# Applied Neuroscience Society of Australasia National Conference 2012

**EEG & NFB: Building Pragmatic Models for Assessment & Improving Affect Regulation**

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Saturday 1 September</th>
<th>Sunday 2 September</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.00am</td>
<td>Registration Desk Open</td>
<td>Registration Desk Open</td>
</tr>
<tr>
<td>8.30am</td>
<td><strong>Welcome from the ANSA President</strong></td>
<td><strong>ANSAGM</strong></td>
</tr>
<tr>
<td>9.00am</td>
<td>KEYNOTE ADDRESS: Dr Ed Hamlin - Self-Directed Neuroplasticity</td>
<td><strong>Update from the BCIA-A (re Neurofeedback Certification)</strong></td>
</tr>
<tr>
<td>10.30am</td>
<td>Morning Tea</td>
<td>Morning Tea</td>
</tr>
<tr>
<td>11.00am</td>
<td>Richard Clark – Slow Cortical Potentials</td>
<td>KEYNOTE ADDRESS: Prof Richard Silberstein</td>
</tr>
<tr>
<td>11.45am</td>
<td>Tim Hill – LENS, Low Energy Neurofeedback System</td>
<td>– <em>The Impact Of Dopamine Depletion On Brain Functional Connectivity: Basic And Clinical Implications</em></td>
</tr>
<tr>
<td>12.30pm</td>
<td>Lunch (Exhibition: Solstice MindMatters at 1pm)</td>
<td>Lunch - Exhibition</td>
</tr>
<tr>
<td>1.30pm</td>
<td>Moshe Perl &amp; Jon Hegg: Deriving neurofeedback training protocols from EEG analysis and symptom presentation</td>
<td>STARRTS, Mirjana Askovic: Neurofeedback and Psychotherapy for Complex PTSD</td>
</tr>
<tr>
<td>2.30pm</td>
<td>Terry Eichmann, <em>The use of Transcranial Direct Current Stimulation for Complex Clients</em></td>
<td>Dr. Paul Holman, <em>Constitution: An important factor in mood regulation</em></td>
</tr>
<tr>
<td>3.15pm</td>
<td>Afternoon Tea</td>
<td>Afternoon Tea</td>
</tr>
<tr>
<td>3.30pm</td>
<td>Yuri Kropotov (via Skype), <em>Functional Biomarkers of Affective Disorders</em></td>
<td>Michelle Aniftos et al: <em>Mining Clinical Data for Evidence of the Efficacy of Neurofeedback.</em></td>
</tr>
<tr>
<td>4.30pm</td>
<td>NFB &amp; Psychology Interest Group: Overview Status of Position Paper re Treatment of ADHD; then NFB IG AGM</td>
<td><strong>ANSAPresident’s Closing Address</strong></td>
</tr>
<tr>
<td>6.30pm</td>
<td>Conference Dinner</td>
<td>ANSA Executive Dinner Meeting: 2012-13 Strategic Plan</td>
</tr>
</tbody>
</table>

**2011/12 Executive Members:**

- **President:** Moshe Perl
- **Immediate Past President:** Sue-Ellen Taylor
- **Secretary:** Michelle Aniftos
- **Newsletter Editor:** Josephine Capitani
- **Treasurer:** Terry Eichmann
- **Web Editor:** Jacques Duff
- **Public Officer:** Jon Hegg
- **Members-at-Large:** Tim Hill & Mirjana Askovic

**Executive Board Preconference Meeting, 5pm Thursday, Cosmopolitan Hotel, St Kilda**
Session Abstracts & Biographies: Saturday 1 September

**Dr Ed Hamlin: Self Directed Neuroplasticity**

Neuroplasticity ranks as one of the most exciting findings to emerge from the “Decade of the Brain” as it opened doors to a number of emerging interventions for altering brain functions. We generally focus on the positive potential associated with the discovery, but, of course, what it really indicated was that the brain is continually being sculpted by its experiences, both external and internal. Neuroplasticity can shape the patterns of brain functioning through habit and happenstance, or it can be directed through particular experiences to function better in a more deliberately determined manner. Applying what we have learned in the area of improved emotion regulation will continue to be one of the most important uses of the knowledge and skills we have acquired. Good emotion regulation is directly related to improved brain regulation. Neurofeedback has proven to be a highly beneficial approach for improving brain regulation and continues to contribute to improvements in emotion regulation skills.

