

26th Annual ISNR Conference
ABSTRACTS: Pre-Conference and Conference Workshops
PRE-CONFERENCE WORKSHOPS

PCW 1 (3-Day)

Title: QEEG Didactic Board Certification Course

Presenter(s): Thomas Collura, PhD; David Cantor, PhD; Harry Kerasidis, MD

Level: Intermediate

Abstract: This course satisfies the accredited didactic course requirements for QEEG Certification as arranged by the QEEG Certification Board. Attendees will earn up to 24 hours towards their QEEG certification requirements. This workshop has been approved by the QEEG Certification Board to provide didactic training which is recognized by the Board toward certification as a technician or a diplomate. The following description includes material from the QEEG board certification requirements. Workshop topics will include Editing raw EEG and artifacts Drug Effects Database Analysis Clinical and Cognitive Aspects; Montages and Spectral and Topographic Aspects of the EEG. Attendees will learn the subject inclusion and exclusion criteria for building a database .and fundamental statistical considerations within databases. Further detailed topics will include the effects of various drugs on the EEG/QEEG data and developmental changes in the EEG and knowledge. Brodmann area functions and network connections will provide an understanding of LORETA and sLORETA interpretation and training Practical information will include knowing which EEG signatures should be referred out to other professionals Be knowledgeable about general cognitive and clinical changes that take effect after neurofeedback training based upon publications. Have a working knowledge of the montages, transforms and power displays along with the specific perspectives they can provide a reader of QEEG output. phase and coherence, how they relate and what they can mean in the interpretation of the QEEG. This course will be taught by three QEEG Diplomates, with backgrounds in psychology medicine, counseling, and engineering. There will be extensive review of real clinical EEG data, and its interpretation and use. More than one system and database will be covered, so that attendees will learn a comparative view, rather than focusing on a single solution. Methods covered will include some of the more recently developed and available systems and services, helping attendees to be current on the latest technology. Incorporating QEEG into a clinical intake will be emphasized, by combining clinical presentation with QEEG and other physiological data, to provide a complete picture of each client's unique clinical presentation.

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PCW 2 (2-Day)

Title: Infralow sLORETA Neurofeedback Workshop

Presenter(s): Mark Smith, MSW

Level: Intermediate

Abstract: Single channel bipolar Infralow (ISF) Neurofeedback has been practiced and taught since 2006-7. An advanced version of this intervention has recently been developed for 19 channels that allows for ISF sLORETA Neurofeedback. This development has ushered in a powerful form of training that targets behavioral networks heretofore unavailable to the ISF neurofeedback clinician. Recent Research has identified the infralow frequencies influence on the excitability cycle of faster frequencies. Infralow frequencies influence the amplitude of fast wave activity while bridging brain regions together into functional networks (Palva & Palva, 2012). This pivotal role for the infralow periodicities allows the clinician to reliably influence the behavior associated with neuronal networks by activating or quieting targeted regions of interest including the Default Mode Network, the Limbic System, and the Salience Network. Moreover, ISF has been associated with the Hypothalamic Pituitary Adrenal Axis and Autonomic Nervous System (ANS) response, neuroendocrine function, and the sleep wake cycle. The centrality of this slow energy in human behavior gives ISF sLORETA training its exceptional potential.

The most studied integrative control centers of the ANS are located in the Brainstem. Recently, a central autonomic network (CAN) has been proposed and elucidated in research that is involved in virtually every aspect of our daily lives. This network is formed by cerebellar and cerebral regions such as the anterior and mid cingulate gyrus, the insula, the posterior cingulate gyrus, the hippocampus, and the ventromedial prefrontal cortex. The CAN is involved in the autonomic control of somatosensory, cognitive, affective, and motor tasks. Targeting this network with ISF neurofeedback has proved consistently effective in clinical work. It dependably allows the clinician to move clients from a flight, fight or freeze response to a rest and repair state. As CAN is involved in the processing of all stimuli, targeting this network with infralow frequencies allows for more subtle responses with nuanced ROI targeting strategies.

This workshop will demonstrate the unique equipment, signal processing, and skill set required to perform ISF sLORETA training. This workshop will take place over two days. This will allow for the didactic portion of the workshop that will include reports of recent ISF sLORETA research projects by internationally recognized researchers examining ISF sLORETA and addiction and ISF training's impact ANS function. The workshop length is set for clinicians to have plenty time for hands on experience with software and equipment.

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PCW 3 (2-Day)

Title: Why Practices Fail and How Not to

Presenter(s): Wesley Center, PhD, BCN

Level: Basic

Abstract: Over 99% of American businesses are categorized as small businesses “those employing less than 100 persons” and small businesses employ 48% of working Americans (McIntyre, 2018; Desjardins, 2017). Although there is dispute of exactly how many small businesses fail “between 33% and 46% in the first 5 years, and nearly 80% failing by year 10” there is general consensus as to why they fail (McIntyre, 2018; Desjardins, 2017; Waring, 2017). Reasons for failure range from no market for the service, poor cash flow, poor team chemistry/bad hires, being out-competed, pricing/cost concerns, loss of focus, burnout, and poor marketing, among others (Wagner, 2012; Gerber, 1995, 2005). These areas of failure are attributable to what Gerber (1995, 2005) says are the failures in, and competing requirements of, the three roles the small business owner fills: the entrepreneur, the technician, and the manager.

For neurofeedback professionals, and others in the brain/mental health care space, nothing in the formal curriculum of licensure track graduate schools prepares them for building and growing a practice that will survive long term. Many of the obstacles to growth faced by neurofeedback professionals are common to all small business owners and are the result of limiting beliefs, faulty assumptions (Hyatt, 2018), and failing to work on the business due to the time demands of working in the business (Gerber, 2005; Pagan, 2018). Others make the mistake of engaging in “hope marketing” (Walker, 2014), the idea that “if you build it, they will come.” Neurofeedback practices, like other small businesses, have basic business activities (marketing, sales, delivery) and disciplines (brand, finance, management) that require the entrepreneur's disciplined leadership if the business is to succeed (Gerber, 1995, 2005). The nature of neurofeedback encourages the neurofeedback professional to cling to the technician role, often to the neglect of the entrepreneur role. The technician is the worst marketer, often focusing on the technology and not the transformation that neurofeedback offers to clients. The entrepreneur however, can tell a compelling story, the hero's journey, that connects with their vision and passion that will resonate with prospective clients. Neurofeedback professionals, as other entrepreneurs, struggle with identifying ideal clients (avatars) and appropriate marketing tools and strategies, and using social media as a means of engaging existing and potential clients (Brunson, 2017; Walker, 2014). However, growth opportunities afforded by mastermind communities, referral source connection events, technology, customer relations management (CRM) tools, and social media marketing abound for entrepreneurs willing to be stretched personally and professionally (Brunson, 2017; Patel, 2017; Pagan, 2018).

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PCW 4

Title: ISNR FOUNDATIONS - Intro to QEEG & Neurofeedback

Presenter(s): Glenn Weiner

Level: Basic

Abstract: This is for anyone who is relatively new to neurofeedback, or for those who feel they can use a refresher on the basics. Most of us were only able to absorb a portion of the information presented in our first neurofeedback training course. It was just too much information, some of which was too complex to understand or memorize on just one presentation. Information about neurofeedback and QEEG presented at the ISNR conference can be overwhelming. For someone new – many of the most BASIC questions are explained too fast or never really get answered.

This course helps fill in the gaps regarding QEEG, EEG and the basics of neurofeedback. The terminology is explained and shown SLOWLY, step by step. We encourage attendees to ask the most BASIC questions.

We focus on helping attendees understand a small number of key concepts well. Our goal is to slow it down it down till you really get it.

These core concepts include:

1. EEG basics. What is beta/alpha/theta/etc? What does it tell us? How do we use it? What is a “slow” or “fast” EEG? Making sense of those squiggly lines.
2. How does neurofeedback really work? What’s the equipment do? How does the brain respond?
3. How do you decide/target what to train? Does the EEG/qEEG tell all? Can you target key brain areas/issues without a qEEG? Intro to multiple models of training and protocols.
4. qEEG simplified. What are the basic concepts needed for beginners? How does it guide training? Are there different “flavors” of qEEG? A discussion of options – including how to learn more.
5. Are there very different points of view in the field about the type of training? From single channel vs multi-channel vs low frequency, vs z score, coherence, etc?
6. How do medications affect neurofeedback and vice versa? Nutrition?
7. What outcomes do providers expect and get from neurofeedback? When does it not work?

