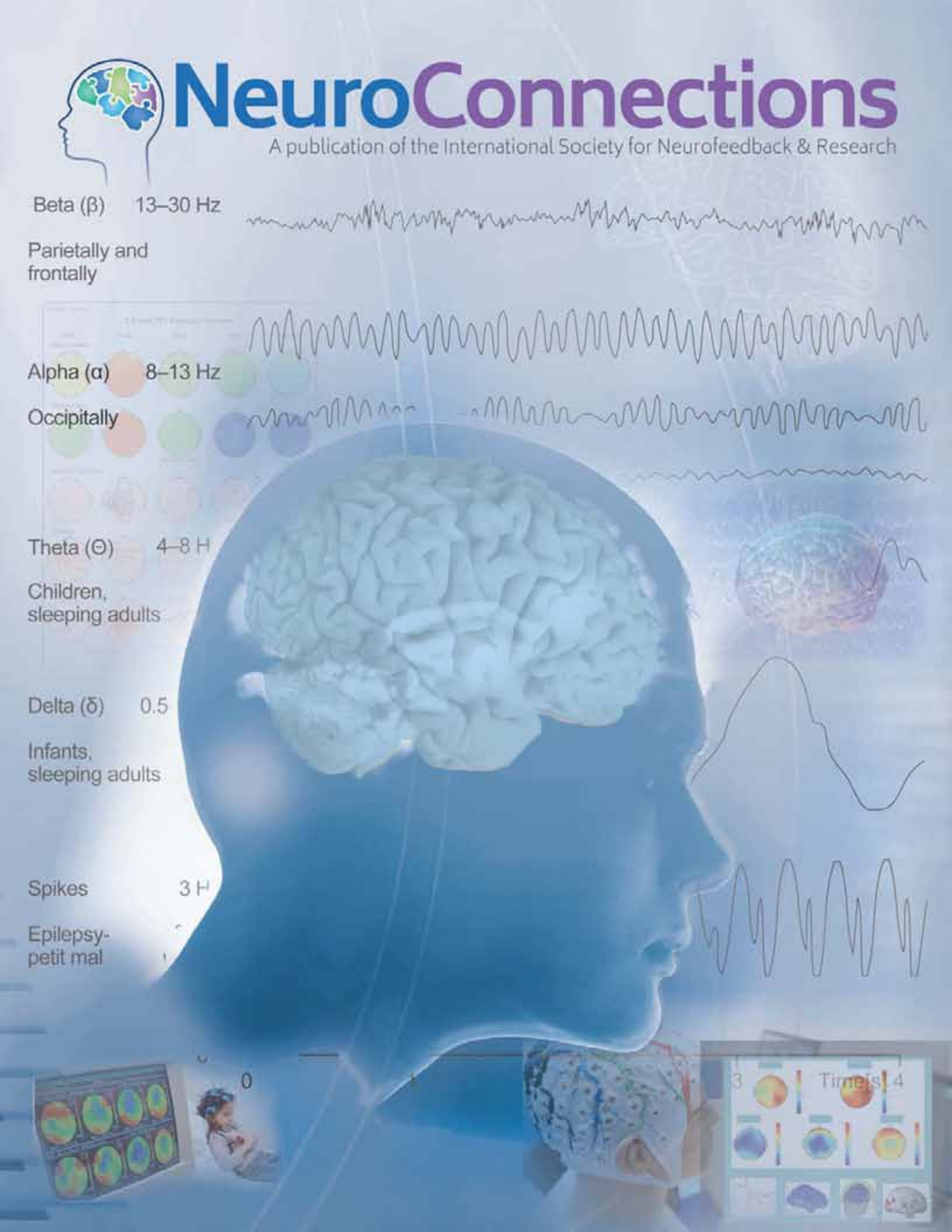
NeuroConnections

A publication of the International Society for Neurofeedback & Research



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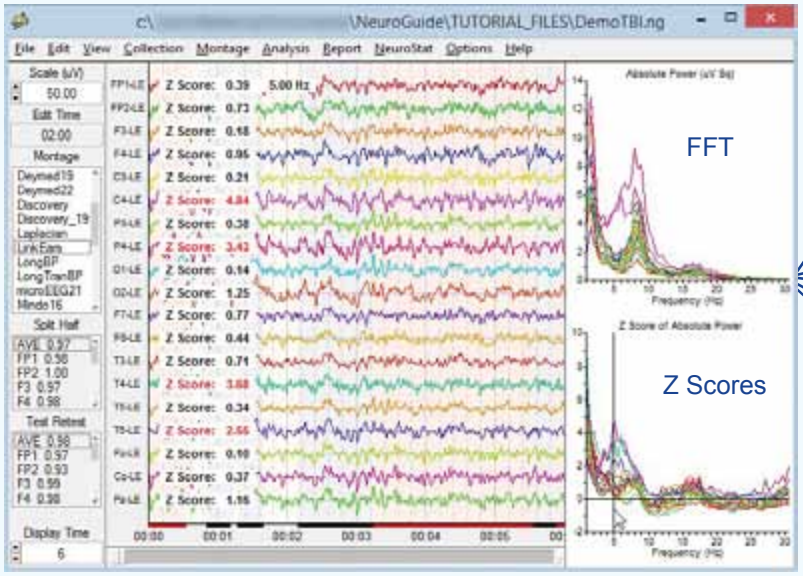

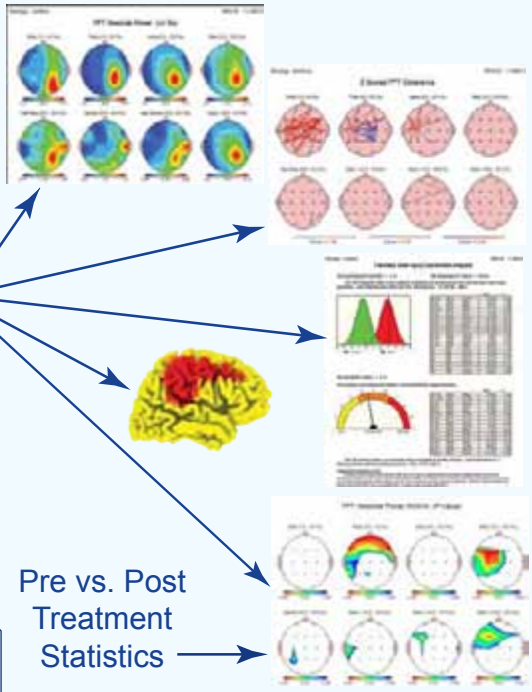

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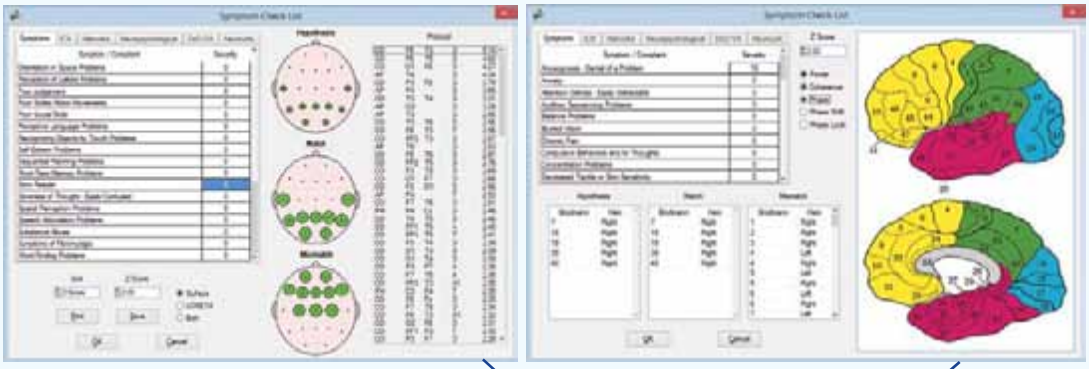

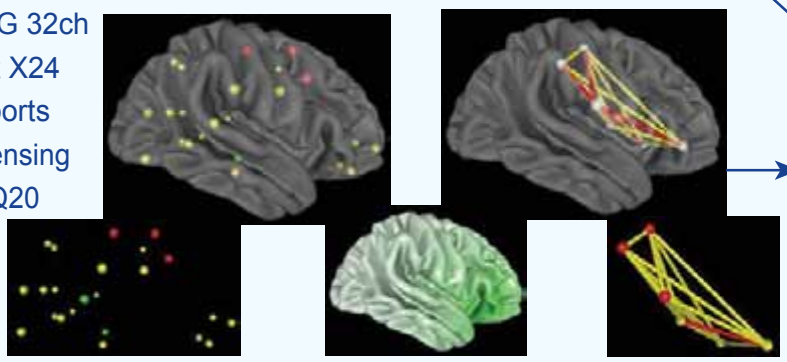

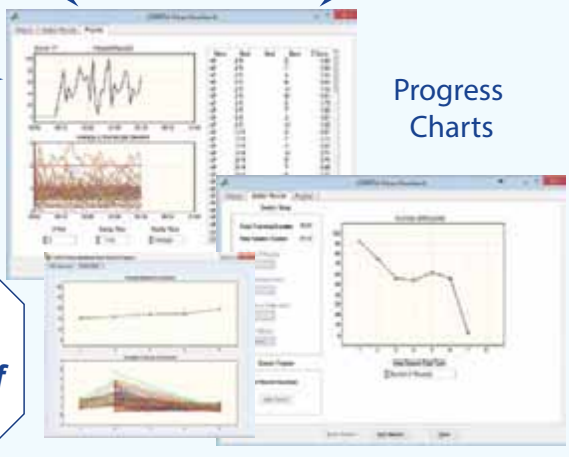

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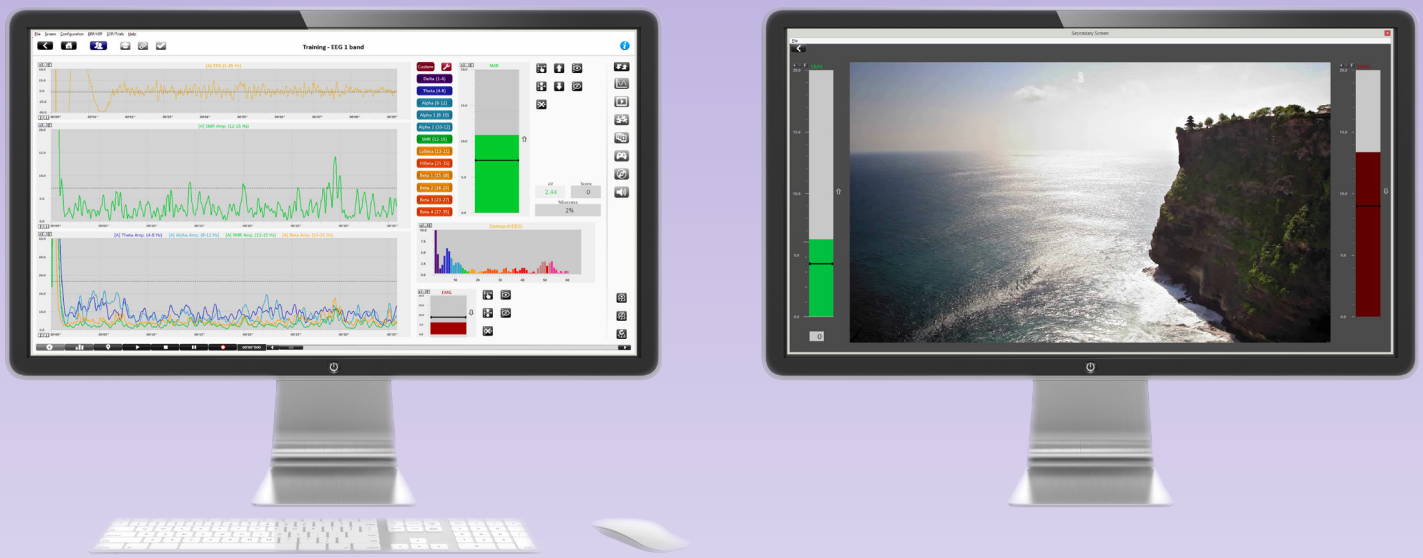

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Welcome to the New *NeuroConnections!*

Robert Coben, PhD, ISNR President

I would like to take this time to welcome everyone to the first issue of the new NeuroConnections! The ISNR board and it's NeuroConnections committee have worked long and hard to make this transformation a reality. I would like to thank them for their tireless efforts and hard work. This includes Amber Fasula, Nancy Wigton, Mark Jones, Pedro Delgado, Angela Gouger and Cindy Yablonski. I would also like to send our appreciation to the previous editors of NeuroConnections, Merlyn Hurd and Roger Riss, for their tireless efforts over many years.