*Ed Hamlin Bio:* Dr. Ed Hamlin is one of the founders of a major psychiatric clinic in North Carolina - the Pisgah Institute in Asheville. Dr. Hamlin did his clinical psychology training at the University of North Carolina Chapel Hill. His neuropsychology training came at Duke University with Pat Loeb. He’s an associate professor at a university in Western Carolina and mentors interns as part of his practice. He specializes in neuropsychology, including neurofeedback, for a variety of conditions, including attention deficit disorder, traumatic brain injury and stroke. He also works with clients to develop optimum brain functioning.

**Prof Richard Clark: Slow Cortical Potentials**

Slow cortical potentials (SCPs) are slow negative DC shifts measurable at the scalp. They belong to the family of event--related potentials (ERPs), differing from the spontaneous activity obtained from conventional EEG measurement. The neurophysiological bases of slow negative DC shifts are long-lasting excitatory postsynaptic potentials at apical cortical dendrites (Neidermeyer et al, 2005). SCPs are correlates of complex cognitive and affective processing, reflecting a wide range of operations including intention, motor planning, expectancy, mental preparation, mental orientation, language, object and event processing: in effect, all consciously driven, attentional and working memory functions. They can either facilitate or inhibit learning by the brain during such operations. This is achieved via tonic regulation of a cortical region (“cortical sheet”) to either lower (increased negativity; facilitation) or raise (increased positivity; inhibition) its threshold of firing. Increased negativity will render the region more likely to respond and adapt to stimulus events (i.e. learning); increased positivity will reduce the likelihood of such response. There are indications that SCP modulation may rely on the coordinated activity of neuronal and glial cell systems (Fellin et al., 2009). Threshold regulation can be trained via SCP neurofeedback, with electrode placement determined by functional relevance. There are benefits of SCP neurofeedback reported for a number of clinical conditions. The best evidence pertains to attention deficit disorder, epilepsy and migraine (Wyckoff et al, 2011) but there is also promising clinical data in relation to alcohol dependence, bipolar disorder, major depression, autism and dyslexia. This presentation provides a review of this background and work through the procedures of SCP training and its outcomes.

*C. Richard Clark Bio:* Richard Clark is a Director of Brain Health Clinics in Adelaide, South Australia that specializes in neurotherapeutic interventions for the treatment of disorders of cognition and affect. He holds full academic status as a Professor in the School of Psychology at Flinders University.
Professor Clark is internationally recognised for his contributions to neuropsychology and cognitive neuroscience. His work has been characterised by the innovative application of multimodal measures of brain structure and function. In particular, he has applied synergistic approaches to neuroimaging of the spatial and temporal dynamics of cortical networks, including high resolution topographic EEG and ERP recordings and MRI-based morphometry. His technical developments have been complemented by his innovative use of experimental paradigms that have drawn upon an expertise in psychometrics, psychophysiology, psychopharmacology, and psychopathology. His work in the early 1990’s was amongst the first to demonstrate brain-computer interfacing to external devices using consciously generated electrical fields from the anterior cingulate.

He has built on his earlier seminal studies in the 1980’s on the role of catecholamines in the control of human attention and on measures of working memory and executive function in head injury to provide some of the first evidence of localized and distributed brain changes in post-traumatic stress disorder and other psychopathologies, including panic disorder, attention deficit disorder, and schizophrenia. In recent years, he has also played a significant role in the development of the first international integrative database of brain and cognitive function that is now enhancing significantly the evidence base for assessment and treatment of brain disorders in both youth and adulthood. These contributions have been funded by major grants from ARC, NHMRC and other peer review–based agencies over more than 25 years. Over the last seven years he has applied his expertise to clinical work in the clinical field of neurotherapy and been instrumental in the development of clinical practice standards for Australia and the creation of a national accreditation authority.

