

## Vanderbilt University Curriculum Vitae

**David R. Vago, Ph.D.**

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### OFFICE ADDRESS

Vanderbilt University School of Medicine  
Osher Center for Integrative Medicine  
3401 West End Ave., Suite 380 (3rd floor)  
Nashville, TN 37203

Office phone: (615) 875-9555  
Home Phone: (801) 647-5906  
Email: [david.vago@vanderbilt.edu](mailto:david.vago@vanderbilt.edu)

### EDUCATION

- 1997 B.A. (Brain & Cognitive Sciences)  
University of Rochester (Rochester, NY)
- 2002 M.S. (Cognition & Neural Sciences)  
University of Utah (Salt Lake City, UT),  
(Thesis: *Nicotinic acetylcholine and contextual learning and memory, Laboratory of Gene Wallenstein, Ph.D. and Raymond Kesner, Ph.D.*)
- 2005 Ph.D.(Cognition & Neural Sciences)  
University of Utah (Salt Lake City, UT)  
(Dissertation: *Functional characterization of the direct cortical input to the CA1 subregion of the hippocampus: Electrophysiological and behavioral modulation of the temporoammonic pathway by a non-selective dopamine agonist, Laboratory of Raymond Kesner*)

### POST-DOCTORAL TRAINING

- 2005-2007 University of Utah (Salt Lake City, UT), Utah Center for Exploring Mind-Body Interactions (UCEMBI), Department of Anesthesiology, [Pain Research Center](#)
- 2007-2008 Weill Cornell Medical College (New York, NY), Department of Psychiatry, Functional Neuroimaging Laboratory, (mentors: David Silbersweig and Emily Stern)
- 2008-2009 Harvard Medical School–Brigham & Women’s Hospital (Boston, MA), Department of Psychiatry, [Functional Neuroimaging Laboratory](#), Boston, MA, (David Silbersweig and Emily Stern)

### POST-DOCTORAL FELLOWSHIP

- 2009 Functional Magnetic Resonance Imaging visiting fellowship, Martinos Center for biomedical imaging, Massachusetts General Hospital, Boston, MA
- 2010-2011 [The Stuart T. Hauser Research Training Program in Biological and Social Psychiatry](#). T32 Clinical Research Training Program-Audit; Harvard Medical School (Boston, MA), co-directed by Robert McCarley, M.D., Martha Shenton, Ph.D. and Grace Chang, M.D

### ACADEMIC APPOINTMENTS

- Research Associate, Department of Anesthesiology, Pain Research Center, University of Utah Medical School, December, 2005 – November, 2007
- Adjunct Faculty in Psychology, Department of Psychology, Westminster College, September, 2005 – May, 2007
- Research Associate of Psychology in Psychiatry, Department of Psychiatry, Weill Cornell Medical College, November, 2007 – December, 2008
- Instructor, Department of Psychiatry, Harvard Medical School, January, 2010 – September, 2016
- Associate Professor of Physical Medicine & Rehabilitation, Osher Center for Integrative Medicine, Vanderbilt University Medical Center, September, 2016 – present
- Associate Professor of Psychiatry & Behavioral Sciences, Vanderbilt University Medical Center, September, 2016 – present

## **HOSPITAL/INSTITUTE APPOINTMENTS**

- Research Associate, Department of Anesthesiology, University of Utah Hospital, December, 2005 – November, 2007
- Research Associate of Psychology in Psychiatry, Department of Psychiatry, New York Presbyterian Hospital, November, 2007 – December, 2009
- Associate Psychologist, Department of Psychiatry, Brigham & Women’s Hospital, January, 2010 – present
- Core Faculty, Vanderbilt Brain Institute, Vanderbilt University Neuroscience program, November, 2016 – present
- Core Faculty, Vanderbilt Institute for Infection, Immunology and Inflammation, Vanderbilt University Medical Center, December, 2017 – present

## **EMPLOYMENT**

- Polysomnograph Technologist, Sleep Disorders Institute, St. Lukes Roosevelt Hospital, Columbia University, January, 1998 – August, 1999
- Senior Research Coordinator, Mind and Life Institute, Boulder, CO, March, 2007 – December, 2010
- Research Director, Osher Center for Integrative Medicine, Vanderbilt University Medical Center, September, 2016 to September, 2019

## **FORMAL MEDITATION TRAINING**

- Vipassana (10-day retreats, Shelbourne Falls, MA; Rishikesh, India), 1996, 2000, 2009
- Insight Meditation Society (3-day retreats), 2014
- Zen (5-day Big Mind, Genpo Roshi), 2000; (Upaya 3-day Zen Brain, Roshi Joan Halifax), 2010-2012
- Ongoing Secular training (Shinzen Young), 2009 – present
- Mindfulness and Metta (Mind and Life Summer Research Institute, Roshi Joan Halifax and Sharon Salzberg), 2005-2014
- Dzogchen/Mahamudra Training (3-5-day retreats, Yongey Mingyur Rinpoche; Chokyi Nyima Rinpoche, Tenzin Wangyal Rinpoche), 2009 – present
- Mindfulness-based Cognitive Therapy (Michelle Foote-Pearce), 2018
- Compassion Cultivation Training (Margaret Cullen), 2019

## **PROFESSIONAL ORGANIZATIONS**

- American Psychological Association, 2012 – 2014
- Cognitive Neuroscience Society, 2007 – 2014
- Social & Affective Neuroscience Society, 2010 – 2016
- Society for Neuroscience, 2001 – present
- New York Academy of Sciences 2008 – present
- American Mindfulness Research Association, 2013 – present
- Academic Consortium for Integrative Medicine and Health, 2016 – present

## **PROFESSIONAL ACTIVITIES**

- **Intramural:**
  - Cognition & Neural Sciences Area Student Representative, University of Utah, 2002-2003
  - Academic Misconduct and Appeals Committee, University of Utah, College of Social and Behavioral Science, 2003-2004
  - Faculty member, Lee Kum Sheung Center for Health and Happiness, Harvard School of Public Health, 2016
  - Senior Training Faculty, Vanderbilt Brain Institute, Vanderbilt University, January, 2017 to present
  - Principal Investigator, Vanderbilt University Institute of Imaging Science, January, 2017 to present
  - Member, Physical Medicine & Rehabilitation Chair search committee, March, 2017 – September, 2017
  - Reviewer, Vanderbilt Institute for Clinical and Translational Research Grant Studio, March, 2018

- **Extramural:**
  - Reviewer: Mind and Life Summer Research Institute Fellowship, June 2009 – present
  - Research Fellow, Mind and Life Institute, 2009 – present
  - Member, Research & Program Evaluation Committee, Prison Mindfulness Institute, 2012 – present
  - Consulting Scientist, Effortless Mindfulness Research Center, 2012 – present
  - Advisor, Journey Meditation, 2016 – present
  - Member, Research Committee, American Mindfulness Research Association, 2013 – present
  - Reviewer: International Symposium for Contemplative Studies, 2014 – present
  - Member, Presidential search committee, Mind and Life Institute, November, 2014 – June, 2015
  - Member, Science of Behavior Change Research Network, National Institutes of Health, January 2015 – present
  - Founding Member, Mindfulness Research Collaborative (MRC), January 2015 – present
  - Member, Bravenet Steering Committee, 2016 – present
  - Member, Osher Collaborative Research Working Group, 2016 – present
  - Scientific Advisor, AwareNow, August, 2019 – present
  - Member, Scientific Advisory Board, Chopra Institute, January 2019 – present
  - **Ad-hoc Reviewer:**
    - American Journal of Psychiatry, Annals of Behavioral Medicine, Annals of the New York Academy of Sciences, BMC Psychiatry, BMC Psychology, Clinical Psychology: Science and Practice, Complementary and Alternative Medicine, Brain Sciences, Cognition & Emotion, Cognitive Therapy and Research, Comprehensive Psychiatry, Consciousness & Cognition, Current Opinions in Psychology, Educational Psychology Review, Frontiers in Behavioral Neuroscience, Frontiers in Consciousness Research, Frontiers in Human Neuroscience, Frontiers in Psychiatry, Frontiers in Psychology, Hippocampus, Human Brain Mapping, International Journal of Consciousness Studies, Mindfulness, Journal of Alternative and Complementary Medicine, Journal of Psychology, Journal of Science and Healing, Mindfulness, Neuroimage, Neuroimage Clinical, Neuropsychologia, Neuroscience and Biobehavioral Reviews, Organizational Behavior and Human Decision Processes, Perspectives on Psychological Science, PLOS ONE, Psychological Review, Psychological Science, Psychology & Neuroscience, Psychoneuroendocrinology, Review of General Psychology, Sage, Social, Cognitive, and Affective Neuroscience, Scientific Reports, Social and Personality Psychology Compass
  - **Grant Reviewer:**
    - Mind & Life Francisco J. Varela Grant program, 2007-present
    - John Templeton Foundation, 2015
    - San Francisco State University, small grant program for research and creative activities
    - Wellcome Trust, 2016
    - Samuel B. Hanser Visionary Award (Kripalu Yoga Center), 2016
    - Mitacs-Elevate Canadian Fellowship, 2015
    - NIH, National Center for Complementary & Integrative Health (NCCIH) Loan Repayment Program, April, 2018
    - NIH, National Center for Complementary & Integrative Health (NCCIH) Fellowships, Career Awards, and Institutional Training Grants, March, 2019
  - **Textbook Reviewer:**
    - Cognition, 1<sup>st</sup> ed., Willingham, Prentice Hall, 2002
    - Biological Psychology, 3<sup>rd</sup> ed., Rosenzweig, Breedlove, & Leiman, Sinauer, 2003
    - Cognitive Psychology: Mind and Brain, Smith & Kosslyn, Prentice Hall, 2003
    - Biological Psychology CD-Rom & instructor's manual, 3<sup>rd</sup> ed., Rosenzweig, Breedlove, & Leiman, Sinauer, 2004
    - Cognition: The thinking animal, 2<sup>nd</sup> ed., Willingham, 2004
    - Biological Psychology, 4<sup>th</sup> ed., Rosenzweig, Breedlove, & Watson, Sinauer, 2007
    - Biological Psychology, 6<sup>th</sup> ed., Breedlove, Watson, & Rosenzweig, Sinauer, 2010
    - The Mind's Machine, 1<sup>st</sup> ed., Sinauer, 2012

