Europe. In particular, many high-level officers of USA and EC funding agencies participated in the event. The impact of the press release was quite impressive and today we are still seeing articles reproducing and translating the press release on international websites/blogs.

Finally, it is worth noting that, as a result of our live demo, the journal Science invited the project coordinator to participate in a live chat (http://www.tobi-project.org/2011/02/22/live-aaas-olaf-blanke-and-jo-se-del-r-millon-robotics) and a podcast (http://www.tobi-project.org/2011/02/23/podcast-using-thoughts-control-robots)

The SUVA

Rehabilitation, as defined by the World Health Organization (1968), is: “The combined and coordinated use of manual, medical, educational and professional means to train or re-involve the individual to his/her highest level of functional ability.” In 1928, Suva takes over the «Zum Schiffl» therapeutic spa in Baden. It runs currently 2 clinics: The Rehaklinik Bellikon founded in the German speaking part of Switzerland in 1974 and the Clinique romande de réadaptation, founded in the French speaking part in 1999.

CRR SuvaCare

What is the SUVA?

In April 1918 Suva commences operation after the approval in a plebiscite, in 1912, of the Sickness and Accident Insurance Law which provided the subsidizing of sickness insurance companies as well as the introduction of compulsory accident insurance for a large part of the working population. It is so mandated to handle compulsory accident insurance and to supervise occupational safety in companies. By 2010, 115'722 companies were insured representing a total of 196'3000 insureds.

With a network of 19 agencies, Suva is never far away. Insurers can count on committed, efficient and professional help from their Suva agency.

Rehabilitation

The SUVA TOBI Team (from left to right): Upper row: Hédi Dimassi, A. Al-Khodairy Lower row: T. de Staercke, N. Pattaroni

The TOBI team

Four persons work part-time for the TOBI project.

• Abdul AL-KHODAIRY M.D. is the main investigator. He graduated in 1978, had some training in general and orthopedic surgery before dedicating his career to physical medicine and rehabilitation. He is now senior fellow of the European Board of Physical Medicine and Rehabilitation. He has been in the domain of spinal cord injury since 15 years. He joined TOBI in 2008.

• Nathalie PATTARONI graduated as physiotherapist in 1987. Since the inauguration of the clinic, she has been one of the 2 senior physiotherapists in the spinal unit. She joined TOBI in 2009.

• Hedi Dimassi graduated as physiotherapist in 1988. He is senior physiotherapist whose main interest is functional electric stimulation and sport medicine. He joined TOBI in 2009.

• Thierry de Staercke is an auxiliary nurse. He graduated in 1992. Before coming to Suva he worked in a nursing home for young mentally retarded patients. Through his experience he developed a special sense of feeling and sensibility which helps much the anxious patient.

Both Nathalie and Hedi take in charge the end-users during the BCI training and prototype applications while Thierry gives them a shampoo at the end and helps them on their way back home.

The spinal rehabilitation team is confronted every day with the psychological impact of losing one’s ability to deal with activities of daily living. All of a sudden, the tetraplegic patient can no more communicate by handwriting, using the telephone or the computer. Some can not even talk. This social rupture intervenes with the rehabilitation process by a loss of motivation and enthusiasm. There is no doubt that BCI technology can offer a valuable help and support to those patients in the initial phase of rehabilitation when no one knows surely if recovery ever happens. As many patients who lost partially or completely their upper limb motor function are followed at the clinic, Suva found the project an opportunity to promote health and so joined without hesitation.

What will TOBI join the SUVA consortium?

The SUVA TOBI team.

CONCLUDED ON PAGE 6
Update on the project

TOBI WORKSHOP 3

Bringing BCIs to End-Users: Facing the Challenge. Evaluation, user perspectives, user needs, and ethical questions

Introduction

The brain-computer interface (BCI) technology uses brain signals to directly drive external devices. Over the past decade, EEG-based BCIs have begun to provide basic communication and motor control abilities to people with severe motor disabilities, thus offering a unique opportunity to improve their quality of life.