In addition to his primary research, Richard Clark has made significant contributions to the advancement of cognitive science including advocacy in the community and extensive service as an office bearer in national and international societies. These offices include Past President of the Australasian Society for Psychophysiology and Patron of the Brain Injury Network of South Australia. He has been a frequent contributor in the media, enhancing public appreciation of the potential benefits of advances in neuroscience and its applications. He was recently appointed a Fellow of the Academy of Social Sciences in Australia.

Dr Tim Hill: LENS (Low Energy Neurofeedback System) - How it is incorporated into our clinical practice.

This presentation will provide a brief description of the development of LENS and what is involved when treating clients with LENS. This treatment will be compared with more traditional forms of Neurofeedback. Outcome research will be briefly summarised. An overview of our own clinical experience utilising LENS will be provided along with a description of how we incorporate LENS into our own clinical practice.

Dr Tim Hill Bio: Dr Hill is Board Certified in Neurofeedback. He has worked full-time in private practice as a registered psychologist since 1987. Prior to working in private practice, Tim worked for 15 years as a lecturer in Psychology and Human Development at the now named University of South Australia. Previously he was a Psychologist with the South Australian Department of Corrections in 1971. Dr Hill is a member of a range of professional organisations: Institute of Private Practising Psychologists; Australian Society of Hypnosis; South Australian Health Practitioners Tribunal; International Society for Neurofeedback Research; Applied Neuroscience Society of Australasia; and he is the Chair of ANSA Committee for Certification of Neurofeedback Practitioners in Australia.
Dr Moshe Perl & Jon Hegg: Deriving NFB Training Protocols from EEG Analysis and Symptom Presentation

This presentation will review the historical development of symptom guided neurofeedback (NFB) and EEG / QEEG based NFB, and their more recent synthesis in clinical practice. In the late 1960s, Professor Barry Sterman founded the field of NFB with his discovery that NFB can control seizure disorders. From that point on, practitioners began using NFB to treat a wide variety of disorders, mostly tracking changes in symptoms to guide NFB. At the same time, university based research continued to correlate EEG patterns with symptoms. With the rise of Quantitative EEG analysis in the 1980s, it was proposed to use deviations from normative data to guide NFB. Both voltage based norms and coherence based norms were developed. Thus two schools of thought developed, and a certain rivalry emerged between the two. More recently, a synthesis of the two systems has occurred: Clinicians are increasingly looking at EEG to help guide NFB, while EEG and QEEG experts are recognising that a blind application of normative deviation as the driver of NFB protocols lacks clinical sophistication – understanding symptomatology is critical. The classification of EEG into phenotypes, or failure modes, by Jay Gunkelman and Jack Johnstone has given a useful framework from which one can analyse EEG, in reference to symptoms, and maximise the effective application of NFB. This method will be explained, with case examples. The strengths and limitations of this methodology will be discussed.

Dr Moshe Perl Bio: Dr. Moshe Perl, PhD received his BS in Physics from the University of Tel Aviv, his MS in Psychology from the University of Texas at Tyler, and his PhD in Clinical Psychology with a minor in Behavioural Medicine from the University of North Texas, in 1982. Since that time, he has worked as a consultant to schools, Departments of Juvenile Justice, and the Children’s Court, both in the United States and in Australia. Since 1998 Dr. Perl has been involved in Neurofeedback and its integration into his work with ADHD, Behaviour and Anxiety Disorders. He has presented his work at a variety of professional conferences, and regularly runs seminars for parents and teachers. Dr Perl has a private practice clinic in Melbourne. His work focuses on ADHD, Behaviour Management, Individual and Family Psychotherapy. He has been coordinating and delivering professional trainings in Neurofeedback since 2000.

Jon Hegg Bio: Jon is the Director of the recently established Brain Training Centre Kambah, ACT. He has been in private practice as a psychologist since 1988 and has specialised in Neurofeedback for 15 years. He works with adults and children with a range of learning and behavioural issues. Jon works closely with Jay Gunkelman and provides a qEEG service for Neurotherapy practitioners. He is an advocate for the use of qEEG to guide Neurofeedback training.