Several months ago, after at least a year of study, we decided to reformat *NeuroConnections*. This was not an easy decision, but we felt was important. This came with other changes to *NeuroConnections*, including moving to an online format only, and AAPB choosing to no longer be involved in this publication. We have appreciated their partnership in this venture for many years.

This change was for many reasons. We wanted NC to be more informational and provide our members and others that might read it with useful aspects of our rapidly developing field. Up to this point, the articles being published in NC were informational but were also presenting scientific information in the form of case studies or small group studies. These articles had started being referenced in the scientific literature with other empirical articles. However, no NC piece was ever subjected to peer review or scientific scrutiny of any kind. This is not a criticism, just a fact. We firmly believe that as our field grows and prospers, the science underlying it must be as empirically and ethically grounded as is possible, for others outside of our field to accept and promote it.

With this in mind, we have taken several steps that we hope will help us grow in the future. First, our journal was transformed to an open-access journal and is now called

Continued on page 13

ISNR Mission Statement

To promote excellence in clinical practice, educational applications, and research in applied neuroscience in order to better understand and enhance brain function. Our objectives are:

- Improve lives through neurofeedback and other brain regulation modalities.
- Encourage understanding of brain physiology and its impact on behavior.
- Promote scientific research and peer-reviewed publications.
- Provide information resources for the public and professionals.
- Develop clinical and ethical guidelines for the practice of applied neuroscience.

Communication from the ISNR Board of Directors

Cindy A. Yablonski, MBA, Executive Director

Over the past several months the ISNR Board of Directors has been engaged in a number of activities to serve the membership.

NeuroConnections re-launch: A new format is offered for the member newsletter, *NeuroConnections*. We welcome your comments and suggestions as we continue to meet the needs of our members. Review back issues of the newsletter.

Membership: ISNR recently welcomed its newest institutional member organization from Spain, Asociacion I&D Neuroterapias. This expands ISNR's Institutional membership to include: Mexico, Australia, The Netherlands, and Switzerland.

ISNRU: The ISNR Education Committee, under the leadership of Robert Coben, PhD as Chair, launched its online educational program ISNR University (ISNRU) in order to support ISNR's mission to promote excellence in clinical practice, educational applications, and research in applied neuroscience in order to better understand and enhance brain function.

ISNRU high-quality training with continuing education credits that is easily accessible online and without commercial bias for the busy neurofeedback professional practicing at any level. Our courses help members meet yearly training and educational requirements. Take advantage of special member pricing today. Learn more about special pricing for ISNRU training.

NeuroRegulation Journal: We would like to take this opportunity to invite submissions of manuscripts to *NeuroRegulation*. As a peer-reviewed journal, *NeuroRegulation* provides an integrated, multidisciplinary perspective on clinically relevant research, treatment, and public policy for *NeuroRegulation* and neurotherapy. Review back issues of NeuroRegulation.

NeuroRegulation welcomes original articles, case studies, critical reviews, commentaries and essays. Submissions are accepted on an on-going basis. Submit your paper or review the criteria.

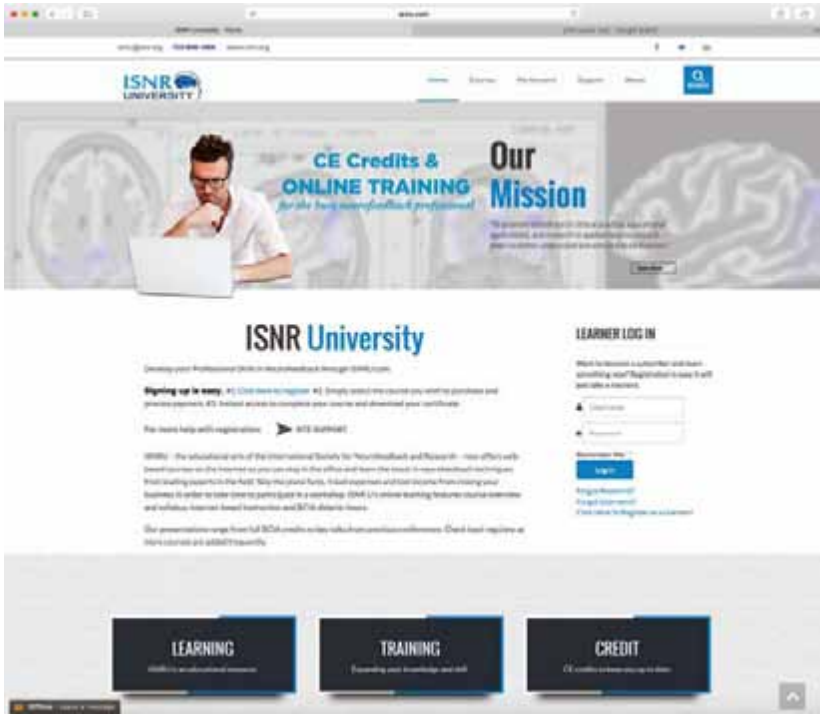
Continued on page 24

ISNR University

Robert Coben, PhD

We are excited to launch ISNR University, also known as ISNRU. This concept has been discussed on the ISNR board for the past 4-5 years and is now becoming a reality. Many people have contributed to this idea over the years, including Anne Stevens, Leslie Sherlin, Randy Lyle and many others. More recently, our ISNRU committee has included Judy Crawford, Michael and Linda Thompson, Fred Shaffer, Don Moss, and Cindy Yablonski.

The mission of ISNRU from the very beginning has been to promote excellence in education and training, and to provide this without any commercial bias or influence. Within this, we attempt to present information at the highest level of scientific credibility possible and extend the reach of these educational efforts all over the world. To this end we are now announcing the launch of ISNRU.com.



Our initial push over the past year or more has been to provide webinars and in-person workshops at the ISNR annual conference. Some of these have now become online courses that one can purchase and view online from anywhere. The initial course offerings include the following:

- Research Evidence Base for Neurofeedback: BCIA Blueprint Area IV—Advanced Level—Roger deBeus, Ph.D
- Current Trends in Neurofeedback—John N. Demos, MA, BCN—Intermediate Level

- Psychopharmacological Considerations For Neurofeedback—David A. Mitnick, MD—Intermediate Level
- Panel Methodologies to Neurofeedback—Sherlin; Wyckoff; Smith; Collura; Cannon; Coben
- Panel—Session Experiences and Opportunities of Brain Training for Athletes—Leslie Sherlin PhD
- Altered Cerebral Connectivity and the Corpus Callosum: Adaptation or Dysfunction—Elliott Sherr MD, PhD
- Moran Cerf—Online, Voluntary Control of Individual Neurons in the Human Brain—Keynote
- An Introduction to Misophonia: Case Reports and Physiological Findings—Miren Edelstein
- Professional Ethics and Standards for Neurofeedback: An Overview—Donald Moss, PhD—Novice Level

Over time, many more course offerings will be made available, including those required for BCIA certification, recertification and more. More ISNRU workshops will be offered at the upcoming ISNR conference in Denver as well. These will include topics related to Learning Disabilities, Slow Cortical Potentials, Intro to NF and QEEG, Sports Concussion, Substance Abuse, Anxiety Disorders, and Developmental Trauma. Preconference workshops include those on Neurofeedback Treatment Implementation, Neuroanatomy, and Working with Raw EEG. These will all be recorded and converted into online courses after the conference.

The goals of ISNRU include:

- Set a standard for the quality of education that is provided for ISNR members and the field of neurofeedback.
- Provide alternatives for didactic training, neuroanatomy/physiology course work, and continuing education opportunities.
- Urge qualified teachers to provide approved training.
- Provide approved education and training in geographical areas where opportunities are less available.
- Provide opportunities for distance/online learning.
- Provide education and training required for BCIA or other board certification.

The following are included in ISNRU's policies and procedures:

1. The ISNR Education Program will provide education in multiple formats and

ISNR University Now Online

The ISNR Education Committee, under the leadership of Robert Coben, PhD as Chair of the committee, is pleased to launch its online educational program under ISNR "U" (University) in order to support ISNR's mission to promote excellence in clinical practice, educational applications, and research in applied neuroscience in order to better understand and enhance brain function.

ISNRU offers high-quality training with CE's that is easily accessible online and without commercial bias for the busy neurofeedback professional practicing at any level. Our courses help members meet yearly training and educational requirements. Take advantage of special member pricing today by visiting www.isnru.com.

LEARN MORE ABOUT SPECIAL PRICING FOR ISNRU TRAINING

ISNRU's Core Objectives

- Augment educational offerings to ISNR members to set a standard for the quality of education that is provided for ISNR members and the field of neurofeedback.
- Provide alternatives for didactic training, neuroanatomy/physiology course work and continuing education opportunities.
- Provide approved education and training in geographical areas where opportunities are less available, and support opportunities for distance/online learning.
- Support qualified educators to provide approved training.
- Provide education and training required for BCIA or other board certification.

Current Course Offerings

- Professional Ethics and Standards for Neurofeedback: An Overview, Donald Moss, PhD
- Psychopharmacological Considerations for Neurofeedback: David A. Mitnick, MD
- Current Trends in Neurofeedback: John Demos, MA, BCIA-N
- Research Evidence Base for Neurofeedback: BCIA Blueprint Area IV, Roger deBeus, PhD
- 2014 ISNR Annual Conference Lectures Highlights (and more available):
  1. Altered Cerebral Connectivity and the Corpus Callosum: Adaptation or Dysfunction, Elliott Sherr, MD, PhD.
  2. An Introduction to Misophonia: Case Reports And Physiological Findings, Miren Edelstein, UCSD psychology PhD candidate and violinist.
  3. Methodologies to Neurofeedback Panel Discussion: Leslie Sherlin, PhD, Sarah Wyckoff, PhD, Mark Smith, PhD, Tom Collura, PhD, Rex Cannon, PhD and Rob Coben, PhD.
  4. Voluntary Control of Individual Neurons in the Human Brain: Moran Cerf, PhD.
  5. Experience and Opportunities of Brain Training for Athletes: Leslie Sherlin, PhD.