- **Editorial appointments**
  - Review Editor, *Frontiers in Psychoanalysis & Neuropsychology*, *Frontiers in Psychology*, 2012 – present
  - Review Editor, *Frontiers in Auditory Cognitive Neuroscience*, *Frontiers in Neuroscience*, 2014 – present
  - Review Editor, *Cognition*, *Frontiers in Psychology*, 2014 – present
  - Guest Editor, *Current Opinion in Psychology*, *The Science of Mindfulness*, 2017–2019
- **Participation in the Organization of Scholarly Meetings (2008-present)**
  - 2008
    - Planning committee member, Mind and Life Summer Research Institute: Scientific and Contemplative Perspectives on Attention and Emotion Regulation (Garrison Institute, Garrison, NY; Mind and Life Institute)
    - Planning committee member, Mind and Life, The Self, Mental Causation and Free Will: Exchanges Between Science and Buddhism on the Human Mind (Berlin, Germany with HH Dalai Lama and Mind and Life Institute)
  - 2009
    - Planning committee member and scientific advisor, Mind and Life 18, Attention, Memory and the Mind: A Synergy of Psychological, Neuroscientific and Contemplative Perspectives (Dharamsala, India with HH Dalai Lama and Mind and Life Institute)
    - Planning committee member, Mind and Life Summer Research Institute: Scientific and Contemplative Perspectives on Self (Garrison Institute, Garrison, NY; Mind and Life Institute)
    - Planning committee member and scientific advisor, Mind and Life 19, Educating World Citizens for the 21<sup>st</sup> Century: Educators, Scientists, and Contemplatives Dialogue on Cultivating a Healthy Mind, Brain and Heart (Constitution Hall, Washington DC with HH Dalai Lama and Mind and Life Institute)
  - 2010
    - Planning committee member, Mind and Life Summer Research Institute: Education, Developmental Neuroscience and Contemplative Practices: Questions, Challenges, and Opportunities (Garrison Institute, Garrison, NY with Mind and Life Institute)
  - 2013
    - Planning committee member and co-organizer, Advances in Meditation Research, NY Academy of Sciences
  - 2015
    - Planning committee member and co-organizer, Advances in Meditation Research, Memorial Sloan Kettering; NY Academy of Sciences
  - 2016
    - Co-organizer, Theoretical and Methodological Challenges in Mindfulness Research: Setting an Agenda for a Programmatic Research Initiative to Study the Neurobiological, Clinical and Real-life Changes Associated with Mindfulness-based Contemplative Practice. (Harvard Radcliffe Institute Exploratory Seminar, Cambridge, MA)
  - 2017
    - Co-organizer, Mind and Life Think Tank: Embodiment, Contemplative Practice, and Equality: Developing a programmatic and research agenda for reducing in-group bias through embodied inquiry and contemplative practice, Osher Center for Integrative Medicine
  - 2019
    - Planning committee member and participant, Mind and Life Think Tank: Mechanisms of Meditation and Consequences for Clinical Practice, Leiden, Netherlands
  - 2020
    - Program Planning Committee, Mind and Life Contemplative Research Conference (CRC)

- **Special awards or recognition for professional activities**

- University of Utah, Department of Psychology—Research Assistantship, 1999 – 2005
- University of Utah, Department of Psychology—Commendation for Excellence in Research, 2001
- University of Utah—Graduate Research Student Travel Award, 2002 – 2004
- University of Utah—Psi Chi Honor Society Award for Excellence in Teaching, 2003
- University of Utah, Department of Psychology—Commendation for Excellence in Teaching, 2003
- University of Utah, Department of Psychology—Kevin Hawley Memorial Award, 2004
- Mind & life Summer Research Institute Fellowship, 2005 – 2007
- [TransTech 200](#) Annual List of Key Innovators who are developing science and technology that significantly impacts mental and emotional well being, Class of 2016
- Mind & Life Think Tank Award, 2017, \$10,000

## TEACHING ACTIVITIES

- **Medical School Courses:**

- Functional Neuroimaging for Radiology Residents, Brigham & Women’s Hospital, Harvard Medical School, 2-3 lectures, 2009 – 2011
- Summer Education Program in Psychiatric Neuroimaging, Brigham & Women’s Hospital, Harvard Medical School, 2-3 lectures, 2013
- Mind-Body Medicine – A Harvard Medical School elective course, 2 lectures, 2016
- [Mind Brain Behavior](#) – Interfaculty Initiative, Harvard University, 2015
- Brain Behavior and Movement, Vanderbilt University Medical School, 1 lecture and practicum yearly, 2017-present
- Vanderbilt University Medical School Residency Program in Psychiatry, 1 lecture and practicum yearly, 2017-present

- **Undergraduate/Graduate School Courses:**

- Mind and Nature (PSYCH 3130), University of Utah, Fall, 1999
- Brain and Behavior (PSYCH 3711), University of Utah, Fall, 2000 – 2005
- Cognition (PSYCH 3120), University of Utah, Spring, 2001
- Teaching Experience (PSYCH 4910), University of Utah, Spring, 2001
- Research Modes of Learning (PSYCH 3900), University of Utah, 2001 – 2004
- Physiological Psychology (PSYC 406), Westminster College, 2005 - 2007
- Physiological Psychology Lab (PSYC 407), Westminster College, 2005 – 2007
- Neuroscience 3861/2 – Undergraduate Research, Vanderbilt University, 2018 – present
- NURO 9999 PhD Dissertation Research, 2017 – present
- Neuroscience 4961 – Integrative Neuroscience, Fall, 2019

- **Continuing Medical Education**

- “Self-Awareness, Self-Regulation, and Self-Transcendence: How Mindfulness-based Practices Transform the Brain”, [Unified Mindfulness Online Course](#), 2018 – present
- “The Science of Mindfulness”, Osher Center Professional Development in Mindfulness Facilitation course, Osher Center for Integrative Medicine, April, 2017 – present

- **Mindfulness Teaching & Facilitation**

- Mindfulness and Compassion Training: Science & Clinical Practice, all-day mandatory training for Harvard Longwood Residency Program in Psychiatry, Harvard Medical school, 2015
- [The Science Behind Meditation](#), Psychology Today, Guest Blogger, 2015 – present
- “Neurobiology of Yoga”, Yoga teacher training online course, [Yogamedicine.com](#)
- “[Meditation and the Brain](#)”, 10% Happier Mobile App, November, 2017 – present
- “Mapping the Meditative Mind & the Emerging Science of Mindfulness”, Nalanda Contemplative Psychotherapy Course, November, 2017
- “Future of Meditation Research Online Course”, Institute of Noetic Sciences, 2018 – present
- “Science and Practice of Mindfulness Meditation”, Vanderbilt school of Nursing, 2017 – present
- “Self-transformation through Mindfulness: Learn how mindfulness can change your brain through improved self-awareness, self-regulation, and ultimately, self-transcendence”, Insight Timer Mobile App, March, 2019
- “Neuroscience of Mindfulness and Compassion: Transformation through Self-Awareness, Self-Regulation and Self-Transcendence”, online course, Compassion Institute, Winter, 2019

- “Mindfulness and Compassion for Chronic Pain”, Insight Timer Mobile App, Fall, 2019
- “Mindfulness and Compassion for Chronic Low Back Pain”, AwareNow Mobile App, Spring, 2020
- “Neuroplasticity” – U-Thrive stress reduction program for college students, Spring, 2020
- **Other Teaching**
  - Summer Educational Program in Neuropsychiatric Functional Neuroimaging, Brigham & Women’s Hospital, Harvard Medical School, Summer, 2011-2016