We explore maps from several qEEG databases. We review images and terminology. Whether it’s absolute power, asymmetry, dominant frequency, EO vs EC (eyes open/eyes closed), coherence, connectivity, spindling beta, Z-score surface training vs LORETA training, voxels, Brodmann Areas, ROI, Default Mode Network (and other networks), eeg training with qEEGs. The difference between an EEG and qEEG. What qEEGs tell you and what they might not.

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PCW 5

Title: Neurology for the Neurotherapist

Presenter(s): Harry Kerasidis, MD; P. David Ims, MA

Level: Intermediate

Abstract: The neurotherapist is first a neuroscientist, a neurophysiologist, a neuroanatomist. Mastering these areas is a necessity before applying modalities such as neurofeedback, magnetic stimulation and electrical stimulation. Furthermore, the neurotherapist increasingly has the opportunity to interact and share clients with neurologists. The goal of this workshop is to provide the framework of clinical neurophysiology and functional neuroanatomy for a spectrum of the more common disorders that affect the nervous system. Presented by a neurologist/clinical neurophysiologist, and his chief EEG/neurotherapy technologist, this workshop will build a common bridge for communication between the fields of neurotherapy and neurology.

The workshop begins with a review of functional neuroanatomy. Structural and physiologic correlates to brain, spinal cord, and peripheral nervous system function will be reviewed. Fundamentals of the tools that have been historically used to define these functions, such as EEG, QEEG, MRI, PET, SPECT, cognitive and event related evoked potentials will be discussed.

The workshop will then review a variety of common disorders that affect the nervous system including QEEG findings and neurotherapy strategies for each:

Seizure disorders are common disorders which affect the brain and often present with abnormalities of the EEG/QEEG. The current nomenclature and organizational understanding of the various seizure types will be reviewed. Appearance of various paroxysmal disturbances seen on EEG will be presented. Standard medication and non-medication therapies, including neurofeedback will be discussed.

Concussion/Traumatic Brain Injury are perhaps one of the most common presenting disorders affecting brain function. A review of the acute and chronic pathophysiology along with neuroimaging, EEG and QEEG findings commonly associated with these injuries, epidemiology, and clinical management will be presented.

Sleep disorders are common confounding variables to neurotherapy. Often treatment of the underlying sleep problems will affect the QEEG appearance. Similarly, neurotherapy often will result in improved sleep quality. The workshop will review common sleep disorders including insomnia, sleep apnea, restless legs and periodic limb movements, shift work and other circadian disorders, and narcolepsy.

Migraine is another common physiologic disorder affecting 1 out every 5 women. The neurovascular theory of migraine pathophysiology will be presented. Migraine may have a complex presentation including complicated aura, and associated symptoms such as sensory sensitivity, nausea and pain. Pharmacologic, nutritional supplement, and neurotherapy strategies will be reviewed.

Stroke and Neurodegenerative disorders. These are the common disorders of the elderly. The anatomy of the vascular supply to the brain will be reviewed. Common and rare causes of stroke will be presented. Prevention and treatment strategies will be discussed. A review of the neurodegenerative

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disorders including Alzheimer's, Parkinson's, Lewey Body Disease, Multiple System Atrophy, and others will be presented as well.

Toxic/Metabolic Encephalopathies. The common causes for toxic and metabolic encephalopathies including thyroid disease, hypoxia, hypercarbia, hepatic and renal failure and others and their effects on the QEEG will be presented.

Attention Deficit Disorder. A neurological historical perspective of the disorder will be presented. Current concepts, epidemiology, natural longitudinal progression, and treatments will be reviewed.

The workshop will end with a Q&A discussion to review the days topics.

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PCW 6

Title: Four Channel Multivariate Coherence Training

Presenter(s): Robert Coben, PhD; Anne Stevens, PhD

Level: Intermediate

Abstract: Over the past several years, we have seen advancements in the ways we assess coherence and connectivity that provide great insights into brain functioning (Coben, Rezazadeh & Cannon, 2014). This understanding has led to approaching coherence in a multivariate fashion that enhances its accuracy (Kus, Kaminshi & Blinowska, 2004). Multivariate autoregressive statistical tools have become critical to this endeavor. Such techniques enable us to measure effective connectivity in a source localized fashion such that we can image reciprocal causality and influence. This accuracy in depicting neural networks gets us closer to the real signals in the brain. This led to an enhancement in how we do neurofeedback training which now uses four sensors and trains coherence in a multivariate fashion (Coben et al., 2018). This workshop will present methods of measuring effective connectivity and conducting multivariate coherence training. We will review the empirical evidence supporting this approach in various clinical populations. We have shown it to be more efficient in changing power and coherence than two channel coherence training in the study reference above. In fact, in this large sample in excess of 170 subjects coherence changed with four channel training by more than four times that of those that received two channel training. In a study of learning disability, this method has shown an advantage of at least 33% over other neurofeedback methods. We have also conducted a project applying it to major depression with significant findings in a crossover design with a two year follow-up as well. Our seizure project has also shown an increase in neurofeedback efficacy of close to 50% compared to SMR training and two channel coherence training. In studies with children with autism it has had shown higher efficacy levels as well. And lastly, we will present new data applying this technique to neurofeedback training to survivors of developmental trauma.

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PCW 7

Title: Stimulation Technologies - Audio-visual Entrainment, Cranio-electro Stimulation and transcranial DC Stimulation - Physiology and Clinical Outcomes

Presenter(s): Dave Siever, CET

Level: Intermediate

Abstract: Since the discovery of photic driving by Adrian and Matthews in 1934, much has been discovered about the benefits of brainwave entrainment (BWE) or audio-visual entrainment (AVE), as it is commonly known today. AVE increases cerebral blood flow, beneficial neurotransmitters such as serotonin, endorphins and norepinephrine, has profound calming effects, induces a meditative mind state, increases brain lactate and excites micro-glia, which in turn devours amyloid deposits. Research on the effectiveness of AVE in promoting relaxation, cognition and hypnotic induction, treating ADD, PMS, SAD, PTSD, migraine headache, chronic pain, anxiety, depression and episodic memory is now available. Recent discoveries have shown AVE to be a powerful means of recovery from traumatic brain injuries of a newly discovered type, termed thalamocortical disconnect.

Modern-day interest in cranio-electro stimulation (CES) was initiated by Robinovitch, who, in 1914, made the first claim for electrical treatment of insomnia. In 1958, the book *Electro-Sleep* inspired research in Europe and in Eastern Block countries, as well as in South America, Asia and finally the US. CES as delivered through the ear lobes primarily stimulates the brain stem and liberates ample serotonin and endorphins. Most of the roughly 200 studies have shown CES as a reliable method to reduce anxiety, depression, pain, improve sleep, and improve cognition and IQ. CES has been extensively studied for drug rehab. CES lends itself particularly well for those with fast running eyes-closed alpha production.

Transcranial DC Stimulation (tDCS) has been extensively studied since the 1980s, totalling roughly 750 studies to date. A major advantage of tDCS is that it may be applied directly over an area of concern where the cortical activity over a specific site on the brain may be enhanced or suppressed, much like NF. Over 800 studies on, tDCS including 100 on stroke rehabilitation have been published to date.

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PCW 8

Title: ClinicalQ and Braindriving

Presenter(s): Paul Swingle, PhD

Level: Basic

Abstract: Neurotherapy is rapidly evolving into a primary care option for many disorders. Problems with mood, anxiety, sleep quality, learning, cognitive processing, pain, addictions, anger management, and age related memory are all amenable to rapid assessment and treatment. The assessment procedures are simple and straight forward involving assessment of a limited number of brain sites. Treatment options other than neurofeedback have been developed to markedly accelerate neurotherapy. These complementary techniques markedly facilitate neurotherapy as a viable primary care alternative to dangerous and often ineffective pharmaceuticals.