The goal of the TOBI project is to develop BCI controlled devices in the areas of communication and control, motor substitution, entertainment, and motor recovery. In these 4 application areas TOBI provides prototypes, which will enable individuals with severe motor disabilities to control assistive devices via a brain-computer interface. Most importantly, TOBI provides hybrid solutions, which allow the users to combine BCI with other assistive technology, so that they can switch between the BCI and other modes of control, thus integrating BCI in the individual assistive technology solutions.

User centeredness and user evaluation has been a key component of the TOBI project from the start. Information about the users' needs and requirements has been obtained early on and procedures for gathering feedback about the different prototypes have been implemented. Within TOBI, persons with disabilities and professionals from the field of rehabilitation and assistive technology are viewed as experts, whose feedback contributes to the success of the project.

Goals

The 3rd TOBI workshop aims at providing a space for an exchange between researchers in the field of BCI and BCI users, individuals with disabilities as well as rehabilitation professionals. It will enable BCI users to gain some knowledge about the state of the art in current BCI technology and express their views on this technology. Researchers on the other hand will have the opportunity to engage in a dialog with potential users of their applications and get some insight into their life experience. The question of requirements for a user driven project design will also be explored.

Keynote speakers will cover the following topics:
- Requirements for BCI assistive devices to be used in everyday life
- The impact of a BCI-controlled device from the perspective of individuals with disabilities

Scientific Program

The scientific program will consist of a series of keynote talks, oral presentations, poster presentations, and round tables.

Keynote talks

Keynote speakers represent the different perspectives on the workshop theme: the point of view of researchers, individuals with disabilities, and assistive technology experts.

Keynote speakers will be announced on the workshop’s web site as soon as they confirm their participation.

Regular sessions: oral and poster

Papers accepted for presentation will be assigned either to an oral or poster session. In the same sessions, members of the TOBI project will report their achievements in non-invasive hybrid BCI for Assistive Technologies.

Authors of selected papers will be invited to submit an extended version for a special issue on “Bringing BCI to End-Users” to be most likely published in Frontiers in Neuroprosthetics (publications costs will have to be covered by the authors).

Round table discussions will provide the opportunity for a dialog between researchers and assistive technology users.

Practical demonstrations of TOBI prototypes will present the state of the art of BCI to potential end-users and prehabilitation professionals.

For further information and updates on the program, please check our website: www.tobi-project.org/tobi-workshop-3

TOBI Workshop 3

Important dates

Deadline early registration (70 EUR): Feb. 28, 2012
Deadline late registration (120 EUR): March 15, 2012
Workshop: March 20-22, 2012

Note: Personal assistance for disabled persons is free of charge.

The University of Tübingen

The Eberhard Karls Universität Tübingen is one of Europe’s oldest universities. Several hundred years of history in the sciences and humanities have been written in Tübingen. The university was founded in 1477, when Count Eberhard “the Bearded” of Württemberg founded the University. The Count brought a palm tree from his pilgrimage to Jerusalem. In ancient times as well as in Christian symbolism, the palm tree represents the “arbor vitae” for the cardinal virtues: wisdom, continence, bravery, and justice. The palm tree is the emblem of the university and it may also stand for the “Oasis of Knowledge” which the Count aimed at creating in Tübingen. His slogan for the young University “Attempto” – I dare it! – proclaims the start in difficult times and has not lost its timeliness.

In Tübingen’s historical center there is hardly a building or a square that is not linked to a renowned scholar. Tübingen notables include Hegel, Hölderlin and Schelling, Mörike and Uhland, Johannes Kepler and Wilhelm Schickard. Tübingen today remains a place of research and teaching. In addition to the nearby 85,000 inhabitants, there are 24,000 german and international students. Some 400 professors and more than 4000 other academic staff teach at the University’s seven faculties. The latest chapter of the University’s history is marked by tremendous growth – the boom in Medicine and the Life Sciences and in other scientific areas has led to an expanded profile.

The University of Tübingen is represented in the TOBI project by two groups: The Institute of Medical Psychology and Behavioural Neurobiology (IMP), one of the pioneers in BCI research, and the Chair for Ethics in the Life Sciences, one of the few European departments in bioethics. The Tübingen TOBI team consists of Prof. Andrea Kübler, PhD candidate Elisa Holz, and student assistants David Bassler and Sandra Hillian-Tres. The Tübingen TOBI team is a multidisciplinary team of psychologists, biologists, and philosophers headed by Professor Kübler.