Not Yet an ISNR Member

Join now by visiting www.isnr.net to find out about the benefits of membership.

Share with Others

Know someone else who'd like to participate in an upcoming ISNR U educational program?

Questions?

We look forward to your participation in ISNRU soon!

If you have any questions, please feel free to contact Cindy A. Yablonski, MBA, ISNR Executive Director at cyablonski@isnr.org.

settings. This shall include programming at the annual conference, in person workshops, webinars and distance/online learning.

2. The direction of the education program and choices of educational topics presented will be the responsibility of the chair, administrators and advisory board.
3. Presenters will be chosen and be accepted by invitation only. These choices will be made by agreement between the chair, administrators and at least two members of the advisory board.
4. All presenters will complete conflict of interest statements that will permit them to disclose their commercial and other involvements that pertain to the content of their presentations.
5. Presentations provided as part of the annual conference will be provided in consultation and agreement with the conference committee.
6. The content of all education provided will be reviewed prior to its implementation.
7. The content of all courses will be reviewed at their completion to assure that all objectives and content were delivered as anticipated.
8. All education provided will be free of commercial bias, attempts to sell equipment, or advocating for particular software or equipment. The only exception to this will be courses that are specifically geared towards a particular treatment approach.
9. Presenters may provide basic contact information, a description of relevant services they offer and how they might be contacted. Otherwise, solicitation or sales during an educational presentation will be strictly prohibited.
10. All opinions and views expressed by presenters should be tied to scientific findings, to the degree that this is possible.
11. Course completion will include interim and/or post-course examination to assess the participants' understanding of the material. They will be required to pass such an exam or exams to receive credit for the course's completion.

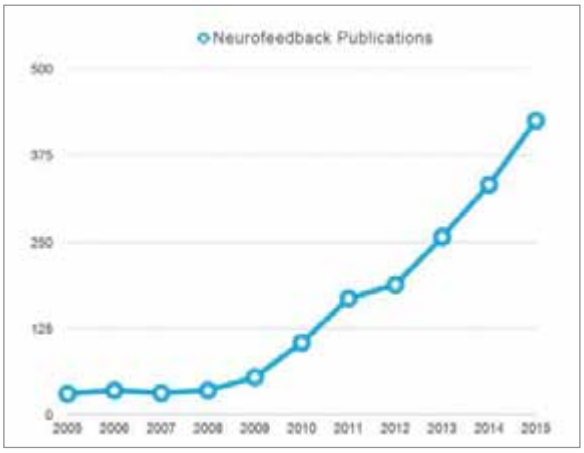
We look forward to the successful launch of ISNRU and welcome any ideas or suggestions. 

Welcome continued from page 6

future. First, our journal was transformed to an open-access journal and is now called *NeuroRegulation* (http://www.NeuroRegulation.org). This journal is already referenced in the Directory of Open Access Journals (DOAJ). Second, we have also tried to move some of our scientific efforts into the neuroscience mainstream by publishing in another open-access journal Frontiers in Human Neuroscience (http://www.frontiersin.org). Thus far, we have published one special issue on seizure disorders (http://journal.frontiersin.org/researchtopic/1951/functional-neuroimaging-neuromodulation-and-neurofeedback-new-frontiers-in-seizure-disorders), and are currently working on another related to Autism Spectrum Disorder. With these as the science arms of ISNR, we have decided to transition *NeuroConnections* into a more informational newsmagazine like other professional organizations (American Psychological Association) have.

We have also changed how the editorial process will take place for NC. We now will have a 10-person editorial board that will attend to multiple aspects of the publication process. This will include a chief, associate and managing editor, director of sales, and section editors related to ISNRU, the ISNR conference, BCIA, International section, Women in Neurofeedback section, and student section as well. We hope that this will make the process more efficient and easier on all involved.

In this inaugural issue there are several articles of interest, including a student article and interview with Dr. Joel Lubar, a focus on international work, a top-10 list for beginners, and an update on neurofeedback in the news. In this latter article, Dr. Kirk Little emphasizes how we are growing, and how research focused on neurofeedback has expanded over the last several years. For example, you will see a graph below that depicts the rapid growth over the last six years in mainstream medical (PubMed) journals. The following methodology was employed to create this graph: for each calendar year, a PubMed search was performed using the term "neurofeedback." The result has been a 1200% increase in such publications over the last six years!



We are all living and working in exciting times for neuroscience and the development and acceptance of neurofeedback and other neuromodulation techniques.

We hope our readers will enjoy this new format and many future issues to come.

ISNR
INTERNATIONAL SOCIETY FOR NEUROFEEDBACK & RESEARCH

Announcing...

THE 23RD ANNUAL ISNR CONFERENCE

Transforming the Field of Neurofeedback through Clinical Practice, Educational Applications and Research

October 15 – 18, 2015

Pre-conference Workshops:
October 12 – 14, 2015

Denver Marriott Tech Center
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- Earn CE's and CME's for your professional development and recertifications by attending educational sessions
- Visit the exhibit hall and attend exhibitor educational workshops to learn about new products and services
- Energize by exchanging ideas with current colleagues and new ones
- The Welcome and Poster Session Receptions will be held in the Exhibit Hall located in the beautiful, state-of-the-art Rocky Mountain Event Center (a 12,000 sq. ft. room with 40' ceilings)!

For more information—visit www.isnr.org

Please Join us at the 23rd Annual Conference

Dan Williams, PT, ISNR Conference Coordinator

Please join us in beautiful Denver, Colorado for the 23rd annual ISNR Conference! This year's Conference will be held October 15th through October 18th, with pre-conference workshops on October 12th through October 14th, at the Denver Marriott Tech Center. This hotel is conveniently located in the prominent Greenwood Village suburb, within walking distance of 20 different restaurants and five minutes from the light rail station, where downtown Denver is a 15-minute ride for $8.00 round-trip. The warm and inviting Colorado lodge atmosphere, generous on-site amenities and services, and signature Marriott hospitality are yours to enjoy during your stay for the conference. Be sure to secure your conference hotel reservations early, as we expect a strong turnout and the room block may sell out.

We are truly proud of this year's entire conference program offerings. The QEEG Didactic Board Certification Exam will be held on site during the conference and we are excited to offer the three-day QEEG Didactic Board Certification Course as part of the pre-conference program. For the second consecutive year, ISNRU, the educational arm of the International Society for Neurofeedback and Res earch, will hold workshops to support its mission: "To promote excellence in clinical practice, educational applications, and research in applied neuroscience in order to better understand and enhance brain function." Also included in the program this year are more overall workshops and expanded small group discussions as options for you to attend to develop your professional skills.

We look forward to welcoming and learning from our keynote speakers, including Mark Gordon, MD, owner and medical director of Millennium-TBI; Sayyed Mohsen Fatemi, PhD, associate, Department of Psychology, Harvard University; Bessel van der Kolk, MD, medical director of The Trauma Center in Boston, MA, Professor of Psychiatry at Boston University Medical School and co-director of the National Center for Child Traumatic Stress Complex Trauma Network; and Dirk DeRidder, MD, PhD, founder and director of the BRAI2N: Brain Research consortium for Advanced, Innovative & Interdisciplinary Neuromodulation.

We are also certain you will be inspired and motivated by our invited speakers,

including Honorable Sam Blakeslee, PhD, former California state senator, founder of the Institute for Advanced Technology and Public Policy at Cal Poly; Lance Iunker, program director, Institute for Advanced Technology and Public Policy, and retired U.S. Army veteran; and Marco Congedo, PhD, research scientist, Centre National de la Recherche Scientifique (CNRS), GIPSA Laboratory, Grenoble, France.

On Friday evening we are holding a special event: a conversation and book signing with Bessel van der Kolk, MD. He is the author of the New York Times best-selling book The Body Keeps the Score: Mind, Brain, and Body in the Healing of Trauma. His book will be available for purchase and signing at the event and all proceeds will benefit the completion of his study of neurofeedback to treat children with histories of trauma, abuse and neglect. Details of the event and the opportunity to purchase limited-availability tickets in advance will be announced soon.

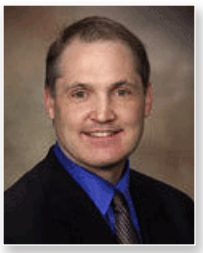
If you are a golfer, or just want to play golf for the day, I hope you will join us for the sixth annual ISNR Golf Tournament at Arrowhead Golf Course on Wednesday, October 14th. The course is reportedly fun and challenging and the scenery is truly breathtaking—large red rocks (arrow heads) jut out of the ground on most holes. You will typically see fox, deer, elk, and other animals on the course. It will be a scramble format with prizes awarded at the banquet dinner. A portion of the proceeds are designated to benefit the ISNRU and Student Advocacy Fund.

Thursday evening in the Exhibitor Hall you will findthe poster session and cocktail reception to showcase the numerous posters, so don't miss out on viewing these high-quality submissions!

Also, back by popular demand for the second consecutive year, is the Casino Night event immediately following the banquet dinner and awards ceremony on Saturday evening. Join your friends and colleagues for an evening of fun and excitement and try your luck on one of the various table games. This event will help raise funds for ISNRU and for students for education, scholarships, awards, and travel. Casino chips will be sold throughout the conference in place of the annual student raffle tickets. Casino Night is purely for entertainment; real money is not involved nor allowed on the gaming tables. The chips purchased throughout the conference from students, etc. can be taken to a table of the player's choice and played as if in a live casino, with the exception that the friendly dealers will instruct inexperienced players on how to properly play each game. At the end of the night, players may redeem their chips for raffle tickets; prizes will be drawn from the raffle tickets at the closing breakfast on Sunday morning.

I would like to extend a very special thank you to all of the 23rd Annual ISNR Conference sponsors and exhibitors! This year's sponsors include BrainMaster Technologies, Inc.; Deymed Diagnostic; Integrated Neuroscience Services; Applied Neuroscience, Inc.; Bio-Medical; NeuroField, Inc.; Stens Corporation; and Thought Technology Ltd. This conference would not be possible without each and every one of our sponsors and exhibitors.

The ISNR conference is great place to learn more about neurofeedback and catch up on the new research. It is also an excellent chance to network with other providers, see the new technology available, and interact with people who are actively leading the field. If you are a doctor, clinician, educator, researcher, mental healthcare professional, or someone interested in techniques, applications, technologies, and solutions that apply neuroscience in order to better understand and enhance brain functioning, then you should attend the ISNR conference! I hope to have the opportunity to warmly receive you at our welcome reception and throughout the conference!



