

# The Action Potential

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(Formerly California Biofeedback)

Summer 2019

## UPCOMING EVENTS:

WABN's 45<sup>th</sup> annual  
conference:

November 2<sup>nd</sup> and 3<sup>rd</sup>

Trauma: Clinical and Practice  
Applications

### NOTE:

The conference will be  
tentatively held at the LAX  
airport if we can get enough  
people registered and  
interested!

Please register today.

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*Julia Riutzel-President*

## A LETTER FROM OUR PRESIDENT:

Dear WABN Membership:

I would like to introduce myself as you will be hearing from me frequently in the next few months.

I accepted the position of President of WABN with the hope that we can enlarge our borders and increase our membership. Joy's talks about how we need more membership to have credibility with the AMA and Medicare resonated with me and I'm hoping that I can spearhead this increase.

I am a psychotherapist working in private practice in Corvallis, using EEG Neurofeedback and various Cognitive therapies. I have been in the psychotherapy field since 1993. Prior to that I was a student/homemaker/mom working in the medical field, first as a nurse, then as a medical assistant and insurance biller. I got into Neurofeedback after sustaining two big brain insults, a major anaphylactic shock with anoxia (1998) and a TBI (2014) from an ATV accident. I attribute a significant amount of my recovery to the use of Neurofeedback. I choose to not practice psychotherapy now without the adjunct use of Neurofeedback since a calm, regulated brain is so much easier to do cognitive work with as well.

Professionally, I have worked with some very difficult and challenging populations. Started out as a family therapist for a substance abuse program, graduated to a local program that offered mental health services to anyone in the community and did anger management classes for the local juvenile justice authorities. Ran my own small private practice while I recuperated from the anaphylaxis, then worked for 5 years, traveling to US Military bases worldwide, working as a Military Family Life Consultant, primarily with the family members of servicemen and women since I'm a family therapist. From there I went on to providing supervision to native Behavioral Health

Technicians working for a Native Health Corporation in rural Alaska and providing all assessment and treatment for Substance Abuse and psychiatric mental health issues, until my accident while going between two of my villages on the frozen Yukon River. Subsequently, I moved back to Oregon and joined a local county mental health clinic as one of their adult therapists. I developed and was primary therapist for a forensic intervention program working under a federal grant to lower the number of mentally ill clients that were serving jail or prison time. During this time, I got trained in the Othmer's Method and was able to introduce Neurofeedback to my clients, who all had histories of substance abuse, trauma, anti-social behavior and complex mental health diagnosis.

My introduction to WABN came at the invitation of Siegfried. I came because I was aware that my exposure to Neurofeedback was somewhat limited and I wanted to evaluate whether I had the best resources for my clients with the knowledge that I had. This organization has given me the opportunity to make informed decisions about my training and what I have to offer. I encourage the growth of WABN as an avenue for improving the outcomes for the providers and the people we serve. Mental health providers in clinical settings don't have the time to do significant amounts of research so WABN serves as a vehicle for bring new developments to the forefront. As a former insurance billing person, who does her own billing now, I understand how important it is to further growth to have the credibility of having a professional organization behind me, if reimbursement is to get more equitable. Hopefully, we can grow the organization, improve the spread of knowledge across provider types and help tip the balance, so that the populations we serve are able to get the best, most effective modalities for grow, healing and balanced lives.

Julia Riutzel MA, LPC

President, WABN



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# The Future of Biofeedback: New Wearables and Apps for Biofeedback and Neurofeedback Clinical Practice Applications

Dr. George Fuller von Bozzay  
Biofeedback Inst. of San Francisco

There is a health technology revolution. Now for the first time the public is becoming aware of physiologic measurement with the use of wearables and apps in their every day lives. Many of these devices are appropriate for bio/neurofeedback training.

With the development of new technology, smart phones, tablets and smart watches the public is getting used to carrying devices with extreme capability. Now the trend towards being able to wear these devices and to monitor activity is hitting critical mass. With the explosive development of activity trackers, sleep trackers, even monitoring rings, as well as flexible screens and electrodes, the public is now becoming aware of physiological monitoring and its usefulness. Biofeedback is on the cusp of a revolution In acceptance, understanding, and use as these trends come together.

There are already apps for biofeedback, for monitoring heart rate, heart rate variability , GSR/Electrodermal response, temperature and blood pressure. In the past two years we saw the development of many different physiologic monitoring devices embedded in wearables of various kinds including smart watches by Apple, Samsung, and other major companies.