## RESEARCH SUPERVISION

- **Ph.D. Dissertation Committee**
  - Condon, P. Cultivating virtue: The effects of mindfulness and compassion-based meditation on mental states and behavior. Department of Psychology, Northeastern University, Boston, MA, 2014
  - Hadash, Y. Mindfulness, self-referential processing and equanimity: Behavioral measurements and mechanisms of action., University of Haifa, Israel, 2016
  - Gupta, R. The Effect of Mindfulness-Based Cognitive Therapy on P1 Event-Related Potential Markers of Threat-Related Attentional Bias and Symptoms in Anxiety Populations, Vanderbilt University, Neuroscience Graduate Program, Nashville, TN, 37203
  - Parvathaneni, P. Gray Matter Based Spatial Statistics in Neuroimaging Studies, Vanderbilt University, Electrical Engineering Graduate Program, Nashville, TN 37203
- **MDiv Thesis Committee**
  - Parameshwaran, K. Scriptural Studies vs. Experiencing God: My Thoughts on the Art of Practical Exegesis and Embodied Care of Clinical Patients and How it can Complement Scriptural Studies, Harvard Divinity School, Harvard University, 2016
- **Medical Residents**
  - David Fischer, 2010 – 2011, Resident Physician, Brigham & Women’s Hospital, Harvard Medical School, Research Fellow, Berenson-Allen Center for Noninvasive Brain Stimulation
  - Jessica Harder, June 2012 – March, 2014, Instructor in behavioral neurology and neuropsychiatry, Brigham & Women’s Hospital, Harvard Medical School
- **Undergraduate/Post-graduate students**
  - *Research Student Trainees*
    - 2001 – 2005: Nicole Byron, Cecilia Eguiguren, Brandon Martin, Adam Bevan, Michael Ryan Hunsaker, Danielle Warthen, Matt Warthen, Brock Kirwan, Anne Walberer
    - 2005 – 2009: Lahdan Heidarian, Haiwen Chen
    - 2010 – 2016: Elisa Nabel, Sara Riley, Erica Greenberg, Courtney Haley, Benjamin Fuchs, Eva Catenaccio, Laurel Morris, Emily Epstein, Rachel Cohn, Lorene Leung, Daniel Millstein, Andrea Poile, Emily Feeney
    - 2016 – present: Kendra Osborne, Joy Grabenstein, Jessica Banasiak, Jean Henry, Kate Bradley
  - *Post-doctoral Fellows*
    - 2017-2018
      - Landrew Sevel, Ph.D
    - 2017-2018
      - Poppy Schoenberg, Ph.D.
    - 2018-2019
      - Michael Finn, Ph.D.,
- **Graduate Students**
  - Paul Condon, September, 2012 – April, 2014
  - Prasanna Parvathaneni, 2017 – 2019
  - Resh Gupta, May, 2017 – present

## RESEARCH PROGRAM

### Ongoing Research Support

UH2/UH3 (5UH3AT009145-04)

King, Britton, Loucks (PI)

9/01/2015-08/31/2020

NIH

#### **Mindfulness Influences on Self-Regulation: Mental and Physical Health Implications.**

*This multi-site study will focus on modifying and refining mindfulness-based interventions (MBIs) by identifying self-regulatory mechanisms (Cognitive, Emotional, and Self-specifying) through existing and novel data sets in order to predict clinical outcomes and medical adherence. This project offers the opportunity to clarify which self-regulation measures are of greatest clinical use related to MBI and clinical behavior change outcomes. Furthermore, this study should identify which MBI elements may be most efficacious at engaging self-regulation, with resulting impacts on clinical behavior change outcomes including medical regimen adherence. This should help contribute to population health by producing implementable and effective treatment and prevention interventions.*

Role: Co-Investigator/Site-PI, 5% FTE

Total: \$4,903,282 (\$913,454 – 2015)

R01 (AT009680-01A1)

Burns, Bruehl (PI)

12/01/2018-11/31/2023

NCCIH

#### **Evaluating Specific and Non-specific Mechanisms in Two Distinct Complementary Interventions**

*Chronic low back pain (CLBP) is a major public health concern. Complementary/integrative (C/I) chronic pain interventions have proliferated (eg, Mindfulness Training [MT], spinal manipulation therapy [SMT]), and some approaches have strong support for efficacy. The general hypothesis is that treatment-induced changes in these non-specific mechanisms will predict outcomes across different C/I interventions. For MT, this would be changes in mindfulness, whereas for SMT, this would be changes in spinal stiffness. The proposed study will compare the degree to which MT and SMT activate specific and non-specific mechanisms, and the degree to which these mechanisms affect pain-related outcomes.*

Role: Co-Investigator, 10% FTE

Bravenet, Bravewell Collaborative

Vago (PI)

03/01/2018-01/31/2020

Einstein School of Medicine – Coordinating Center

#### **Targeting Self-Regulatory Mechanisms in Integrative Medicine: A Pilot Multi-Site Pragmatic Trial**

*This study will assess the role of a behavioral assay of attention regulation in predicting improvements on patient-reported outcomes. This study also plans to assess the effect of treatment modality (e.g., acupuncture, mind-body medicine group, massage therapy) dosage and its interaction with self-regulatory measures on clinical outcomes. Lastly, the study aims to assess the association self-regulatory behavior and degree to which patients take a proactive role in managing their health and maintaining healthy behavioral changes over time.*

Role: Principal Investigator, 2% FTE

Total: \$27,000

NRSA (1 F31 AT010299-01)

Gupta (PI)

2/01/2019-01/31/2022

NIH

*The proposed research will determine whether mindfulness-based cognitive therapy (MBCT) can modify event-related potential (ERP) markers of attentional bias to threat, and whether these modifications are associated with an improvement in symptoms acutely and at 6-months follow-up. The proposed research will thus provide insight into a potential physiological mechanism through which MBCT may target early stages of attentional bias and reduce clinical symptoms of anxiety.*

Role: Primary sponsor

Total: \$90,000

R01 (AT009680-01A1)

Victorson, Greco (PIs)

07/15/2017-06/30/2022

NCCIH

#### **Creating and optimizing mindfulness measures to enhance and normalize clinical evaluation (COMMENCE)**

*Mindfulness has become an increasingly studied health behavior in clinical research trials. A major challenge of mindfulness research has been how to most effectively measure and assess mindfulness using self-reported survey instruments. This study seeks to apply innovative instrument development methods to create a standardized measurement system of mindfulness so we may advance our understanding of important clinical processes and mechanisms of action.*

Role: Consultant

## Pending Research Support

**(U01), NIH/NCCIH (PAR-18-118) Dusek (PI) 09/01/2020-08/31/2025**

*The U01 mechanism across 4 BraveNet Clinical sites aims to ensure the efficiency of screening, recruitment, and retention procedures across Emergency Department (ED) sites, refine the process for screening eligible pain patients and conducting the trial in multiple EDs, and ensure that recruitment and retention procedures in the pilot trial are replicable across multiple EDs.*

Role: site PI, 15% FTE

**(U01), NIH/NCCIH (PAR-18-118) Fresco (PI) 04/01/2020-03/31/2025**

### **Om-mHealth: Integrating mobile-based support in traditional mindfulness-based interventions**

*The overarching goal of this research is to optimize Om-mHealth—a mind and body intervention targeting high blood pressure that effectively integrates traditional mindfulness-based intervention (MBI) principles with available and accessible mobile health (mHealth) tools.*

Role: site PI, 5% FTE

**R01 Murphy (PI); Schoenberg (co-I) 01/01/2020-12/31/2024**

**NIH**

### **Early Phase II Randomized Controlled Trial Examining Mindfulness-Based Intervention for Late Effect Neuroinflammation in Head and Neck Cancer High Systemic Symptom Burden**

*This study aims to investigate 1) clinical outcomes of an MBI for Head and Neck Cancer patients and 2) central nervous system markers of neuroinflammation using Positron Emission Tomography.*

Role: Co-Investigator, 10% FTE

**R21 Vago (PI) 04/01/2020-11/31/2022**

**NCCIH**

### **Neurophysiological and Endogenous Inhibitory Mechanisms Supporting Mindfulness-based Chronic Pain Relief**

*This application proposes to test inhibitory control mechanisms using conditioned pain modulation, EEG, and behavioral approaches for individuals with chronic low back pain.*

Role: Principal Investigator, 25% FTE

**R61/R33 Vago (PI) 07/01/2020-06/31/2025**

**NCCIH**

### **Clinical Validation of Attention Regulation Markers in Predicting Chronic Pain Outcomes**

*This application proposes to test whether attention regulation mechanisms are engaged by MBCT using fMRI and predict 1) pain-related outcomes, and 2) opioid cessation. Target engagement is anticipated to allow for identification of those individuals who will likely benefit (or not) from MBCT to treat symptoms not addressed with ongoing opioid therapy*

Role: Principal Investigator, 25% FTE

**Schoenberg, Vago (PIs) 02/01/2020-01/31/2021**

## **John Templeton Foundation**

### **The effects of compassion training on multiple brain hyper-connectivity and real-world social connectedness**

*This project will examine the neural correlates and outcomes associated with compassion training upon dimensions of social connectedness, i.e. the experience and world-view of belonging, acceptance, and fellowship using (i) EEG hyperscanning, (ii) thematic analysis of social interaction, (iii) self-report measures of social connectedness.*

Role: co-Principal Investigator, 10% FTE

## **Completed Research Support**

**Yoga Science Foundation/University of Toronto Vago, Farb (PI) 2/01/2016-1/31/19**

### **Mindful Yoga for Interoceptive Awareness**

*This multi-site 3-arm randomized controlled study plans to test a mindful yoga intervention vs. power yoga and cardiovascular exercise control in a population of out-patients with moderate levels of depression to determine whether the mindfulness component can improve interoception through 1<sup>st</sup> person, 2<sup>nd</sup> person, and 3<sup>rd</sup> person perspectives.*

Role: Co-Investigator/Site-PI

Total: \$10,000



**Mind and Life Institute** **Vago, Forbes, Farb, Wilson-Mendenhall (PIs)** **09/14/2017-09/16/2017**  
**Think Tank Award**  
**Embodiment, Contemplative Practice, and Equality: Developing a programmatic and research agenda for reducing implicit bias through embodied inquiry and contemplative practice**  
*This award will support the meeting of a working group to investigate implicit bias and associated prejudice with a focus on identifying conditions that mitigate the effects of such bias in social settings.*  
Role: Principal Investigator  
Total: \$10,000