The workshop starts with the precise ClinicalQ assessment procedure that determines treatment strategies. The ClinicalQ data base contains over 1500 clinical patients and has proven to be far more accurate as compared with data bases based on presumptively “normal” subjects. Emphasis is on Braindriving treatment procedures including review of major unconditioned stimuli required for treatment. The use of Braindriving techniques in the treatment of learning disorders and specific skill development including reading, mathematics, cursive writing delays are emphasized. These classical conditioning procedures can be applied while the child is engaged in the skill under treatment. Similar procedures have been found to be very effective for clients with sequelae of head injuries. Other treatment options including neurofeedback, AVS, CES, energy psychology methods, craniosacral manipulations, harmonic sounds, electrostimulation, and behavior therapies appropriate for a wide range of disorders are presented. Practitioners will be able to immediately apply these efficient techniques. Conditions that require full QEEG and normative data base procedures will be identified as will conditions in which the more aggressive treatments are contraindicated.

Materials provided will include detailed procedures for the rapid assessment protocol, site location forms for acupuncture meridians, and procedure sheets for energy routines. Hands-on training for some craniosacral manipulations, acustimulation and energy routines is provided. This workshop is presented in response to many requests from previous participants in shorter workshops for one full day of training in these effective neurotherapeutic techniques.

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PCW 9 (2-Day)

Title: The use of Neurostimulation (pEMF, tDCS, tACS, tRNS) and QEEG Neurotherapy in Clinical Practice

Presenter(s): Nicholas J. Dogris, PhD, BCN, QEEG; Tiffany Thompson, PhD, BCN, REEG-T, QEEG-D

Level: Intermediate

Abstract: This workshop covers the use of transcranial direct current, transcranial alternating current, transcranial random noise, and pulsed electromagnetic field stimulation clinical, treatment techniques for the treatment of psychiatric disorders (children, adolescent and adult), TBI, and concussion. In this workshop, Day 1 will be centered around the theory and clinical application of neurostimulation and the various methods that are available. This will include an over view of treatment protocols, tDCS, tACS, tRNS and pEMF neurostimulation and synchronized neurofeedback methods. Day 2 of this workshop will be centered around analysis and the clinical interpretation of QEEG as it is applied to neurostimulation and neuromodulation. We will discuss advanced QEEG analysis methods from the Neuroguide, WinEEG and EEGlab/MatLab software platforms. Case conceptualization and treatment planning will be covered with the intention of formulating well rounded treatment plans. Clinical cases will be presented and will include, but not limited to, depression, anxiety, TBI, opioid addiction (substance abuse), and childhood disorders (ADHD, Autism).

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PCW 10

Title: How to Link Symptoms to Dysregulated Networks in the Brain and Design Neurofeedback Protocols

Presenter(s): Robert W. Thatcher, PhD

Presented by Applied Neuroscience, Inc.

Abstract: Hands on training in how to identify dysregulated brain network hubs and connections linked to symptoms. Learn how to use NeuroGuide and the NeuroNavigator and swLORETA to examine networks in 3-dimensions and evaluate functional connectivity, phase differences and information flow. Learn how to create Neurofeedback protocols and evaluate changes of symptoms and brain function over sessions.

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PCW 11

Title: Advanced QEEG and Neurofeedback Concepts: Cross-Frequency Coupling, NeuroNavigator and Cerebellar Neurofeedback?

Presenter(s): Robert W. Thatcher, PhD

Presented by Applied Neuroscience, Inc.

Abstract: Understanding cross-frequency coupling from brainstem to limbic system to cortex including Neurofeedback protocol generation. Cross-frequency measures such as cross-frequency phase-amplitude coupling, cross-frequency coherence, cross-frequency power and cross-frequency phase reset will be demonstrated. Advanced Neuroimaging topics will be covered including the potential to resolve sources in the Thalamus, Sub-Thalamus, Habenula and Cerebellum. Implications and future applications of Neurofeedback including Cerebellar Neurofeedback will be discussed.

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WS 1

Title: ISNR FOUNDATIONS - What to Choose? Various Neurotherapy Modalities in QEEG and Symptom-Guided Protocol Creation

Presenter(s): Tiffany Thompson, PhD, BCN, REEG-T, QEEG-D; Michelle Presniak, PhD

Level: Basic

Abstract: Neurotherapy protocols have advanced over the last decade with a variety of treatment equipment and options available, including both neurostimulation and neurofeedback. Choosing the best protocol for our clients can be one of the most challenging obstacles for a clinician. This process both relies on clinical skill and experience, as well as expertise in reading EEG and QEEG data.

Although more research is still needed, studies are emerging showing that QEEG-informed protocols may be more effective for clients (Arns, Drinkenburg, & Kenemans, 2012; Wigton & Krigbaum, 2015). The focus of the current workshop is to help clinicians learn how to translate EEG and QEEG data into treatment protocols for clients, based on the integration of intake data and QEEG data. The emphasis of this workshop is not on any one treatment modality, but on many with the aim of providing clinicians exposure to translating EEG and QEEG data into a variety of neurotherapy options. This includes neurostimulation, such as tACS, tDCS, tRNS, pEMF, CES and rTMS; and various forms of neurofeedback, such as Z-score training, single-channel training, and LoRETA-based training.

The goal of the workshop is to help clinicians learn how to develop protocols for various kinds of equipment and treatment modalities, and to also help them begin exploring when and why certain treatment options may be more beneficial than others. During this half day workshop, the presenters will present clinical cases with EEG and QEEG data, and develop both their recommended treatment plan across multiple treatment modalities and equipment choices. Cases will range from children to adults in a variety of areas including ADHD, OCD, PTSD, head injury, and movement disorders.

A further benefit of this course will be the overview of fundamental and advanced QEEG and EEG assessment, in conjunction with clinical data and client presentation, as a blueprint for treatment selection.

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WS 2

Title: Ethics in the age of Neuroscience: How do we understand the "Good Life."

Presenter(s): Randall Lyle, PhD; Sarah Prinsloo, PhD

Level: Intermediate

Abstract: Neuroscience and neuromodulation bring new and complex questions and considerations to our understanding and application of Ethics. The traditional professional "code of ethics" was built around an accumulation of "thou shalt not's" related to universal principles and legal liabilities. Essentially, modern day professional ethics codes are built around the universal idea of "do no harm" and are filled out in detail by the ways in which people in each field have failed in that principle and been sanctioned either by the community of professionals or by the legal system for having caused so kind of harm. Increasingly, ethics has become a set of regulations designed to provide "risk management" and protection from professional and legal liability. We think that ethics is more than this. Historically, ethics, as a discipline of philosophical thought has not only been concerned with "do not harm," but has also on occasion sought to understand the principle of "doing good." We will invite participants to join with us in reflecting on the ancient conceptualization of ethics as the "Good Life." Aristotle talked about the "Good Life" as a life lived ethically and which also feels good, or what we today might describe as emotional well-being. What does it mean to both feel good and to do good? How are ethics and human attachment intertwined and mutually interdependent? What are the costs and benefits that derive from a particular culture or familial style of life? In addition, we will explore how the "Good Life" concept is transformed and expanded by the modern discoveries and understanding of the brain. How does relational neurodevelopment inform or change the way we think and do ethics? Finally, we will invite discussion about the idea that these new insights into how the brain works may provide us a pathway out of the "rule" of ethics to an integration and adaptation to a "virtue" ethics, out of maleficence and into beneficence.

