



The International Society for Neurofeedback and Research (ISNR) has a long history of supporting clinical research into self-regulation of brain electrophysiology through its scientific meetings, journal and internally funded research awards. Because millions more people could benefit from this research, including people with attention deficit, autism, substance abuse and brain injury who seek a long lasting drug-free approach with no known side effects, the ISNR Foundation now seeks funding for leading academic researchers to support further research in neurofeedback.

- *The funds accepted by the Foundation will be leveraged because these funds support studies and researchers that enable larger competitive grants from public funding agencies.*
- *Donors to the Foundation will impact on health and science in a potentially important therapy that lacks large budget corporate or governmental support.*

WHAT IS NEUROFEEDBACK?

Like other forms of biofeedback, NFT uses monitoring devices to provide moment-to-moment information to an individual on the state of their physiological functioning. The characteristic that distinguishes NFT from other biofeedback is a focus on the central nervous system and the brain. Neurofeedback training (NFT) has its foundations in basic and applied neuroscience as well as data-based clinical practice. It takes into account behavioral, cognitive, and subjective aspects as well as brain activity. Thus, it meets the American Psychological Association's definition of an evidence-based intervention since NFT is "...the integration of the best available research with clinical expertise in the context of patient characteristics, culture, and preference."



NFT is preceded by an objective assessment of brain activity and psychological status. During training, sensors are placed on the scalp and then connected to sensitive electronics and computer software that detect, amplify, and record specific brain activity. Resulting information is fed back to the trainee virtually instantaneously with the conceptual understanding that changes in the feedback signal indicate whether or not the trainee's brain activity is within the designated range. Based on this feedback, various principles of learning, and practitioner guidance, changes in brain patterns occur and are associated with positive changes in physical, emotional, and cognitive states. Often the trainee is not consciously aware of the mechanisms by which such changes are accomplished although people routinely acquire a "felt sense" of these positive changes and often are able to access these states outside the feedback session.

NFT does not involve either surgery or medication and is neither painful nor embarrassing. When provided by a licensed professional with appropriate training, generally trainees do not experience negative side-effects. Typically trainees find NFT to be an interesting experience. Neurofeedback operates at a brain functional level and transcends the need to classify using

existing diagnostic categories. It modulates the brain activity at the level of the neuronal dynamics of excitation and inhibition which underlie the characteristic effects that are reported.



NFT has been found to be a successful intervention in modifying seizures, attention, traumatic brain injury, chronic pain, autistic behaviors, headache/migraine, depression, anxiety, addictions, and sleep problems. Also, it has been applied effectively in meeting educational goals such as resolving reading and math disabilities. Moreover, it has been used to help maximize the performance of athletes, artists, and executives. Lasting positive changes have been documented after successful NFT.

Being a self-regulation method, NFT differs from other accepted research-consistent neuro-modulatory approaches such as audio-visual entrainment (AVE) and repetitive transcranial magnetic stimulation (rTMS) that provoke an automatic brain response by presenting a specific signal. Nor is NFT based on deliberate changes in breathing patterns such as respiratory sinus arrhythmia (RSA) that can result in changes in brain waves. At a neuronal level, NFT teaches the brain to modulate excitatory and inhibitory patterns of specific neuronal assemblies and pathways based upon the details of the sensor placement and the feedback algorithms used thereby increasing flexibility and self-regulation of relaxation and activation patterns.

The International Society for Neurofeedback and Research (see www.isnr.org) is the largest group of licensed professionals involved in the practice, teaching, and research of NFT. Some members of ISNR have sought and received certification by the Biofeedback Certification Institute of America (see www.bcia.org). Members of ISNR subscribe to a code of ethics providing an added measure of accountability to the standards of their profession. Additionally, ISNR is committed to supporting new developments by publishing a professional journal and newsmagazine, by producing a well-attended annual conference, and by encouraging large studies of NFT through the ISNR Research Foundation.

WHAT IS ISNR?

The International Society for Neurofeedback and Research was founded in 1992 "to promote excellence in clinical practice, educational applications, and research in applied neuroscience in order to better understand and enhance brain function." The Society is composed of nearly a thousand practitioners and academicians who are interested in affecting human behavior in health and disease by influencing brain physiology, principally by brain wave biofeedback. The society has fostered research directly through its own funding (the ISNR Research Committee), has published a peer reviewed scientific journal (the Journal of Neurotherapy) and has held annual scientific meetings. Details about the Society, its meetings, its directly sponsored research, and its journal can be found at the Society's web site <http://www.isnr.org>.

WHAT IS THE ISNR RESEARCH FOUNDATION?

With the emphasis on research and development of neurotherapy - through four years of direct sponsorship of research projects, through twelve volumes of the Journal of Neurotherapy and through seventeen annual scientific meetings, the Society is embarking on a new phase of research emphasis. Through the Research Foundation – a separately established and governed 501(c) 3 corporation, ISNR seeks to channel funding from individuals and foundations to qualified academic researchers to conduct well designed large-scale studies that will determine efficacy of neurofeedback. To this end the research foundation will engage in a number of strategies. One will be to dialog with academics and departments interested in neurofeedback to foster research capabilities and interest and graduate studies. A key part of this process is to identify researchers and institutions capable of performing large-scale studies. Another will be to collaborate with researchers and research-supporting institutions to establish criteria for definitive studies, and determine – for instance – what conditions are suitable for sham controls, and which study designs are optimal for conditions studied. A third will be ongoing support and monitoring of research funded through the Foundation, with strict performance, ethical and accountability standards. Finally, the Foundation will inform the general public and health care providers about advances in knowledge, quality, credibility and availability of neurofeedback services.