This article reviews the currently available devices, apps and wearables as well as discusses their positive and negative features and how they can be used by the biofeedback practitioner both in-office and for home practice.

We have a unique opportunity at this time to move the field of biofeedback from it's present small, insignificant, and unknown state, to being on the forefront of healthcare and massive public use. With the development and increasing popularity of wearables and apps, biofeedback can finally capture the public's imagination and be used as intended, for the learning of self regulation skills and internal health care.

It is increasingly important to bring this knowledge to the world, and this is the time and way to do it. Young millennials are interested in tech and devices, and also in their health and consciousness. While they are not now aware of biofeedback, this app and wearable development can be the bridge to bringing them, along with the rest of the public, into this philosophy and application of being an active participant in one's own health, rather than passive recipient of medical services and medication.

Best current apps: (check Biomedical instruments 800-521-4640 or Amazon for their current pricing.)

GSR – e-sense by Mindfield (\$99 biomonitors applications) has a graph of electrodermal response, data, as well as a customizable video clip feedback screen.

HRV/respiration- Inner Balance , (HeartMath \$129)(Wireless Bluetooth sensor version \$159),This successor to the Emwave, this device provides good graphics for HIV/respiration training providing both a professional screen and training screens.

Biostrap - band monitors HR, HRV, SPO2, Resp, activity, and sleep (\$199.) While it looks like a typical activity tracker,It is anything but. It provides downloadable graphs and data points for these physiologic measures on a daily basis.

Respiration and activity tracking – Spire, (\$110 Spire) Stone is worn on belt throughout the day and buzzes if tense.

Now the new permanently worn, washable, Health Tag -adheres to waistband requires no charging, includes sleep tracking , HR and HRV, and true respiration training screen.

EMG – Cricket by Somaxis \$250 multiple Wireless Bluetooth sensors can be placed anywhere on the body.

EEG – limited artifact detection, But can be used for general brainwave training.

Emotiv-Insight headset mobile (\$299) -five sensors, Motion sensor detects head movement. Epoc+ headset Mobile (\$799) 14 channel more professional grade.

Neurosky -Mind wave mobile (\$100) Basic brainwave training with many apps.

Muse(\$149) primarily for meditation with good sound and visual feedback and training graphs.

Muse 2 (\$249) updated and includes heart rate and respiration and posture feedback.

Other-

Watches – Apple Watch series 4 (\$400 +) able to do EKG/HR, Has very good breathing pacer, notification of various activity modes. And is poised to tackling other healthcare challenges.

Rings- Constant activity HR and sleep monitor in a ring – MOTIV (199.), OURA (299) – also measures temperature and BVP.

Other useful instruments:

Pulse oximeter – Oxygen saturation Measure from fingertip (Santamedical , Amazon, \$22)(Also faceLake FL \$14) (there are usable versions available for \$9).

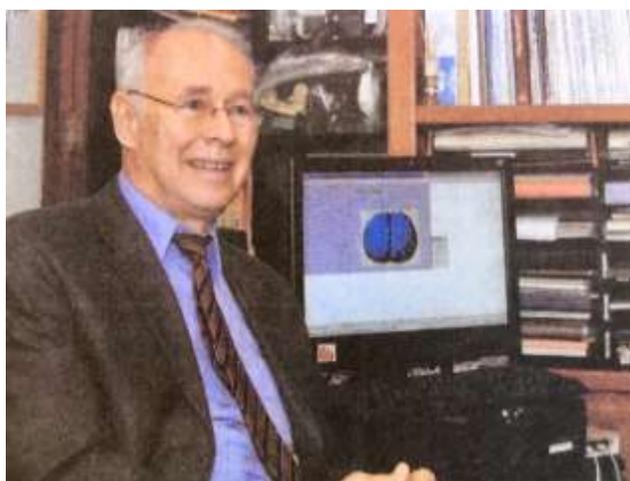
Temperature – noncontact infrared thermometer (Amazon \$18)

Posture- Lumo Lift (\$99 +) sticks on and provides haptic feedback.

