

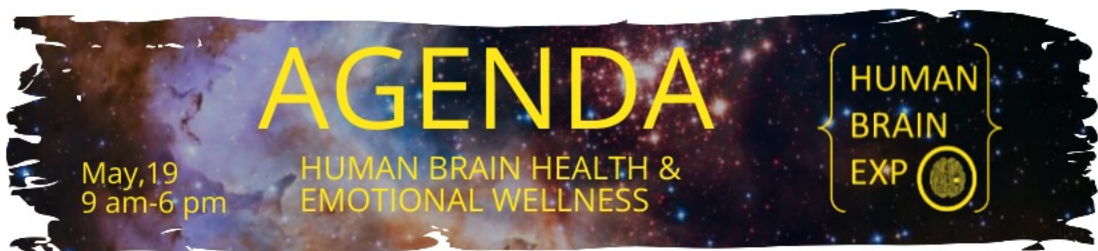
# HIBE



FUTURE OF HUMAN BRAIN MANAGEMENT AND  
SCIENCE OF EMOTIONAL WELLNESS

# AGENDA

# 2023



## INTRODUCTION

*Psychiatric and Neurological Diseases continue to be a major global health burden. According to data, provided by The World Health Organization, globally **300 million** individuals are affected by depression, > **39.5 million** by bipolar disorder, and **287.4 million** by schizophrenia (SCZ). The number of people with dementia is expected to rise to **152 million** by 2050<sup>1,2</sup>.*

*The number of products and services targeted this issue has risen tremendously in the last 3 years, but the safety and efficiency of those products are under question.*

*According to American Psychiatric Association, “there are more than **10,000** mental or behavioral health apps publicly available; however, there is little available information on the quality and effectiveness of the apps, “leaving consumers with very little to go on when trying to determine which apps might be helpful and worthwhile.” Several recent studies highlight the need for better information on the effectiveness and quality of mental health apps”.*

*Some AI based technology that analyzing conversations of text messages, detecting mental health disorders, and even designing drugs to treat opioid use disorders was FDA approved. But as FDA representatives admit themselves, they are not able to keep up with the speed of newly appearing technology and with the safety and effectiveness questions this technology arises. As an example, a mental health nonprofit KoKo recently used ChatGPT to consult **4,000** people, and those people were not aware they communicate with AI. Some chats, such as BetterHelp and Talkspace, disclosed their users’s information to third parties without any acknowledgement.*

*According to the the Organization for the Review of Health and Care Apps (ORCHA) among **600** mental health apps reviewed, which were meant to help with anxiety, depression, self-harm, panic attacks, and thinking suicide, only **29.6%** meet general criteria related to Clinical Assurance, Data Privacy, and User Experience.*

*The representatives from US Department of Health & Human Services emphasize the importance of addressing the safety issues related to appearing technology, that in their opinion can hurt the most vulnerable population.*

***The industry specialists: psychiatrist, neurologists, etc, highly recommend to do NOT use any AI powered therapies without a real human professional involvement.***

*The importance of Neuroscience: Motor & Sensory processing in Mental Health was broadly recognize by the most reputable organizations<sup>3</sup>:*

*One of the symptom criteria for Autism Spectrum Disorder is “hyper- or hypo-reactivity to sensory input or unusual interest in sensory aspects of the environment” ([American Psychiatric Association \[APA\], 2013](#))*

*A positive correlation between sensory processing scores and the presence of depression and/or anxiety has been found ([Liss et al., 2005](#))*

*Sensory processing differences have been proposed in both adults and children with obsessive-compulsive disorder. ([Rieke and Anderson, 2009](#))*

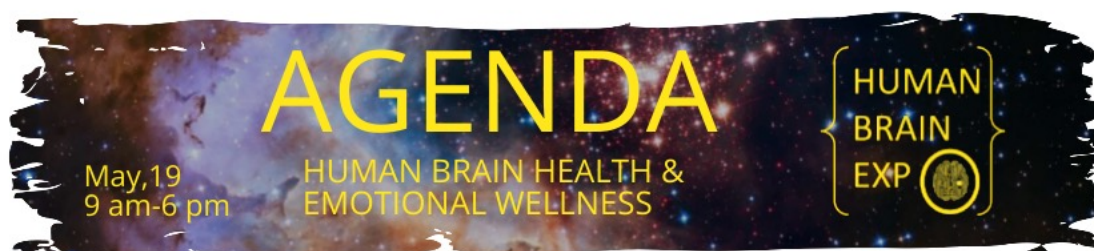
*Haptic perception — the active sensing of object surfaces through palpation — is a skill developed throughout development, progressing from relatively unguided exploratory movement early in life to adult-level haptic acuity observed in early adolescents ([Gori et al., 2012](#)). If proprioceptive feedback is poor, it may be the case in autism ([Haswell et al., 2009](#)).*