To finance these strategies the Foundation will pursue funding from interests that share the objective of improved and accessible patient care for the disorders that appear to benefit the most from neurofeedback and other neurotherapy interventions. Identifying and contacting and dialoging with these interests will be ongoing.

WHY MORE RESEARCH IS VITAL

Practitioners of neurofeedback know how potent this therapy can be in a wide variety of disorders. Many times our patients/clients have been inadequately treated with other therapies and adding neurotherapy to their treatment regimes makes a huge clinical difference. Yet neurofeedback remains a therapeutic option available to the few – most often those who have become convinced of the effectiveness of neurofeedback through word of mouth and who have the ability and motivation to self-pay. Because neurofeedback lacks large randomized and controlled studies that can demonstrate its efficacy and specificity, it is not widely accepted as a mainstream therapy and is not recognized by third party payers. As a result hundreds of thousands of people with afflictions including autism related disorders, post concussive disorders, attention deficits disorders, substance use disorders and other disorders known to respond to neurofeedback can not avail themselves of this therapy. These include children with ADHD and Asperger's syndrome, returning veterans with brain injuries and PTSD, and a growing incarcerated population of persons with substance abuse. The societal impact of more treatment options for these and other conditions is obvious. The objective of the Foundation is improved quality of and accessibility to neurofeedback through sound science. The Foundation believes that it is possible scientifically to further assess the efficacy of non-medication, brain physiology based treatments. To do this requires substantial funding. While some public funding is available through governmental agencies such as the National Institutes of Health, competition for these funds requires substantial data and experience from other studies. The Foundation intends to facilitate these other studies, enlisting the best of academia in this pursuit.

WHY WE NEED HELP NOW

The Foundation is just starting – beginning its first year and has a vision (above) that will refine through dialog and collaboration and insight as it evolves. The focus of this first year is to initiate and guide a long-term process that will yield advances in quality and accessibility of care for those who suffer from brain dysfunctions such as autism, attention deficits, brain injuries, addictive disorders, affective disorders and others amenable to neurofeedback. The economy is stressed at many levels, and foundations and academic institutions and other endowment-holding organizations are forced to reorganize and reallocate increasingly scarce resources. Nevertheless, the Foundation believes that now is the time to begin its quest of long-term development in support of improved care.

NEUROFEEDBACK SUCCESS



ADHD

*"My child healed from the issues 90% of what I originally hoped to address. Overall, I feel that the results of my therapy far exceeded my original expectations." **RT, San Francisco***



AUTISM

*"Even three weeks into neurofeedback we started seeing improvement--and it's a year later and my daughter's been doing really well. She can maintain eye contact and dialog for longer periods of time. As an added bonus, her quality of school work is improving. Now there's a hope and a future, a bright one." **TM, Long Island, NY***



TBI

“When I started biofeedback, I had memory and cognitive processing issues and paralysis on the left side of my body due to a work injury. The neurofeedback improved my memory and thinking. With the biofeedback, I had a total breakthrough in the paralysis on the left side of my body. The repetitious hand/arm exercises established strength and better function. The muscle movement pattern got better with each session. Both therapists helped me very much. I believe both forms of biofeedback are a necessity for anyone who has had a mild brain injury and/or muscular injury.” **GF, San Rafael, CA**



EPILEPSY

“When Beth was diagnosed with Epilepsy, her neurologist put her on anti-seizure medications that caused symptoms ranging from sleepiness to clumsiness to headaches and constant nausea. We decided to try neurofeedback in hopes to get her off the medications. After 50 sessions of neurofeedback, Beth’s seizure activity was reduced by 75% and they were much less intense. This was 5 years ago and they continue to remain at the lower frequency. She has been medication-free for 4 years.” **PL, St. Louis, MO**



ISNR SPONSORED RESEARCH AWARDS

In 2004 ISNR established a research committee to raise funding and invite proposals from researchers in clinical and academic practice for research projects that would advance knowledge in the field of neurotherapy. Because of the limited resources, projects considered were necessarily limited in scope and likely to demonstrate the feasibility of new technology and/or gather pilot data. In every case of award the contributions of equipment, salaries, clinical services and other in kind contributions exceeded the amount of the award by a factor of at least twice the award. A number of proposals were submitted and evaluated during the life of the committee from 2004 to 2007 and the following awards were made.

2004

1) \$20,000 awarded to Mario Beauregard, PhD (Principal Investigator) and Johanne Levesque, PhD (Co-Investigator) of the Department of Psychology at the University of Montreal for their project "Effect of Neurofeedback Training on the Neural Substrate of Executive Deficits in ADHD Children." In this study standard instruments assess the effectiveness of neurofeedback therapy (NFT) on attentional performance and fMRI assesses the effect of NFT on activation of the anterior cingulate cortex and other areas of interest while the participants perform attentional tasks. This study is the first attempt at delineating functional neuroplasticity associated with NFT and increases our knowledge and understanding of the neurobiological effects of NFT on the neural substrate of executive deficits in ADHD children. This is the first study to use an imaging measure of brain physiology other than EEG to assess the outcome of NFT. Funding from the ISNR research fund was used for research salary, participant reimbursement and the cost of doing fMRIs.