– George Fuller von Bozzay, PhD

Founder and Director Biofeedback Institute

Past Associate professor Stanford University school of medicine  
and University of California Medical School





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## 44<sup>th</sup> Annual Conference Summaries

Kelly McCarthy

Kelly McCarthy, M.A. BCB

Clinical Health Psychology Doctoral Student

California School of Professional Psychology, San Diego



### **Somatics panel: Esther Gokhale and Elyse Shafarman**

This presentation began with learning about the Alexander technique, where Elyse Shafarman and Esther Gokhale described the benefits of this practice. She enthusiastically walked the audience through a case study utilizing the mindful movement method for learning how to move without the common anticipatory fear reflexes and tightening from anxiety. Her book titled “8 steps to a pain free back” outlines ways to use natural ease and poise of the body to change the body’s startle reflex. She also offered tools on how to manage pain, stress, high performance, pregnancy, and aging. The presenters described the history of the spine’s curvature and how medical texts have moved from the natural J-spine to the S-spine shape, and how the current emphasis on the S-spine has altered our posture and tension. The presenters emphasized how the J-spine posture helps to reduce chronic lower back pain, osteoarthritis, and neck tension. Using EMG sensors placed along the lower back, the presenters demonstrated how tension is dispersed while sitting in various postures. Following this demonstration, the presented led the audience through an experiential activity to practice activating the glute muscles while walking. The goals of the techniques presented are to improve posture, increase awareness of posture, and to allow bones to respond to gravity in an appropriate way. Tips for putting these skills into practice include setting visual reminders around the house, car, or work in order to increase awareness of one’s posture. Practicing in the car is a good place to start, such as holding the wheel lower and with a lighter grip to reduce tension. The presenters and the audience even commented on how some car seats and airplane seats are very harmful for posture and can lead to increased back pain. Overall, Elyse Shafarman and Esther Gokhale led a very engaging and informative presentation that left the audience feeling very aware of our posture.

### **Dr. Erik Peper: Posture workshop**

Dr. Peper began the workshop with a seemingly simple task of asking the audience to take a breath, while he quietly examined for dysfunctional breathing patterns. Dr. Peper then explained how the key for proper breathing is growing wider, not taller. His presentation illuminated how dysfunctional breathing can lead to low energy, neck tension, headaches, back pain, and more. Intertwined with breathing comes the need for good posture. Dr. Peper demonstrated how the C-spine is the universal

poor posture when we slouch over our phone/computer screen, which contributes to increased cervical spine stress that is equivalent to carrying 60lbs. He then presented evidence for how slouching increases symptoms of depression and anxiety. On the other hand, he described how changing posture can impact strength, modulate energy levels, recall of positive and negative thoughts, breathing and HRV, cognitive task performance, and sense of power. Interestingly, Dr. Peper presented research explaining how the expansive posture exhibited when feeling prideful occurs in blind people who have never seen posture, while powerlessness is exhibited as collapsing and constricting.

This workshop described factors that impact posture, including environmental factors (such as what chairs are available), the defense reaction, vision, thoughts and memories, and breathing. Interspersed throughout the workshop were experiential exercises that included skipping, neck compression, eye movements, and breathing. This engaging presentation finished with tips on how to interrupt automatic slouching, such as changing ergonomics, utilizing a power position, alternating between sitting and standing, looking up, and breathing lower. Finally, Dr. Peper encouraged us to utilize biofeedback posture devices as a tool for improving posture. This workshop was an energetic, informative, and applicable to everyone's biofeedback and neurofeedback practice.

## Lightening rounds:

### Dr. Shari Shamsavari

Dr. Shamsavari's lightening round presentation focused on her work with the Secretary of Health to introduce prevention education and rehabilitation for children in Jalisco, Mexico. Her passion and dedication to this work is inspiring, where she has trained 400 medical doctors and social workers on a manual for teaching children self-regulation in vulnerable, low income communities across Mexico. Dr. Shamsavari empowers children to make positive changes using the simple skill of breathing for self-regulation. While establishing these clinics and structured programs for ages 4 and up, she has been an ambassador for the children to help the government pass a law that incorporates prevention and rehabilitation for children and families. Dr. Shamsavari's work is not limited to Mexico, but is now expanding through government programs in other countries. She is also looking for help to continue this expansion for children and communities around the world. If interested, you may contact her via email directly. As a student, it was inspiring to learn ways that biofeedback skills can make an impact around the world and to share Dr. Shamsavari's passion for this work.