***Solutions that target motor and sensory processing are able proactively address mental wellness questions and represent less risk for the vulnerable population***

1. Vos, T. et al. Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet* 396, 1204–1222 (2020).

2. Patterson, C. World Alzheimer Report 2018. The state of the art of dementia research: New frontiers. (Alzheimer’s Disease International, 2018).

3. Harrison LA, Kats A, Williams ME, Aziz-Zadeh L. The Importance of Sensory Processing in Mental Health: A Proposed Addition to the Research Domain Criteria (RDoC) and Suggestions for RDoC 2.0. *Front Psychol.* 2019 Feb 5;10:103. doi: 10.3389/fpsyg.2019.00103. PMID: 30804830; PMCID: PMC6370662.



*Taxonomy of sensations, related neural circuits, and associated mental disorders<sup>3</sup>.*

<i>Neural circuits</i>	<i>Associated disorders</i>
<p><b>Sensations from internal signals</b>  <i>Anterior cingulate cortex, insula (cf. <a href="#">Craig, 2002, 2003</a>), organum vasculosum, subfornical organ, thalamus, hypothalamus, periaqueductal gray, parabrachial nucleus, nucleus of solitary tract, ventrolateral medulla, area postrema, vagus nerve (<a href="#">Quadt et al., 2018</a>); amygdala (<a href="#">Knuepfer et al., 1995</a>)</i></p>	<p><i>Panic disorder (<a href="#">Ehlers and Breuer, 1992</a>; <a href="#">Ehlers, 1993</a>), depression (<a href="#">Avery et al., 2014</a>), post-traumatic stress disorder (<a href="#">Glenn et al., 2016</a>), generalized anxiety disorder (<a href="#">Pollatos et al., 2007</a>), autism spectrum disorder (<a href="#">Garfinkel et al., 2016</a>)</i></p>
<p><b>Sense the size, shape, and texture of objects as well as sense their movement across the skin</b>  <i>Dorsal root ganglion, lateral parabrachial nucleus, thalamus, cerebral cortex</i></p>	<p><i>Autism spectrum disorder (<a href="#">Tavassoli et al., 2016</a>)</i></p>
<p><b>Sense pain</b>  <i>Dorsal root ganglion, spinothalamic tract, thalamus, sensory cortex, limbic areas</i></p>	<p><i>Fibromyalgia (<a href="#">Serra et al., 2014</a>), Post-traumatic stress disorder (<a href="#">Lerman et al., 2016</a>)</i></p>
<p><b>Sense temperature</b>  <i>Dorsal root ganglion, spinothalamic tract, lateral parabrachial nuclei, preoptic area, thalamus</i></p>	<p><i>Depression (<a href="#">Bär et al., 2005</a>)</i></p>
<p><b>Sense of the static position and movement of the limbs and body</b>  <i>Dorsal root ganglion, primary sensorimotor cortex, thalamus, basal ganglia</i></p>	<p><i>Schizophrenia (<a href="#">Arnfred et al., 2015</a>)</i></p>
<p><b>Olfaction Smell</b>  <i>Dorsal root ganglion, primary olfactory cortex, thalamus, orbito-frontal cortex, amygdala, hypothalamus</i></p>	<p><i>Alzheimer's disease (<a href="#">Kesslak et al., 1988</a>)</i></p>
<p><b>Gustation Taste</b>  <i>Dorsal root ganglion, facial nerve, glossopharyngeal nerve, thalamus, gustatory cortex</i></p>	<p><i>Eating disorder (<a href="#">Dazzi et al., 2013</a>)</i></p>
<p><b>Vision** Sight</b>  <i>Koniocellular, magnocellular, and parvocellular cells, cortico-cortical connections into supra- and infra-granular layers, superior colliculus, suprachiasmatic nucleus, retinal lateral interactions, top-down cortical interaction</i></p>	<p><i>Schizophrenia (<a href="#">Ford et al., 2014</a>)</i></p>
<p><b>Audition** Hearing</b>  <i>Corticofugal, dorsal/ventral auditory streams</i></p>	<p><i>Schizophrenia (<a href="#">Ford et al., 2014</a>)</i></p>