Study completed and published as:

Beauregard, M., & Levesque, J. (2006) Functional magnetic resonance imaging investigation of the effects of neurofeedback training on the neural bases of elective attention and response inhibition in children with attention-deficit/hyperactivity disorder. Applied Psychophysiology & Biofeedback, 31(1):3-20.

Levesque, J., Beauregard, M., & Mensour B. (2006) Effect of neurofeedback training on the neural substrates of selective attention in children with attention-deficit/hyperactivity disorder: a functional magnetic resonance imaging study. *Neuroscience Letters*. 394(3), 216-221.

2) \$2,000 awarded to Marco F. Congedo, PhD of the IRISA (Institute for Research in Informatics and Random Systems), Rennes, France in support of his study, "A 3-D Real-Time Virtual Brain Navigation Environment for Immersive EEG Biofeedback." This study is a further step in the development of more powerful neurofeedback paradigms through the creation of a true 3-dimensional real-time brain navigation system. Such a system should be able to record EEG from 19 to 64 locations and represent the 3-D brain activity as a virtual environment as close as possible to the actual human brain. It is being done within the SIAMES team (Computer Generated Images, Animation, Modeling and Simulation) located in the Institute for Research on Informatics and Random System (IRISA), Rennes, France. SIAMES (<http://www.inria.fr/recherche/equipes/siames.en.html>) is a team of more than 20 engineers and computer science experts affiliated with two French National Institutes of Research (INRIA and CNRS) and with the University of Rennes. According to Dr. Congedo, "possible applications of the technique include the treatment of epileptic foci, the treatment of specific brain regions damaged as a consequence of traumatic brain injury, and in general of any specific cortical electrical activity. The system can be used for research in Neurofeedback, Brain-Computer Interaction, and general electrophysiological research. The system will disclose a whole new universe of applications and will probably represent the most powerful and immersive real-time virtual representation of electrical brain activity to date." The outcomes of this study will be in the public domain. Funding from iSNR research fund provided for electrocaps and other supplies. The bulk of the funding for this complex project came from the French government.

Study is ongoing and published as:

Arrouët C., Congedo M., Marvie J-E., Lamarche F., Lécuyer A., & Arnaldi B. (2005), *Open-ViBE: a 3D Platform for Real-Time Neuroscience*, *Journal of Neurotherapy*, 9(1), 3-25.

2005

1) \$20,000 was awarded to Mario Beauregard, PhD, Jean-Paul Soucy, MSc, MD, and Johanne Levesque, PhD for their proposed study entitled, "Effect of Neurofeedback Training on Dopamine Neurotransmission in AD/HD Children: A Single Photon Emission Computed Tomography (SPECT) Study." The study was to be done at Département de Psychologie, University de Montreal, Canada. Dr. Beauregard's study to ascertain if the same changes occur in dopamine transmission in neurofeedback treatment that occur in medication (methylphenidate) treatment was withdrawn due to the inability of the investigators to obtain

Canadian approval for the radioisotope ligand necessary for the study. The funding for this study was rolled over to a subsequent 2007 award to this group as detailed below under 2007.

2) \$5,000 was awarded to Rex Cannon M.A. and Joel Lubar Ph.D. of the University of Tennessee for a study to determine the efficacy of low resolution brain electromagnetic tomography (LORETA) neurofeedback training (LNFB) of 14-18 Hz activity in a three-voxel cluster of the left dorsolateral prefrontal cortex (DLPFC). Of particular interest to neurofeedback clinicians is the possibility of using LNFB effectively in sub-cortical and limbic regions. This advance in neurofeedback allows a trainee to focus on electrical activity in deep brain structures.

Study completed and published as:

Cannon, R., Lubar, J., Gerke, A., Thornton, K., Hutchens, T.A., & McCammon V. (2005) EEG Spectral-Power and Coherence: LORETA Neurofeedback Training in the Anterior Cingulate Gyrus. *Journal of Neurotherapy*, 10 (1) 5-31.

Cannon, R., Congedo, M., Lubar, J., & Hutchens, T. (2009) Differentiating a Network of Executive Attention: LORETA Neurofeedback in Anterior Cingulate and Dorsolateral Prefrontal Cortices. *International Journal of Neuroscience*, 119(1):1 - 39.

Cannon, R., Lubar, J., Sokhadze, E., & Baldwin, D. (2008) LORETA Neurofeedback for addiction and the possible neurophysiology of psychological processes influenced: A Case Study and region of interest (ROI) analysis of LNFB in right anterior cingulate cortex (ACC). *Journal of Neurotherapy*, 2008, v. 12, N 4.

2006

1) Joe Horvat, PhD and Jonathan Walker, MD received a \$20,000 per year award for a two year multi-site study of traumatic brain injury (TBI) and EEG biofeedback. This study, still in progress, relies on substantial donations of equipment by Thought Technology. The study aims to estimate the efficacy of neurofeedback (NFB) to ameliorate neurocognitive symptoms in patients with traumatic brain injury. The primary outcome is total symptom score, measured on the neuropsychological symptom survey, the Iva, a patient constructed Primary Concern Scale and the Microcog. The authors hypothesize that patients assigned to NFB will exhibit significantly lower symptom scores as compared to patients receiving only standard care groups. The study will also examine changes in QEEG maps of patients treated with NFB for traumatic brain injury. This study has been delayed due to the untimely death of the PI, Joe Horvat.