Jon is on the Board of Biofeedback International Alliance Australia (BCIA-A) and an executive member on the Applied Neuroscience Society of Australaslia. He founded the qEEG Study group (The Q Club) and is working to promote educational opportunities for society members. In his words:

‘I guess when you forget enough you are probably ready to teach.’
Terry Eichmann: The Use of Transcranial Direct Current Stimulation with Complex Clients

During this session, Terry will discuss

- The principle of operation of tDCS;
- The operation of the tDCS hardware;
- Site selection;
- Resources available;
- Cautions to observe in the use of tDCS.

Terry will also describe his use of tDCS with three clients;
- a) with Borderline Personality Disorder;
- b) Brain Injury after an attempted suicide followed by an MVA; and
- c) a Brain stem stroke victim.

Terry Eichmann Bio: Terry is a Psychologist in Private Practice in Carina on the southside of Brisbane. He has been using neurofeedback with clients for the last 14 years. Terry attended his first Neurofeedback workshop in Sydney early in 1998 with Tom Allen who was using Thought Technology hardware and Biograph software; in 1998 attended EEG Spectrum training; and applied Sue and Siegfried Othmer’s protocols in selecting sites and frequency bands for clients using a TT ProComp with Biograph software for a few years.

Terry attended Barry Sterman’s introductory workshop on QEEG technology in Brisbane in 1999 and began to use a Mindset with Barry’s SKIL software in 2001. He based his clients’ training protocols on SKIL analyses for the next three years. In 2003 ISNR invited Valdean Brown to our annual conference in Noosa who conducted a workshop on his non-linear dynamical approach to neurofeedback. After trialling Val’s software for a period of months and achieving results with clients more quickly than previous protocol based or QEEG based approaches, Terry has settled on the Zengar NeurOptimal method as his preferred modality.

In his quest to remain current and to use the most efficient and effective techniques, Terry has attended a number of workshops since 2003, and has been certified to use Len Oach’s LENS system, and Peter Van Deusen’s TLC system. He has also attended a number of QEEG workshops with Jay Gunkleman and Yuri Kropotov and others in order to keep up to date with recent developments in QEEG based approaches.

After trialling these alternative techniques for a number of months after attending these workshops his experience has been that NeurOptimal continues to be the most efficient and effective system to use with his clients. Given recent research findings in 2011 about brain function he is also convinced that it is the most valid approach. He continues to achieve highly satisfactory outcomes with a wide variety of clients who present with a wide variety of symptoms.

In recent months, Terry has been trialling transcranial direct current stimulation (tDCS) with a number of quite challenging clients and has been achieving significant changes within very few sessions (relative to neurofeedback). Terry is a Fellow of ANSA. He is currently the Treasurer of ANSA and has held the roles as President, Secretary, and Treasurer for ISNR-Pacific Rim in the past. As President of ISNR he was instrumental in jointly establishing ANSA with AAAPB in 2007. He was also one of the committee members responsible for the establishment of BCIA-Australasia and is currently a Board member of BCIA-A serving as Secretary.
The brain is separated into four functional systems: sensory (including attention), executive, memory, and affective systems. Dysfunctions in these systems are associated with different categories of brain disorders. Affective disorders are caused by dysfunctions in the affective system of the brain. The affective system includes amygdala, nucleus accumbence, orbitito-frontal, insular, cingulate cortical areas modulated by nuclei of the ascending activation system. Most of the areas of the affective system lie deep in the brain and produce quite small (if any) electrical potentials that can be recorded from the surface of the head. In line with this fact, spontaneous EEG and event related potentials recorded from the scalp provide relatively little (in comparison to the sensory and executive systems) biomarkers of functioning of the affective system. These biomarkers include, 1) excessive central beta activity as an index of activation level of the anterior cingulate cortex, 2) excessive amplitude of the P4 NOGO component in the GO/NOGO task as an index of hyper-functioning of the action monitoring system of the brain, 3) excessive amplitude of the P3a component as an indicator of hyper-sensitivity of the novelty assessment neuronal network. On the other hand, the affective system has reciprocal interconnections with the executive system via the striatal inhibitory network of the brain. So, hyper-activation of the affective system in some disorders like PTSD is reflected in decrease of the executive components and increase of the sensory related components of ERPs. Author’s experience with application of the QEEG and ERPs for diagnosis affective disorders will be presented.