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WS 3

Title: Perception, Affect, and EEG Distribution Predicting Social Behavior Deficits With qEEG

Presenter(s): Richard Soutar, PhD

Level: Intermediate

Abstract: Dynamic salience network-mediated switching of large scale networks engages the default mode network or the central executive network for processing internal or external stimuli depending on task and context (Bressler & Menon, 2010). Underlying the salience network is the limbic salience detection system (Floresco, 2015). While central executive dominance is driven by the external attention system and the fronto-parietal networks, the DMN is driven by the limbic system (Menon, 2015 A & B). The combined activity of both systems is reflected in anterior- posterior activation (Morolas-Romero et al, 2013, Leech & Sharp, 2013) and bi-hemispheric activation difference (Gold, et al, 2012). Combined they define the global direction of neural activity (Peterson and Posner, 2012). These reflect both vagal related sympathetic and parasympathetic activity responding to stimuli both internal and external (Craig, 2005). These dimensions of activity recall the published work of Sterman on Vigilance Theory (Sterman, 2006) and Rosenfeld and Baehr (Rosenfeld & Baehr, 1999) and Choi et al (2011) on affect and Asymmetry in NFB research. Strong support exists for the notion that external salience is driven by perceptual shifts into critical states guided by emotional valancing (Miller et al, 2000; Miller 2016; Fan et al, 2012; Menon, 2015B). Consequently, asymmetry is an excellent proxy measure of neural system disorder which can be measured as underarousal (attentional cognitive function), overarousal (anxiety) or excess inhibition (depression). Statistical analysis of primary dimensions of social behavior indicate that these key social behaviors fall into categories of approach and avoidance that correlate with overarousal and inhibition and secondarily with underarousal in the form of vigilance and attention deficits. Percent asymmetry consequently becomes a predictor of social behavioral efficiency (Soutar, 2017). In addition, this type of analysis also makes it possible to determine the percent of contribution of toxic stress to abnormal qEEG compared to physical stressors such as TBI, toxins, and pathogens. This workshop will review research and supporting statistics to recommend what standard NFB protocols are most effective with various abnormal behavior patterns and related symptoms typically used to describe DSM categories.

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WS 4

Title: Mentoring & Teaching the Next Generation

Presenter(s): Robert Longo, MRC, LPC, BCN; Judy Crawford

Level: Intermediate

Abstract: Neurofeedback-based professional organizations, including ISNR and AAPB, encourage their clinical members to become board certified by BCIA. Professionals currently using neurofeedback in their practice or planning to add this modality are often interested in becoming BCIA Board Certified. One of the requirements to become BCIA Certified is to participate in 25 contact hours of mentoring with a BCIA-approved mentor to learn the application of hands-on skills. This is accomplished through the review of personal training, where the mentee is taught to self-regulate; patient/client sessions where the mentee runs the full session; and case conference presentations which are full cases that are discussed from intake through protocol selection and discharge.

The act of mentoring professionals in neurofeedback is a complex task that requires the mentor to teach, guide, encourage, and support the mentee in a variety of skills, knowledge, and the associated standards of care, ethical practices, challenges to our profession, and the rights and responsibilities of those persons seeking our services. Some mentees will have clinical experience doing neurofeedback while others have not even taken a didactic course nor acquired the equipment. Thus, some mentees will have a year or years of doing neurofeedback, while others have little to no neurofeedback experience.

The focus of this workshop is to provide attendees with an overview of the BCIA mentoring process, including the importance of addressing professional ethics and standards of practice, use of equipment, how to conduct a neurofeedback session, and how to determine the efficacy of a neurofeedback session, with BCIA mentees.

BCIA mentoring requirements, as they apply to professionals providing neurofeedback and seeking BCIA certification, will be reviewed and discussed including skills acquisition. Skills acquisition topics to be addressed will include, but not limited to; informed consent, client's / patient's role, rights and responsibilities, client / patient relationships, client / patient orientation to the neurofeedback process, preparing for a neurofeedback session, equipment maintenance, basic hygiene procedures including electrode attachment and cleaning, neurofeedback training goals, session note taking and data.

In addition, this workshop will address challenges EEG biofeedback/ neurofeedback mentoring practitioners face in providing mentoring services and how to decide whether a new mentee is a good match for your skills and background. Case examples and problematic mentoring experiences will be discussed.

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WS 5

Title: BCIA Neurofeedback Exam Review Course

Presenter(s): Mark Jones, DMin

Level: Intermediate

Abstract: For those planning to sit the BCIA exam, this course will provide a basic overview of the BCIA Blueprint of Knowledge. The workshop will also serve as a concise overview of neurofeedback theory and practice for those who simply want an update. The workshop is a fast moving overview of neurofeedback, history of the field, principles of learning, concepts of biofeedback, basic neurophysiology and neuroanatomy, basic instrumentation and electronics, research, psychopharmacological considerations, treatment planning, and professional conduct.

The presenter regularly teaches neurofeedback at introductory to advanced levels and mentors clinicians seeking certification. As a seasoned clinician, the instructor brings insights from years of practice. The content focuses on the type of review that students have reported as helpful for preparing for the exam and achieving certification.

The workshop is designed to create a supportive atmosphere where participants interact, create sound exam-taking strategies and gain confidence in their preparation. Key concepts from each area of the BCIA Neurofeedback Blueprint of Knowledge will be highlighted. Review questions will be presented so that students can assess their progress as the workshop progresses.

Learning Objectives:

Based upon the content of this presentation attendees will be able to:

- Describe EEG collection and interpretation concepts, such as montages; active, reference, and ground electrodes, analog-to-digital conversion, QEEG, LORETA source density analysis
- Name electrical and instrumentation terms including impedance, differential amplifier, sampling rates, high and low pass filters
- Identify common artifacts including eye movement, muscle tension, cardiac, electrode movement
- Recognize key features of normal and abnormal waveforms
- Describe the application of key learning theory concepts, such as, operant conditioning, to NFB
- Name key Brodmann Areas and related disorders that are common targets of NFB treatment
- List the levels of efficacy for NFB
- Understand the basis of event related potential (ERP)
- Describe basic ethical principles inherent in NFB practice
- Define basic statistical terms
- Identify basic brain structures related to NFB
- Name key neural networks
- Understand the purpose of common biofeedback modalities used along with NFB
- List common disorders where NFB is evidenced-based including seizure disorders, ADHD, anxiety, depression, post-concussion

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WS 6

Title: ISNR FOUNDATIONS - Maximizing Neurofeedback Effectiveness: Protocol Decisions & Neurotherapeutic Tactics

Presenter(s): Glenn Weiner, PhD

Level: Basic

Abstract: There are many ways to do neurofeedback. This workshop will review the various ways that it is being done and the supportive research behind them. Most clinicians learn one approach, work with patients for a bit and want to expand their toolbox to get success with the patients whom they have not succeeded with. While we will review all of the major neurofeedback approaches, we strongly believe that good clinical outcomes can take place regardless of the primary approach utilized, and that clinician skills play a significant role in outcomes.

We will focus on protocol decision making and the protocol adjustment process. Time will be spent in presenting practical methods for monitoring progress to assist with this. We will discuss decisions about how to train, where, what frequency, uptraining vs. downtraining, how many channels to train, surface vs LORETA, amplitude, coherence, Z scores or not, alpha-theta and infralow.

Part of improving clinical outcomes is managing the various psychotherapeutic aspects that are inherent in doing this work. We will discuss the issues of orienting patients for neurofeedback; managing the issues around medication; coaching in session; issues around increasing awareness; homework; threshold setting; decision making with feedback displays, etc. Time will also be spent in reviewing some of the auxiliary approaches such as entrainment; HRV; meditation; home training; self-monitoring; and journaling. Some neurotherapeutic tactics for working with children will also be discussed.

Dependent upon participants interests we can discuss the protocol decision logic for patients from our clinic with the full range of disorders which tend to seek treatment in an outpatient setting (e.g. PTSD; OCD; ADHD; Chronic Pain; Depression; Anxiety; Sleep, etc.).

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WS 7

Title: ISNR FOUNDATIONS - Neurobehavioral Therapy for ADHD: Increasing effectiveness of Neurofeedback by integrating neuro-behavior/neuro-cognitive techniques in treatment of Attention Deficit.

Presenter(s): Elena Labkovsky, PhD

Level: Basic

Abstract: Attention Deficit Disorder (ADHD) is a brain-based syndrome that has to do with a set of brain functions involved in regulation of attention, concentration, memory, motivation, learning from experience, impulsivity, hyperactivity, organization, social skills, and others. According to the National Institute of Mental health (NIMH), prevalence of children diagnosed at least once with ADHD increased by 42% between 2003 (7.8%) and 2011 (11.0%), and the numbers seem to keep going up.