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## Summaries Continued:

### Dr. Fleischman: Taking ILF neurofeedback to where it's needed most

Dr. Fleischman discussed the Oregon implementation project, where he and his team have established neurofeedback in agencies that provide services to high risk, underserved populations. His program has established itself to be feasible, scalable, and sustainable while providing immense benefit to those in need. His lightning talk presentation covered ways that agency clients are often more complicated than private practice clients, with more psychological, medical, and legal difficulties. The agencies are well attuned to their target population and have realized the benefits of adding neurofeedback to a population that may have limited insight and therefore, limited engagement in talk-therapy.

According to his implementation model, he utilizes the Cygnet ILF neurofeedback system. In his generosity, he has donated a system to the agency, sent an agency staff member to the Cygnet training, and provides weekly clinical supervision via video conferencing to ensure faithful implementation of the practice. To ensure data collection, he encourages the agencies to use symptom tracking and QIK testing to monitor progress. He has found it most effective when there is limited cost to the agencies, which may rely on a stipend for staff training until the program can be more self-sustainable. To support these efforts, Medicaid in Oregon now covers neurofeedback with a reimbursement rate of \$114 for 45-minute session, \$98 for 30 minute sessions. Oregon is home to approximately 90,000 people on Medicaid, who often utilize healthcare at high rates. Dr. Fleischman and his team are doing much needed work to give back to the communities that otherwise would not have access to the many benefits of neurofeedback. His generosity and dedication to this work is inspiring to see all the ways that neurofeedback is utilized.

### Siegfried Othmer: Autonomic Regulation

This presentation began with conceptualizing brain instabilities as a loss of self-regulatory control, with seizures, migraines, and panic attacks as examples. Dr. Othmer explained how hyperexcitability can be seen in cellular excitability and network excitability, where pharmacology addresses synaptic excitability and neurofeedback and biofeedback addresses network excitability. The prime objectives of ILF neurofeedback include brain stability and improved regulation of affect, autonomic nervous system, arousal, and maintenance of vigilance. While all neurofeedback trains the whole brain, inter-hemispheric placements are best for promoting autonomic regulation and brain stability. Similarly, biofeedback training promotes autonomic regulation through increased balance between parasympathetic nervous system (right hemisphere) and sympathetic nervous system (left hemisphere).

Dr. Othmer then described history of and current application of neurofeedback and biofeedback on a variety of conditions, including migraines, PANDAS, asthma, panic disorder, suicidality, and bi-polar disorder. He encouraged the combination of multiple modalities for optimal self-regulation, where each technique makes unique contribution with multiple independent ways to target the system.

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*“While all neurofeedback trains the whole brain, inter-hemispheric placements are best for promoting autonomic regulation and brain stability.”*

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Rachel Horseman

*Graduate Student  
Clinical Psychology Doctoral Program  
Alliant International University San Diego*



## **Functional assessment: systematic appraisal of CPT data over 10 years – implications for neurofeedback**

**Dr. Siegfried Othmer**

The Continuous Performance Test is a pressured choice reaction time test for the general quality of nervous system functioning. Four subtests included in CPT consist of inattention, impulsivity, reaction time, and variability in reaction time which integrate into general steady-state functioning. When the nervous system misses a target or has a delay in reaction, considered as a “discrete error”, this indicates an episodic failure or instability. Dr. Siegfried Othmer presented on specific discrete errors accumulated through a decade of collected CPT data: omission errors, commission errors, and reaction time outliers. When analyzed, such outliers did not fit on a typical Gaussian distribution; rather, outliers behaved in an unpredictable way such that their distribution represented a combination of a Gaussian distribution, exponential decline, and a power law line. These distribution characteristics suggests a chaotic nature. Similar characteristics are seen through the analysis of omission and commission errors that propose a shared mechanism. The correlations between all three of these discrete errors exceeded 0.9, thus Dr. Siegfried Othmer posits one causal mechanism: dysregulation with vulnerability of impulsivity and attention. The implications for neurofeedback include the need of explicit testing for the propensity toward intermittent failures, brain stability and continuity of state. This is also seen as a clinical objective and additive to improved state regulation, and this serves as a target for neurofeedback. Dr. Othmer comments on the need for norms in CPT performance, suggesting in the form of percentiles. Data has shown substantial improvement in commission errors in terms of mental age equivalence in performance with modest improvements in reaction time, variability, and omissions following neurofeedback intervention. Future research may compare early to late data to track improvement through data mining or decrements that are traceable to protocol changes in CPT.