Indeed these indexes information flow in the cortex 1) have high test-retest reliability; 2) consistently reflect experimental manipulations in stimulus sensory and emotional modality, probability, behavioral meaning etc. 3) are associated with executive functions such as action selection, action preparation, action suppression and monitoring conflict between competing actions. The ERP waves discriminate a selected psychiatric condition from healthy population with quite large effect sizes. However, majority of ERP waves appear to be not single entities but can be further decomposed into separate components with distinct functional meanings. In the same time, each psychiatric disease appears to be characterized by multiple dysfunctions in complex brain systems, and consequently must be indexed by multiple ERP components obtained in different behavioral paradigms. The second part of the paper deals with new methodological approaches emerged recently to overcome these hurdles in ERP clinical application. They are: 1) ICA-based ERP decomposition into separate functionally meaningful components, 2) non-parametric methods for mapping generators of ERP components into 3D tomograms; 3) appearance of ERP normative database. The third part of the paper presents our own studies on application of the Human Brain Index (HBI) database for discriminating different psychiatric groups from healthy controls as well for designing protocols of treatment the corresponding brain dysfunctions.

Yuri Kropotov Bio: Prof. Dr. Kropotov has got three high educations: in theoretical physics (1971, Leningrad State University), in philosophy (1976) and in neurophysiology (Institute of Experimental Medicine of USSR Medical Science Academy, 1975). He defended two dissertations: one in 1975 with title “Infra slow electrical and metabolic processes in the human brain” (1975), and the second one in 1984 with title “Neurophysiological mechanisms of human memory”. In 1970-1990 he worked in psychiatric clinics of the Institute of Experimental Medicine and Institute of the Human Brain of Russian Academy of Sciences in Saint Petersburg with neurological and psychiatric patients to whom electrodes were implanted for diagnosis and therapy. By means of implanted electrodes he
recorded various physiological parameters of the human brain such oxygen concentration, impulse activity of neurons and local field potentials. For this research he was awarded the highest scientific award - the USSR State Prize (1985), while his discoveries were officially registered by the Academy Committee in 1990 (diploma for highest achievement in science). Now his scientific interests are focused on Quantitative EEG and normative data bases, event-related potentials (ERPs), neurotherapy (neurofeedback, tDCS, DBS), QEEG/ERP markers of ADHD and other brain disorders. Academic Press, Elsevier recently published his book on “Quantitative EEG, event related potentials and neurotherapy” (2009). For this book he got Award for the Year’s most significant publication in the field of neurofeedback from Foundation for Neurofeedback and Applied Neuroscience. He was also awarded the Copernicus Prize - Award of the Polish Neuropsychological Society (2009). He published more than 200 papers including 8 books. He is currently Director of laboratory of the Institute of the Human Brain of The Russian Academy of Sciences (St.-Petersburg) and Professor at Institute of Psychology of Norwegian University for Science and Technology (Trondheim).

Session Abstracts & Biographies: Sunday 2 September

BCIA-A
In 2010, ANSA agreed to the development of an independent body whose role would be to develop and oversee standards for certification within Australasia. It was also agreed that this new organization would be affiliated with The Biofeedback Certification International Alliance. In 2011, Biofeedback Certification International Alliance – Australia Inc. (BCIA-A) was first registered in Australia and a Committee was formed. BCIA-A has an affiliate relationship with BCIA. BCIA-A offers certification for both entry-level and advanced Neurofeedback practitioners.

BCIA-A will be responsible for overseeing Neurofeedback Certification within Australia. BCIA-A will be responsible for ensuring that people applying for certification have prerequisite educational requirements and conform to approved ethical standards. Standards for certification will be, at least, equivalent to those of BCIA within Australasia. Neurofeedback professionals will gain certification based on the same "Blueprint of Knowledge" developed by BCIA and will sit the normal BCIA exam. Grandparenting arrangements for existing practitioners that meet predefined criteria will be available for an 18-month period commencing August 13 2011. Entry-level certification will be available for those who do not meet such criteria.