Neurofeedback in the News

Kirk Little, PsyD

Neurofeedback isn't new to us but still is to many. We are seeing a lot of interesting stories in the news these days, more than ever. And the news is largely positive. This past year, there have been articles in the *Washington Post, Poughkeepsie Journal, ADDitude Magazine,* the *Huffington Post, Healthline News, the Scientific American, Medscape, Wired Magazine, PsychCentral, Boston Globe, CNBC,* and *Newsweek*.

In fact, there has been a 13-fold increase in published articles in just the last seven years. In 2007, under a PubMed search using the term "neurofeedback", there were 15 studies. In 2014, there were 198. Perhaps because of this, Merriam-Webster Unabridged Dictionary added Neurofeedback as a new word (along with WTF, photobomb, emoji, and 1,700 new entries). Here's how they defined it:

> **Neurofeedback *(noun)*** the technique of making brain activity perceptible to the sense (as by recording brain waves with an electroencephalograph and presenting them visually or audibly) in order to consciously alter such activity.

"Brain-training" has become a buzz word for those looking to find an extra one percent which could prove the difference between finishing first or second place. We will see a story about, for example, the Canadian Women's Soccer team using neurofeedback to help in their pursuit of excellence. And we will see the newest EEG wearable device being touted at a consumer products show.

However, it seems as if the strong scientific studies are what are mostly driving the news. As a case in point, last year, Naomi Steiner's study which was published in Pediatrics got a lot of positive air time. This is how an article in the Boston Globe began:

> *"With more than one in 10 children diagnosed with attention deficit hyperactivity disorder, parents and doctors alike have been eager to find alternatives to prescription stimulant medications like Ritalin or Adderall. Some of these options include computer programs that train the brain to increase attention span and a therapy called neurofeedback where a practitioner teaches children how to keep their brain calm and focused."*[1]

1 https://www.bostonglobe.com/lifestyle/health-wellness/2014/02/17/brain-training-school-has-lasting-effect-alleviating-adhd/ZdwuUpkjycA5OBQVvX282K/story.html

Just this week, we see an exciting study by Majid Fotuhi of Johns Hopkins of elderly patients with mild cognitive impairment who saw ". . . marked improvement in cognitive performance and enlargement in hippocampal size." Dr Fotuhi told Medscape Medical News, "One of the key interventions in this program, above and beyond treatment of a patients' medical conditions, providing neurofeedback and meditation training and emphasizing the role of diet, exercise, and omega-3 fatty acids, is an emphasis on purpose in life ."2

Unfortunately, the hackneyed arguments against neurofeedback do occasionally appear in a major article about neurofeedback. Articles typically suggest it's "controversial," "costly," or the evidence "isn't there yet." But these counter-arguments seem to be getting weaker and weaker, as the accumulating mountain of evidence drowns these voices out. It is only a matter of time before neurofeedback gets the recognition it demands. As prominent researchers support it as an effective intervention, it gains more credibility.

So here is, perhaps, some of the best news of all. In case you didn't already know, Dr. **Bessel van der Kolk** is a psychiatrist who has been active as a clinician, researcher, and teacher in the area of traumatic stress for more than four decades. His new book "The Body Keeps the Score: Brain, Mind, and Body in the Healing of Trauma" has an entire chapter devoted to neurofeedback.

Recently, he has completed the first randomized controlled trial of NFB for adult trauma survivors, which showed that "20 sessions of neurofeedback over 10 weeks not only dramatically reduces PTSD at levels equal or greater to those observed in top-tier research on trauma-focused therapies for adult PTSD, but also became the first PTSD treatment outcome study to demonstrate substantial improvements in executive functioning (e.g. impulse control, attention and concentration, decision-making and problem-solving, cognitive flexibility, etc.) as a result of treatment ."3

Because of the great success of the study, he is proposing a similar study for children. His team will recruit "40 children with histories of severe abuse or neglect and assign them to either brain biofeedback (clinical neurofeedback) or traditional biofeedback (heart rate variability retraining)." So far they have enrolled 15 children into this study.

In case you didn't already know, we at ISNR are fortunate to have Dr. van der Kolk as our keynote speaker at this year's conference. Join us in Denver to have a conversation with him about his work with neurofeedback, and how the Trauma Center's proposed Child Neurofeedback Study has the potential to be part of the tipping point for our field.

2 http://www.medscape.com/viewarticle/848384
3 http:/www.traumacenter.org

Neuro-biofeedback Imaging in Human Performance and Mental Health

BrainAvatar

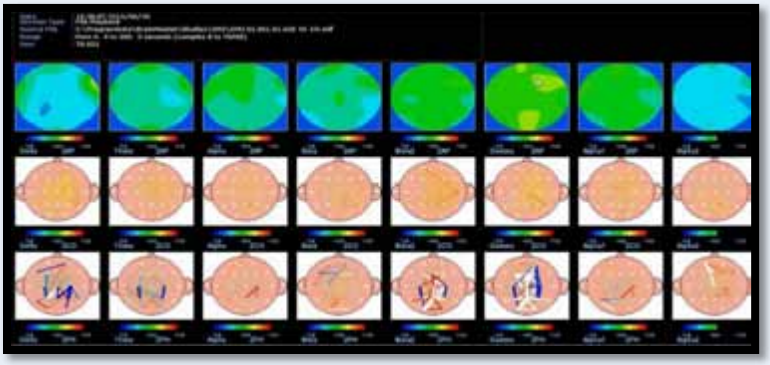
QEEG begets Neurobiofeedback begets live brain imaging.

Until very recently, the field of neuroimaging had little direct relevance or impact on the field of clinical mental health. The cost of equipment such as MRI, fMRI, CT, or PET generally exceeds the million dollar mark, and the facilities and staff necessary to provide imaging services have put diagnostic and evaluative use in the range of $1000 or more per visit. This situation has changed, however, with the availability of low-cost, high-speed EEG-based imaging methods.

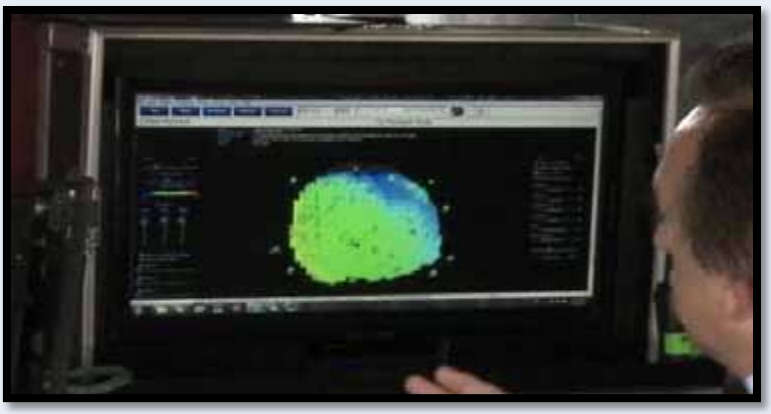
It is now possible to identify a new modality that can be called "NeuroBiofeedback Imaging" or NBI. NBI is produced by computing (reconstructing) every in real time, and rendering them on a display. Every single voxel is turned into an accurate full-color image point, providing a live 3-D image of brain activity in real time The inverse solution method used here, "standardized LORETA" or sLORETA, provides over 6,000 voxels.

When EEG, QEEG, neurofeedback, and live brain imaging are combined into a practice model, they can provide an integrated approach to client evaluation, assessment, and providing mental health-related services.

QEEG-based neurobiofeedback imaging is based upon the data acquired from surface electrodes, generally using the standard 10-20 sites. A portion of EEG is then selected for analysis. Anything from 1 second to many minutes of EEG can be used to produce individual images, live animations, or series of images.



In addition to live 2-D surface maps that are visible in real time, BrainAvatar produces live 3-D sLORETA brain images that show brain activation patterns live as they occur. In this example, a researcher is observing the EEG of a test driver operating a high-performance sports car. The relative patterns of brain activation are visible instantly, showing the driver's emotional state changes.



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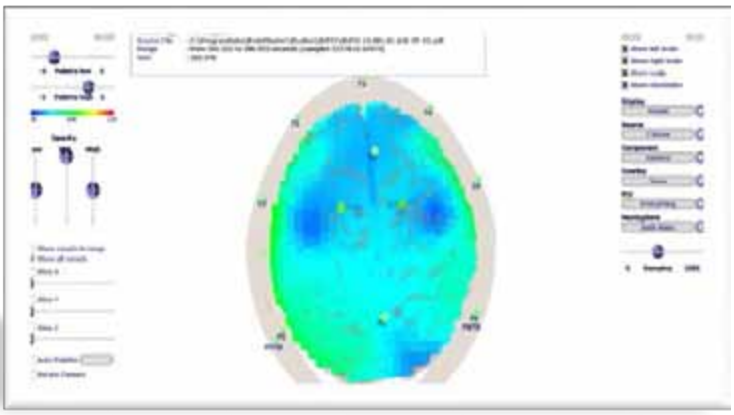
Live sLORETA Z-Score Imaging in Mental Performance

BrainAvatar

Integrated Live Z-Score imaging & biofeedback emerges as a new Modality.

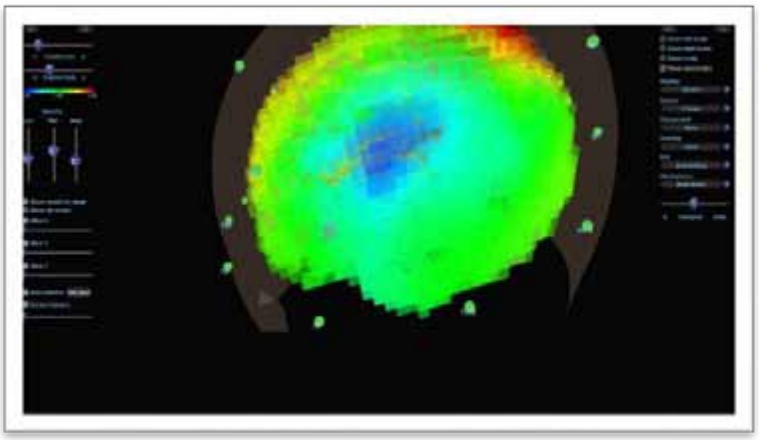
Z-Score imaging is a new method, in which each and every one of the thousands of volume elements ("voxels") is instantly converted into a color that reflects its level of activation. The units that are being quantified relate to the amount of electrical current estimated to be occurring in that voxel. The units are expressed as "current source density," which is the amount of current per unit of volume. They are in units of "nanoamperes per cubic millimeter." The voxels thus become image components, and the activity of the brain can be built up by combining the voxels on a real-time display. This representation provides a 3-dimensional representtation that can be rotated, zoomed, or modified to show only specific regions of interest (ROI's), Brodmann areas, or even Networks and hubs.

Other imaging techniques such as CT, MRI, fMRI, and PET are based on anatomic, metabolic, or related physical processes. Only the EEG is based solely on the electrical activity of the brain. EEG reflects the activity of the working cells in the cerebral cortex that are engaged in the information processing and emotional control of the brain It is these signals that are used in EEG-based neurobiofeedback imaging. Therefore, these images truly reflect the activity of the brain, and ways that other methods cannot.