3. Harrison LA, Kats A, Williams ME, Aziz-Zadeh L. The Importance of Sensory Processing in Mental Health: A Proposed Addition to the Research Domain Criteria (RDoC) and Suggestions for RDoC 2.0. *Front Psychol.* 2019 Feb 5;10:103. doi: 10.3389/fpsyg.2019.00103. PMID: 30804830; PMCID: PMC6370662.



# AGENDA

May, 19  
9 am-6 pm

HUMAN BRAIN HEALTH &  
EMOTIONAL WELLNESS

HUMAN  
BRAIN  
EXP 

**8:30 am**

*Introduction to Human Brain Expo (HBE). Perspectives and Plan. Evgenia Leonova, PhD, MBA*



**FOUNDER**

*We believe that Human Brain Health and Mental Wellness are the most critical subjects in a Human LifeTime and deserve more attention than it currently holds. We believe many issues can be proactively solved via modern solutions that target Human Brain Wellness.*

*\* establishing interdisciplinary collaborations to boost innovations - mass market products, driven by neuroscience and psychology. For an example environmental design, kinesiology tools, healthy brain senses solutions, VR solutions, etc;*

*\* boosting the Neuroscientific Research in the area of Human Brain Happiness;*

*\* establishing a pipeline of the delivery of these solutions to the customers via established organizations, centers, and networks;*

*\* building educational content delivery solutions.*

**9:00 am – 9:40 am**

*Susan Gibson “Nutrition for Brain Health”*

*Susan Gibson is the president of Vivolor® Therapeutics and creator of Vivolor® Memory Support, has won multiple awards for her work helping people regain their lives and confidence through improved memory and brain health. Watching her mother’s devastating decline into dementia gave her passion to apply her pharmacy degree, Harvard MBA, functional nutrition certification, and 30 years’ experience developing new healthcare products to now providing education and supplements that have helped numerous clients lead full lives with clarity of mind for years to come. Susan is on a mission to help millions of people using natural solutions and encourages starting early, although these resources help at any stage of memory loss. For more information, please see: [Vivolor.com](https://vivolor.com) and [Maximize Your Memory Challenge](https://memorywellnessacademy.com/) <https://memorywellnessacademy.com/>*



**Susan Gibson**

President of Vivolor® Therapeutics

*Abstract*

*Your brain is the most complex thing in your body and is the control center for all that you do. Your brain is ‘on’ even when you are sleeping. Although your brain is only 2% of your body weight, it uses over 20% of your nutrients. It is critical that your brain gets the fuel and nutrients it needs. We will discuss the benefits of vegetables; good oils and DHA; vitamins; supplements*

*And the importance of avoiding inflammatory and oxidative foods: Sugar, Processed foods, Gluten, Dairy*

*Eating a brain-healthy diet helps improve mood and energy, promote clear thinking and strong memory and prevent dementia. It’s essential to start early giving your brain the fuel it needs to run at its best.*

**9:45 am – 10:25 am**

*Aaron Bromberg “The neuroscience of sleep and the future of non-invasive brain stimulation”*



**Aaron Bromberg**  
CEO at StimScience

*Aaron Bromberg is the CEO of StimScience, a Berkeley neurotechnology startup focused on sleep. He has 16 years of experience launching and growing some of the most successful hardware and software product lines at Amazon, Bose, and various startups. In 2019, Aaron left Amazon to focus on products that matter. At StimScience, he works with a team of world-class neuroscientists to create groundbreaking sleep aids, and to use neuroscience to improve their mental and physical wellbeing.*

*Abstract*

*When we think of sleep, we usually think of the sleep environment – the softness of the mattress, the thread count of the sheets. But sleep is a brain activity, a series of electrical patterns that is measurable and individually unique. By reading your brain’s unique sleep signature and using safe, non-invasive electrical stimulation, we can directly increase sleep duration and quality more effectively than any sleeping pill. These advances in sleep neurotechnology point the way to a future where personalized neuroscience is used in everyday consumer devices to improve peoples’ lives.*