**IMPACT Foundation/Anon Philanthropic donors** **Vago (PI)** **1/01/2012-12/31/2016**  
**Neurobiological Substrates Underlying Varieties of Restful Experience and Modalities of Meditative Awareness**  
*This study aimed to investigate expert and novice practitioners of mindfulness-based meditation to identify neurobiological substrates of intrinsic brain activity in the context of distinct resting state networks. Five specific states of modality-specific restful experience that replace mental imagery, internal talk, viscerosomatic and emotional sensations with restful analogues were examined.*  
Role: Principal Investigator, 5-10% FTE  
Total: \$185,000

**Harvard Radcliffe Institute** **Vago, Stern (PIs)** **01/21/2016**  
**Exploratory Seminar Award**  
**Theoretical and Methodological Challenges in Mindfulness Research**  
*This exploratory seminar assembled researchers and scholars from across disciplines to begin a discussion for the creation of a comprehensive research initiative that focuses on Contemplative and investigating the clinical efficacy and basic mechanisms of very specific forms of mental training that involve meditation. The seminar also attempted to address theoretical and methodological challenges emerging in the new field.*  
Role: Principal Investigator, 5-10% FTE  
Total: \$18,000

**1440 Foundation/Mindfulness Connections** **Vago (PI)** **01/01/2012- 6/30/16**  
**/Hope Lab**  
**Health & Stress Evaluation of Young Adults – A Long-term, Opportunistic Follow-Up Assessment of Mindfulness Training in School Children**  
*This study aimed to investigate the potential long-term effects of exposure to mindfulness training during elementary school, on subsequent health attitudes, resilience to stress, and well-being as adults, and to provide pilot data for contemporary curriculum development integrating contemplative practices and skills development into K-12 education.*  
Role: Principal Investigator  
Total: \$125,835, 5-10% FTE

**Starr Foundation** **Ahles, Silbersweig (PI)** **07/01/2008–06/30/2012**  
**Translational studies of neural mechanisms of chemotherapy induced cognitive changes**  
*The goal of this project is to test regionally and mechanistically specific hypotheses concerning chemotherapy induced cognitive changes, as well as to identify potential biomarkers and strategies for therapeutics.*  
Role: Co-Investigator, 5-10% FTE

**MLI-FJVRF-08-001** **Vago (PI)** **1/01/2006-12/01/2011**  
**Mind and Life Institute/Francisco J. Varela Grant Award for Contemplative Science Research**  
**The Effects of Mindfulness Meditative Training on Impairments in Affect Regulation Associated with the Experience and Anticipation of Pain in Fibromyalgia Patients.**  
*The goal of this project has been to investigate whether mindfulness meditative techniques are able to significantly decrease perceptual and cognitive biases and the dysregulation of affective states (i.e., anxiety, catastrophizing) associated with the experience and anticipation of pain in Fibromyalgia patients.*  
Role: Principle Investigator  
Total: \$10,000

**Univ. Utah Magnetic Source Imaging Award** **Vago (PI)** **11/01/2006-11/01/2011**  
**Neural Basis of Cognitive and Emotional Processing in Fibromyalgia.**  
*The goal of this project has been to investigate the effects of mindfulness training on attention and emotion regulation processes using a fear-potentiated startle paradigm with Magnetoencephalography (MEG).*  
Role: Principle Investigator  
Total: \$25,000

**NCCAM within the Pain Research Center at the University of Utah.**

*This program facilitated transdisciplinary and translational approaches to investigating mind-body interactions and their relationship to health. The major goal of this project has been to evaluate the cognitive and affective processes associated with mindfulness meditation training in Fibromyalgia patients.*

Role: Contributing Investigator

Total: \$900,000

**PUBLICATIONS AND PRESENTATIONS**

Peer-reviewed publications in NCBI-My Bibliography

[[https://www.ncbi.nlm.nih.gov/myncbi/14IYpsl\\_VSr5v/bibliography/public/](https://www.ncbi.nlm.nih.gov/myncbi/14IYpsl_VSr5v/bibliography/public/)].

**Articles in refereed journals:*****In Preparation/Under Review***

1. **Vago, D. R.**, Pan, H., Young, S., Silbersweig, D., Stern, E. Fronto-striatal-limbic and Modality-specific Markers of Clarity in Novice and Advanced Meditators During Open Monitoring and Concentrative Meditative States of Tranquility. *In Preparation*
2. **Vago, D. R.\***, Root, J.\*, Pan, H., Perez, D. L., Weisholtz, D., Butler, T., Epstein, J., Silbersweig, D. A., Stern, E. Engaging Threat of 9/11 Imagery with Cognitive Control: Frontolimbic Neural Circuit Activity is Dependent on Direct Versus Indirect Exposure to Trauma of 9/11 Attacks on World Trade Center. *In Preparation*
3. **Vago, D.R.**, Lazar, S., Desbordes, G., Peters, S., Dumais, T., Moitra, E., Lipsky, J., Kimmel, H., Sager, L., Rahrig, H., Cheaito, A., Acero, P., Scharf, J., Schuman-Olivier, Z., Lindahl, J., Ferrer, R., Loucks, E., Britton, W. Cognitive Processes Engaged by Mindfulness-Based Interventions: A Systematic Review and Evidence Map of Constructs and Measures. *In Preparation*
4. Desbordes, Acabchuk, R., Peters, S., Dumais, T., Moitra, E., Lipsky, J., Kimmel, H., Sager, L., Rahrig, H., Cheaito, A., Acero, P., Scharf, J., Lazar, S., **Vago, D.**, Schuman-Olivier, Z., Lindahl, J., Ferrer, R., Loucks, E., Britton, W. Self-Related Processes Engaged by Mindfulness-Based Interventions: A Systematic Review and Meta-Analysis. *In Preparation*
5. Kimmel, H., Moitra, E., Britton, W., Dumais, T., Ferrer, R., Lazar, S., **Vago, D.R.**, Lipsky, J., Cheaito, A., Sager, L., Peters, S., Rahrig, H., Acero, P., Scharf, J., Loucks, E., Fulwiler, C., Hoge, E. Systematic Review of Emotion-Related Self-Regulation Processes Engaged by Mindfulness-Based Interventions. *In Preparation*
6. Matwin, S., Foote-Pearce, M., **Vago, D.R.** A Continuum of Mindfulness for short- and long-term practice. *In Preparation*.

***Published***

1. Wallenstein, G.V. and **Vago, D.R.** (2001) Intrahippocampal Scopolamine Impairs Both Acquisition and Consolidation of Contextual Fear Conditioning. *Neurobiology of Learning and Memory*. 75, 245-252. Epub 2001/04/13. doi: 10.1006/nlme.2001.4005. PubMed PMID: 11300731.
2. Wallenstein, G.V., **Vago, D.R.**, Walberer, A.M. (2002) Time-dependent involvement of PKA/PKC in contextual memory consolidation. *Behavioural Brain Research*. 133, 159-164. PMID: 12110449
3. **Vago, D.R.**, Kesner, R.P. (2007) Cholinergic modulation of Pavlovian fear conditioning in rats: Differential effects of intrahippocampal infusion of mecamylamine and methyllycaconitine. *Neurobiology of Learning and Memory*. 87, 441-9. doi: 10.1016/j.nlm.2006.11.001. PubMed PMID: 17178240.
4. **Vago, D.R.**, Bevan, A., Kesner, R.P. (2007) The role of the direct perforant path input to the dorsal CA1 subregion in memory retention and retrieval. *Hippocampus*. 17, 977-987. Epub 2007/07/03. doi: 10.1002/hipo.20329. PubMed PMID: 17604347.
5. **Vago, D.R.**, Kesner, R.P. (2008) Disruption of the direct perforant path input to the CA1 subregion of the dorsal hippocampus interferes with spatial working memory and novelty detection. *Behavioural Brain Research*. 189, 273-83. doi: 10.1016/j.bbr.2008.01.002. PubMed PMID: 18313770.
6. **Vago, D. R.**, Epstein, J., Cattenacio, E. Stern, E. (2011) Identification of Neural Targets for the Treatment of Psychiatric Disorders: The role of functional neuroimaging. *Neurosurgery Clinics of North America*. 22, 279-305. doi: 10.1016/j.nec.2011.01.003. PubMed PMID: 21435577.