Neurofeedback has proven to be and remains one of the most effective modalities for treating ADHD. The treatment effect can be enhanced even more by integrating various neuro-behavioral oriented approaches for treating ADHD into a therapeutic concept called “Neurobehavioral Therapy.”

Unlike patients with other psychological conditions, for patients with ADHD (especially children), neurofeedback sessions are of increased challenge. It is extremely difficult for an ADHD patient to remain still in a chair with electrodes on his/her head, being attached to the training EEG machine, trying to meet the NF protocol requirements and obtain maximum positive feedback. Besides, ADHD patients constantly crave novelty and feel very uncomfortable and non-motivated when required to do the same thing over and over - which is one of the key elements during Neurofeedback. That encourages neurofeedback therapists to reduce session duration (compared to durations used with other conditions) and often allow one or multiple breaks between runs during a NF session. Neurobehavioral therapy helps to resolve these issues and significantly increases therapeutic effectiveness when treating ADHD patients. We see Neurobehavioral therapy as a combination of various brain-behavior techniques, which can be used in different proportions during a therapy session, depending on what seems to be the most effective combination for a given patient.

The workshop is aimed to introduce Neurobehavioral therapy as a set of treatment procedures which can be effectively used along with Neurofeedback to treat ADHD and related behaviors.

The workshop will include live demonstrations of some elements of Neurobehavioral Therapy (like Neuro-Cognitive Training, etc.) and will provide participants the opportunity to experience this modality during the workshop.

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WS 8

Title: Connectivity Assessment and Training in Developmental Trauma

Presenter(s): Robert Coben, PhD; Anne Stevens, PhD

Level: Intermediate

Abstract: Based on the Adverse Childhood Experiences (ACE) study (Anda et al., 2006), at least one adverse type of event occurred in 64% of the sample and physical, sexual, or emotional abuse in at least 28%. The ACE study showed us that a history of developmental trauma predisposes such persons to later life problems including a greater risk of mental health, somatic, substance abuse, sexuality, memory, emotional regulation and partner violence issues. Teicher et al. (2016) have been able to show that abuse experiences alter brain development which persists into later years and that type of abuse impact different brain regions. This same group of researchers have demonstrated profound adverse effects on neuroplasticity and connectivity between important regions of the brain involved in emotional and social regulation. These often include regions of the limbic system, left frontal cortex and insula, and right parietal regions including the precuneus. Last year we (Armes & Coben, 2017) presented data on 69 subjects with developmental trauma using high density eeg. The findings showed significant differences with the DT group have greater power and connectivity anomalies, especially long rang connectivity findings. During this workshop we will focus on understanding these findings and brain changes that occur in children that experience these very unfortunate events. We will discuss advances in effective connectivity measurements from eeg data so that the learner will understand how such data can be processed. This will also include graph theory metrics for later pre-post comparison. From this we will present a model of coherence based neurofeedback training using four channel multivariate coherence training for trauma survivors. Outcome data will also be discussed using this approach with instruction on how to implement such an approach in a clinical practice. Case vignettes will also be utilized to show how assessment, training, and outcome measurement may be used to maximize treatment outcomes.

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WS 9

Title: The Importance of Visually Inspecting EEG Raw Data in War Veterans Suffering from PTSD and/or TBI

Presenter(s): Lori Russell-Chapin, PhD; Nicole Pacheco, PhD; Ted Chapin, PhD

Level: Intermediate

Abstract: Current neurophysiological research assessing the brain wave activity in war veteran populations suffering from mental health disorder (e.g., post-traumatic stress disorder), often utilize quantitative electroencephalography (qEEG) analysis derived from 19-channel EEG. This approach provides useful information and insight of how this population compares to other populations. As research methods have improved, biomarkers have become more consistent with this population. However, few, if any, studies discuss the role of visual inspection of the raw data or publish images of the raw data of these subjects. The heavy reliance upon qEEG analysis without a thorough visual inspection of the data can lead to the practitioner's unintentional negligence and failure to note the presence of abnormal activity, including but not limited to, paroxysmal activity and interictal epileptiform discharges (IEDs). Another important reason for close visual scrutiny in the raw data of this population is their high risk of experiencing head trauma due to the nature of their work (e.g., military active duty). Head trauma or Traumatic Brain Injury (TBI) increases the likelihood of seizure. Electroencephalography (EEG) is the gold standard and the best assessment tool for identifying seizure activity as well as abnormal brain activity (e.g., interictal epileptiform discharges).

Mental health professionals performing 19-channel EEGs need to be aware of several important areas when working with this population:

- When are seizures most likely to occur? A professional may be unintentionally increasing the likelihood a seizure will occur.
- What does seizure activity look like? How does it differ from sleep? Especially during eyes closed recording when patients are asked to relax, this is a time that they will likely become drowsy or even go to sleep (remember diagnostic EEGs are 20-30 minutes in medical settings and they want to see sleep).
- What do you do if a patient has a seizure?
- Why is reliance on qEEG not always appropriate with this population?

War Veterans who have experienced active duty are more likely to experience or at risk of experiencing a Traumatic Brain Injury (TBI) (Hoge, McGurk, Thomas, Cox, Engel & Castro (2008). Head trauma a risk factor for developing a seizure disorder. TBI also increases a veteran's risk of developing Post-Traumatic Stress Disorder (PTSD) twofold (Todder, Levine, Abujumah, Cohen & Kaplan, 2012). It is unlikely that a practitioner will witness a seizure during a typical 20 to 30 minute 19-channel EEG data collection recording session. However, it is likely that paroxysmal, interictal epileptiform discharges (IEDs) would be observed. Therefore, it is of utmost importance to be able to detect IEDs, differentiate normal versus abnormal activity, and take appropriate action if questionable activity is seen during a recording to ensure the patient's health and safety (e.g., establishing referral system to a board certified electroencephalographer).

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In conclusion, when working with populations who are at risk of experiencing brain injuries or trauma, the practitioner must exercise skill in differentiating between normal and abnormal brain wave activity and take appropriate action when signs of seizure activity occur.

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WS 10

Title: Using tDCS, tACS and Microcurrent Therapy Adjunct to Neurofeedback

Presenter(s): Robert Crago, PhD; Sanjay Manchanda, PhD; Jay Sanguinetti, PhD

Level: Basic

Abstract: The workshop will teach you how to employ different forms of low-level electrical current stimulation as very powerful and effective adjuncts to your neurofeedback and other therapeutic work. The primary focus will be tDCS but tACS and Microcurrent therapy will also be discussed. It will include:

- Summary of past and current relevant Basic Research in tDCS and tACS
- Summary of past and current relevant research on Clinical Applications
- Safety considerations based on research and clinical experience
- Recommended protocols for best use cases and electrode placements for tDCS
- How to individualize treatment based on synthesis of:
 - Symptom presentation
 - Functions of brain areas
 - Qeeg
 - Current research
- Combining tDCS with Neurofeedback
- Protocols and devices for Supervised Home use of tDCS
- EEG entrainment with tACS
- Case Studies and Clinical Vignettes
- Lesser known Physiological and EEG effects of various AC Frequencies including Frequency Specific Microcurrent
- Hands on practicum with use and placement of electrodes.

Learning Objectives

1. Participants will be able to summarize past and current relevant research on basic clinical mechanisms and clinical research on tDCS and tES.
2. Participants will become aware of safety conclusions and considerations in the use of tDCS and tES.
3. Participants will be able to think about how to individualize treatment based on synthesis of:
 - a. Symptom presentation
 - b. Functions of brain areas
 - c. Qeeg
 - d. Current research
4. Participants will understand how tDCS could be used in combination with Neurofeedback in their practice.
5. Participants will begin to understand how to use tACS along with Neurofeedback to power up their sessions.
6. Participants will become aware of protocols and available devices that are currently being used for supervised Home use of tDCS.

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7. Participants will gain experience in the hands-on use and placement of electrodes with various devices.
8. Participants will be able to summarize lesser known Physiological and EEG effects of various AC Frequencies and how they might be used in their clinical work.