# AGENDA

May, 19  
9 am-6 pm

HUMAN BRAIN HEALTH &  
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HUMAN  
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## 10:30 am – 11:10 am

Noah Falstein “Power of games to inform, to teach, to change behavior, and bring entertainment to otherwise boring or unpleasant medical procedures”



**Noah Falstein**  
Executive Advisor to Akili Interactive

A professional game developer since 1980, Falstein was among the first 10 employees at LucasArts, The 3DO Company, and Dreamworks Interactive. He served for four years as Google’s Chief Game Designer, working closely with their AR and VR projects, leaving in 2017 to work as a designer and producer for health/games companies. He served as Senior VP of Content for Mindmaze, a Swiss unicorn creating games for rehabilitation. More at [https://en.wikipedia.org/wiki/Noah\\_Falstein](https://en.wikipedia.org/wiki/Noah_Falstein) and <https://www.linkedin.com/in/gamedesignexpert/>

Falstein was the first elected chairman of the International Game Developers Association and has published over 100 articles and book chapters. He is currently working with diverse health/neurogaming companies including Executive Advisor to Akili Interactive, which won FDA clearance for a video game to treat pediatric ADHD and went public last year with billion-dollar valuation. Other healthcare clients of his include Abbott Labs, Healium, Apple Health, TrainPain, Dopavision, and Level Ex.

### Abstract

The games industry is maturing, and in the process games and game technology are increasingly being used in the medical field for education, training, and even directly as FDA-cleared treatment. Games are informing patients, training physicians, and treating a wide variety of conditions, including ADHD, depression, myopia, chronic pain, anxiety, PTSD and many others. This session will survey some of these approaches and delve into just how and why games are changing the face of medical care.

## 11:15 am – 11:55 am

Dr Jacqueline R Scholl “The Listening Brain: Why our children can’t read”



**Dr. Jacqueline R. Scholl,**  
AuD, CCC-A, CSP/A  
Executive Director Soundwrx  
Tuned Care Head of Pediatrics

Dr Scholl is the Executive Director & Head of Audiology for Soundwrx Inc and the Pediatric Director for Tuned Care.

Prior to starting Soundwrx, a 501(c)(3) organization, and becoming the Pediatric Director for Tuned Care, Scholl owned her own clinic. As founder and manager of the Scholl Center, she curated an impressive team of clinicians who changed the landscape for audiological care in Oklahoma. Scholl’s clinic was the recipient of numerous awards, and she personally continues to be noticed for her standards of exemplary care, advocacy, innovative solutions, passion, and mass-scale policy change.

Scholl has practiced hearing health care for 25 years and after selling her practice in 2019, she continues to blaze trails by changing policy and providing best practice services to children across the state of Oklahoma. She is a tireless advocate for those who don’t have a voice.

Scholl earned a BS in Communication Sciences and Disorders, and her master’s in audiology from Missouri State University. She completed her doctorate in audiology at Arizona’s School of Health Sciences in Mesa, AZ. She has contributed numerous articles for national publications and frequently speaks at conferences when she’s not working on changes at the state capital.

### Abstract

Children across the globe struggled to read prior to the pandemic lock down, but few were listening. Post pandemic reading scores in 2022 received more attention when the National Assessment of Educational Progress (NAEP) Nation’s Report Card painted an even more dismal portrait of student proficiency. Math and reading scores continue to plummet no matter how many millions of dollars are allocated to reverse the trend. Still, no one is listening.

The hierarchy of skills required to read have been universally accepted by most specialists. Yet, poor readers struggle with the most fundamental building block of the pyramid – phonemic awareness. If the brain cannot authentically hear and reproduce sounds, a child can’t differentiate phonemes. If a child can’t read, they can’t learn. These children are misdiagnosed and therefore never receive the appropriate intervention they need. At the core, the auditory pathway is almost never screened for problems, and it’s never understood what the brain is hearing. This session will cover the underlying problem of phonemic awareness in struggling readers, why it exists, how to measure it, and offer solutions for addressing it.