2) Graduate Student, Andrew Hill of the UCLA, Psychology Department was awarded a \$5000 grant for his proposal "EEG Biofeedback Training of Lateralized Networks of Attention: What Actually Happens During EEGBF?" Proposal supervision was to be by Dr. Eran Zaidel, PhD

and Dr. Jack Johnstone, PhD. The proposed research aims to vigorously assess EEG Biofeedback techniques in clinical use by combining assessment of ERP and spectral EEG with a new behavioral test of lateralized attention. This is especially important as clinical EEGBF practices differ widely regarding choice of left, right, and interhemispheric training. This study was unable to be completed due to several conflicts, and the funding was returned.

2007

1) A \$1000 award for a Pilot Project to Ascertain Utility of the Tower of London Test (TOL) to Assess Outcomes of Neurofeedback in Clients with Asperger's Syndrome. Bojana Knezevic (PI), Lynda Thompson, and Michael Thompson. This project assesses the utility of the Tower of London (TOL), an individually administered neuropsychological instrument designed to assess higher-order problem solving – specifically executive planning (EP) abilities – in children and adults. The goal of the current study is to investigate the effects of neurofeedback and training in metacognitive strategies on EP in children with Aspergers Syndrome (AS) as tested by TOL. In addition, these changes are expected to correlate with improvements in AS clients noted in the previous research on IVA, TOVA, and questionnaire data. Preliminary results show that AS individuals seem to improve their planning and problem solving performance, approach to the task, problem solving speed, response to failure and frustration ability, and flexibility in altering problem-solving efforts. Currently, 30 consecutive AS clients have been tested and 14 comparison group participants in order to obtain pre-NFB data. Post-NFB data has been obtained on 14 AS clients.. Current trends of decreased symptomatology on questionnaire data and performance improvements on IVA and TOVA are expected to reach significance once the sample size increases.

2) A \$12,000 grant for Neurofeedback and Motivation Enhancement Therapy Based Bio-Behavioral Treatment in Psychoactive Substance Use Disorder (PSUD) awarded to Estate (Tato) M. Sokhadze, Ph.D., University of Louisville. Cocaine addicts are very difficult-to-treat having features of low motivation to change and reluctance to enter inpatient treatment. Motivational Interviewing (MI) (referred also as Motivation Enhancement Therapy [MET]) is designed to increase the compliance and probability of treatment entry and abstinence. Due to its brevity, MI is best suited to enhance compliance and facilitate treatment engagement. This project proposes that a combined application of neurofeedback and motivational interviewing techniques will be an effective intervention for cocaine addiction. It also studies the application of cognitive ERP and qEEG for post-treatment assessment. The overall goal of this project is to utilize electrocortical (dense-array ERP, qEEG) variables and measures of behavioral performance on mental tasks (reaction time, accuracy) to explore cognitive functions in patients with cocaine dependence diagnosis and compare recovery of these functions during brief biobehavioral intervention in an outpatient population. This research also proposes to characterize changes in cortical functioning associated with success rate of three arms for cocaine addiction treatment (MET, NFB, combined MET + NFB).

In this study most of the subjects successfully learned to increase sensorimotor rhythm (SMR), but were less successful in simultaneous SMR increase and Theta decrease blocks. Increase of the SMR during successful neurofeedback sessions was accompanied by a general arousal increase as indexed by the parallel increase of beta band power, as well as a significant increase of the skin conductance level and skin temperature decrease. Subjects who completed course of combined neurofeedback and MI intervention showed improvement on behavioral and ERP measures of their executive functions (e.g., conflict detection, error monitoring, cortical inhibition, etc.) and showed decreased reactivity to drug-related cues. Among the clinical outcome measures the most significant was decrease of depression scores (Beck Depression Inventory) and PTSD symptoms (PSS-SR). The drug screens did not show decrease in cocaine use, however the number of positive tests for marijuana use decreased significantly. Motivational interviewing was useful in maintaining a high level of retention in this study. The results of this pilot study support that a combination of motivational interviewing with neurofeedback is a promising approach to biobehavioral intervention for addictive disorders, and specifically for treatment of cocaine addiction in outpatient populations.

This study resulted in several papers:

Sokhadze, E., Stewart, C., & Hollifield, M. (2007) Integrating cognitive neuroscience methods with neurofeedback therapy in treatment of substance use disorder comorbid with PTSD. Journal of Neurotherapy, 11(2), 13-44.

Sokhadze, T.M., Cannon, R., & Trudeau, D.L. (2008) EEG biofeedback as a treatment for substance use disorders: Review, rating of efficacy and recommendations for future research, Applied Psychophysiology & Biofeedback, 33 (1), 1-28.

Sokhadze, E., Stewart, M., Hollifield, M., El-Baz, A., & Tasman, A. (2008) Attentional bias to drug- and stress-related pictorial cues in cocaine addiction comorbid with PTSD. Journal of Neurotherapy, V 12, N 4, 205-225

Sokhadze, E., Stewart, C., Hollifield, M., & Tasman, A. (2008) Event-related potential study of executive dysfunctions in a speeded reaction task in cocaine addiction Journal of Neurotherapy, v. 12, N 4, 185-204

And also several pending grant applications:

NIH-NIDA, R21-DA027157 : (PI) Executive dysfunctions and emotional abnormalities in cocaine addiction. Submitted on 10/19/2008. 2 years, \$275,000, pending review.