The IMP was established at the Faculty of Medicine of the University of Tübingen in 1993, chaired by Professor Birbaumer. The IMP is internationally leading in biofeedback research and its clinical applications. For more than 30 years Birbaumer and his group have developed techniques for self-regulation of brain activity using the electric (EEG), magnetic (MEG) and metabolic activity of the brain (fMRI, fNIRS). Biofeedback of brain activity has been applied to several clinical disorders, such as epilepsy, attention deficit/hyperactivity disorder, complete motor paralysis due to neuronal degeneration (amyotrophic lateral sclerosis; ALS), stroke and emotional disorders.

Research in Brain-Computer-Interaction for rehabilitation and establishing communication in so-called locked-in patients began more than 20 years ago. First pioneer work of the UT team around Professor Birbaumer culminated in the first message transferred by means of BCI: a locked-in and artificially ventilated patient with ALS was trained by Birbaumer’s PhD student Andrea Kübler to self-regulate his slow cortical responses and communicate by regulation of sensorimotor rhythms and with the P300-evoked potentials. Currently, intensive research is conducted to use BCI for motor rehabilitation in stroke patients and to restore communication in the total locked-in syndrome. Over the past 15 years Birbaumer and his team trained around 60 severely paralysed patients with BCIs and have thus exhaustive experience in user training and data analysis.

With the background of intensive experience in applying BCI to severely impaired patients in their home environment the next step for the EKUT team within TOBI was to focus on BCI evaluation by end users and ethical aspects of BCI use in patients. User groups are recruited together with TOBI partners “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neurodegenerativen Erkrankungen” (BSP) and “Beratungsservice für Patienten mit neuron...
How is Suva contributing to TOBI?

Suva is contributing by recruiting end-users with severe motor deficiency in their upper limbs (spinal cord injury, hereditary muscle disease (myopathy), infectious disease (Guillain-Barré syndrome)). Up to now, 8 end-users have participated to the experiments (BCI training) and 3 have successfully been able to test prototypes (Robotino®) and text entry (Qualiworld®). One has also tested a hybrid text entry prototype and another BCI control of a wheelchair.

What does Suva expect from TOBI?

So far, the results of the experiments are promising. The preparation for the usage of BCI is for now time consuming. Some end-users have complained of fatigue. Motivation was high with all. That leaves us confident in the technology. Some more time is needed to end up with a friendly easy-to-use interface.

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The ethics team of the TOBI project is affiliated to and lead by the Institute for Ethics in the Life-Sciences. The chair of Ethics in the Life Sciences has been established with the objective to promote and to institutionalize ethical discussion within scientific research and the professional teaching of the biological disciplines. The department’s mission is to promote an interdisciplinary philosophy of the life sciences, notably the three realms of ethics, theory and history of the life sciences. The main focus in research and teaching, in addition to issues of application-related (“applied”) ethics and dealing with ethically relevant biological and anthropological theories about man and his relationship to other living beings, lies on philosophy of science and epistemological issues (to clarify basic biological concepts problems of reductionism, the status of biology in relation to other sciences, evolutionary epistemology, etc.) as well as biology and history of philosophy (history of biology, Darwin’s reception in different disciplines and countries, the reciprocal influence of philosophy and biology).

The function of the ethics team within the TOBI project is giving advice concerning legal and moral issues in dealing with human research subjects and doing research in ethical and anthropological aspects of Brain-Computer Interfaces. During the first year the project was supported by gathering and reporting relevant legal regulations from the different countries involved and by providing ethical guidelines for good research practice. During the second year a framework for ‘BCI-philosophy’ was established using material from philosophical anthropology and the philosophy of technology. In addition, a survey of relevant literature helped to systematize moral issues in BCI already known. The current work consists of qualitative empirical research concerning user-experiences and BCI professionals’ opinions of morally relevant issues in BCI use and research. The team will continue its work with the edition of an international volume on BCI ethics and BCI philosophy.

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The successful candidate will work in the framework of European (in particular TOBI, www.tobi-project.org) and Swiss projects related to the development of novel enabling technologies as well as for seeking deeper understanding of fundamental mechanisms underlying the field of neuroprosthetics.