## 12:00 pm – 12:30 pm Lunch



# AGENDA

May, 19  
9 am-6 pm

HUMAN BRAIN HEALTH &  
EMOTIONAL WELLNESS

HUMAN  
BRAIN  
EXP 

**12:30 pm – 1:10 pm**

## Rachel Francine “The Magical Science of the Musical Brain”



**Rachel Francine**  
CEO of SingFit

*Rachel Francine is a digital pioneer and trained futurist who, starting in 1996, helped lay the tracks of the Internet as we know it, as a member of the CitySearch New Markets team. Rachel spent over 15 years transforming brick and mortar products into scalable digital solutions for companies including Cars.com, Ticketmaster, Warner Brothers Pictures, Anheuser-Busch, and Al Gore’s Current TV. Rachel subsequently earned a Master’s of Science degree in Futures Studies and Strategic Foresight from the University of Houston with a focus on Transformative Economics in order to create companies and industries that transform the health, social wellbeing and financial abundance of individuals and communities.*

*In 2012, Rachel co-founded Musical Health Technologies, whose debut product, SingFit PRIME, mass distributes music as medicine for the first time in history. SingFit PRIME is the winner of the USC Keck School of Medicine Body Computing prize, the AARP Innovation@50+ Award and the McKnight’s Dignity in Aging Award. Rachel is a frequent speaker on the present state and future possibilities for technology, digital health, innovation, entrepreneurship, and women in business. Rachel has spoken at conferences held by organizations as diverse as Aging into the Future, HealthXL, Ernst & Young, The World Futures Society and the Professional Golfers Association. In 2017 Rachel was named one of MedCity News’ 50+ Innovation Leaders and has been featured in Forbes, Fast Company, The Philadelphia Inquirer and Billboard Magazine.*

*What if a pill could create neuro plasticity that would allow speech to be restored after a traumatic brain injury? How about if that same pill could increase the mass of the Broca’s area of the brain to release speech for people with aphasia or non-verbal autism? What if the side effects of that pill were to positively regulate the neurochemicals and hormones including serotonin oxytocin, cortisol, and dopamine to improve mood and reduce agitation for people with dementia? Sound impossible? From a pill yes, but the clinical research shows that these results and more can be achieved through the act of prescribed singing. Yet with only 10k music therapists certified to practice in the US (vs over 120 speech language pathologist), historically these benefits only reached the fortunate few. Now, technology, including the SingFit digital health platform, allows healthcare professions, unpaid caregivers, and individuals themselves to use singing as a therapeutic tool, even if they have no previous musical experience. Learn about how singing can be a womb to hospice solution for building and maintaining better brain health.*

**1:15 pm – 1:55 pm**

## Dr Boris Goldstein “Neurointerfaces”

*Dr. Boris Goldstein is a seasoned entrepreneur with 30 years of experience in building and leading world-class companies in AI, big data, and software development. He has founded or co-founded over 20 private companies during this time, demonstrating his ability to consistently drive success in the industry, taking some of them public.*

*Dr. Goldstein is the founder of High Technology (Solby Holding), a software company where he built the organization from the ground up to employ over 3,000 people with 40 offices across 17 countries. Additionally, he founded EForex, a leading online fintech company that has been acquired by ActTrader, Finavasia, and technology for forex, as well as two major crypto exchanges. He is also the founder of E-Trade Eurasia, which holds the license of E-Trade Group for the Eurasian market (later sold back to E-Trade Group).*



**Dr. Boris Goldstein**  
Founder at Brain Scientific  
(symbol BRSF) and BrainBit

*Furthermore, Dr. Goldstein is the co-founder of Intelligent Video Systems, which eventually split to become Axxon Soft and ISS international - two leading AI video analytic and face recognition companies. He is the founder of Brain Scientific (symbol BRSF) and BrainBit, two of the world’s leading brain AI companies. He is also the founder of Ryah Group (symbol Ryah: CSE), a top AI-driven big data company focused on plant-based medicine. Dr. Goldstein’s achievements extend beyond his entrepreneurial ventures. He serves as a director for several banks, including Daldaris (acquired by Sakaru Bank) and the Commercial Bank of San Francisco (acquired by First Bank and Trust).*

*Dr. Goldstein holds a B.A., MBA, and Ph.D. in Applied Mathematics from Latvian Technical University.*

*BrainBit empowers individuals to understand the relationship between the brain and behavior, delivering unique insights into mind and body wellness motivating people.*

*With over 30 games developed and controlled by the brain, and, also, integrated into VR.*