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WS 11

Title: ISNR FOUNDATIONS - Ethics in qEEG and Neuromodulation

Presenter(s): Robert Longo, MRC, LPN, BCN; Leslie Sherlin, PhD, CMPC, QEEGD, BCN, BCB

Level: Intermediate

Abstract: Our professional organizations, and specifically ISNR, can provide practitioners and professionals offering qEEG and neurofeedback services opportunities to create and participate in ongoing forums for discussion of peripheral biofeedback and EEG biofeedback and the standards of care, ethical practices, challenges to our profession, and the rights and responsibilities of those persons seeking our services.

The focus of this workshop is to provide attendees with an overview of professional ethics and standards of practice as they apply to the helping professions and specifically those providing peripheral biofeedback and EEG biofeedback/neurofeedback and qEEG services. In addition this workshop will address challenges peripheral biofeedback and EEG biofeedback/neurofeedback practitioners face in our organizations, clinics, and practices.

Neurofeedback is becoming a “Holistic” form of treatment/intervention for clients and patients with a variety of disorders. Neurofeedback practitioners come from a variety of backgrounds and professional training, (i.e., medical, mental health, education, to name just a few) and are often asked to help clients/patients with various disorders that may fall within or outside of their professional training; (nurses working with patients having mental health issues, counselor and educators working with clients /patients with headaches, TBI related symptoms). As healthcare becomes more complex and integrated, those practicing peripheral biofeedback and EEG biofeedback/neurofeedback need to consistently keep ethics and standards of care in check.

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WS 12

Title: Neurofeedback and Virtual Reality from Office Assessment to Home Monitoring

Presenter(s): Robert Reiner, PhD; Scott Lloyd, PhD; Heather Davidson, PsyD

Level: Intermediate

Abstract: Recent advances in at home training have expanded the reach of psychology and enabled greater consistency and efficacy of treatments. The staff from Behavioral Associates will update clinicians on how to use in vitro assessments to inform in vivo practice with neurofeedback, biofeedback and virtual reality applications.

Following a physiological stress assessment the clinician can use of heart rate variability (HRV) biofeedback, in conjunction with mobile phone based virtual reality (Samsung, Oculus) exposure therapy programs to help increase treatment adherence among phobia sufferers. Dr. Reiner will also demonstrate how the use of three-dimensional photography and videography can allow clinicians to create their own virtual environments expanding the range and depth of immersive environments available to help treat more obscure phobias and obsessions.

At home neurofeedback training (Myndlift, Muse) is another areas of increasing promise in the field. New wearable devices can help regulate brainwaves targeted by a quantitative electroencephalogram (qEEG) in the office for symptoms ranging from anxiety, attention, depression and addiction. Staff will review progress from case-study examples of real patients who completed at home training and regular qEEG re-assessment at the office.

Training with the latest technology can be appealing but it can also be daunting for those without knowledge of how each product works in a clinical setting. Dr. Lloyd will help guide practitioners through demonstrations and troubleshooting protocols for treating a variety of common outpatient disorders. He will discuss how to implement biofeedback, neurofeedback, tDCS (transcranial direct current stimulation) and virtual reality into a variety of practice models, with variations for any budget or patient size.

Getting children to buy into therapy is not always easy. While technology can be attractive it presents it's own challenges both from the technical as much as the personal side of clinical practice. Dr. Davidson will discuss her extensive experience working with children and supervising young clinicians to tailor biofeedback, neurofeedback and virtual reality protocols to younger clients. Finally she will discuss case studies from those who have used at home training to help improve their focus and school performance.

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WS 13

Title: The Power of Audio-visual Entrainment: Why it's a Must for Every Practice

Presenter(s): Dave Siever, CET; Becky Bassham, Board certified in NFB (BCN) and qEEG (QEEG-T); John LeMay, MA Marriage & Family Therapy

Level: Intermediate

Abstract: Dave Siever: Physiology of Audio-visual Entrainment (AVE). Modern research continues to show the benefits of AVE through non-frequency mechanisms such as; increased cerebral flow, hypnosis and deep meditation, increasing neurotransmitters such as serotonin and endorphins, providing autonomic calming, jumpstarting the brain (as is seen with thalamocortical TBI), generating lactate & ATP and for activating microglia to clean up amyloid deposits in Alzheimer's. Research on the effectiveness of AVE in promoting relaxation, cognition and hypnotic induction, treating ADD, PMS, SAD, PTSD, migraine headache, chronic pain, anxiety, depression, TBI, PTSD, Alzheimer's and memory is now available.

Becky Bassham: Use of AVE in Residential Treatment for Addictions and TBI

At our residential treatment center for addictions and TBI recovery, AVE has become the #1 go-to device to help give clients rapid relief from the symptoms of medication withdrawal, pain, anxiety, insomnia, headaches, and "brain fog." Many of our clients present one or more of the following profiles: addictions, anxiety, depression, PTSD, and traumatic brain injury (TBI).

AVE has given us significant improvement in self-reported ratings of focus, relaxation, grounded (FRG), as well as reduction in pain and cravings. With its convenience, portability, ease of administration, and freedom from reliance on patient cooperation in our particularly volatile population, AVE is often the first thing we turn to in the first few days of admission. AVE also offers an affordable option for home-based aftercare upon release from our program. We will review EEG and subjective outcomes in cases of addictions and TBI.

John Lemay: QEEG/ERP, brain metabolism, working memory.

The QEEG offers a unique way of looking at brain metabolic functioning. Based on a simple but comprehensive evaluation of functioning including QEEG and ERP analysis, stimulation technologies can be tailored to the client. Several cases utilizing a mixture of nutrition, AVE and EEG biofeedback interventions will be presented. Cases will focus on persons with working memory challenges. A treatment planning methodology will be spelled out so that attendees can integrate the information into practice.

Dave Siever: Thalamocortical Disconnect Type of TBI, and How to Treat It with Audio-visual Entrainment

Brain injuries, whether physical traumas or viral infections (flu, mumps, Lyme Disease, etc.), trigger reactive gliosis and inflammation in the brain. During this process, the thalamocortical loop where alpha rhythms originate, shuts down or disconnects (TCD). This loss of alpha brain wave production manifests as anxiety, sleep disorders, emotional instability and cognitive losses. Behaviors range from anorexia to substance abuse, ritualistic obsessions to violence. Electroencephalography (EEG) tracings and

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quantified EEG (qEEG) easily detect a TCD in which low voltage, loss of alpha and poor phase are specific markers.

Audio-visual Entrainment (AVE) involves the presentation of auditory and photic stimuli at brain wave frequencies. AVE increases cerebral blood flow, neurotransmitters and lactate in the brain. AVE used in a surprising and counter-intuitive way has given these brain-injured people a second chance at regaining their lives, occupations, social life and good mental health. A counter-intuitive approach using AVE to “jumpstart” the brain is proving to be highly successful.

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WS 14

Title: Advanced Protocol Methodologies and LORETA Analysis in Clinical Work

Presenter(s): Joel Lubar, PhD, BCIA-BCN Senior Fellow, QEEG Diplomate; Sal Barba, PhD, BCIA-BCN; Kevin Uzi, MS

Level: Intermediate

Abstract: An important challenge in developing protocols for neurofeedback is the ability to track progress in a form that patients could appreciate as well as demonstrating statistically for the practitioner that significant changes have occurred. This is important whether one is using the simplest form of single-channel surface training, multichannel surface training or LORETA neurofeedback which involves all 19 channels of the standard 10-20 montage. The parameters that need to be included in developing protocols for surface training include absolute power and/ or amplitude, relative power, power ratios, coherence, phase, phase lock and phase shift. For LORETA neurofeedback, it is important to develop protocols and track progress for current density, phase, coherence, phase lock, and phase shift.

This half-day workshop will focus on methodologies for developing database fusion and symptom checklist based protocols for advanced LORETA and surface neurofeedback protocol development and advanced analysis of the data illustrated through new software. The presenters will demonstrate how to develop protocols through the LORETA and surface tracking programs. They will illustrate how to obtain precision in multiple protocol development, as well as showing the participant how to track the progression of sessions automatically through graphical and statistical analysis. This approach allows the clinician to develop surface and Laplacian protocols. Furthermore, these methods provide the capacity to import protocols easily and automatically into the Neuroguide training system for neurofeedback.