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Junior Postdoc Opening in Non-Invasive BCI at EPFL

EPFL, one of the two Swiss Federal Institutes of Technology (www.epfl.ch), has an immediate opening for one junior postdoc in the field of brain-computer interaction (BCI) to work in the lab of Prof. José del R. Millán (http://people.epfl.ch/jose.millan). Millán’s lab (http://cnb1.epfl.ch) conducts research on non-invasive BCI and neuroprosthetics. His lab is part of the Center for Neuroprosthetics, which carries out research at the interface of neuroscience and bioengineering in an environment of both theoretical and experimental research, rich for the development of novel enabling technologies as well as for seeking deeper understanding of fundamental mechanisms underlying the field of neuroprosthetics.

The successful candidate will work in the framework of European (in particular TOBI, www.tobi-project.org) and Swiss projects related to the development of novel principles for brain-computer interaction and testing with disabled end-users.

PhD Position at the Graz University of Technology

At the Institute for Knowledge Discovery, BCI-Lab at the Graz University of Technology, Austria, a PhD position (starting any time) is available.

The Institute for Knowledge Discovery (http://bci.tugraz.at) is looking for a person with an MSc or Dipl-Ing. in engineering or computer science with experience in one of the following fields: neuroscience, bio signal processing, machine learning, brain-computer interfaces, fMRI.

English is essential. High motivation, good interpersonal and communication skills are strongly requested.

The Graz University of Technology aims to increase the number of women in those areas where they are under-represented ad urges them to apply.

More information about the Institute can be found on the website: http://bci.tugraz.at.

Application including a curriculum vitae and letter of interest should be addressed to: Assoc. Prof. Dr. Gernot Muller-Putz

Institute for Knowledge Discovery
Graz University of Technology
Krenngasse 37
A-8010 Graz, Austria
bci@tugraz.at

For more information about job opportunities in and outside the TOBI consortium, please check our website at: www.tobi-project.org/jobs
Journal Paper

Flashy Characters with Famous Faces Improves ERP-based Brain Computer Interface Performance

T. Kaufmann, S.M. Schalz, C. Grözinger and A. Kübler

A Brain-Computer Interface as Input Channel for a Standard Assistive Technology Software


Listen, You Are Writing! Speeding up Online Spelling with a Dynamic Auditory BCI

M. Schreuder, T. Rost, M. Tangermann

A Novel 9-Class Auditory ERP Paradigm Driving a Predictive Text Entry System

J. Hoehne, M. Schreuder, B. Blankertz, M. Tangermann


C. Sannelli, C. Vidaurre, K.-R. Müller, B. Blankertz

Beyond the Responsibility Gap. Discussion Note on Responsibility and Liability in the Use of Brain-Computer Interfaces

G. Gräbler

First Steps Towards a Brain-Imagery Based Stroke BCI: New Strategy to set up a Classi

V. Kaiser, A. Kreilinger, G.R. Müller-Putz, C. Neuper

Impact of Auditory Distraction on User Performance in a 4-Class Brain-Computer Interface

E.V. Friedrich, R. Scheer, K. Sonnleitner, C. Neuper

A Hybrid Brain–Computer Interface Based on the Fusion of Electroencephalographic and Electromyographic Activities

R. Leeb, H. Siagha, R. Chavarriaga and J.R. Millán

Selected papers of TOBI workshop 2 have been published in three special issue on “Brain-Computer Interfaces: Technological Development and Applications” vol 13 of the Journal of the International Society for Bioelectromagnetism.

Book Chapter

Brain-Computer Interfaces and Visual Activity

C. Vidaurre, A. Kübler, M. Tangermann, K.-R. Müller, J.d.R. Millán

Phase-based Features for Motor Imagery Brain-Computer Interfaces

B. Hammer, R. Leeb, M. Tavella, J.d.R. Millán

Promoting Brain-Computer Interface Technology for Stroke Rehabilitation

F. Pichiorri, F. De Vico Fallani, G. Marone, F. Cincotti, M. Molinari, D. Mattia

A Model of BCI-Control

A. Kübler, B. Blankertz, K.-R. Müller, C. Neuper

Comparison of Feature Extraction Methods for Brain-Computer Interfaces

P. Ofner, G.R. Müller-Putz, C. Neuper, C. Brunner

Does ERP Correlate with the Strength of Impairment after Stroke?