*We are also working on different brain related AI applications.*

# AGENDA

May, 19  
9 am-6 pm

HUMAN BRAIN HEALTH &  
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**2:00 pm – 2:40 pm**

*Marjorie Morrison “Reimagining behavioral health through intentional and thoughtful design”*

*Marjorie Morrison is the CEO and co-Founder at Psych Hub, the world #39 largest mental health education platform. A visionary and passionate pioneer in the mental health space, Morrison co-founded Psych Hub with Patrick J. Kennedy to connect people with best-in-class online education for mental health practitioners, allies, and consumers to learn more about some of our Nation’s most vexing mental health challenges. In her current role, Morrison is reimagining behavioral health through intentional and thoughtful design. By leveraging the digital space and combining clinical research with the art of storytelling, her mission is to provide engaging, evidence-based content on mental health that is easily accessible to everyone.*

*Prior to launching Psych Hub, Morrison was the founder and CEO of PsychArmor Institute, a 501(c)3 non-profit organization, committed to bridging the military-civilian divide by developing, promoting, and distributing free online courses covering a wide range of topics important to those who serve military service members and their families. Under Morrison’s leadership, PsychArmor flourished and is now widely recognized as the trusted and leading expert for “Best-in-Class” resources regarding the understanding of and solutions to complex and unique military veteran issues. Marjorie’s focus on supporting members of the military and their communities was first developed in the field after she spent years writing and implementing a revolutionary proactive counseling program for the U.S. Marines. This implementation research was utilized to create a groundbreaking solution to approach military mental health care. Morrison is a CA Licensed Marriage Family Therapist, a CA Licensed Professional Clinical Counselor, a PPS-credentialed School Psychologist, and the author of *The Inside Battle: Our Military Mental Health Crisis*.*



**2:45 pm – 3:25 pm**

*Keith Kirkland “Haptics | Why Education is the Next Frontier”*



**Keith Kirkland**  
Chief Haptic Officer and  
Cofounder of WearWorks

*Keith Kirkland is a haptics enthusiast, accessories designer, engineer and impact-driven strategist that is deeply excited about reimagining the use of touch in design and digital communications. His work has been recognized by the Pratt’s Rowena Reed-Kostellow Award, SXSW, The Cooper Hewitt Design Museum, EY, TED, Dropbox, The Yokohama Government, Beyond Bauhaus, and the MET Museum. He is a serial entrepreneur inspired by the intersection of touch, equitable business model development and nuanced customer insights to create sustainable impact-driven technologies that deliver at scale. Keith is also cofounder of WearWorks, an award-winning haptic navigation company that help the first person who is blind run the NYC marathon without sighted assistance. HapticNav™ and Wayband®, is a haptic navigation app (and optional haptic wristband) that gently navigates a person to a destination using vibrations, without the need for any visual or audio feedback..*

## **Intro**

*The haptics industry was projected to be \$8B in 2022. It did \$9.2B. By 2030 the haptics industry is expected to grow to \$23B globally. With CAGR at 11% up from the projected 8%, we are seeing an acceleration of haptic development and applications.*

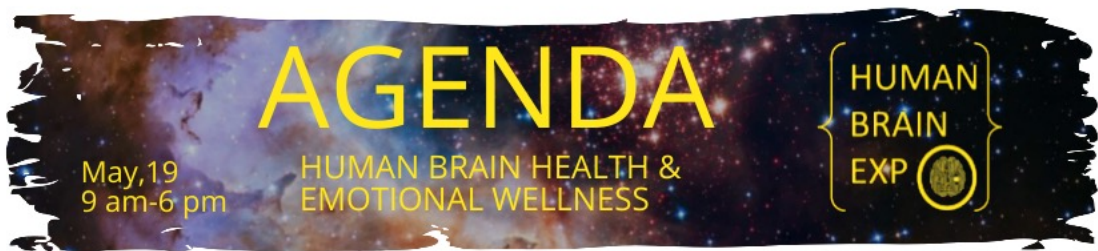
*There are a few things driving this development. The gaming industry’s phenomenal growth (now, it is 3x larger than film and music industries combined!). Also, the drive toward VR/AR and the need for haptic feedback in virtual training and medical simulations has also pushed the development of haptics forward.*