The development of protocols is based on the quality of the raw EEG. If the recording contains artifacts due to muscle contamination, eye movement, blinks, head movement and many other types of artifact the protocols the clinician has developed will be completely flawed that could cause a cascade of mistaken training directions. There are now advanced methods which we will illustrate how to separate out many of the artifacts that could contaminate a quality EEG recording.

This workshop will further provide illustrations from our case material illustrating results of training over many sessions and relationships between EEG measures and behavioral measures based on psychometrics, ratings and other patient derived information. A critical point is that a treatment no matter how well it looks during training will not be clinically significant unless the results are maintained long after the training has been completed. We will address this issue with illustrations that with proper protocol development and integration of the neurofeedback with other treatment modalities long-term positive effects can endure.

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WS 15

Title: Lightspeed Neurofeedback: Live Z-score Modulated Pulsed NIR and Neural Connectivity

Presenter(s): Peni Jean Gracefire, LMHC

Level: Intermediate

Abstract: This workshop will present an innovative new technique directly integrating pulsed near-infrared light into neurofeedback designs which modulate the delivery of the pulsed NIR based on changes in selected EEG metrics, discuss case studies using this approach, and explore the significance of including photobiomodulation as an element of feedback within the neurofeedback paradigm itself.

Photobiomodulation has emerged as a promising therapy in recent years for ameliorating symptoms associated with both mental health and neurophysiological conditions. Early findings in the literature indicate photobiomodulation has significant clinical potential in the treatment of a number of brain based disorders, including, but not limited to, traumatic brain injury (Henderson, 2016), Alzheimer's and Parkinson's (Johnstone, 2015), improving executive function (Barrett, 2013), memory (Rojas, 2012), stroke and developmental disorders (Hamblin, 2016), and depression (Cassano, 2015).

A meta-analysis of articles examining the link between photobiomodulation and biological processes such as metabolism, inflammation, oxidative stress and neurogenesis suggest these processes are potentially effective targets for photobiomodulation to treat depression and brain injury. It also suggests there is preliminary clinical evidence suggesting the efficacy of photobiomodulation in treating major depressive disorder, comorbid anxiety disorders, and suicidal ideation (Cassano, 2016).

The Vielight Neuro is the first instrument of its kind, a transcranial-intranasal near infrared light (NIR) photobiomodulation device, delivering pulsed NIR with light emitting diodes (LEDs) at a wavelength of 810 nm, which has been documented as the infrared wavelength with the highest skin penetration profile (Rojas, 2013). Delivering the near-infrared light in pulses, instead of as a continuous exposure, addresses concerns regarding thermal effects on biological tissue (Ando, 2011).

The deployment of photobiomodulation and neurofeedback in the same treatment arc is currently being explored, with early reports indicating encouraging clinical outcomes. Dr. Marvin Berman has stated that including photobiomodulation in a neurofeedback treatment plan is an excellent way to boost ATP and repair damaged neural connectivity (Berman, 2017). Used as an adjunctive intervention, the photobiomodulation devices have historically been standalone methods, delivering pre-set pulses for selected amounts of time in a separate context from neurofeedback.

This workshop will introduce neurofeedback protocol designs which incorporate the Vielight device to deliver NIR at 810 nm, pulsed at rates determined by the clinical analysis of individual qEEG results of each subject within the context of current literature on photobiomodulation. The exposure to these pulses are directly modified by shifts in pre-selected EEG metrics, with paradigms based on changes in power and connectivity in monitored neurophysiological locations compared to a set of database norms.

Making the Vielight stimulation contingent on EEG behavior creates a framework in which the pulsed light becomes an explicit feedback element, an entirely novel application pairing its documented

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enhancement of BDNF and synaptogenesis (Hennessy, 2017) with unique patented live Z-score neurofeedback designs focusing heavily on supporting neural connectivity (Collura, 2008).

Cases studies using this technique will be presented and potential implications for future support of individuals with brain injury, cognitive impairment, depression, stroke, dementia, and a variety of similar conditions known to exhibit impacted connectivity will be discussed.

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WS 16

Title: Infralow sLORETA Neurofeedback for Eating Disorders: Targeting the Central Autonomic Network

Presenter(s): Mark Smith, MSW; Leila Ostad, MSW

Level: Intermediate

Abstract: This workshop will describe Infralow sLORETA neurofeedback training with individuals who suffer from eating disorders. Discrete brain networks including the Default Mode Network and Salience Network will be described, as well as, other behaviorally related regions of interest.

Recent research has identified the influence of infralow frequencies on the excitability cycle of faster frequencies. Infralow frequencies influence the amplitude of fast wave activity while bridging brain regions together into functional networks (Palva & Palva, 2012). This pivotal role for the infralow periodicities allows the clinician to reliably influence the behavior associated with neuronal networks by activating or quieting targeted regions of interest. ISF sLORETA neurofeedback presents a unique opportunity to regulate the dysfunctional networks involved in eating disorders.

Both obesity and eating disorders are conditions of disordered eating that result from a complex interaction of a multitude of factors including internal mechanisms (homeostatic, cognitive, and emotional) and external influences (environmental cues, social context) on food intake. In an effort to treat such a common and life threatening illness it is important to understand the internal brain networks involved in an effort to create a more viable treatment. The Central Autonomic Network (CAN) is an internal regulation network. Different sub regions of the CAN are specifically involved in the sensory and motor control of the autonomic nervous system (ANS) (Beissner, Meissner, Bar, & Napadow, 2013).

One of the brain networks involved in the CAN that has been found to modulate food cravings is the Default Mode Network (DMN). The DMN works as a way to maintain a sense of self, as activity in the DMN reflects disengaging from the external environment and self-reflecting (Buckner, Andrews-Hanna, & Schacter, 2008). In addition to the DMN, the Salience Network (SN), which includes the anterior cingulate cortex and insula, also presents a brain network that has been postulated to play an important role in mediating the relevance of internal and external stimuli and detecting the more behaviorally relevant stimuli and the coordination of neural resources (Seeley et al., 2007). The core function of the SN is to process important stimuli (i.e. hunger) and recruit a suitable behavioral network to produce result on the internal demand. SN dysfunction has been linked with a host of psychiatric conditions, particular those involving self-regulation and executive function deficits (Uddin, 2015). It is thought that the SN suppresses the DMN to facilitate attention when food is present. Inflexibility of the DMN may be a major cause for the heightened food cravings seen in food addicted individuals.

Previous neuroimaging studies report that the PCC serves as the hub of the DMN and is one of the most densely connected brain regions (Greicius, Krasnow, Reiss, & Menon, 2003). In recent research, it was found that by using ISF sLORETA to regulate the activity of the PCC, morbidly obese women had significantly statistical decrease in food cravings (De Ridder et al., in press).

Supportive case presentations, pre-and post qEEG data, and newly published research will be presented.

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WS 17

Title: Does Neuroscience Change Everything?: Trauma therapy and neurofeedback

Presenter(s): Sebern Fisher, MA

Level: Intermediate

Abstract: Developmental trauma affects every major system in the human brain from the brain-stem to the cortex from the sense of balance to the sense of self. There are structural impacts and functional ones. Perhaps the most widespread and important network is the Default Mode Network. We will explore the DMN in this workshop as it is the network that represents “self” and “other”. As we will see it is severely attenuated in those with histories of developmental trauma. This attenuation should lead us to wonder about the consequences for therapy with patients for whom neither they themselves nor their therapist really exist. We will discuss this fully, but there is one conclusion that is unavoidable: We cannot adequately treat those with histories of severe trauma without training their brains. It is not always easy to train these brains but a whole lot easier then to treat the minds these brains give rise to.

Each brain we train is a quantum universe unto itself. Before we interact with it, we can't know its rules. But we have one primary goal which is to reduce fear. We will look at different neurofeedback approaches with most attention to protocols that regulate the brain and quiet reactivity.