This example of extreme functional capability is an individual who is able to demonstrate the ability to control, or to tolerate, pain through mental (and spiritual) discipline. (Collura, Hall, Peper, & Booiman, 2014)

The following example is from an elderly individual, who had moderate speech difficulties. Slow speech and word grasping were evident. When recorded an imaged in beta, his EEG shows a deficit of beta that is focused on Broca's area. This area resides in front of the facial motor control regions, and manages verbal speech. This deficit correlates directly with the functional deficit in this individual.



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Why Does the Field Need a Standardized and Recognized Certification?

Judy Crawford, Executive Director, BCIA

BCIA's mission is quite clear:

"BCIA certifies individuals who meet education and training standards in biofeedback and progressively recertifies those who advance their knowledge through continuing education."

There are at least three distinct groups who need to understand how biofeedback and neurofeedback can open up a whole new paradigm of treatment: clients, especially where drugs or other treatments have not been successful; the health care community as a whole, who need to understand that this is based on sound science and research and that they could begin to utilize or refer as a valid treatment option; and other professionals looking to offer better and different options for their own clients. Another group that is quickly learning that this modality is a valid approach to gaining a competitive edge includes athletes and others interested in peak and optimal performance.

All health care education is based on recognized patterns of training, no matter which university program one attends. In the US, we have learned to trust that a referral to a licensed provider confirms that there is a standard in education; the same basic courses have been taught at all professional programs. There is no worry that your doctor or dentist only went to a weekend school and just read a few books to learn their skill set. Documenting a standardized regimen of education and training, where everyone who carries this credential learned the same fundamental science, based on the best research currently available, is how we can best show the world the validity and promise of our field. Standardized education and training is also what would enable a clinician to further evaluate new methods and research as it becomes available.

There is no vaccination available that assures that all professionals are created equal. Obviously, there are licensed and highly educated providers who have not been found to operate at the highest professional standards. Certification is no different; BCIA cannot assure competency, only that a person has met recognized standards of education and training. Licensure and certification must work together, as that is what truly protects the client. BCIA provides the foundation of training, and licensure provides the framework for one to legally and independently treat a di-

agnosed disorder or to provide supervision for those who are unlicensed. There are many applications where one does not treat a diagnosed disorder, but rather teaches focus or relaxation, and in that scenario, a license would not be required. In this case, a certification may be even more important.

BCIA certifications are based on the Blueprint of Knowledge that includes the current scientific evidence published in refereed journals. BCIA rejects narrow, unsubstantiated perspectives and the conflict of interest that exists when certification depends on a specific vendor's equipment, databases, and protocols. All certificants are taught this same basic science through a didactic education program and a mentoring program where one learns the clinical or optimal performance applications. They must agree to follow BCIA's *Professional Standards and Ethical Principles* (PSEP), and must pass a standardized exam that adheres to the highest psychometric standards. All requirements were originally built following an extensive job analysis and are regularly updated by a task force of international authorities. BCIA continually gathers data to validate and revise its exams through the psychometric process to ensure the relevance, integrity, and value of our certification program.

BCIA's biofeedback certification is the only program that is recognized by the three major international membership organizations: the Association for Applied Psychophysiology and Biofeedback (AAPB), the Biofeedback Federation of Europe (BFE), and the International Society for Neurofeedback and Research (ISNR).

Showing a standardized, research- and evidence-based training is what will be meaningful to clients, health care professionals, and other decision makers. A credential based on these standards is what they have come to look for and is what will elevate the field.

Board continued from page 7

Website: Kate Novian and Joe Barr have been diligently working on a new website design and anticipate its launch shortly.

The ISNR Board values your input, your ideas, and your suggestions. This is your organization and your involvement is essential. So please feel free to contact me to discuss any issues and I will be sure that the Board addresses your concerns. My email is cyablonski@isnr.org.

Neurofeedback in Latin America, Spain, and Mexico

Pedro Delgado,, MD Javier Elcarte & Tanya Morosoli

Neurofeedback in Latin America

Neurofeedback in clinical practice and research has developed steadily and continuously over the past 15 years in Spanish speaking health care professionals. To my knowledge, there are neurofeedback practitioners in Costa Rica, El Salvador, Panama, Colombia, Chile, Peru, Argentina, Uruguay, Brazil and Venezuela in Latin America. Moreover, many practitioners in Spain are university-level professionals from the health care field. In Venezuela neurofeedback emerged in the late '90s, and as of this year, we have approximately 30 health care professionals working in clinical practice, some with BCIA certificates. Through ISNR networking, many of these professionals have established links and have shared interest in creating and participating in local neurofeedback organizations or funding an Ibero-American neurofeedback organization. Mexico and Spain, at the vanguard, have established neurofeedback organizations in their countries and have organized conferences on the topic. The limitation in the number of professionals has been the language barrier, due to the fact that many interested and also practicing neurofeedback practitioners are not fluent in English; scientific articles and trainings occur almost exclusively in English, even though professionals in Mexico, Spain, Colombia and Venezuela have experience in training in Spanish. Here, we present in both languages, the experience of two well-established health care professionals that are neurofeedback practitioners from Spain and Mexico.

El neurofeedback en la práctica clínica y en investigación ha tenido un desarrollo firme y contínuo en los últimos 15 años en profesionales de la salud hispano hablantes. De mi conocimiento hay practicantes de neurofeedback en Costa Rica, El Salvador, Panamá, Colombia, Chile ; Perú, Argentina, Uruguay Brasil y Venezuela en Latino América y también en España muchos de ellos profesionales del campo de la Salud. No deja de ser interesante saber que hay un interés creciente en profesionales de la salud hispano parlantes establecidos en los EEUU. En Venezuela el neurofeedback se inició a finales de los años noventa del siglo pasado y para

este momento tenemos evidencia de por lo menos 30 profesionales de la salud trabajando en la práctica clínica del neurofeedback agunos certificados por BCIA. A través de las redes de ISNR muchos de estos profesionales han hecho contaco y han compartido el interés de crear organizaciones locales o por la creación de una organización Ibero Americana. Mejíco y España a la vanguardia han creado organizaciones locales en sus países y han implementado congresos en la materia. La limitación en el crecimiento del número de profesionales ha sido la barrera del lenguaje debido a que muchos interesados o practicando neurofeedback no son fluentes en inglés y la mayoría de las publicaciones científicas o del entrenamiento ocurre en inglés aún cuando Méjico , España y Venezuela en adiestramiento en español. Aquí presentamos en los dos lenguajes, la experiencia de dos profesionales de la salud practicantes de neurofeedback bien establecidos en España y Méjico.

Pedro Delgado, MD, International Member at Large, ISNR Board

Neurofeedback in Spain

Both neurofeedback and biofeedback had a period of "hibernation" in Spain for many years. The first centers implemented these techniques in the late '90s and

First and foremost, there is almost a complete absence of good scientific literature in Spanish both on bio and neurofeedback.

most of them were from the private sector. They worked until recently as isolated islands, far away from each other. Over the past five years, most of the equipment producers all over the world have suddenly landed in Spain, with their products and courses; some of them very poor in content and curriculum.

This slow and uneven development of neurofeedback in our country is due, in my opinion, to two main factors. First and foremost, there is almost a complete absence of good scientific literature in Spanish both on bio and neurofeedback (Spain is a country that has never shown a high level of English proficiency within its population, including the academic environment. This has prevented many professionals from approaching this kind of therapy). Although knowledge of English is slowly improving, we believe it is an absolute priority for us to promote proper literature on neurofeedback in Spanish. Secondly, is the lack of interest in the university bodies and professional associations for therapies often regarded as "alternative" treatment coinciding with poor scientific endorsement. Indeed, there are very few serious studies on neurofeedback in our country, although some universities like the Complutense, the Pontificia de Salamanca, Seville and others have begun to develop working neurofeedback groups with interesting results in research.

It is difficult to determine how many practitioners have incorporated neurofeedback into their professional practice in recent years in our country. Given the availability of training and the different forums created by the equipment producers and distributors, we might say that today there are over 500 neurofeedback professionals since 2010. Many of the professionals are actively working already in treatment centers. At present, there are centers in almost all regional main cities, and above all, in the Madrid area. It has to be mentioned here as well, the strong presence of the EEG Info network.

At the same time, various foundations and associations have been established, such as the Association for Research and Development in Neurotherapies (IDN), two years old and with over 100 members. The IDN is trying to establish, homolo-

gate, and standardize some scientific rigor, in line with the ISNR, among all neurofeedback trainers and practitioners in our country. In 2015, the IDN has successfully organized the First Spanish Congress in Neurotherapies with the theme: "Neurofeedback, from Empirical Evidence to Clinical Application" and is in the process of organizing for the April 2016 European Conference in Neurofeedback.

El neurofeedback y en general el biofeedback ha tenido un periodo de "hibernación" en España durante muchos años. Los primeros centros en implementar estas técnicas datan de finales de los 90, la mayoría de ellos desde la iniciativa privada, y han funcionado hasta hace poco como islas aisladas los unos de los otros. Durante los últimos 5 años, se ha producido un desembarco casi en tropel de la mayoría de los productores de equipos con sus correspondientes cursos de formación, algunos de ellos muy pobres en cuanto al contenido y curriculum de los mismos.

Esta evolución tan lenta y dispar del neurofeedback en nuestro país se debe, en mi opinión a dos factores fundamentales; por un lado, la ausencia casi completa de literatura digna en español sobre bio y neurofeedback. España es un país que no ha destacado precisamente por el dominio del inglés de su población, incluida el entorno académico, lo que ha impedido a muchos profesionales su acercamiento a este tipo de terapia. Aunque el conocimiento del inglés va mejorando lentamente, creemos que es absolutamente prioritario potenciar literatura de calidad sobre neurofeedback en español. Y por otro, el desinterés de las instancias universitarias y los colegios profesionales por terapias muchas veces consideradas como "alternativas" y con poco refrendo científico. Efectivamente, son muy pocos los estudios serios sobre neurofeedback en nuestro país, aunque algunas universidades, como la Complutense, la Pontificia de Salamanca, la de Sevilla y otras han comenzado a desarrollar grupos de trabajo, con resultados interesantes en el área de la investigación.

Es difícil precisar en números cuantos profesionales se han incorporado el neurofeedback durante estos últimos años en nuestra geografía, observándose además diferencias significativas en función de la región. Teniendo en cuenta la oferta formativa presente, los foros creados por las empresas productoras y distribuidoras de equipo, a día de hoy cálculo que habremos superado con creces los 500 profesionales que han contactado con el neurofeedback desde el 2010, muchos de ellos trabajando ya activamente en sus centros con distintos equipos. En estos momentos, existen centros en prácticamente todas las capitales de provincia, destacando por su número sobre todo la capital Madrid. Y en cuanto al formato, mencionar la

fuerte presencia de las redes de EEG Info.

Igualmente, se observan intentos de creación de fundaciones y asociaciones como la Asociación para la Investigación y Desarrollo en Neuroterapias (IDN) con dos años de vida y más de 100 socios que intentan homologar, estandarizar y establecer cierto rigor científico, en la línea del ISNR, en la formación, implementación y práctica del Neurofeedback en nuestro país. En este sentido, la IDN ha organizado con éxito el I Congreso Español de Neuroterapias con el tema: "Neurofeedback, de la Evidencia Empírica a la Aplicación Clínica" y estamos en el proceso de organizar para Abril 2016 la Conferencia Europea en Neurofeedback.