Prof R Silberstein - Impact of Dopamine Depletion on Brain Functional Connectivity
In this talk, I will describe research findings examining the effects of dopamine depletion and dopamine agonists on brain functional connectivity. These findings will also be discussed in the context of ADHD symptomatology and the relationship between creativity and ADHD.

Richard Silberstein Bio: Richard Silberstein is Professor of Cognitive Neuroscience at Swinburne University of Technology and Chairman of the company Neuro-Insight Pty Ltd. He holds a Ph.D. from the University of Melbourne in neurophysiology and a BSc (Hon) majoring in physics from Monash University. He was the head of the Dept. of Physics at Swinburne University and the foundation director of the Brain Science Institute at Swinburne University. Professor Silberstein has over 30 years of neuroscience research experience and is the originator of Steady State Topography (SST) brain imaging technology. He has published over 180 papers in the form of conferences presentations, journal articles and book chapters in various areas of cognitive and clinical neuroscience as well as consumer neuroscience.
Mirjana Askovic: Neurofeedback and Psychotherapy for Complex PTSD
This paper aims to present how neurofeedback gets integrated into the treatment of the clients with chronic complex PTSD. A case study will be used to illustrate a role of neurofeedback in different stages of trauma treatment. The presenter will also discuss integration of neurofeedback into a multicultural, multidisciplinary setting of the NSW Service for the Treatment and Rehabilitation of Torture and Trauma Survivors.

Mirjana Askovic Bio: Ms. Askovic is a psychologist with over 20 years of clinical experience in work with children and adults. She received her training from the University of Belgrade and studied developmental psychology and neuropsychological diagnostics before immigrating to Australia. For the last 10 years she has been working at STARTTS, a Sydney based centre for treatment of refugee survivors of torture and trauma. Her major focus for the last six years has been in integrating the use of neurofeedback with psychotherapy, family and social support in work with chronic, complex PTSD. This work has resulted in the establishment of STARTTS Neurofeedback Clinic in 2007.

Dr Paul Holman: Constitution: An important factor in mood regulation
In the last 20 years, genetic research on personality has refocussed our attention on the concept of temperament and inherent constitution. It is now clear that in any population of mammals one can find differing temperamental trends which serve group survival in the face of changing environmental conditions. Research clearly shows that temperament is the major factor in determining the set-point of an individual's mood and that this defines limits on the mutability of their overall life outlook.

Paul Holman Bio: Dr Holman is a psychiatrist who has been practising medicine for 40 years. Dr. Holman trained at Cambridge and King's College Hospital London. He came to Australia in 1980 and worked in addiction and general psychiatry for many years, now in private practice specialising in chronic fatigue and anxiety states. He has a longstanding interest in nutritional medicine, and recently authored ‘Hawks, Doves and Other Humans: Discovering a New Science of Constitution’, and has written extensively about nutrition and mind-body medicine. He describes himself as “introverted, but with quite a sweet nature” He continues to be perplexed by the human condition.

Michelle Aniftos: Data Mining for Clinical Efficacy of Neurofeedback for Self-Regulation
As practitioners, we may find ourselves ahead of the research in our implicit knowledge and belief in the efficacy of neurofeedback as an intervention option for improved brain-based functioning. There is a wealth of potential research data nested deeply within the archives of our client records but data mining for research is fraught with ethical and methodological dangers. In this session, Michelle aims to inform and inspire colleagues to adopt clinical practices that enable client data to be collated for research.

Michelle Aniftos Bio: Michelle is a Clinical Psychologist who works in private practice providing services in health and education to children and adults. Since 2004, Michelle has enjoyed particular success integrating EEG biofeedback into clinical interventions to improve client self-awareness and self-regulation of affect, arousal and attention. She currently supervises six psychologists learning NFB methods; two provisional psychologists completing final pracs; and a Masters’ student who is researching archival data held in Michelle’s clinic. Michelle is a member of the APS Clinical College, and an active member of the Applied Neuroscience Society of Australasia.