*As designing with, and for, the sense of touch becomes more accessible, there is an elephant in the room: Who are the future hapticians that will fill these new roles? The educational degrees needed to fill this opportunity are mainly at the PhD and Masters level. With so few programs offered for study, how might our industry respond to support educational needs to fill these new opportunities.*

## **Summary**

*One of touch’s greatest touted assets is its innate accessibility. This talk is to present a need for haptics education as one of the major opportunities to create a ubiquitous (and thoughtful) haptic future.*





**3:30 pm – 4:10 pm**

*Kirthika Parmeswaran “Digital Therapeutic for Postpartum Depression”*

*Kirthika is the Founder & CEO of Vital Start Health, a University of Pennsylvania’s Penn Center for Innovation early-stage startup developing the first clinically guided, personalized, equitable reproductive & maternity mental health platform using Virtual Reality. She has extensive experience across business and technology in healthcare, telecommunications, and cybersecurity. She has won numerous awards and honors, including Outstanding Leadership in Healthcare award, is a DARPA award recipient and a strategic thought leader with an R&D background. Kirthika has a Master’s in Computer Science from Washington University in St. Louis and an Executive Master’s in Technology Management from University of Pennsylvania’s School of Engineering and Wharton School of Business. She loves to read, sing, play with her dog and volunteer for wellness initiatives in the community.*



**Kirthika Parmeswaran**  
CEO of Vital Start

*Vital Start Health, a University of Pennsylvania startup, has developed the first reproductive and maternal mental health digital therapeutic platform using Virtual Reality for personalized clinically guided care. Vital Start Health empowers moms and mental health practitioners to prevent and treat Perinatal Mood and Anxiety Disorders more effectively, equitably, and faster using low-cost Virtual and Augmented Reality Framework that measures and personalizes care at every stage of the wellness journey. We have completed initial feasibility studies, launched platform, filed IP, won numerous awards and are currently exploring innovation pilots and partnerships.*

Web: [www.vitalstarthealth.com](http://www.vitalstarthealth.com)

**4:15 pm – 4:55 pm**

*Fatemeh Khatami, PhD*

*“Neural Coding and Models for Natural Sounds Recognition”*



**Dr. Fatemeh Khatami**  
Assistant Professor,  
Bioengineering Department,  
University of the Pacific

*Dr. Khatami is an assistant professor at University of the Pacific and conducting Biosensor lab at UOP. She has PhD in Biomedical Engineering with focus on neuroscience and algorithm development. She did a postdoc research at University of California, San Francisco. She did her undergraduate study in Electrical engineering. She is interested in modeling biological systems, wearable technology, and physiological signal processing. She is highly experienced in bio signal processing, data analysis, and machine learning. She has contributed to scientific publications in scientific journals, such as PNAS and PlosComputational Biology.*

**Abstract**

*Mammalian brain can recognize natural sounds in the presence of acoustic background noise. A well-known theory of neural coding suggest that neural systems are optimized for natural environment signals and sensory inputs that are biologically relevant. The optimal coding hypothesis suggests that neural populations encode sensory information to maximize efficient utilization of environmental inputs. In this study ability of the brain to utilize high-level statistical regularities in natural sounds is explored by using natural sounds and their texture and neural recordings from the auditory midbrain of awake rabbits. In the next part of the research, role of hierarchical organization in the auditory pathway for sound recognition and optimal coding in the presence of challenging background noise is explored. Optimal computational neural network model is developed for word recognition in presence of speech babble noise. Interestingly optimal computational strategy for word recognition in noise predicts various transformations performed by the ascending auditory pathway, including a sequential loss of temporal and spectral resolution, increasing sparseness and selectivity.*



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HUMAN BRAIN HEALTH &  
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**Kazu Okuda, MD**  
Founder & CEO at Universal Brain

**5:00 pm – 5:40 pm**

*Kazu Okuda, MD “Brain-based personalized treatment for mental health”*

*Kazu Okuda, MD, is the founder and CEO of Universal Brain and is working on developing a cutting-edge neurofeedback system to establish the treatment of mental disorders.*

*In the psychiatry department of a university hospital, he was intensely shocked to find that the prognosis of patients varied greatly depending on the physician's skill.*

*He founded Universal Brain to establish treatment and diagnosis based on the analysis of physiological data. At Universal Brain, he engages in developing an innovative EEG headset and neurofeedback algorithms to treat patients with psychiatric disorders.*