NIH-NIMH, R01-MH083697-01: (PI) Integrated behavioral treatment and cognitive assessment of adolescents with dual diagnosis, Submitted on 11/06/2007, 5 years, \$1,200,000 (pending resubmission).

Grants in preparation (January-February 2009 cycle): NIDA, R01, (PI) Behavioral therapy integrated with neurofeedback in treatment of adolescent drug abusers with comorbid ADHD.

3) A \$20,000 award for Effects of Neurofeedback Training on Spatiotemporal Patterns of Response Inhibition in AD/HD Children: A Magnetoencephalography Study to Mario Beauregard and Johanne Lévesque, University of Montreal.

This study cross correlates outcome of neurofeedback training on performance tests, QEEG and magnetoencephalography (MEG.) Like previous studies by Dr. Beauregard which employed PET scanning and MRI correlates of QEEG and performance changes, this study offers to strengthen ADHD neurotherapy validation using an image technology other than QEEG to display neurophysiologic evidence of remediation of performance deficits. Eight subjects have been enrolled. The recruitment process is relatively slow given the stringent nature of the inclusion/exclusion criteria

**ISNR RESEARCH FOUNDATION
BOARD OF DIRECTORS
&
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2008-2009 BOARD OF DIRECTORS

President

David L. Trudeau, MD, is the editor emeritus of the *Journal of Neurotherapy* and has served as chair of the ISNR research committee since its inception four years ago. He directed the Neurofeedback Lab in the Department of Psychiatry at Minneapolis Veterans Affairs Medical Center for ten years, prior to his retirement in 2000. He has served as Assistant Professor in the Department of Family Practice and Community Health in the Academic Health Center at the University of Minnesota and in the Department of Psychiatry at the University of Kansas-Wichita. He currently holds the rank of Adjunct Associate Professor at the University of Minnesota. He is a career addictionist and has been the recipient of grants from the Center for Addiction and Alternative Medicine Research under the Office of Alternative Medicine, NIH. He has been active in the teaching of medical students, psychiatry and family practice residents and addiction fellows in addiction medicine and brain wave biofeedback. He has authored forty-four scientific articles in the fields of neurofeedback, QEEG, and addiction medicine. He has co-chaired annual national scientific meetings of ISNR, and has served on the board of directors.

President-elect

M. Barry Stermán, PhD received his degree in Psychology and Neuroscience, from the University of California at Los Angeles in 1963. He received his undergraduate degree in psychology also from UCLA. His academic appointments include

- *Research Psychologist, V.A. Medical Center, Sepulveda, Calif. 1963 – 1997,
- *Lecturer, Dept. of Psychology, Yale University, 1964,
- *Assist. Prof., Dept. of Anatomy, School of Med., UCLA, 1965-69,
- *Visiting Associate Prof., Inst. Brain Research, Univ. of Tokyo, 1967,
- *Assoc. Prof., Depts. of Anatomy and Psychiatry, UCLA School of Med., 1969-1975,
- *Attending Staff, Neonatal Service, County/USC Medical Center, 1973-83,
- * Professor, Depts. of Anatomy and Psychiatry, Step IV, UCLA School of Medicine, 1975 – 1998,
- * Professor Emeritus, Depts. of Neurobiology and Biobehavioral Psychiatry, UCLA School of Med., 1998-Present and
- * Faculty, Collaborative Centers for Integrative Medicine, UCLA, 2004-Present.

Dr. Stermán is a Fellow in the NIMH Mental Health Training Program, Brain Research Institute, UCLA, actively involved from 1960-63 and was active in the National Science

Foundation Sleep Research Exchange Program, UCLA/University of Tokyo from 1967 to 1970. His most recent publications include:

Sterman, M.B. Functional patterns and their physiological origins in the waking EEG: Implications for Event-related EEG responses. In: *Event-Related Desynchronization. Handbook of Electroencephalography and Clinical Neurophysiology, Revised Series, Vol. 6. G.* Pfurtscheller and F.H. Lopes da Silva, (Eds.), Elsevier Science B.V., Amsterdam, Chapter 3, 33-49, 1999.

Sterman, M.B. Basic concepts and clinical findings in the treatment of seizure disorders with EEG operant conditioning. *Clinical Electroenceph.*, 2000, 31(1): 45-55.

Sterman, M.B. EEG markers for attention deficit disorder: pharmacological and neurofeedback applications. *The Child Study Journal*, 2000, 30(1), 1-23.

Sterman, M.B. and Kaiser, D.A. Comodulation: A new QEEG analysis metric for assessment of structural and functional disorders of the CNS. *J. Neurotherapy*, 2001, 4(3): 73-83.

Egner, T, Sterman, M.B. Neurofeedback treatment of epilepsy: From basic rationale to practical application. *Expert Reviews in Neurotherapeutics*, 2006, 6, 247-257.

Treasurer

Richard E. Davis, MS is a licensed counselor in private practice in the Dallas/Fort Worth, Texas metro area. He holds two Masters Degrees, a Masters in Labor and Industrial Relations and a Master's in Counseling and Human Development with a concentration in biofeedback from the University of North Texas. He is also certified in EEG Biofeedback by the Biofeedback Certification Institute of America and has been involved in Biofeedback/Neurofeedback for 17 years working almost exclusively with Neurofeedback and EEG for the last 12 years. He is a former Treasurer and Board Member for the Biofeedback Society of Texas, and is presently completing a two year term as Treasurer for the International Society of Neurofeedback and Research. He is also a Board Member of the EEG Division of the Association for Applied Psychophysiology and Biofeedback. Richard also holds a Bachelor of Business Administration Degree in Production/Operations Management and has had many years of varied business experience to bring to the Treasurer's position.