7. Min, B-K, Yang, P. S., Bohlke, M., Park, S., **Vago, D. R.**, Maher, T. J., Yoo, S-S. (2011) Focused ultrasound modulates the level of cortical neurotransmitters: Feasibility for a functional brain mapping technique. *International Journal of Imaging Systems and Technology*. **21**, 232-240. doi:10.1002/ima.20284
8. **Vago, D. R.**, Nakamura, Y. (2011) Increased Selective Attention Towards Pain-related Threat in Fibromyalgia: Preliminary Evidence for Effects of Mindfulness Meditation Training. *Cognitive Therapy & Research*. **35**, 581-594. Mindfulness Meditation Training. *Cognitive Therapy & Research*. **35**, 581-594. doi:10.1007/s10608-011-9391-x
9. Holzel, B. K., Lazar, S. W., Gard, T., Schuman-Olivier, Z., **Vago, D. R.**, Ott, U. (2011) How does mindfulness work? Proposing mechanisms of action from a conceptual and neural perspective. *Perspectives on Psychological Science*. **6**, 537-559. doi :10.1177/1745691611419671. PMID:26168376.
10. Perez, D. L., Root, J., Brown, A., **Vago, D. R.**, Epstein, J., Cloitre, M., Silbersweig, D., Stern, E. (2012) Frontolimbic Gray-Matter Abnormalities in Childhood Sexual Trauma-Related PTSD. *Journal of Neuropsychiatry and Clinical Neurosciences* **24**(2): 12-12.
11. Mind and Life Education Research Network (listed alphabetically: Davidson, RJ, Dunne, J, Eccles, JS, Engle, A, Greenberg, M, Jennings, P, Jha, A, Jinpa, T, Lantieri, L., Meyer, D., Roeser, RW, **Vago, DR.** (2012) Contemplative practices and mental training: Prospects for American Education. *Child Development Perspectives*. **6** (2), 146-153. doi:10.1111/j.1750-8606.
12. **Vago, D. R.**, and Silbersweig, D. A. (2012). Self-Awareness, Self-Regulation, and Self-Transcendence (S-ART): A Framework for Understanding the Neurobiological Mechanisms of Mindfulness. *Frontiers in Human Neuroscience* **6**:296. doi:10.3389/fnhum.2012.00296
13. Orringer, D., **Vago, D. R.**, Golby, A.J. (2013) Clinical Applications and Future Directions of Functional MRI. *Seminars in Neurology*. **32**(4), 466-475. DOI:10.1055/s-0032-1331816
14. **Vago, D. R.** (2013). Mapping modalities of self-awareness in mindfulness practice: A potential mechanism for clarifying habits of mind. *Annals of the New York Academy of Sciences*. 1-15. doi:10.1111/nyas.12270
15. Davis, J. H., \* **Vago, D. R.** \* (2013) Can enlightenment be traced to specific neural correlates, cognition, or behavior? No, and (a qualified) Yes. *Frontiers in Human Neuroscience*. **4**(870). (\* shared first authorship) doi:10.3389/fpsyg.2013.00870
16. Desbordes, G.\* , Gard, T.\* , Hoge, E.\* , Holzel, B.\* , Kerr, C.\* , Lazar, S.\* , Olendzski, A.\* , **Vago, D.R.\*** (2014). Moving beyond Mindfulness: Defining Equanimity as an Outcome Measure in Meditation Research. *Mindfulness*. (\* shared first authorship) doi:1868-8527 (Print).
17. Kripalu Yoga Research Consortium (listed alphabetically: Gard, T.\* , **Vago, D. R.\***, Noggle, J., Park, C., Wilson, A. (2014). Potential self-regulatory mechanisms of yoga for psychological health: Directions for future research. *Frontiers in Human Neuroscience*. (\* shared first authorship) doi:10.3389/fnhum.2014.00770
18. Perez, D. L., Barsky, A. J., **Vago, D. R.**, Baslet, G., & Silbersweig, D. A. (2015). A neural circuit framework for somatosensory amplification in somatoform disorders. *J Neuropsychiatry Clin Neurosci*, **27**(1), e40-50. doi:10.1176/appi.neuropsych.13070170
19. Cheek, J., Lipschitz, D.L., Abrams, L., **Vago, D.R.**, Nakamura, Y. (2015). Dynamic reflexivity in action: An armchair walkthrough of a qualitatively driven mixed-method and multiple method study of Mindfulness-Based Skills Training in School Children. *Qualitative Health Research*, **25**(6), 751-762. doi:10.1177/1049732315582022
20. Perez, D. L. Pan, H., Weisholtz, D., Root, J., Fischer, D., Butler, T., **Vago, D. R.**, Isenberg, N., Epstein, J., Silbersweig, D. A., Stern, E. (2015) Altered threat and safety neural processing linked to persecutory delusions in schizophrenia: a two task functional magnetic resonance imaging study. *Psychiatry Research: Neuroimaging*, **233**(3), 352-366. doi:10.1016/j.psychresns.2015.06.002
21. Perez, D. L.\* , **Vago, D. R.\***, Pan, H., Root, J. Fuchs, B. H., Epstein, J., Clarkin, J., Lenzenweger, M. F., Kernberg, O., Levy, K., Silbersweig, D. A., Stern, E. (2015). Frontolimbic neural changes associated with clinical improvement following transference-focused psychotherapy in borderline personality disorder. *Psychiatry and Clinical Neurosciences*, **70**(1), 51-61. (\* shared first authorship) doi:10.1016/j.psychresns.2015.06.002
22. Hadash, Y., Plonsker, R., **Vago, D. R.**, & Bernstein, A. (2016). Experiential self-referential and selfless processing in mindfulness and mental health: Conceptual model and implicit measurement methodology. *Psychol Assess*, **28**(7), 856-869. doi:10.1037/pas0000300

23. **Vago, D. R.**, Zeidan, F. (2016). The brain on silent: mind-wandering, mindful awareness, and states of mental tranquility. *New York Academy of Sciences*, 1373(1), 96-113. doi:10.1111/nyas.13171
24. Zeidan, F., **Vago, D.R.** (2016). Mindfulness meditation-based pain relief: A mechanistic account. *New York Academy of Sciences*, (1373),1: 114-127. doi:10.1111/nyas.13171
25. Yaden, D. B., Haidt, J., Hood Jr, R. W., **Vago, D. R.**, & Newberg, A. B. (2017). The Varieties of Self-Transcendent Experience. *Review of General Psychology*. doi:10.1037/gpr0000102
26. Cheek, J., Abrams, E. M., Lipschitz, D. L., **Vago, D. R.**, Nakamura, Y. (2017). Creating novel school-based education programs to cultivate mindfulness in youth: What the letters told us. *Journal of Child and Family Studies*. doi:10.1007/s10826-017-0761-1
27. Van Dam, N. T., van Vugt, M. K., **Vago, D. R.**, Schmalzl, L., Saron, C. D., Olendzki, A., Meissner, T., Lazar, S. W., Kerr, C. E., Gorchov, J., Fox, K. C. R., Field, B. A., Britton, W. B., Brefczynski-Lewis, J. A., Meyer, D. E. (2017). Mind the hype: A critical evaluation and prescriptive agenda for mindfulness and meditation research. *Perspectives on Psychological Science*. doi:10.1177/1745691617709589
28. Van Dam, N. T., van Vugt, M. K., **Vago, D. R.**, Schmalzl, L., Saron, C. D., Olendzki, A., Meissner, T., Lazar, S. W., Kerr, C. E., Gorchov, J., Fox, K. C. R., Field, B. A., Britton, W. B., Brefczynski-Lewis, J. A., Meyer, D. E. (2017). Reiterated Concerns and Further Challenges for Mindfulness and Meditation Research: A Reply to Davidson and Dahl. *Perspectives on Psychological Science*, (1),66-69. PMID: 29016240. PMCID:PMC5817933. doi:10.1177/1745691617727529.
29. Yaden, D. B., Meleis, M., Newberg, A. B., **Vago, D. R.**, McDaniel, J. (2018). Cross-Cultural Contributions to Psychology and Neuroscience: Self, Mind, and Mindfulness in Buddhism. *Pacific World* 3(19), 53-68. doi:10.1037/gpr0000102
30. Vieten, C., Wahbeh, H, Cahn, R. B., MacLean, K., Estrada, M., Millis, P., Shapiro, S., Radin, D., Josipovic, J., Presti, D. E., Sapiro, M., Chozen Bays, J., Russell, P., **Vago, D. R.**, Travis, F., Walsh, R., Delorme, A. (2018). Future directions in meditation research: Recommendations for expanding the field of contemplative science. *PLoS ONE*. 13(11):e0205740. doi: 10.1371/journal.pone.0205740
31. **Vago, D. R.**, Gupta, R. S., & Lazar, S. W. (2018). Measuring cognitive outcomes in mindfulness-based intervention research: a reflection on confounding factors and methodological limitations. *Curr Opin Psychol*, 28, 143-150. doi:10.1016/j.copsyc.2018.12.015
32. Schoenberg, P., **Vago, D.R.** (2019). Mapping Meditative States and Stages with Electrophysiology: Concepts, Classifications, and Methods. *Curr Opin Psychol*, 28, 211-217. Doi: 10.1016/j.copsyc.2019.01.007.
33. Bernstein, A., **Vago, D. R.**, & Barnhofer, T. (2019). Editorial Overview: Understanding Mindfulness, One Moment at a Time: An Introduction to the Special Issue. *Current opinion in psychology*. doi:10.1016/j.copsyc.2019.08.001.
34. Loucks, E. B., Nardi, W., R., Gutman, R., Kronish, I. M., Saadeh, F. B., Wentz, A. E., Webb, J., **Vago, D.R.**, Harrison, A., Britton, W. B. Loucks EB, Nardi WR, Gutman R, et al. Mindfulness-Based Blood Pressure Reduction (MB-BP): Stage 1 single-arm clinical trial. (2019) *PLoS One*, 14(11):e0223095. doi:10.1371/journal.pone.0223095
35. Gupta, R. S., Kujawa, A., **Vago, D. R.** The Neural Chronometry of Attentional Bias: Evidence for Early and Late Stages of Selective Attentional Processing. 2019. *International Journal of Psychophysiology*, 146:20–42. doi:10.1016/j.ijpsycho.2019.08.006

**Books, book chapters, invited review articles:**

1. Wallenstein, G.V., **Vago, D.R.**, Walberer, A.M. (2001) Hippocampus. In *Encyclopedia of Neurological Sciences*, Academic Press.
2. Roeser, R.W., **Vago, D.R.**, Pinela, C., Morris, L.S., Taylor, C., and Harrison, J. (2013). "Contemplative Education: Cultivating Positive Mental Skills and Social-Emotional Dispositions through Mindfulness Training," in *Handbook of Moral and Character Education*. 2<sup>nd</sup> ed.
3. **Vago, D.R.**, Morris, L.S., Wallenstein, G.V., (2014) Hippocampus. In *Encyclopedia of Neurological Sciences*, 2<sup>nd</sup> ed. Academic Press.
4. **Vago, D.R.**, Morris, L.S., Wallenstein, G.V., (2016) Hippocampus. In *Encyclopedia of Neurological Sciences*, 2<sup>nd</sup> ed. Academic Press.
5. McKernan, L.C., Coronado, R., & **Vago, D.R.** (2020). Clinical Hypnosis and Mindfulness-Based Interventions for Spinal Pain. In C. Liberson (ed), *Rehabilitation of the Spine*, 3<sup>rd</sup> edition.