Javier Elcarte, España

Neurofeedback in Mexico

The second meeting for the Mexican Society for Bio and Neurofeedback (SMBN) was held in the National Autonomous University of Mexico (UNAM)'s Cultural and Academic Center in Queretaro, last year. The Institute of Neurobiology of this recognized Mexican University (one of the top 10 Latin American universities), hosted the meeting. That recognition was a great achievement for our Society considering that it raised neurofeedback and QEEG awareness among national neuroscientists. Thanks to our international invited speakers, Barry Sterman, Erik Peper, Lynda and Michael Thompson, Robert Thatcher, Robert Turner, Johanne Levesque, Leon Morales Quezada and Diana Martinez, and the national faculty, it truly was a memorable learning experience.

As a Society, we feel very grateful for ISNR and BCIA support. Mexican members obtain the benefits of becoming institutional members of ISNR. More recently, BCIA-Mexico was founded, representing a joint effort that will simplify the certification process in bio and neurofeedback for Mexican clinicians who meet all the requirements.

Lastly, one of our priorities is to develop a one-year university postgraduate course in applied neuroscience, in which the theoretical and practical foundations of evidence-based neurofeedback will be taught comprehensively.

El año pasado se llevó a cabo el segundo congreso de la Sociedad Mexicana de Bio y Neuroretroalimentación (SMBN) en el Centro Académico y Cultural de la Universidad Nacional Autónoma de México (UNAM) en Querétaro. El Instituto de Neurobiología de esta reconocida universidad (misma que pertenece al listado de las diez mejores universidades de América Latina), fue sede de este evento. Ello representó un gran logro para la Sociedad considerando que permitió la difusión

de la neuro-retroalimentación y el EEG cuantitativo en el ámbito neurocientífico nacional. Fue una memorable experiencia educativa gracias a nuestros invitados internacionales: Barry Sterman, Erik Peper, Lynda y Michael Thompson, Robert Thatcher, Robert Turner, Johanne Levesque, León Morales Quezada y Diana Martínez y a nuestro profesorado nacional.

Como Sociedad nos sentimos muy agradecidos por contar con el apoyo de la ISNR y de la BCIA. Nuestros miembros obtienen los beneficios propios de la membresía institucional a la ISNR. En forma más reciente, se fundó la BCIA-México, representando un esfuerzo conjunto que simplificará el proceso de certificación en bio y neuro-retroalimentación de los clínicos mexicanos que cumplan con todos los requerimientos.

Por último, una de nuestras prioridades consiste en desarrollar un diplomado universitario en neurociencia aplicada cuya duración será de un año y que incluirá la enseñanza exhaustiva de los fundamentos teóricos y prácticos de la neuro-retroalimentación basada en evidencia.

Tanya Morosoli, Mexico

An Interview with Dr. Joel Lubar

Shanda Stevens

Recently, I had the pleasure of interviewing Dr. Joel Lubar, a pioneer in the field of neurofeedback. His clinical work and research involved the application of neurofeedback to treat clients with ADD/ADHD. His immeasurable personal library of knowledge has developed and grown throughout the years and continues to this day. Dr. Lubar is a spirited teacher that generously shares his lessons, accomplishments, and insights into our field of neurofeedback. As a graduate student, this was an enlightening experience and I am so fortunate to have had it. These 55 minutes were easily a semester's worth of material. Dr. Lubar and the pioneers of neurofeedback have faced many obstacles, technological limitations and skepticism throughout the past decades. I am so grateful for all of their work and the precedent that has been set. Journeying forward will most certainly not be easy, however, with experts such as Dr. Lubar who are so willing to share and teach with seemingly endless amounts of expertise and energy it is clear the only hurdles we have to jump will be the ones we place in front of ourselves!

SS: *Dr. Lubar, I'd like to talk to you about your early work in the 1970's working with ADD/ ADHD children. What brought you to this type of research and what did you learn?*

JL: When I was replicating Barry Sterman's work on seizures, I noticed that some of the patients who had a great deal of difficulty concentrating and focusing (primarily because of the anti-convulsant medications and seizure problems) started to do better when doing neurofeedback. There was some early literature that suggested that individuals with ADD/ADHD might have excessive slow activity in the frontal lobe, so I evaluated that. The first study was published in 1976, which was a double-blind study, and we examined the effects of training individuals to increase SMR over the central cortex at the same time to decrease theta activity (4-8 Hz). What we found was the hyperactivity greatly improved while they were getting that type of training.

However, one of the things I was aware of was that sometimes even though the hyperactivity improved they still could not attend and focus for long periods of time. I thought maybe what we should do is train them to decrease the slow activity and increase beta activity. I initially started to train to increase 16

to 20 Hz and eventually found that anywhere between the 14 and 18 or 14 to 20 range seemed to be very effective in improving focus and concentration.

I developed the concept way back then of the ratio of theta to beta as a possible measure, an indicator of the degree an individual could experience potential deficits. It is important to point out that theta/beta ratio is not a diagnostic tool for ADD/ADHD. This is very important and people often misinterpret this. You cannot diagnose ADD/ADHD with any one single measure, it is a very complex disorder and there are many different factors that have to be put together to achieve an accurate diagnosis. However, a large percentage of the individuals (particularly with the inattentive form of attention deficit) do have a higher theta/beta ratio than matched controls. It is a collateral measure.

We have progressed considerably since the 1970's and 1980's from training individual sites even though we know what locations work very well. Starting around the mid-1980s with the development of Quantitative EEG, we look at the whole brain eyes open, and eyes closed, and doing different tasks in varying conditions. The advantage to doing this is that since ADD/ADHD is not a single disorder but a disorder embedded with many other disorders as well, we are able to get the entire picture of what the problem is. ADD/ADHD is sometimes associated with anxiety and depression and can also be a result of a traumatic brain injury. The main form of ADD/ADHD is highly correlated with genetic markers having to do with dopamine metabolism. People with completely normal neurotransmitter functions can still develop severe attention deficits if they have a dramatic brain injury or other kinds of neurological disorders. It is a very complex disorder, but on the other hand it is the most commonly treated disorder using neurofeedback.

SS: Let's talk technology. Where did the potential for advancement in technology lead you?

JL: I became interested in the idea of the inverse solution, the ability to be able to localize where the generators are inside the brain, up to a point that produces the surface distribution of the EEG. There are many inverse solutions but the most accurate one, the one that's been validated in literally hundreds of publications, is called LORETA, which stands for Low Resolution Electromagnetic Tomography. It was developed by Roberto Pascual-Marqui and Dietrich Lehmann at the KEY Institute in Zürich, Switzerland. We were the first group at our laboratory at the University of Tennessee to ever use LORETA for neurofeedback. We actually developed a LORETA neurofeedback program in conjunction with Zürich. In 2004, Marco Congedo and I published the first paper in the IEEE Journal, and since then a number of other people (including Rex Cannon), have published numerous papers including several books about LORETA

neurofeedback. LORETA has really taken over and the reality is that people are moving more in the direction of LORETA neurofeedback training. It is now also being used for seizure disorders with considerable success by Dr. Lucas Kobeda and Dr. Robert Turner, as well as others.

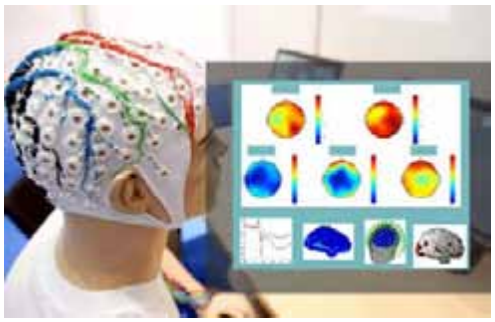
SS: Dr. Lubar will you tell me about your collaborative work with Barry Sterman?

JL: I replicated his original findings in my laboratory in 1975. I decided that it would be beneficial if I could go out to California to see what Barry was doing. I applied for, and received, a Postdoctoral Senior National Science Foundation Fellowship. This allowed me to get postdoctoral credit at UCLA's Department of Neuroscience and also enabled me to work at the Sepulveda VA where Barry had his lab. There I had a chance to observe their work with patients and set up programs for them analyzing Fourier transforms for QEEG. It was exciting and interesting to see the type of work they were doing as well as replicating it. When I returned to the University of Tennessee this work continued to develop and move from the seizure research into the area of ADHD.

SS: Ohio State University is conducting a five-year ADHD study investigating the efficacy of neurofeedback in children ages seven through ten. What are your thoughts on this study?

JL: It is a double-blind study. I was involved in some of the initial work setting it up and know Dr. Vincent Monastra very well. We have worked and published together and he is coordinating the actual training. Let me say this, you're never going to get results in a double-blind study that you are going to get in a clinical setting because the interaction of the well-trained clinician with the patient is part of the reinforcement. Their encouragement assists the patient in developing schemes for improving their performance in a neurofeedback or LORETA setting. One of the big problems—and this is a critical problem, is that when you provide sham feedback the patient is looking at the display and they observe feedback occurring, and although it has very little to do with what they are doing, part of the time and occasionally, it just might happen to reinforce the participant's EEG when they are producing the same pattern that the experimental group is getting reinforced for. This is called variable ratio partial reinforcement in terms of learning theory, and it is so powerful that if it didn't exist there would be no casinos! On a slot machine for example, if you hit maybe one out of 100 pulls and receive a reward, you may stay there a very long time. One doesn't even have to get rewarded very often to keep you trying to produce the same behavior. So here's the problem, they're getting partial non-contingent reinforcement and because of that there is a good chance that the control group is going to show improvement. Another point to be

made is that if you were put in front of the screen and presented with stimuli and you are trying really hard to make those stimuli occur you are forcing your brain to attend and focus. Yes, I would not be surprised if the sham group shows improvement, I hope the neurofeedback group shows more improvement than the sham group, but it's not the right design. I'll tell you what the right design in my opinion is—you have three groups and they are absolutely matched by age and are identical in every regard including condition, we will suppose ADHD. Group one will receive traditional treatment meaning medication. Group two receives only neurofeedback. Group three gets medication plus the neurofeedback. The medication is held constant throughout training, no change in dosage and the neurofeedback is provided throughout the training to the feedback group and the mixed group. Now you will be able to tell very clearly if the effect of the neurofeedback alone is as strong as the medication. In addition, you will be able to determine if the effect of the neurofeedback is enhanced by the medication and is there an additive effect. You will not have any of the problems that you have with non-contingent or sham feedback and will know very clearly what the power of the neurofeedback is compared with the medication. That is really the bottom line, because when parents bring their children for training there is a bias in the sense that the vast majority of parents who bring their children in will say, "I don't want to use the medication, I'm against it, I want to do something else." I think this kind of a design will very clearly show us whether or not the medication and the neurofeedback are equivalent or whether they are additive or not. I would be happy to advise any group that can get the funding to do such a study. It is a straightforward study that can be done in less than a year but you have to have a long-term follow up no matter what you do!