Secretary

Jane Kingston, PhD was licensed in 1989 as a marriage and family therapist, and practice in Half Moon Bay, CA. She has been in private practice since 1993. Her training for neurofeedback was obtained in 1997 in San Francisco, and this modality accounts for about half her practice.

Her not-for-profit board experience includes various offices (including president) in the Santa Clara Valley Chapter of CA Marriage and Family Therapists, Secretary and Director of the Half Moon Bay Family Council, and Treasurer of the Northern California Psychologists for Social Responsibility. In a previous career, she gained extensive experience as a technical writer and editor, all within the scientific academic community, at MIT, Lawrence Berkeley Laboratory, EG&G, and the Department of Energy, and as education coordinator in the Computer Center at Stanford. She has written grants to raise funds from various foundations, and is familiar with the world of foundations and government funding agencies.

Sergeant at Arms

Lynda Kirk, MA is a Phi Beta Kappa graduate of the University of Texas at Austin and is a Licensed Professional Counselor in the state of Texas. As a public health Peace Corps volunteer in West Africa, she became interested in mind-body phenomena, which led her to begin her study of biofeedback. Lynda is the founder and clinical director of the Austin Biofeedback and EEG Neurotherapy Center where she directs a staff of clinicians and sees clients for all applications of biofeedback and neurofeedback. Lynda is past-president and Foundation Board member of the Association of Applied Psychophysiology and Biofeedback (AAPB). She is past-president and Fellow of the International Society for Neurofeedback and Research (ISNR) and past-president of the Biofeedback Society of Texas. Lynda is a BCIA-Senior Fellow in biofeedback and a BCIA-Fellow in EEG neurofeedback. She is a Diplomate in Quantitative EEG (QEEG).

Members at Large

John K. Nash, PhD is Licensed Psychologist in the State of Minnesota. He received his Bachelor of Science degree in biology/biochemistry from Princeton University in 1968. He received a Master's degree for work at the Institute for Neurological Science at the University of Pennsylvania.

His Psychology Ph.D. is from the University of California, Santa Barbara, where his dissertation involved human EEG research on attention and perception. He received National Institutes of Health-sponsored postdoctoral training in one of the first four Behavioral Medicine training programs in the U.S., at the New Jersey Medical School. He completed his postdoctoral internship at the Clinical Psychology Department, Iowa Methodist Medical Center in Des Moines. He has worked with psychological, emotional and physical problems for over 25 years, using cognitive behavior therapy and biofeedback.

Dr. Nash's professional activities have included working in a large multi-specialty medical practice in the Twin Cities, being Clinical Director of a Community Mental Health Center, evaluating human EEG and biofeedback research for NASA and operating his own private practice in the Twin Cities since 1987.

Dr. Nash helped found the Society for the Study of Neuronal Regulation (now our International Society for Neurofeedback and Research) and was its President in 2000. He participated in the early efforts in neurofeedback certification. He has published on neurotherapy and EEG in peer reviewed journals including *Clinical Electrophysiology*, *Journal of Adult Development*, *Memory and Cognition* and *Psychophysiology*. He is a Consulting Editor for the *Journal of Neurotherapy*. He also has extensive experience speaking and consulting with management and professional groups.

Charles (Dick) Stark, MD was educated at the University of Michigan Medical School and School of Public Health. He then spent 17 years doing epidemiological research at NIH (National Cancer Institute and National Institute of Child Health and Human Development) and the FDA (Bureau of Radiologic Health). His second career in clinical Family Medicine lasted to the present and merged with his current 3rd career in EEG and Peripheral/Autonomic

Nervous System Biofeedback. His current 3rd career emphasizes hands-on clinical activities and clinical research.

Estate (Tato) Sokhadze, PhD received Ph.D. in Human Physiology in 1988 (Novosibirsk, Russia). He completed post-doctoral fellowship in Psychopharmacology at Wake Forest University in 2001-2003, and post-doctoral training in Cognitive Neuroscience at Rice University in 2004. Currently Dr. Sokhadze is an Assistant Professor of Psychiatry and Behavioral Sciences at University of Louisville and a Director of Evoked Potential Lab at Cognitive Neuroscience Labs. His research interests include application of dense-array EEG/ERP brain mapping, neurofeedback, TMS, and other applied psychophysiological techniques in psychiatric research. Specific psychopathology areas of interest are substance abuse, PTSD, autism, conversion disorder, bipolar disorder, and comorbid mental conditions.

International Member at Large

Efthymios Angelakis, PhD is Director of the neuropsychological lab of the Department of Neurosurgery at the University of Athens Medical School, research associate of the Hellenic Neurosurgical Research Center, and he has a private practice for neuropsychological assessment and neurofeedback. He received his Ph.D. from the Department of Psychology at the University of Tennessee, and he did his postdoctoral research and training at the University of Pennsylvania and at Drexel University Psychology Departments in cognitive neuroscience. He specializes in clinical and experimental neuropsychology, quantitative EEG (qEEG) analysis, and neurofeedback and his research interests include innovative applications of neurofeedback and transcranial Direct Current Stimulation, neuropsychology of epilepsy, Dystonia, and brain injury, as well as in the study of cognitive processes in Persistent Vegetative State and Minimally Conscious State.