## Abstracts:

1. **Vago, D.R.**, Hone, A., Barrett, C., Kesner, R. P., Wallenstein, G. V. (2002). Intrahippocampal blockade of  $\alpha 7$ ,  $\alpha 3\beta 2$ ,  $\alpha 2\beta 4$ , and  $\alpha 4\beta 4$  nicotinic acetylcholine receptors disrupts early consolidation and acquisition of contextual fear. *Society for Neuroscience Abstracts*, 185.2.
2. **Vago, D.R.**, Calder, A., Kesner, R. P. (2003). Functional characterization of the direct perforant path into the hippocampus. *Society for Neuroscience Abstracts*, 835.2.
3. **Vago, D.R.**, Kesner, R. P. (2004). The role of the direct perforant path in retrieval and detection of spatial change. *Society for Neuroscience Abstracts*, 434.3.
4. **Vago, D.R.**, Kesner, R. P. (2005). An electrophysiological and behavioral characterization of the temporoammonic pathway: Disruption produces deficits in retrieval and spatial mismatch. *Society for Neuroscience Abstracts*, 647.5.
5. Nakamura Y., **Vago, D.R.**, Volinn, E. (2007). *Mindfulness Meditation Training for Fibromyalgia (Chronic Pain Condition)*. Abstract published in the Proceedings of the meeting, "Toward a Science of Consciousness", Budapest, Hungary.
6. Roeser RW, Sims, JM, Mills, KLM, Carlson, BR, **Vago D.R** (2011) Pilot Study of a Music-based Mindfulness Training (MBMT) for Stress-Reduction Among College-Attending Adults. Biennial Meeting of the Society for Research on Child Development, Montreal, Canada.
7. Brown A, Root J, Perez DL, **Vago, D.R.**, Teuscher O, Pan H, Cloitre M, LeDoux J, Silbersweig D, Stern E. (2011) Functional and Structural Abnormalities in Childhood Sexual Abuse-Treated PTSD: Implications for Characterization and Treatment. *International Society for Traumatic Stress Studies*.
8. **Vago, D. R.**, Pan, H., Stern, E., & Silbersweig, D. A. (2013). Neural Substrates Underlying Modalities of Awareness in Mindfulness Practice. Abstract published in *J Neuropsychiatry Clin Neurosci*, 25(2), 102.
9. Gupta, R.S., Fresco, D.M., Bernstein, A., Kang, H., Mohr, E.M., Schoenberg, P.L.A., **Vago, D.R.** (2019) The effect of mindfulness-based cognitive therapy on event-related potential markers of attentional bias in anxiety. *Society for Neuroscience Abstracts*.
10. Schoenberg, P.L.A., Henry, J.M., **Vago, D.R.**, Speckens, A.E.M (2019). Modulated electrocortical current density dynamics in major depression following mindfulness-based cognitive therapy. *Society for Neuroscience Abstracts*.
11. Mohr, E.M., Brandmeyer, T., Hecht, R., Gupta, R. S., Schoenberg, P. L. A., **Vago, D. R.** (2019). The effects of mindfulness-based interventions on sustained attention and inhibitory control. *Society for Neuroscience Abstracts*.

## Presentations at Scientific Meetings:

1995

- **Poster presentation.** "Immunocytochemical localization of selective glutamate receptor subunits in kainic acid treated rats. *Society for Neuroscience Abstracts*, 650.7.

2001

- **Oral presentation.** "*PKA/PKC inhibition produces a time-dependent retrograde deficit of contextual fear conditioning*", *Society for Neuroscience*

2002

- **Poster Presentation.** "*Intrahippocampal blockade of  $\alpha 7$ ,  $\alpha 3\beta 2$ ,  $\alpha 2\beta 4$ , and  $\alpha 4\beta 4$  nicotinic acetylcholine receptors disrupts early consolidation and acquisition of contextual fear*". *Society for Neuroscience*

2003

- **Poster presentation.** "*Functional characterization of the direct perforant path into the hippocampus*" *Society for Neuroscience*

2004

- **Poster presentation.** "*The role of the direct perforant path in retrieval and detection of spatial change*". *Society for Neuroscience*

2005

- **Poster presentation.** "*An electrophysiological and behavioral characterization of the temporoammonic pathway: Disruption produces deficits in retrieval and spatial mismatch*" *Society for Neuroscience*

2006

- **Oral presentation.** "*The effects of mindfulness meditation training on cognitive and emotional biases associated with the perception of pain in fibromyalgia*". *Mind & Life Summer Research Institute*.

2008

- **Oral presentation.** “*Mindfulness Training for Fibromyalgia: Changes in General Symptoms, Perception of Pain, and Associated Brain Correlates*. 6<sup>th</sup> Annual Conference: Integrating Mindfulness-Based Interventions into Medicine, Health Care, and Society for Clinicians, Researchers, and Educators, Center for Mindfulness, Worcester, MA.

2010

- **Oral presentation.** “*Mindfulness Meditation Training for Fibromyalgia: A Preliminary Study Investigating Attention-related Bias on a Dot-Probe Task*. American Psychosomatic Society Workshop: Meditation Research and Psychosomatic Medicine – Evidence for Efficacy, Research Design – Challenges and Lessons Learned.
- **Poster presentation.** “*Mindfulness Meditation Training for Fibromyalgia: A Preliminary Study Investigating Attention-related Bias on a Dot-Probe Task*. American Psychosomatic Society. Stress & Health. Abstract 1453.
- **Poster presentation.** “*Effects of mindfulness meditation on perceived symptoms of fibromyalgia: A qualitative approach to understanding clinical changes*. Center for Mindfulness, Worcester, MA.

2012

- **Oral presentation.** “But why is paying attention to the present moment good for you? Neuro-Pscho-Behavioral processes underlying the salutary effects of mindfulness”. Bernstein, A. (Chair), 46th annual Association for Behavioral and Cognitive Therapies convention, National Harbor, MD.
- **Oral presentation.** “[Self-Awareness, Self-Regulation, and Self-Transcendence: A Framework for Understanding the Neurobiological Mechanisms of Mindfulness](#)”, Bessel A. van der Kolk’s 23<sup>rd</sup> Annual International Trauma Conference.
- **Oral presentation.** “*Mindfulness Meditation Training for Depression Targeting Specific Mechanisms for Predicting Treatment Response*”, Brigham & Women’s Hospital – Depression Center.
- **Poster presentation.** “*The Effects of Mindfulness on Iconic Memory*”, in: Mind & Life Summer Research Institute: The Situated and Embodied Mind.
- **Oral presentation.** “*Mechanisms of Mindfulness: Integrating Neurobiological, Clinical, and Buddhist Models with Standards for Measurement*”, Lazar, S., (Chair), International Symposia for Contemplative Studies.
- **Oral presentation.** “*Aligning the Goals of Contemplative Science with the Funding Priorities of NIMH*”, Fresco, D. (Chair), International Symposia for Contemplative Studies.
- **Oral presentation.** “Pain and Mindfulness Meditation”, Nakamura, Y. (Chair), International Symposia for Contemplative Studies.
- “Neurobiological Models for Mindfulness”, [Mind and Life XXIV, Latest Findings in Contemplative Neuroscience](#). A private meeting with His Holiness, The Dalai Lama. April 24<sup>th</sup>, 2012.
- **Grand Rounds.** “Emerging Neurobiological Models for Mindfulness: Conceptual Clarifications and Opportunities for Clinical Research”, Harvard Longwood Psychiatry Grand Rounds, Beth Israel Deaconess Medical Center

2013

- **Oral presentation.** “*Limbic Neuromodulation through Meditative Practice without Suppression or Appraisal*”, Neurobehavioral Facets of Emotion Regulation in Normative, Disordered, and Treatment Contexts. Chair: D. M. Fresco; Association for Behavioral and Cognitive Therapy.
- **Poster presentation.** “*Neural Substrates Underlying Modalities of Awareness in Mindfulness Practice*”, American Neuropsychiatric Association Annual Meeting, Boston, MA.
- **Poster presentation.** “Neural Substrates Underlying Modalities of Awareness in Mindfulness Practice. Brain Research Institute – Neurosciences Research Center, Interdisciplinary mini-retreat and poster session. Brigham & Women’s Hospital, Harvard Medical School, Boston, MA.

2014

- **Invited Keynote.** “*Mapping the Meditative Mind: Exploring the Neural Substrates of Mindful Awareness*”, Interdisciplinary Symposium on Empathy, Contemplative Practice and Pedagogy, the Humanities and the Sciences, University of Utah, Department of Languages and Literature
- **Invited Keynote.** “*Self-Awareness, Self-Regulation, & Self-Transcendence: A Systems-based Integrative Framework by which Mindfulness Functions to Reduce Bias and Sustain a Healthy Mind*”, Center for

Mindfulness, International Scientific Conference for Clinicians, Researchers and Educators, Kluge Symposium on Mindfulness and Compassion: Mechanisms, Models, and More, Worcester, MA.