Reactivity can be expressed in emotional, behavioral and cognitive dysregulation and as psychotherapists we focus on this aspect of the human dilemma. But it clearly expresses itself in the body and perhaps most profoundly in inflammation. There is a growing body of research literature that links depression and inflammation. The now famous ACE (Adverse Childhood Experiences) study demonstrates that the consequences of these childhoods are severe. We will review this study briefly but suffice it to say that without treatment intervention, a person with an ACE score of 6 will have 20 years taken off her life. A person with an ACE score of 4 or above will suffer significantly higher incidences of coronary heart disease, liver and lung disease and autoimmune disease. The common pathway for these diseases is inflammation.

A patient of mine described it this way: “There’s a tiny spark and then almost immediately (gesturing from the back to the front of her head) there is a forest fire.” Daniel Amen describes “the ring of fire” in the brains of developmental trauma survivors.

Babies experience multiple fear provoking experiences in a day. A good-enough mother attends and soothes these moments. When the parent is not, as it were, good-enough the baby will experience inflamed affect and an inflamed body putting them at significant if not inevitable risk of mental and physical illnesses as they age. We will explore how neurofeedback helps to organize the attachment system through affect regulation and the importance of following and quieting inflammatory processes in the body.

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WS 18

Title: Cognitive Neuromodulation - A New Paradigm for the Treatment of ADHD

Presenter(s): Daniel Long II, PhD

Level: Intermediate

Abstract: This intermediate level training will demonstrate a unique treatment approach being researched and utilized at the WVU MindFit Clinic. The method combines Infralow Fluctuation (ISF) neurofeedback and a method of cognitive training that has been employed at WVU since 2009 specifically to address ADHD in a young adult population. Infralow Fluctuation training has garnered considerable interest over recent years, given that it appears to be significantly related to an array of self-regulatory processes. Especially relevant to ADHD, the infralow signal has been empirically associated with the Default Mode Network and may significantly inform ADHD diagnostic status (Broyd, Helps, & Sonuga-Barke, 2011; Tye et al., 2012). Cognitive training, on the other hand, is often broadly defined as tasks - typically presented in a game-like format - designed to enhance aspects of attention, memory, or other facets of cognitive performance. Empirical research on cognitive training tends to be mixed, with some research findings showing considerable efficacy in mitigating the symptoms of ADHD (e.g. Rabiner et al., 2010), and others failing to demonstrate such effects (e.g., Cortese et al., 2015; van der Donk, Hiemstra-Beernink, Tienk-Kalff, et al., 2015). Cognitive training, as it is operationalized and studied at the WVU MindFit Clinic, has demonstrated promising results (Long, Leppma, & Foster, Manuscript in Preparation), however. Specifically, it was demonstrated that students (n=40) who underwent WVU MindFit cognitive training on average experienced a 2 standard deviation increase in attention quotients, and nearly 70% of the sample no longer demonstrated quantitative impairment after about 10 weeks of training. More recently, a novel approach was designed that combines cognitive training and ISF neurofeedback. In this approach, attentional training is conducted by simultaneously addressing both tonic (i.e. endogenous, effortful process of maintaining cognitive processing) and phasic alertness (exogenously cued) during in vivo cognitive processing demands. Specifically, cognitive training is utilized to address phasic demands, and ISF neurofeedback is utilized to address tonic alertness demands via training of the Cingulo-Opercular Network - the fundamental function of which has been empirically linked to tonic alertness (Sadaghiani & Esposito, 2014). Software was devised so that feedback from the ISF training would facilitate or hinder the processing of cognitive task demands, which affords greater reinforcement of tonic alertness learning during tasks that require phasic processing.

This workshop will be taught on the Brainmaster Avatar platform that utilizes Discovery amplifier. Though hardware and software is not required to attend the workshop, it is highly recommended that attendees obtain the aforementioned to get the most out of this training. Attendees with equipment should contact admin@neurofeedbackservicesny.com to arrange for an ISF sLORETA license before attending the workshop.

26th Annual ISNR Conference

ABSTRACTS: Pre-Conference and Conference Workshops

WS 19

Title: Practicum - Cognitive and Emotional EEG Evoked Potentials for Clinical and Research Applications

Presenter(s): Thomas Collura, PhD; Harry Kerasidis, MD; Thomas Feiner, BA; Ronald Bonnstetter, PhD; Estate Sokhadze, PhD

Level: Intermediate

Abstract: This workshop will present practical and theoretical aspects of recording and analyzing event-related potentials (ERP's) using whole-head EEG and sLORETA techniques. The tools will include Atlantis and Discovery EEG's. XLNT Brain, Capito cognitive assessment software, and EEGLab/MATLAB. Special software that is open sourced will be described and made available. Presentation methods will be shown including those designed for a personal emotional responses assessment, for neurocognitive testing of performance, and in evaluation methods for monitoring of student athletes, with focus on possible concussion injury. Results from a forensic case involving a capital crime will be presented and discussed in the context of individual decision-making processes. Methods shown will include visual and auditory stimulation using words, pictures, and sounds. Emphasis will be placed on results from the presentation of faces, and of emotionally charged words. Individual response patterns to various emotional expressions will be demonstrated in resulting individual evoked potential responses. The calculation and interpretation of P300 cognitive evoked potentials will be covered, and shown in examples.

Electroencephalographic (EEG) electromagnetic tomographic analysis (ETA) imaging techniques provide a mechanism for exploring decisions, while the individual is directly engaged in choice making, thus exposing precognitive emotional responses to identified beliefs, thoughts, feelings, and actions. This presentation discusses frontal EEG gamma band activity research, at the precognitive level and its use for describing approach-avoidance decision making. Gamma is the primary focus of measurements as it provides an immediate emotional response to a stimulus, even before a conscious thought has formed. Our approach process provides the intensity of a person's emotional response to a stimulus by measuring voxel activation and also provides emotional directionality by differentiating approach/withdrawal responses within the prefrontal cortex. While agreement between the self-report and the scanned gamma activation can form confirmation, additional insights are revealed when the two data basis do not agree. By examining precognitive gamma asymmetry, we can expose the thought process, especially the role of emotions. While most of the time our initial brain activity aligns with our written response, internal conflict can be exposed when our stated response and the brain imaging do not align. In addition, emotional triggers are very personal and differ in directionality and intensity from person to person.

26th Annual ISNR Conference

ABSTRACTS: Pre-Conference and Conference Workshops

WS 21

Title: Assessment and Neurofeedback for ADD, ASD, Anxiety and Head Injuries

Presenter(s): Michael Linden, PhD

Level: Intermediate

Abstract: This workshop will present the advances in the diagnosis and treatment of Autism, Aspergers, Head Injuries and ADHD/ADD. The progression of the fields of QEEG and Neurofeedback beginning with children with ADHD to Autism and adults with ADHD and Aspergers and head injuries will be reviewed. The need for accurate testing and successful treatments without side effects will be emphasized.

Symptoms and etiology of ADHD, ASD, anxiety and head injuries/concussions and dementia will be reviewed. The use of QEEG to discover which subtype of Autism (6), Aspergers (2) and ADD (4) will be explained. We will discuss the similarities and differences in symptoms and QEEG patterns of ADD, ADHD, anxiety, head injuries, and Aspergers and the combinations of these disorders. We will present the use of QEEG brain mapping, CNSVS memory testing, behavior rating scales and continuous performance tests to guide and monitor neurofeedback, direct neurofeedback and HRV protocol selection. Neurofeedback candidate selection, protocol development, treatment monitoring and treatment decisions will be explained that lead to successful outcomes.

This workshop will also review a multimodality treatment system approach for children, adolescents and adults with Autism/Aspergers, ADD, anxiety and head injuries including Neurofeedback, electrical stimulation neurofeedback and HRV biofeedback. Common neurofeedback and biofeedback treatment problems and obstacles will be discussed.

Pre- and post-neurofeedback QEEG and CPT case study data will be presented. Research studies will be presented for ADD, head injuries and ASD. Recent research of Neurofeedback for retired NFL players with Concussions and Dementia will be explained and reviewed. In addition, DTI research with Autism will be presented.

This workshop is appropriate for Psychologists/neuropsychologists, physicians (neurologists, psychiatrists, family medicine), therapists, nurses, educators, neurofeedback providers, biofeedback/neurofeedback clinicians, students and researchers. Dr. Linden has over 30 years experience in these areas, presents internationally and has published articles in all of these fields.