## **Strategies for Use of 24-hour HRV monitoring: Research and Clinical Implications**

**Dr. Stephen Sideroff, Yair Lurie, & Beth Argus**

Many variables are involved when considering continuous HRV monitoring. Research must control for confounding variables with an experimental design and application appropriate for its purpose and the devices utilized. Yair Lurie presented on the nature of physiological monitoring devices which measure

**HRV. In order to continuously monitor ambulatory heart rate, wearable devices are highly beneficial. Such devices are located most accurately on the chest, but also from the finger, ear, or waist. These devices provide consistent and contextual recordings on an individual level measured in both time and frequency domains (e.g. RMSSD, VLF, LF, HF). Some considerations with continuous monitoring include: what the latest standards are; if the output is scientifically appropriate; and whether the data is accurate. Devices vary on how they process signals and filter the data collected. Research must also control for sensitive autonomic activity and the impact of circadian rhythms, diet, age, and one's internal and external environment. As such, HRV monitoring devices are a beneficial measure of wellness relative to stress that may be applied to individuals that are athletes, are under acute stress, have hypertension, and experience depression and anxiety. Dr. Stephen Sideroff followed in his presentation regarding awareness and feedback training in individuals with anxiety and pain, presenting on a case study involving PTSD. HRV monitoring, in junction with psychotherapy, biofeedback, and neurofeedback, provided early warnings of threats to wellness and supported the reduction of reactivity in respect to PTSD symptoms. Such warnings allowed for further support in the recovery of a baseline state. Beth Argus presented on the benefits of a stress management and resiliency employee assistance program (EAP) in the workplace. Employees enrolled in a biofeedback and resilience program increased resiliency in participants with stress, anxiety and depression. These participants received biofeedback sessions for HRV training and continued to experience the benefits of biofeedback following program completion as they learned the context of wellness and stress.**

## **The Role of Astroglia Implications for Neurofeedback**

**Dr. Hanno W. Kirk**

**Infra Low Frequency (ILF) targets specific cortical frequencies below 0.1 Hz which is used to track slowly varying physiological waveform variables. The current model of operant conditioning underlying neurofeedback, however, does not accurately reflect the mechanism underlying continuous involvement with an observed signal in terms of neurofeedback training. ILF neurofeedback training occurs in real time and is contingent upon continual participation and an uninterrupted reinforcement process. Dr. Hanno Kirk presented on "skill-learning" at the brain level based upon slow cortical potential (SCP) and optimal response frequency without volitional involvement. The evolution of neurofeedback has also moved towards inter-hemispheric training involving precise frequency specifications, and the brain was found to respond promptly at frequencies as low as 0.1mz. Dr. Kirk presents astroglia as a target of ILF neurofeedback following current research of the role astroglia plays in axonal insulation and speed of information exchange. Astroglia has been observed in the segregation and coordination of cortical networks as well as promoting plasticity and rhythmicity within the brain through synchronized activation and deactivation of neuronal ensembles that, if dysregulated, implicates pathology and CNS dysfunction. This links astroglia in restoration of circadian rhythms that is a focus of neurofeedback. Astroglia also plays a role in modulating hemodynamics across neural assemblies relevant to cognitive performance. Dr. Kirks also speaks to The Human Connectome Project, where the detection and mapping of correlates within an engaged brain networks are being researched in an effort to self-regulate self-organizing systems from a Skills Learning Model. Protocols are being initiated regarding specialized placements and cross-overs of electrodes to capture interconnection effects across the brain and their corresponding frequencies.**

# Emotional Resilience: Management and Emotional Eating

Lucia Foster-Engen, Cody Gustaveson

Emotional eating is a form of adaptive self-regulation when experiencing symptoms of anxiety and stress that is attributed to reduced inhibition. This reduction in capacity to inhibit behaviors is associated with reduced vagal activity from sympathetic arousal that is differentiated from general impulsivity. Lucia Foster-Engen and Cody Gustaveson presented on research findings where diminished HRV, as well as vagal recovery measured through a standard deviation of NN intervals (SDNN), measuring changes in heart rate, predicted emotional eating in a given sample. This follows the Neurovisceral Integration Model which integrates autonomic, neurological, and affective systems to inform emotional dysregulation. Activity in the prefrontal cortex output to limbic structures that, in turn, downregulate parasympathetic activity and reduces HRV. This impacts inhibitory processes during acute stress that results in emotional eating. Attenuated vagal recovery can be impacted by various independent factors, however HRV biofeedback interventions aide in improving baseline states. Interventions for emotional eating target using natural resources to manage stress and anxiety through diaphragmatic paced breathing and psychoeducation on the mind-body connection. HRV biofeedback training provides a natural coping mechanism (i.e. “rescue breathing”) while psychotherapeutic approaches provide emotion regulation, distress tolerance, and acceptance.