- **Oral presentation.** “*Moving beyond Mindfulness: Defining Equanimity as an Outcome Measure in Meditation Research*”, Center for Mindfulness, Worcester, MA.
- **Oral presentation.** “*Moving beyond Mindfulness: Defining Equanimity as an Outcome Measure in Meditation Research*”, International Symposium for Contemplative Studies, Boston, MA.
- **Oral presentation.** “*Health & Stress Evaluation of Young Adults – A Long-term Opportunistic Follow-up Assessment of Mindfulness Training in School Children*”, International Symposium for Contemplative Studies, Boston, MA.
- **Oral presentation.** “*Potential Self-regulatory mechanisms of yoga for psychological health*”, International Symposium for Contemplative Studies, Boston, MA.

## 2015

- **Oral presentation.** “*Foundational Issues in Cognitive Science from Contemporary Scientific and Buddhist Perspectives*”. Mind and Life XXVIII with His Holiness, the Dalai Lama, Serra Monastery, Bylakuppe, India.
- **Workshop Leader.** “*Mindfulness and Compassion Training: Science and Clinical Practice*”, All-day mandatory training workshop for Harvard Longwood Psychiatry residents, with Sonia Matwin, Ph.D., Randal Paulsen, M.D., and Christopher Germer, Ph.D.
- **Oral presentation.** “*Neural Mechanisms and Predictors of Expertise in Open Monitoring Meditation*”, Advances in Meditation Research, Memorial Sloan Kettering and New York Academy of Sciences
- **Invited Keynote.** “*The Resting Brain in Experienced Meditators: Mapping Modalities of Quiescence*”, Consciousness, Mindfulness, & Compassion International Association Conference, San Francisco State University
- **Oral presentation.** “*Brain, Mind & Soul: Advances in Clinical & Scientific Approaches to Brain-Mind Health & Spirituality*”, 4<sup>th</sup> Annual Conference on Medicine and Spirituality, Cambridge, MA
- **Oral presentation.** “*Mechanisms of Mind-Body Medicine in Cardiovascular Health*”, Osher Center for Integrative Medicine, Mind-Body and Cardiovascular Health
- **Oral presentation.** “*Neurocognitive Substrates and Mechanisms of Mindfulness Meditation*”, Conference on Medicine and Religion, Cambridge, MA

## 2016

- **Grand Rounds.** “The Neurobiology of Mindfulness and Clinical Implications”. Physical Medicine & Rehabilitation, Vanderbilt University Medical Center
- **Invited Keynote.** “[The Neurobiology of Mindfulness and Clinical Relevance](#)”. Launching SUNY Initiatives in Mindfulness and Health, State University of New York (SUNY) Conversations in the Disciplines Grant, Western New York Contemplative Faculty & Staff Group, Buffalo, NY
- **Invited Keynote.** “Foundational Issues in the Basic Neuroscience and Clinical Science of Mindfulness”. Brigham Young University, Neuroscience Research Program, Provo, UT
- **Invited Keynote.** “[Mapping the Meditative Mind: Exploring the Neural Substrates of Mindful Awareness Across the Spectrum of Expertise](#)”, MD Anderson Cancer Center, Houston, TX

## 2017

- **Oral presentation.** “Common Pathways for Fronto-striatal-limbic Functioning: States of Meditation and Psychopathology”. Vanderbilt Institute for Imaging Science, Vanderbilt University Medical Center, February, 2017
- **Oral presentation.** “The Neurobiology of Mindfulness and Clinical Implications”. Tennessee Psychological Association Annual Convention, Nashville Airport Marriott, November, 2017
- **Oral presentation.** “Mapping the Meditative Mind: Neural substrates for Modalities of Awareness”. Seminars in Neuroscience: Brain, Mind, and Society, Brain Research Institute, Vanderbilt University, December, 2017
- **Grand Rounds.** “The Neurobiology of Mindfulness and Clinical Implications”. Psychiatry & Behavioral Sciences, Vanderbilt University Medical Center, December, 2017

## 2018

- **Oral presentation.** “Targeting Self-Regulatory Mechanisms in Mindfulness-based Interventions”, Bravenet meeting, San Diego, CA, April, 2018
- **Oral presentation.** “Neuroscience of Compassion: Multi-dimensional Construct and Integrative Health Skill”. International Congress on Integrative Medicine and Health, May, 2018

- **Oral presentation.** “The Effects of Mindfulness on Pain: Present & Future Prospects for Research and Clinical Application”. International Congress on Integrative Medicine and Health, May, 2018
- **Poster presentation.** Hadash Y, Plonsker R, **Vago DR**, Bernstein A. Experiential Self-Referential and Selfless Processing in Mindfulness and Mental Health: Conceptual Model and Implicit Measurement Methodology. Paper presented at: International Conference on Mindfulness (ICM), July 2018; Amsterdam, Netherlands.
- **Oral presentation.** **Vago, DR**, Matwin, S. The Third Wave of Cognitive and Behavioral Therapies: Science and Practice of Mindfulness, Tennessee Psychological Association Annual Convention, November, 2018
- **Oral presentation.** “What Do We Know & Where Should We Go? A Critical Discussion on the Science of Mindfulness & Meditation”. Panel Discussion with Tania Singer, PhD, Richard J. Davidson, PhD, Yuval Hadash, PhD, and Amit Bernstein, International Symposium for Contemplative Research, Phoenix, AZ, November, 2018
- **Oral presentation.** “Cognitive Mechanisms and Effects of Mindfulness”. Group paper session with Arnaud Delorme, PhD, Yuval Hadash, PhD, and Amit Bernstein, International Symposium for Contemplative Research, Phoenix, AZ, November, 2018

2019

- **Oral presentation.** “Cognitive, psychosocial, and neurobiological mechanisms of mindfulness”, *Mechanisms of Meditation and Consequences for Clinical Practice*, Mind and Life Think Tank, Antonino Raffone, Elena Antonova, Jos Brosschot, Anne Speckens, Heleen Slagter, Philipp Kanske, Judson Brewer, Susan Bogels, Henk Barendregt, Zoltan Dienes, Amber Carpenter, Shaun Gallagher, Thorsten Barnhofer, Brian Ostafin, Leiden, Netherlands, December, 2019

#### Invited Lectures and Talks:

2006

- “Neuroanatomy – Function and Dysfunction”. Dept. of Psychology, Westminster College, Salt Lake City, UT. October, 2006

2007

- “Memory”. Dept. of Psychology, Southern Oregon University. Ashland, OR. February, 2007
- “Neurobiological effects of meditation”. Presbyterian Church, Salt Lake City, UT. May, 2007
- “Mindfulness and Fibromyalgia”. Mind & Life Summer Research Institute, Garrison, NY. June, 2007

2009

- “[Happiness and the Brain](#)”. The Agenda with Steve Paikin, TV Ontario. January, 2009.
- Blogging for Mind and Life XVIII: Attention, Memory & The Mind: A Synergy of Psychological, Neuroscientific, & Contemplative Perspectives with His Holiness the 14<sup>th</sup> Dalai Lama, Dharamsala, India. April 2009. <http://www.mindandlife.org/blog/dharamsala/>
- “The Contemplative Neurosciences”, Mind & Life Summer Research Institute, Garrison, NY. June 2009
- “The Emerging Field of Contemplative Neuroscience”, Department of Psychiatry, Brigham & Women’s Hospital, Harvard Medical School. September, 2009
- “The Neurobiology of Self”, Department of Psychiatry, Massachusetts General Hospital, Harvard Medical School. December, 2009
- “[The Effects of Meditation & Contemplative Practice on Pain](#)”, National Public Radio, Charlotte affiliate WFAE, December, 2009.

2010

- “Effects of Contemplative Practice on Developmental Neuroplasticity”, Department of Psychology, Portland State University. March, 2010
- “The Emerging Field of Contemplative Neuroscience”, Mind & Life Summer Research Institute, Garrison, NY. June 2010.
- “The Neurobiology of Self-representational processes and representation during adolescence and early adulthood: Implications for Contemplative Education”, Mind & Life Summer Research Institute, Garrison, NY. June 2010.
- “[Sustainable Happiness: A dialogue between Science and Contemplative Wisdom](#)”, A public talk with Tibetan Buddhist meditation master, Yongey Mingyur Rinpoche, **David R. Vago, PhD** and Robert Roeser, PhD, Portland, OR. July, 2010.