SS: ***I would like to talk about your wife Judith. How has your partnership affected your research?***

JL: Judith's involvement has affected our clinical work tremendously. What happens is when we have a patient come in, I do an hour to an hour and a half intake evaluation getting the detailed neurological and medical history, doing the QEEG analysis, as well as establishing a rapport with a patient. Judith does up to a two-hour evaluation in which she evaluates the individual as well as the entire family. She does a detailed family intervention and a family genogram to understand how the problem manifests itself at school, at home and in other settings. In addition, when we had 15 or more cases with similar family

"By combining the clinical work with the neurofeedback our success rate was well over 90%. We had virtually no dropouts over 30 years of practice."

and or academic problems, Judith would analyze the group results to determine which therapy and or feedback protocols tended to produce the best long-term results. What we find is that by combining the clinical work with the neurofeedback our success rate was well over 90%. We had virtually no dropouts over 30 years of practice. We followed many of our patients for more than 10 years, and they continued to do extremely well. The criticism that is always leveled is that, "Well you're combining neurofeedback with therapy so how do we know it's not just the therapy?" Well, the answer to that is very simple. A lot of these individuals have been in all kinds of therapy for years and they haven't made much progress. Now we do the neurofeedback and all kinds of positive things happen. That's what we called the multiple baseline approach. We have treatment A, B, C, and D, and nothing happens, and then you're given E and suddenly it has a very positive effect. We know that treatment E is very potent, that is the neurofeedback in this case, whether it is surface or LORETA. In our Southeastern Neurofeedback Institute, our practice for years, we always combined individual and family therapy when needed. There are cases when you do not have to do a lot of therapy, it depends on the nature of the problem. ADD is usually a big disruptor of families and the family structure, so if you do not work with the family you may not get the desired results.

SS: ***I am hearing you say that you took a holistic view of treatment of your clients, not simply the presenting symptoms or disorders, seriously considering the external factors that affect the client. Is that a fair statement?***

JL: Yes, we took it into consideration and let me give you another example. Judith and I worked for eight years at St. Mary's Medical Center and Knoxville, Tennessee developing a biofeedback chronic pain program. We would meet every Tuesday for the duration of the program and at each meeting there would be myself, Judith, the neurologist, the psychiatrist the anesthesiologist and biofeedback therapists. We spent time reviewing each case. The reality was they were saying the biofeedback seemed to be the treatment that had the most significant approach in helping the clients with severe chronic pain more than

any of the other things that had been tried. In these cases the medical part was very important, given the clients' circumstances. However, the biofeedback at that time was very effective.

SS: ***How do you respond to the skeptics as to the efficacy of neurofeedback?***

JL: I think there's a lot less of that now than when the field first started. There were certain individuals—and many practitioners using neurofeedback know who they were—who were very critical of the field. They wanted to see the randomized, controlled double-blind studies, which were just beginning to exist. Today I'm very positive and feel much better about neurofeedback and biofeedback than we used to. We do not have any big detractors like we did 15 years ago. The trend turned, as more and more people got involved and began getting positive results. Physicians started to pay attention—even referring patients—and often their most difficult cases. Here's the interesting event: for example, I held a workshop in June with Dr. Deborah Simkins, MD, which was only open to physicians. We had 14 people that came, all medical doctors, psychiatrists, pediatricians, neurologists, general practice, and family practice physicians. We did this specifically for them to see what the response would be. It was incredibly positive; every one of them liked it and many are going to incorporate neurofeedback into their respective practices. So we are going to be doing more workshops to encourage medical people and non-physician practitioners to become involved. I have a number of physicians right now that I meet with on a regular basis and help them with their patients by evaluation of QEEGs and protocols for neurofeedback and LORETA.

SS: ***What is your view of the neurofeedback field today?***

JL: It is exploding and growing like crazy. Just look at all the workshops offered by different groups, it seems that every other day someone is offering a boot camp or training for neurofeedback and LORETA neurofeedback, it's just all over the place. My own view is that you really need to do a QEEG analysis as part of the evaluation. It enables you to see patterns that are associated with anxiety, depression, PTSD, OCD and up to 150 clinical entities. If you miss those things you may get a partial effect. The patient may see improvements in one area but problems in another. By having comprehensive treatment, we can handle the comorbidities; the QEEG is very important.

SS: ***In your opinion, what does the future of neurofeedback look like and what are some of the possibilities?***

JL: Currently, when we do a lot of our training we work with regions in the brain called Brodmann Areas. We train people to be able to change the activity within different Brodmann areas. There is another approach however, which is

more detailed, it is called Graph Theory. It has to do with looking in great detail at connectivity between different brain regions and being able to map out what are called hubs and nodes. Hubs are areas that connect to many different nodes and nodes are areas that connect across different Brodmann areas and these mediate whole networks. There is an executive network, spatial attention network, an anxiety network and so on. The movement now is moving towards training networks and the interaction between them, rather than training individual locations. In addition to Graph Theory there is another modality developing in the field, and this is the use of Functional MRI, which is very expensive and not available to everyone. When patients have been trained using fMRI, results are obtained very quickly because it has an almost pinpoint accuracy: you can train down to the millimeter range. It allows training in places of the brain that we cannot even get to with LORETA such as the basal ganglia and other subcortical regions. It also allows you to be able to affect neurotransmitter systems more directly. This does not mean that the kind of feedback that we are all doing right now will fade away, it will not. The reason it will not is an fMRI device is several million dollars and simply maintaining it is a couple of hundred thousand dollars each year. Therefore, it will be limited in availability. The other thing to be considered is that fMRI involves a very powerful magnetic field and we cannot expose a patient to that that strength of magnetic field over and over and over again. You can do a few sessions and that is about it. Whereas with LORETA and surface neurofeedback, you can do training even a hundred times without producing a negative side effect for the patient. fMRI is one type of feedback that integrates what we do with LORETA and is moving rapidly into the future.

SS: ***What is your best advice for students interested in the field of neurofeedback?***

JL: Well let me say this, and I tell students and they don't particularly like to hear this, but having a background in physics and higher mathematics is very important. The reason I say this is because the literature that is coming out now in our field contains really a lot of mathematical physics. It is very complicated; it is not simple and the field is moving rapidly in the direction of being more quantitative. You know it is much more accurate but it involves a lot more background.

Now, do not be discouraged, it is good to get in with a collaborative group if you can. If you have people that have that background then you could go to them and say "well I just read this paper and I think it is important but I do not understand what these equations are for, what does it mean?" Have someone within your collaboration describe it to you! Even Albert Einstein wrote books for the popular press in which he described general relativity in Dick and Jane language. He did it so that someone with a high school education or some col-

"It is clear that the neurofeedback really does help them, it helps them tremendously."

lege could really understand. It is possible to take very complex concepts and present them descriptively so that people can follow.

The other thing is that there is another area of neuroscience that is important, the understanding of neurochemistry, neuropharmacology and psychopharmacology. Understanding how these drugs work on neurotransmitters and neuromodulators, the way they affect these systems of the brain; developing an understanding on how they work and what they do is important.

In addition, knowing how to read and analyze EEG has great value. Simply performing a QEEG is not sufficient, you have to look at the raw signal first. One needs to understand what is artifact, what is real, and should then be able to extrapolate from that very complex signal the essential features which will allow you to move towards a protocol and an evaluation of the patient. So, you need to know quite a bit of neurology and electroencephalography.

Another thing, if you're going to be working by communicating with physicians, you need to be able to speak their language and understand their language as well.

SS: ***What does your current work involve?***

JL: I am working with a large group that treats multiple addictions including alcohol and drug addictions. I set up a complete LORETA neurofeedback program and I am going to be continuing to work with them. I will continue to develop treatment based on their feedback and integrate it into the other treatments as well. They are getting very good results. These are patients that have had severe problems with alcohol and prescription and street drugs, they have been in other multiple treatment programs and have had relapses. This current group has a very comprehensive treatment program and as a result, we put together all the different components. It is clear that the neurofeedback really does help them, it helps them tremendously. This is a big area that I am working in right now.

SS: ***How is this experience different than the ADD work that you have done?***

JL: There is a large overlap between different types of addictive disorders and ADD.

Some of the same genetics are involved in both, so in trying to treat one, you often have to treat the other as well.

SS: ***What is a most-memorable case, study or project?***

JL: This is a difficult question to answer because I have published over 130 papers as well as many books. One of the most challenging studies I have ever been involved in was a double-blind crossover study with seizure patients back in the 1980's. The Epilepsy Foundation of America supported the study; we worked with extreme cases, it was very challenging. We were very lucky that it came out positive. I have had so many cases throughout the years and I get letters all the time from many of my past clients, from as far back as 20 years. They tell me how they are doing, how their careers are progressing and they say they owe much of it to neurofeedback. All of that is very gratifying.

SS: ***How many patients would you say you have seen throughout the years?***

JL: More than 2,000 over a long period of time.

SS: ***Ok, for the next few questions/statements, I am going to start them and ask you to finish them for me! A research project that I have not participated in but would like to, would be…***

JL: I would like to be able to cross validate QEEG findings with findings from SPECT scans (which look at brain perfusion) and functional MRI (which looks at blood oxygen levels) and put all of these together so that when we see abnormalities in the SPECT scans or the MRI we can link them to the specific frequencies and locations and track systems in the QEEG. There is another technique that is a derivative of MRI that is called Diffusion Tensor Imaging (DTI), this allows mapping out the track system (where A is connected to B) within the living brain. This is very different from what we did in 1960's and 1970's when had to use animals and stain their brains then look at the track systems after they were no longer around. We can do DTI in the living brain! Ultimately when a person engages in a complex task we will be able to follow the neural activity through the brain and be able to see which systems are activated, which ones are deactivated, and maybe get a handle on what this whole thing means when we say an event emerges into consciousness. Where does that take place in the brain and how does it actually occur? That is the big question in neuroscience and philosophy—what is the concept of consciousness, what does it mean to be aware of a stimulus or patterns of stimuli? Does that take place first in sensory systems? Where in the brain and what systems make that possible? It has implications for important questions about how other species experience consciousness—because we know they do!

SS: ***When it is time to relax, I…***

JL: I swim in the ocean every day that I can. I have a lot of different interests; I am an amateur astronomer, I follow the field and I love it! I play a musical instrument; well, the keyboard that is! Once upon a time, I used to play the piano, that was a long time ago. I like music. At one time I made stained glass windows, some very complex, but I stopped because I didn't want to breathe in the lead fumes. I used to do a lot of gardening, but now live in a condo so I advise regarding landscaping.

SS: ***The most dangerous, interesting or surprising thing I have done, that is apart from neurofeedback is…***

JL: Ok, well the most dangerous thing I ever did was scuba diving. I was a certified diver and I went to many dives; they can be life-threatening if you're not careful. I have done cave dives and on occasion they were very frightening. Caves can be a very dark and mysterious experience—I do not do it anymore. Now I do a lot of snorkeling. Recently I was snorkeling and I saw these huge things in the water, they looked like submarines. I realized they were manatees and they came right up next to me. I also once saw a Grouper that was five feet long eat a fish that was three feet long! I also love fishing!

