

**Volume 9 (2005)**

**Summary of Contents with Abstracts**

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**NUMBER 1**

**EDITORIAL**

*Tim Tinius, PhD*

**SCIENTIFIC ARTICLES**

**Open-ViBE: A Three Dimensional Platform for Real-Time Neuroscience**

*Cédric Arrouët, ME*  
*Marco Congedo, PhD*  
*Jean-Eudes Marvie, PhD*  
*Fabrice Lamarche, PhD*  
*Anatole Lécuyer, PhD*  
*Bruno Arnaldi, PhD*

**Background.** When the physiological activity of the brain (e. g., electroencephalogram, functional magnetic resonance imaging, etc.) is monitored in real-time, feedback can be returned to the subject and he/she can try to exercise some control over it. This idea is at the base of research on neurofeedback and brain-computer interfaces. Current advances in the speed of microprocessors, graphics cards and digital signal processing algorithms allow significant improvements in these methods. More meaningful features from the continuous flow of brain activation can be extracted and feedback can be more informative.

**Neurofeedback to Improve Physical Balance, Incontinence, and Swallowing**

*D. Corydon Hammond, PhD*

An innovative neurofeedback protocol for the treatment of problems with physical balance, incontinence, and swallowing is described. Successful case reports from four consecutively treated cases are presented. This protocol holds potential promise for work with the elderly, stroke and head injury patients, primary nocturnal enuresis, and in peak performance training where balance is important. Further controlled research is warranted.

**KEYWORDS.** Neurofeedback, EEG biofeedback, balance, incontinence, stroke, head injury

**NEWS FROM OTHER JOURNALS AND WEBSITES**

**CLINICAL CORNER**

- **Temporal Lobe Slow Waves**  
*John R. Hughes, MD*
- **Temporal Lobes and Their Importance in Neurofeedback**  
*D. Corydon Hammond, PhD*

**Methods.** Borrowing technology so far employed only in virtual reality, we have created Open-ViBE (Open Platform for Virtual Brain Environments). Open-ViBE is a general purpose platform for the development of three dimensional real-time virtual representations of brain physiological and anatomical data. Open-ViBE is a flexible and modular platform that integrates modules for brain physiological data acquisition, processing, and volumetric rendering.

**Results.** When input data is the electroencephalogram, Open-ViBE uses the estimation of intra-cranial current density to represent brain activation as a regular grid of three dimensional graphical objects. The color and size of these objects co-vary with the amplitude and/or direction of the electrical current. This representation can be superimposed onto a volumetric rendering of the subject's MRI data to form the anatomical background of the scene. The user can navigate in this virtual brain and visualize it as a whole or only some of its parts. This allows the user to experience the sense of presence (being there) in the scene and to observe the dynamics of brain current activity in its original spatio-temporal relations.

**Conclusions.** The platform is based on publicly available frameworks such as OpenMASK and OpenSG and is open source itself. In this way we aim to enhance the cooperation of researchers and to promote the use of the platform on a large scale.

**KEYWORDS.** EEG, real-time EEG, neurofeedback, brain-

## ISNR CONFERENCE

Summaries and Abstracts of Student Scholarship Presentations and ISNR Research Funded Presentations Presented at the 2004 International Society for Neuronal Regulation (ISNR) 12th Annual Conference, Ft. Lauderdale, Florida

Editorial Note: Introduction to ISNR Conference Abstracts, 2004

### Student Scholarship Presentation Abstracts

- **Executive Function: A Possible Circuit of Attention, Cognition and Motivational Brain Processes**  
*Rex Cannon, BA*
- **Frontal Alpha Asymmetry: A State or Trait Measure of Affective Response**  
*Elizabeth Morgan Canyock, MS*
- **QEEGs of Dissociative Identity Disorder (DID) Subjects**  
*James A. Kowal, MS*
- **Low Resolution Electromagnetic Tomography (LORETA) in Monozygotic Twins Discordant for Chronic Fatigue Syndrome**  
*Leslie Sherlin, MS*
- **EEG Gamma Coherence and Other Correlates of**

computer interface, virtual reality, Open-ViBE, OpenMASK

### TOVA Results Following Inter-hemispheric Bipolar EEG Training

*J. A. Putman, MA, MS*  
*S. F. Othmer, BA*  
*S. Othmer, PhD*  
*V. E. Pollock, PhD*

**Introduction.** This study examines recovery of attentional measures among a heterogeneous group of clients in a pre- and post-comparison using inter-hemispheric EEG training at homologous sites. A continuous performance test was used as an outcome measure. The client population was divided into three categories: (a) primarily attentional deficits, (b) primarily psychological complaints, and (c) both.

**Method.** Neurofeedback protocols included T3-T4, Fp1-Fp2, F3-F4, C3-C4 and P3-P4. A wide range of reward frequencies was used, and these were individually selected to optimize the subjective experience of the training. Participants were 44 males and females, 7 to 62 years old, who underwent treatment for a variety of clinical complaints. Dependent variables were derived from a continuous performance test, the Test of Variables of Attention (TOVA), which was administered prior to EEG training and 20 to 25 sessions thereafter.

**Results.** After EEG training a clear trend towards improvement on the impulsivity, inattention, and variability scales of the TOVA was

### Subjective Reports during Ayahuasca Experiences

*David Stuckey, PsyD*

- **LORETA Neurofeedback and Automaticity**  
*Kerry Towler, MA*

### ISNR Research Fund Supported Research Projects

- **Effect of Neurofeedback Training on the Neural Substrate of Executive Deficits in ADHD Children**  
*Mario Beauregard, PhD,*  
*Johanne Lévesque, PhD, and*  
*Mensour Boualem*
- **EEG in Real-Time: New Perspectives and a Platform for 3-D Visualization of Functional Brain Dynamics**  
*Marco Congedo, PhD, Cédric*  
*Arrouët, ME, Anatole Lécuyer,*  
*PhD, and Bruno Arnaldi, PhD*

### Selected E-ISNR 2004 Conference Presentation Abstracts

- *Silvana Galderisi, Armida Mucci, Umberto Volpe, Lucio Vacca, Paola Bucci, and Mario Maj*
- **Theta States through Neurofeedback, Hypnosis and Energy Medicine**  
*John Gruzelier, PhD*
- **Unlocking the Locked-In: Brain-Computer Communication in Paralyzed Patients**

evident. Participants with normal pre-training scores showed no deterioration in their performance, indicating that homologous site inter-hemispheric EEG training had no deleterious effect on attention. In addition, reaction time was predominately in the normal range for this population and remained unchanged following training.

**Conclusion.** Normalization of attentional variables was observed following training irrespective of the primary clinical complaint. These results suggest that inter-hemispheric training at homologous sites provides another “generic” EEG biofeedback protocol option for addressing attentional deficits. Inter-hemispheric training likely serves as a general challenge to the regulation of cerebral timing, phase, and coherence relationships. Such a challenge may result in more effective regulation of cerebral networks, irrespective of whether these are involved in attentional or affective regulation.

**KEYWORDS.** EEG, neurofeedback, attention, inter-hemispheric, bipolar, TOVA

*Jochen Kaiser and Niels  
Birbaumer*

- **EEG and ERP Microstates:  
The Atoms of Thought and  
Emotion**

*Dietrich Lehmann*

- **Functional Wiring of the  
Brain Based on Virtually  
Implanted Electrodes**

*Roberto D. Pascual-Marqui,  
PhD*