Executive Director

Cynthia Kerson, PhD has been the Executive Director for ISNR since 2006. She brings with her knowledge of the Society and of the field of neurotherapy. Dr. Kerson received her PhD through the University of Natural Medicine in Clinical Psychophysiology. She is also in private practice in San Rafael, California.

ADVISORY COMMITTEE

Martijn Arns studied Biological Psychology at the Radboud University Nijmegen (The Netherlands). After several projects in the Westmead Hospital, the Max Planck Institute in Munich and Organon Research in Newhouse, he started his own company focused on applied neuroscience in 2001: Brainclinics.

His focus is to bring neuroscience research out of the laboratory with the goal to improve diagnostics and treatments in mental health care. He is specialized in Personalized medicine, diagnostic services and treatment of brain related disorders using techniques such as QEEG, neuropsychological assessments, Neurofeedback and TMS. The main focus is on personalizing treatment and diagnosis in order to get more targeted and efficacious treatment.

Martijn Arns is director of Brainclinics Diagnostics B.V. (formerly known as Brain Resource Company Netherlands) and Brainclinics Treatment B.V., Chairman of the Applied Neuroscience Foundation, advisor for the Brain Resource Company and was founding director of Brainquiry B.V until July 2007.

Mario Beauregard, PhD is currently associate researcher at University of Montreal (Departments of Psychology and Radiology, Neuroscience Research Center). He is the author of more than 100 publications in neuroscience, psychology and psychiatry. Dr. Beauregard is the co-author and editor of *Consciousness, Emotional Self-Regulation and the Brain*. Because of his research into the neuroscience of consciousness, he was selected by the World Media Net to be among the "One Hundred Pioneers of the 21st Century." His groundbreaking work on the neurobiology of emotion and mystical experience at the University of Montreal has received international media coverage. In 2006, he received the Joel F. Lubar award for his contribution to the field of neurotherapy. The National Film Board of Canada has produced a documentary film about his work titled *The Mystical Brain* (2007). Recently, Dr. Beauregard has published a new book titled *The Spiritual Brain*.

Marvin Berman, PhD is a licensed psychologist in Pennsylvania and President of the Quietmind Foundation and Quietmind Associates a comprehensive Neuropsychology and psychotherapy practice located in Plymouth Meeting, PA. Quietmind Foundation has been involved in neurofeedback research for since the early 1990s with a focus on dementia research and ADHD and conduct disordered children in the public mental health system. Currently he is directing a study on the efficacy of neurofeedback on executive functioning in early stage dementia. Dr. Berman is a member of the Quietmind Foundation's Institutional Review Board (IRB) that offers monitoring and approval of safety and ethical treatment of subjects as well as consultation on the conducting of clinical research for clinicians seeking to get involved in research. Dr. Berman and his group offer training and professional development programs for psychiatry residents and clinical psychology graduate students through internships and practicums.

David A. Kaiser, PhD is an applied clinical neuroscientist with entrepreneurial and academic experience. He develops quantitative EEG tools for a living. He is Editor of the *Journal of Neurotherapy*, fellow of the International Society for Neurofeedback and Research, President-elect of the Neurofeedback Division of the Association for Applied Psychophysiology and Biofeedback, and has taught neuropsychology and neuroscience courses, including quantitative EEG analysis, at the Rochester Institute of Technology. Dr. Kaiser's Ph.D. is in

Psychology from University of California at Los Angeles, he also has an M.F.A. from University of Iowa, and a B.A. in English from Cornell University.

Joel F. Lubar, PhD received his B.S. and Ph.D. from the Division of the Biological Sciences and the Department of Biopsychology at the University of Chicago. Dr. Lubar has published more than 130 papers, wrote many book chapters, and eight books in the area of neuroscience and applied psychophysiology. He has been an Associate Editor for the *Journal Physiology and Behavior*, and an Associate Editor for *Biofeedback and Self Regulation*, Associate Editor for the *Journal of Neurotherapy*, and a member of the Editorial Board for the journal of *Applied Psychophysiology and Biofeedback*. He was an Assistant Professor at the University of Rochester, a Senior Faculty Science Fellow for the National Science Foundation at the UCLA School of Medicine, a visiting professor at the Institute of Physiology of the School of Medicine of the University of Bergen in Norway and is currently a Full Professor and now Professor Emeritus at the University of Tennessee. Dr. Lubar had been President of the Academy of Certified Neurotherapists which he incorporated into the Biofeedback Certification Institute of America EEG Specialty area (BCIA-EEG). He has been president of the EEG Division of the Association for Applied Psychophysiology and Biofeedback (AAPB) and was President of AAPB in 1996-1997. He was President of the International Society for Neuronal Regulation (ISNR). Dr. Lubar has been co-director of Southeastern Biofeedback Institute in Knoxville and Pompano Beach, Florida since 1979.

Dr. Lubar was responsible for developing the application of EEG biofeedback (neurofeedback) as a treatment modality for children, adolescents, and adults with attention deficit hyperactivity disorder. This endeavor began with controlled double blind cross over studies in the mid 1970s.