SS: ***Lastly, do you have a website where your fans can keep up with you?***

JL: Yes, www.eegfeedback.org as well as www.brainfeedbacktraining.org.

SS: ***Thank you Dr. Lubar!***

About the Author: *Shanda Stevens is a graduate student at the University of Texas at San Antonio and studies neurofeedback under the direction of Dr. Mark Jones. She holds the seat of secretary for the Students of ISNR. In addition, she is a credentialed mediator and is Honorary Commander for the 320th Training Squadron, Joint Base San Antonio, Lackland.*

I want to be a Neurofeedback Professional, Where Do I Start?

By Nancy L. Wigton, PhD, LPC, BCN, QEEGD

As I reflect upon the approaching anniversary of my entrance into the neurofeedback (NF) field 15 years ago, I find myself thinking how different it is today regarding available educational resources to the beginning NF professional. Back in 2000, there were no "how-to" books available; thus, the only options for learning neurofeedback (NF) was attending conference workshops and/or mentoring with more knowledgeable clinicians. Today, however, the landscape is much improved in several ways. First, there are numerous of what I would term "collection" books, which are typically edited by a well-known NF professional and contain chapters authored by NF experts discussing their particular model or approach to NF. Also, there are now various books which actually discuss the basics and technical details which can be considered "how-to" books. Moreover, several position and review papers have been published to provide professional guidelines and theoretical foundations addressing important underpinnings for the beginning NF professional. Finally, there are now a plethora of didactic and experiential educational opportunities in both live and video formats. Therefore, today there are many educational choices and options for those who are entering our field, so much so, that it could be considered an overwhelming task for one to answer the question of, "where do I start?" To that end, this is intended to address that question for the clinician who has only a beginning knowledge of NF and is considering adding NF to their professional repertoire. Yet, it is important to realize, one cannot expect to become proficient in NF simply by reading the items included in this list. Thus, it should only be considered a starting point in what can be a significant learning curve in becoming proficient in the craft of NF.

With regard to the list content, it is important to note, while there are some items which can be viewed as "how-to" resources (Demos, 2005; Thompson & Thompson, 2003), it is by no means exhaustive for that purpose. The primary goal is to provide the reader a general overview of NF (Hammond, 2011),

material on some important theoretical underpinnings (Ros et al., 2014; Sherlin et al, 2011; Strehl, 2014), as well as professional guidelines and standards (Hammond et al., 2004; ISNR, 2013), a primer on the technical aspects of NF (Collura, 2014), and an overview of the current state of the field with respect to the many different NF modalities available (Krigbaum & Wigton, 2014). What the reader will find missing is promotion of any particular modality of NF or a roadmap to do NF just like any particular expert in the field. What is hoped, however, is that the information will better prepare the reader to find a path and decide which approach to NF best fits his or her individualized skill set, personal framework, and professional background.

This beginners list is limited to only 10 items; thus, given the numerous options available today, it is far from exhaustive, and there are certainly other titles which are worthy of inclusion. Yet, by limiting the list to 10, with a combination of more articles than books, the belief is that actually reading the material is a task which a busy professional could realistically accomplish. The list is provided in alphabetical order by author, and as such, does not indicate priority or reading order.

Top 10 Neurofeedback Reading List for Beginners

Collura, T.F. (2014). Technical foundations of neurofeedback. New York: Routledge.

Demos, J. N. (2005). *Getting started with neurofeedback*. New York: W. W. Norton & Company.

Hammond, D. C. (2011). What is neurofeedback: An update. *Journal of Neurotherapy, 15*(3), 305-336. http://dx.doi.org/10.1080/10874208.2011.623090

Hammond, D. C., Walker, J., Hoffman, D., Lubar, J. F., Trudeau, D., Gurnee, R., & Horvat, J. (2004). Standards for the use of quantitative electroencephalography (QEEG) in neurofeedback: A position paper of the International Society for Neuronal Regulation. *Journal of Neurotherapy, 8*(1), 5–27. http://dx.doi.org/10.1300/J184v08n01_02

International Society for Neurofeedback & Research. (ISNR; 2013). Practice guidelines for neurofeedback. http://www.isnr.net/neurofeedback-info/GuidelinesforNeurofeedback.pdf

Krigbaum, G., & Wigton, N. L. (2014). When discussing neurofeedback, does modality matter? *NeuroRegulation, 1*(1), 48-60. http://dx.doi.org/10.15540/nr.1.1.48

Ros, T., Baars, B. J., Lanius, R. A., & Vuilleumier, P. (2014).Tuning pathological brain oscillations with neurofeedback: A systems neuroscience framework. *Frontiers in Human Neuroscience, 8*(1008), 1-22 . http://dx.doi.org/10.3389/fnhum.2014.01008

Sherlin, L. H., Arns, M., Lubar, J., Heinrich, H., Kerson, C., Strehl, U., & Sterman, M. B. (2011). Neurofeedback and basic learning theory: Implications for research and prac-

tice. Journal of Neurotherapy, 15(4), 292-304. http://dx.doi.org/10.1080/10874208.2011.623089

Strehl, U. (2014). What learning theories can teach us in designing neurofeedback treatments. Frontiers in Human Neuroscience, 8(894), 1-8. http://dx.doi.org/10.3389/fnhum.2014.00894

Thompson, M., & Thompson, L. (2003). The Neurofeedback Book. Wheat Ridge, CO: Association for Applied Psychophysiology and Biofeedback.

About the Author: *Nancy Wigton, PhD, LPC, BCN, QEEGD, holds a PhD in psychology, a MA in counseling, is a Licensed Professional Counselor, Board Certified Neurofeedback therapist (BCIA, Fellow), and certified QEEG Diplomate. She has been in the counseling field since 1991 and in private practice providing QEEG-based neurofeedback since 2000. She is also Adjunct Professor and dissertation content expert at Grand Canyon University, as well as executive editor of the journal NeuroRegulation. Dr. Wigton's areas of specialization and research interests include EEG biofeedback and QEEG analysis; as well as z-score neurofeedback, with an emphasis on 19-channel z-score neurofeedback in clinical settings. Since 2008, she has presented at conferences and published on her work with z-score neurofeedback, with a recent emphasis on 19-channel z-score neurofeedback.*

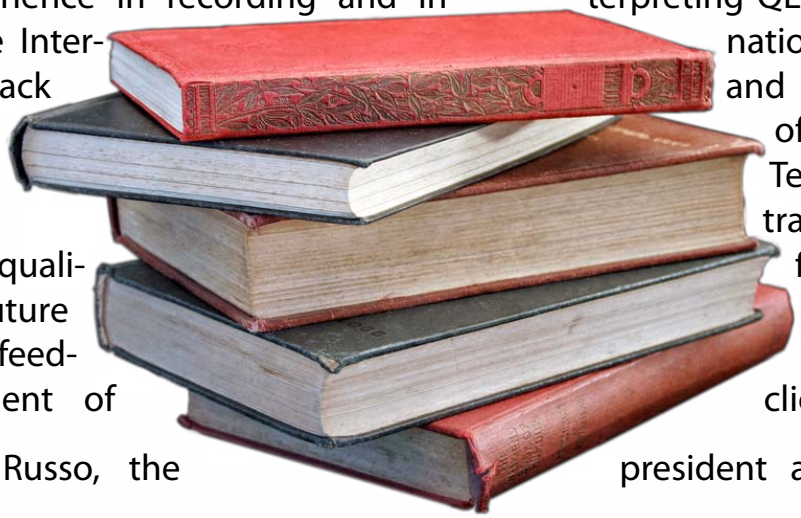
Students of the International Society for Neurofeedback and Research, a Student Organization

Laurel Cook , BA

Who we are and what we do

We are a student organization at the University of Texas at San Antonio (UTSA) who focus on neurofeedback (NFB) and biofeedback (BFB). Dr. Mark Jones and current president G. Michael Russo founded this new, cutting-edge society. We are the first organization at UTSA, and the first ISNR-recognized association for students to gain neurofeedback and biofeedback knowledge through the educational process. Our goal is to share information with counseling students that they find applicable to their professional development. Additionally, we want to help students utilize opportunities for funding to attend conferences and do research. In the future, we will provide monthly meetings for local professionals to speak to members about NFB and BFB. By joining SISNR, students will have opportunities to network with these professionals, as well as other organizations including ACA, AAPB, and others.

Dr. Mark Jones is the advisor of the Students of the International Society for Neurofeedback and Research (SISNR) student organization at UTSA. He is board-certified, and extensively trained in neurofeedback (BCN) and Quantitative EEG (QEEG). He has years of experience in hospital and clinic-based treatment, in addition to experience in training clinicians in psychotherapy. His initial neurofeedback training was with EEG Spectrum in 2003 followed by one year of supervised practice with a leading neurotherapist as part of his certification. He has specialized training and extensive experience in recording and interpreting QEEG. He is also a member of the International Society for Neurofeedback and Research and president of the Biofeedback Society of Texas. His comprehensive training makes him uniquely qualified to teach and advise future counselors who aim to include feedback modalities in the treatment of client needs.



G. Michael Russo, the president and founder of

the UTSA chapter of SISNR, began his neurofeedback training with a San Antonio-based neurofeedback practitioner in 2011. Initially, Russo thought neurofeedback was hokey, but he developed a passion for neurofeedback while observing the significant changes in clients across a wide range of presenting concerns. Now, he plans to work as a teaching assistant, where he will inspire other students to include neurofeedback in their treatment repertoire. Russo is a second-year graduate student in the Department of Counseling at the University of Texas at San Antonio. He is recognized by the Biofeedback Certification International Alliance as one of the youngest individuals to hold his Board Certification in Neurofeedback (BCN). He has authored two peer-reviewed publications and co-authored one book chapter that focuses on neurofeedback. Upon completion of his Master of Science in Clinical Mental Health Counseling, he aims to pursue his Doctor of Philosophy in Counseling Education and Supervision.

How this organization wants to impact the counseling community

Through the combined efforts made by the SISNR at UTSA executive board, students will be able to come together and discuss what's going on locally and internationally with counseling and the need to integrate neurofeedback into practice. By joining SISNR, students will be able to see first-hand how they can impact their client's ability to grow and change. SISNR will assist students in obtaining the education and training to become certified in neurofeedback as well as showcase opportunities where students can take part in research, network with professionals, and increase their knowledge of this therapeutic modality.

What's missing in the future?

Going forward, students will need additional university-based mentorship. Many programs allow students to pursue internship opportunities that could be completed at local private practices. Practitioners who are knowledgeable in neurofeedback are encouraged to, at the very least, network with their local universities in order to enhance the knowledge-basis of feedback modalities in the student population. Without this networking, individuals like Russo would not have had the opportunity to learn about this passion and career-shaping modality. Through SISNR at UTSA, our hope is to facilitate the opportunity for students to find their passion, utilize their skills, and beneficially impact clients and future research. Your support of mentorship through your local university is incredibly valuable and very much in need. If you have follow-up questions or are interested in stating a student-based chapter at your university please feel free to contact us through email at: sisnr.utsa@gmail.com.