*After graduating from medical school at the Kyushu University and receiving clinical training at the University of Tokyo Hospital, he joined a medical device AI startup. He worked in the CEO/CFO's office, raising funds (\$20M while in office) and driving clinical research with university hospitals. The company's product received marketing approval and reimbursement in Japan.*

*Universal Brain is working on cutting-edge neurofeedback systems to treat mental disorders. This enables us to prescribe personalized, at-home, and non-invasive therapy.*

*- Universal Brain is developing*

- (1) innovative portable EEG headset for use in the treatment*
- (2) neurofeedback algorithm for reducing the symptoms of psychiatric disorders.*

**5:45 pm – 6:25 pm**

*Richard Hanbury “Audio-visual neuromodulation to alleviate pain and tension”*

*Founder of Sana - making a device that allows anyone to have deep relaxation and pain relief anywhere in an average of 8-10 minutes. We have decades of research and anecdotal data, completed 4 pilot studies, with two pivotal FDA studies underway - Fibromyalgia (Duke) and Neuropathic Pain (Mount Sinai). We have breakthrough designation for Fibromyalgia and anticipate FDA approval in Q4 2021.*



**Richard Hanbury**  
CEO and Founder at Sana Health

*Richard is alumni of The Wharton School Business School 1999-2001 MBA with major in Healthcare and Entrepreneurial Studies.*

*About Sana Health:*

*Sana Health team completed the HAX accelerator program in Shenzhen 2016, Sana Health carried out pilot trials with University of California, San Francisco, then a 75-person controlled trial with help from Stanford University and Special Operations Command. This has been followed by large RCTs at Duke - Fibromyalgia, and Mount Sinai - Neuropathic pain.*

*The device has shown the potential for use in a wide variety of medical applications including stroke rehabilitation, treatment of traumatic brain injury, insomnia, epilepsy, Post-Traumatic Stress Disorder and pain control.*

*The device has also been employed in a variety on non-medical applications in the sport, military and business fields, including exploratory work with the Defense Evaluation Research Agency (DERA), RAF, Royal Marines, SAS, SBS, United States Air Force, US Navy, NASA - National Aeronautics and Space Administration, McLaren Formula One and with Richard Branson for Virgin Balloons.*

**6:25 pm – 7:00 pm**

*Panel Discussions*

*There is no health without a mental health  
(Human Brain Health & Emotional Wellness)*

*In the era of prosperous AI, the big question is what defines us as humans and what we can do to benefit humanity to save and enhance its existence.*

*Nowadays robots easily pass any tests that are meant to identify a human. The cognitive abilities of the robots surpass human's abilities to process information and provide reliable results. The human behavior and emotional state got controlled via robotically set recommendations on food, grocery & fashion items, video materials, etc.*

*Due to the digitalization of health care, we are in the stage where our health verdicts get recommended via robots and the entire conversation with the healthcare provider involves technology and AI setup.*

*While AI gets advanced continuously humans constantly get under the threat of violence, political conflicts, health-related issues, etc.*

*We believe it is the right time to address the Human Brain Wellness & Capabilities on a broader scale and attract more participants and resources to address the issues on a mass-market scale.*

*Human Brain Expo is meant to gather professionals whose work is directly related to Human Brain Health & Emotional Wellness.*

*The Expo aims to facilitate knowledge and experience exchange that can help to evolve the human brain treatments, cognitive abilities, and resilience to stress and aging.*

*Our main focus is to identify and propagate the relevant to the subject matter research; to evaluate the industry innovations on their influence on the human brain and emotional wellness; to inform the vulnerable population regarding the latest industry discoveries. Also, we are in the stage of gathering a comprehensive expert board to provide consulting services.*

*Our GOAL is to create innovative and interactive interdisciplinary ecosystem to propagate the Brain Health Treatments evolution.*

- **PRODUCTS**
- **SERVICES**
- **TECHNOLOGY**
- **PRACTICES**

*MISSION is to facilitate interdisciplinary collaborations and exchange of knowledge, vision, and experience to facilitate innovations in Human Brain Wellness Lifecycle, including mental health management, pain management, aging, cognitive abilities management, to improve industry standards for brain health management and science of emotional wellness.*

*If you are interested in becoming a shareholder or joining our experts' board, please, complete the request on our official website:*

*[www.humanbrainexpo.com](http://www.humanbrainexpo.com)*