A Supervised Recalibration Protocol for Unbiased BCI

S. Perdikis, M. Tavella, R. Leeb, R. Chavarriaga, J.d.R. Millán

Brisk Movement Imagination for the Non-Invasive Control of Neuroprostheses: a First Attempt

G.R. Müller-Putz, P. Ofner, V. Kaiser, G. Claulez, C. Neuper

Are We Ready? Issues in Transferring BCI Technology from Experts to Users


Evaluation of Proportional and Discrete Shared Control Paradigms for Low Resolution User Inputs

T. Carlon, G. Mannard, R. Leeb and J.d.R. Millán

Neural Basis of Communication by Means of Auditory BCIs

A. Riccio, L. Simione, D. Mattia, F. Cincotti, M. Olivetti Beurdinelli

Slow Feature Analysis - A Tool for Extraction of Discriminating Event-Related Potentials in Brain-Computer Interfaces

S. Daehne, J. Hoehne, M. Schreuder, M. Tangermann

For a full list, details and download of publications, please refer to TOBI website: www.tobi-project.org/publications/

ANNOUNCEMENTS

The 34th Annual International Conference of the Engineering in Medicine and Biology Society will take place in San Diego, California, USA on August 25 through September 1st 2012.

The general theme of EMBC’12 is “Engineering Innovation in Global Health”, covering a broad spectrum of topics in biomedical engineering and healthcare technologies, including medical and clinical applications. The conference program will consist of invited plenary lectures, symposia, workshops, invited talks, and poster sessions. A special focus will be on the impact of advances in biomedical technology on the delivery, management, and evaluation of medical care.

Important deadlines:
- March 31, 2012: submission of full-length papers for Regular and Special Sessions
- April 15, 2012: submission of proposals for Tutorial/Workshop Sessions

Further information can be found at http://www.embc2012.org/ANNOUNCEMENTS.html

Tools for Brain-Computer Interaction is an integrated project funded by the EC 7th Framework program, managed by EPPiL. This Newsletter only reflects the authors’ views and funding agencies are not liable for any use that may be made of the information contained herein.

01/14
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01
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October
held
on
Restoring human motor and cognitive function has been a fascinating research area during the last century. Interfacing the human nervous system with prosthetic systems to restore neuro-motor abilities is facing its crucial passage between research and actual clinical reality, enhancing the potentials of therapists, clinicians and researchers to rehabilitate, diagnose and generate knowledge.

The 2012 International Conference on Neurorehabilitation will bring together researchers and students from the fields of Clinical Rehabilitation, Applied Neuropsychology and Biomedical Engineering in order to promote, feed and encourage this therapeutic global shift.

Conference topics
- Clinical Impact of Technology
- Brain-Computer Interface in Rehabilitation
- Neuromotor & Neurosensorimodeling and processing
- Biomechanics in Rehabilitation
- Neural Prostheses in Rehabilitation
- Neuroprosthetics in Rehabilitation
- Others

The First International Conference on Neurorehabilitation will be held in Toledo Spain on November 14-16, 2012.

The conference theme is Coupling Humans and Complex Systems in a Cyber World: Today’s Principles for Tomorrow’s Society

Steady technological progress in all spheres of human activities makes it possible for everyone to access almost limitless amounts of data and interact in countless ways with their surroundings, as well as with each other. In order for this data to become information and for interactions to become meaningful, however, we need sound principles for the design of complex systems, and ways of how to couple them efficiently to human. The SMC community has accumulated considerable expertise with such complex systems in all areas of Systems Science and Engineering, Human-Machine Systems, and Cybernetics, which we can now harness. A challenge in this endeavor will be to test the scalability of existing principles and theories to cope with the complexity of tomorrow’s cyber society.

Important deadlines:
- Feb 15, 2012: submission of proposals for Special Sessions
- March 31, 2012: submission of full-length papers for Regular and Special Sessions
- April 15, 2012: submission of proposals for Tutorial/Workshop Sessions

For additional information on the conference website: www.embs.org/2012

If you would like to subscribe to the TOBI Newsletter, please follow the instructions at: www.tobi-project.org/lists/