This application of neurofeedback is one of the largest and used in clinics and schools throughout the United States, Canada, parts of South America, Europe, Israel, and China. Dr. Lubar has presented his research in many workshops in Europe, Japan, Australia, Israel, South America, Canada and to many state and national meetings of biofeedback organizations. He was the first president of the Biofeedback Society of Tennessee. Dr. Lubar was an invited keynote speaker at the Third International Conference in Biobehavioral Self Regulation and Health held in Tokyo, Japan in October 1993. In 1997, Dr. Lubar was invited to present lectures and workshops at the Medical University of New South Wales in Canberra, Australia. Dr. Lubar has been involved in the development of databases for the assessment of individuals with ADD/HD and has been a scientific advisor for a number of organizations that are involved in developing research to validate this application of neurofeedback. In 1992 he and his colleagues published a paper in *Pediatric Neurology* that showed for the first time that children with the inattentive form of ADD without hyperactivity differed significantly in terms of quantitative EEG parameters from matched non-clinical controls. Dr. Lubar is currently involved in research using an inverse solution technique known as Low Resolution Electromagnetic Tomography (LORETA) which allows one to locate current source generators inside the cortex that are responsible for the surface distribution of EEG. He and his colleagues

at the University of Tennessee have trained individuals using LORETA neurofeedback to change activity inside the brain. This has never been done before and has been the first attempt to use the inverse solution for this application.

Andy Merdek, Esq. is vice president of legal affairs, general counsel and corporate secretary for Cox Enterprises, Inc., one of the nation's leading media companies and providers of automotive services. He is responsible for all legal matters, regulatory compliance, litigation management and corporate governance of its roughly 600 subsidiaries and also supervises the CEI Legal Department as well as the work of more than 100 outside law firms. Merdek is a former partner in the law firm of Dow, Lohnes & Albertson of Washington, D.C. and Atlanta, where his counseling and litigation practice included media law, antitrust, mergers and acquisitions. He joined Cox Enterprises in 1987 as vice president and general manager of The Atlanta Journal-Constitution and began his newspaper career on the editorial side as a reporter and editor for the Portland Press Herald and Maine Sunday Telegram. Merdek currently serves as chairman of the Newspaper Association of America's Legal Affairs Committee. A Phi Beta Kappa, Magna Cum Laude graduate of Middlebury College, Merdek is also an Order of the Coif graduate of the University of Virginia School of Law.

Lonnie Nelson, PhD received his degree in Clinical Psychology from the University of Arizona in 2004. He has been involved with ISNR since 2000, when he began working with B. Robert Crago, PhD, as a clinical practicum student. From his first exposure to NF, he has been a strong advocate of research endeavors in the field, and has focused his efforts in this domain toward the notion of Practice-based Research methodologies, largely based on the lack of enthusiasm from the National Institutes of Health for funding studies examining the efficacy of NF for any of the disorders which it is well suited. Dr. Nelson remains active in ISNR as a member of the Student Advocacy Committee, and Chair of the Committee for the Advancement of Research in NF. He is actively pursuing the empirical evaluation of many approaches used by NF practitioners in his work with the Defense and Veterans Brain Injury Center in sites both at the Veterans Affairs Medical Center in Richmond, VA, and the Ft. Carson Army base in Colorado Springs, CO. He will bring strong methodological and practical research knowledge, as well as a creative approach to the many tasks that will face the members of the ISNR Research Foundation.

Minna Ng, PhD received her degree in Psychology with an emphasis on neuroscience in 2007. Minna obtained her graduate training at the University of California, San Diego and the Salk Institute of Biological Studies where she studied the relationship between visual perception and its neural basis using psychophysical and functional magnetic resonance research methods. Currently, she is a post-doctoral fellow at the University of California studying vision in clinical populations.

Robert W. Thatcher, Ph.D. received a bachelor's degree in chemistry from the University of Oregon and a Ph.D. degree in Psychology/Biopsychology from the University of Waterloo before completing postdoctoral fellowships in Neurobiology and Neurophysiology at Albert

Einstein College of Medicine and New York Medical College. In 1973 Dr. Thatcher was appointed as Assistant Professor of Psychiatry at New York Medical College and in 1977 as an Associate Professor of Psychiatry at New York University School of Medicine. In 1979 Dr. Thatcher was appointed as a professor of Psychiatry and Director of the QEEG service at Shock Trauma, University of Maryland before joining the National Institutes of Health in 1991 as the Program Manager for the integration of 128 channel EEG with MRI, PET and SPECT. Dr. Thatcher was the director of the NeuroImaging Laboratory at the Bay Pines VA Medical Center, Bay Pines, FL from 1993 to May 2006 and he is currently the director of NeuroImaging at the Applied Neuroscience Research Institute in Bay Pines, Florida. Dr. Thatcher is an adjunct professor of Neurology in the Department of Neurology at the University of South Florida. As the principal investigator for the Department of Defense Head Injury Program (DVHIP) Dr. Thatcher over saw the collection and analysis of quantitative EEG from over 1,500 head injured patients which also involved the integration of EEG with MRI. Dr. Thatcher currently serves on the National Institutes of Health Scientific Advisory Committee for the NIH Human Brain Map Project and he sits on the boards of the American Board of Electroencephalography and Clinical Neurophysiology and the EEG and Clinical Neuroscience Society. Dr. Thatcher is certified as an expert in both conventional electroencephalography and quantitative electroencephalography (QEEG). Dr. Thatcher is the author of six books and over 200 publications.



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