**Brian Rankin, MA**

*Clinical Psychology Doctoral Student  
California School of  
Professional Psychology  
Alliant International University,  
San Diego*



## **Dr. Sideroff- Following HRV through the volcanoes and rivers of Costa Rica**

Dr. Sideroff had a presentation explaining the long-term effects of neurofeedback. He shared personal experiences of how neurofeedback has impacted his life and the quality of life for many of his patients with reactive attachment, PTSD, and mild neurocognitive disorders. Various electrode placements were explained in case presentations and it was very interesting to explore how neurofeedback can shift and maintain brain states. It was a real pleasure seeing how patients learn to function more efficiently and how much impact neurofeedback can have on the body.

## **Jay Gunkelman- Training or Treating: working with medically diagnosed clients**

Jay delivered a very interesting talk on his international case series of epileptic seizures that he has been a part of the past few years. Looking over EEG's to see various epileptic waveforms in some severe clinical cases and hearing how neurofeedback and SMR training was being utilized was a great experience. Hearing how successful his collaborative team has been in finding relief for patients, despite working in different countries, was very inspiring and I could tell that this

experience has been very rewarding for him. The work that has been done with these epileptic patients, who are now medication and seizure free, is clearly a step in the right direction for our field. Jay ended his presentation emphasizing “neurofeedback with epilepsy is beginning to have strong outcomes and the practice of epilepsy will shift with time.”

### **Dave Siever- Concussion, TBI, its Relation to Alzheimer’s/Chronic Traumatic Encephalopathy and its Treatment with Audio-Visual Stimulation**

Dave Siever had a great discussion on audio-visual entrainment (ACE) and the impact that it has on the network and circuitry within our brains. Seeing how entrainment was utilized in patients with concussion and TBI and the relation to degenerative brain diseases in sport and Olympic athletes to improve performance, growth, and well-being was very interesting. Seeing the impact that ACE is having in increasing blood flow in the brain for improved functioning as well as how this practice is being utilized currently in the area of peak performance was valuable and I enjoyed learning a little more about AVE in clinical practice.

### **Dr. Kaiser- Workshop on SKIL-based training**

In Dr. Kaiser’s workshop, he discussed neurofeedback default network training with children. Providing case examples, he explored the learning curve and how changing the parameters or blood supply lines to the brain changes the systems behavior to a more balanced state. Examining the role of our bodies ultradian rhythm cycles has and its impact neuronal activation during training was very interesting. Dr. Kaiser highlighted the importance of getting feedback from the patient how we should incorporate the patient as part of the feedback loop. Tailoring treatment to each client is essential and having the patient involved by providing feedback informs our treatment as we get them to be more balanced.

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### **NEW ADDITIONS TO OUR ANNUAL CONFERENCE!**

We are celebrating! At our 45<sup>th</sup> annual conference, we will have both a 50/50 raffle and a silent auction.

Interested in learning more?

Email the Executive Director at : [biofeedbackcalifornia@gmail.com](mailto:biofeedbackcalifornia@gmail.com)



WESTERN ASSOCIATION FOR  
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## WABN'S MISSION STATEMENT

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*“To foster the advancement of the field of biofeedback, applied psychophysiology and related disciplines. As a professional guild, we advocate for greater awareness of our field and serve as a forum for the exchange of relevant information derived from clinical and research experiences. Our members aspire to embrace the highest ethical standards and we respect and protect the welfare of others, especially the most vulnerable among us. Compassion, tolerance and inclusion are core values we nurture without ourselves and those with whom we work.”*

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### Contact Us

Western Association for  
Biofeedback and Neuroscience  
(WABN)

222 N Columbus Dr. Ste. 3508

773.368.4363

[biofeedbackcalifornia@gmail.com](mailto:biofeedbackcalifornia@gmail.com)

[www.biofeedbackneuroscience.com](http://www.biofeedbackneuroscience.com)

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**WESTERN ASSOCIATION FOR  
BIOFEEDBACK AND NEUROSCIENCE  
(WABN)**

222 N Columbus Dr. Ste. 3508

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