- “Emerging Neurobiological Models for Mindfulness”, Grand Rounds, Center for Addiction Medicine, Massachusetts General Hospital, Harvard Medical School, November, 2010.
- 2011**
- “[Neurobiological Models for Mindfulness](#)”, Metro-Area Research Group, New York University, January 26, 2012.
  - “Mechanisms of Mindfulness in the context of self-awareness and self-regulation”, Workshop on Meditation and Brain Imaging, Depression Clinical Research Program, Boston, MA, April 2011
  - “The Neurobiology of Self: Helping to Understand the Meditative Mind”, [Meditation & Psychotherapy: Helping Our Patients, Helping Ourselves](#), Harvard Medical School, Department of Continuing Education, offered by Department of Psychiatry, Cambridge Health Alliance Physicians Organization, May, 2011
  - “[Mechanisms of Mindfulness in the context of Self Awareness and Self Regulation](#)”, The Trauma Center, Justice Resource Institute, May, 2011
- 2012**
- “[The Emerging Science of Mindfulness Meditation](#)”, Buddhist Geeks, June, 2012.
  - What is Mindfulness? How Can it Help Me? & How Does it Affect My Brain? Brigham & Women’s Hospital – Psychiatry Outpatient Clinic, September, 2012.
- 2013**
- “Mapping the Meditative Mind: Exploring the Neural Substrates of Mindful Awareness”, Kripalu Center for Yoga and Health, April, 2013
  - “Modalities of Awareness: Neuroscientific and Contemplative Perspectives”, Buddhist Geeks Conference, Boulder, CO, August, 2013.
  - “Mapping the Meditative Mind”, New Dialogues Between Buddhism and Science: Researching the Effects of Meditation and Compassion on Health and Wellbeing, Ligmincha Institute, Virginia, October, 2013
  - “Understanding the Science of Mindfulness”, Harvard Pilgrim Healthcare, November, 2013
- 2014**
- “[The Mogul: Russell Simmons and Cognitive Neuroscientist David Vago](#)”, Rubin Museum, Brainwave Series, March, 2014
  - “The Science of Mindfulness: How Mindfulness-based Meditation Practices Affect the Mind-Brain-Body”, Harvard Development and Alumni Association, March, 2014
  - “Meditation: Connecting Your Brain and Your Health: What is meditation, How does it work, Does It Really Impact Health, Should I try it.”, Brookline Public Library, April, 2014.
  - “Mapping the Meditative Mind: Exploring the Neural Substrates of Mindful Awareness”, Functional and Molecular Neuroimaging Salon, Brigham & Women’s Hospital, Brain Research Institute, May, 2014
  - “Mindfulness: The Science of Settling the Mind for Optimum Health”, CVG Collaborative Medicine Conference (Medtronic), Newport, RI, August, 2014
  - “The Neuroscience of Mindfulness & the Meditative Experience”, Universal Church, Chelmsford, MA, October, 2014
  - “Practical Neuroscience of Mindfulness for Therapists: Dialogue between a Brain Researcher and a Clinician” with Stefan Zora, MD, Private Practice Colloquium, Salem, MA, November, 2014
  - “The Neurobiology of Mindfulness and its Clinical Relevance”, Cambridge Hospital, November, 2014
- 2015**
- “The Science of Mindfulness”, Harvard Health Speaks, Center for Wellness, Harvard University, Cambridge, MA, March, 2015
  - “Science on Screen: Free the Mind”, panel discussion, Real Art Ways, Hartford, CT, March, 2015
  - “[Tantric Obsession](#)”, with [Scott Carney, Rubin Museum](#), Brainwave Series, New York, NY, March, 2015
  - “Mindfulness and Aging”, Aging Successfully, MIT, Cambridge, MA, April, 2015
  - “The Importance of Relating to Self and Others in the Practice of Teaching and Learning”, Mind, Body, Being seminar, Harvard School of Education, Cambridge, MA, April, 2015
  - “Mapping the Meditative Mind: Exploring the Neural Substrates of Mindful Awareness”, Brigham & Women’s Hospital, Research Initiatives Meeting, Department of Psychiatry, Boston, MA, September, 2015
  - “Research on Meditation and its Clinical Applications”, Mind-Body Medicine, Harvard Medical School elective course, October, 2015
  - “Mindfulness Programs: Fad or Way of the Future”, U.S. Institute – HR Director’s Forum, Boston, MA, October, 2015

- “Fatigue and Depression & Mindfulness with Multiple Sclerosis”, Cure Fund, National Patient Education Program with Tarun Singhal, MD, North Attleboro, MA, November, 2015
- “Mapping the Meditative Mind: Exploring the Neural Substrates of Mindful Awareness”, Institute for Noetic Sciences, Future of Meditation Research, Petaluma, CA, November, 2015
- “Mindfulness: Contextualizing it and the Underlying Neurobiology”, Harvard College Health Advocacy Program, Cambridge, MA, December, 2015

## 2016

- “Mapping the Meditative Mind: Exploring the Neural Substrates of Mindful Awareness Across the Spectrum of Expertise”, Osher Center for Integrative Medicine, Vanderbilt University, Nashville, TN, January, 2016.
- “The Neurobiology of Mindfulness and its Clinical Relevance”, with Sonia Matwin, PhD, Cambridge Hospital, February, 2016
- “[Now and Zen: How Mindfulness Can Change Your Brain and Improve Your Health](#)”, Harvard Medical School Longwood Seminars, March, 2016
- “Mapping the Meditative Mind: Exploring the Neural Substrates of Mindful Awareness Across the Spectrum of Expertise”, Mindfulness TN, Knoxville, TN, April, 2016.
- “Neurobiology of Yoga”, online course, yogamedicine.com, October, 2016
- “Neurobiology of Mindfulness & its Clinical Implications”, Department of Physical Medicine & Rehabilitation Grand Rounds, Vanderbilt University Medical Center, November, 2016
- “Short- and Long-term effects of Meditation Practice on the Brain”, Sivananda Yoga Retreat Center, November, 2016

## 2017

- “The Science of Mindfulness”, [Mindwell-U](#) webinar, January, 2017
- “Mapping the Meditative Mind – Neural substrates for Modalities of Awareness”, Vanderbilt Institute for Imaging Science Seminar, February, 2017
- “Targeting the Self in the Brain through Mindfulness-based Meditation”, Vanderbilt Volunteer Services, March, 2017
- “Self-Transformation through Mindfulness”, [Ted-X, Nashville](#), March, 2017
- “A Science of Mindfulness and its Clinical Relevance”, Professional Development in Mindfulness Facilitation, Osher Center for Integrative Medicine, Vanderbilt University, April, 2017
- “Mindfulness Research: Past, Present, and Future”, Invited Keynote. “[MindfulnessTN symposium](#)”, Knoxville, TN, May, 2017
- “Transforming the Self Through Mindfulness”, Invited Keynote, School for Science and Math at Vanderbilt, July, 2017
- “Cultivating Gratitude: Buddhadharma to Contemporary Mindfulness”, Sivananda Yoga Retreat Center, November, 2017
- “Neurobiology of Gratitude and Prosocial Behavior”, Sivananda Yoga Retreat Center, November, 2017
- “Cultivating Gratitude: Buddhadharma to Contemporary Mindfulness”, Sivananda Yoga Retreat Center, November, 2017
- “Dissolving the Self for Sustainable Well-being”, Sivananda Yoga Retreat Center, November, 2017
- “Navigating Academic Life Mindfully: Science and Practice”, Graduate programs in Biomedical Sciences, December, 2017
- “Mapping the Meditative Mind: Neural Substrates for Modalities of Awareness”, Vanderbilt Brain Institute, Neuroscience Seminar Series, December, 2017

## 2018

- “Neuroscience of Mindfulness and its Clinical Relevance”, Vanderbilt School of Nursing, February, 2018
- “Mapping the Meditative Mind: Neural Substrates for Modalities of Awareness”, Molecular Mind Laboratory (MoMiLab), Lucca, IT, March, 2018
- “Mindfulness: The Current Science and Relevance in Clinical, Education, and Corporate Settings”, Invited Keynote, Center for Mindful Living, April, 2018
- “Mindfulness in Leadership: Better leadership through a mindfulness-based orientation towards wellness”, Vanderbilt Leadership Academy, April, 2018
- “Mindfulness: Science and Practice”, Vanderbilt Pediatric ICU, VUMC, Nashville, TN, May, 2018

## 2019

- “The Science of Mindfulness: The Current State of the Field”, Part I and Part II, Professional Development in Mindfulness Facilitation Course, Osher Center for Integrative Medicine, September, October, 2018
- “Neurophysiological Correlates of Meditative Practice in Normal and Clinical Populations”, Vanderbilt University, Department of Psychology, Clinical Brown Bag Series, November, 2018
- “Meditative Practice: Neurophysiological Correlates and Clinical Relevance”, Department of Psychology, Northwestern University, January 2019
- “Mapping the Meditative Mind”, Mind Body Medicine Day, Osher Center for Integrative Medicine, Northwestern University Medical Center, January, 2019
- “Mapping the Meditative Mind: From Clinical Outcomes to Unified Compassion”, [University of Virginia Contemplative Sciences Center](#), April, 2019
- “From Body Awareness to Unified Compassion: Neurophysiology supporting Meditative States and Stages”, Body, Breath & Mind: A Symposium on the Contemplative Sciences, Ligmincha Retreat Center, Virginia, April, 2019
- “Mind and Body Practices for Integrative Health: Science and Practice, Asset Health, Keynote address, May, 2019
- “The Neuroscience of Self-Transformation: Incorporating Mindfulness into the Fabric of Society”, Forum of Living Cities, Moscow, Russia, June, 2019
- “Mechanisms of Mindfulness: What do We Know? And Where Do We Go?” Invited lecture, UCSD Center for Mindfulness, San Diego, CA, July, 2019
- “Self-regulatory Mechanisms of Mindfulness: Mental and Physical Health Implications”, Grand Rounds, Vanderbilt University Medical Center, Department of Physical Medicine and Rehabilitation, Nashville, TN, August, 2019
- “Mind and Body Practices for Integrative Health: Science and Practice, American Academy of Insurance Medicine, Keynote address, September, 2019
- “Meditative Practice: Neurophysiological Correlates and Clinical Relevance”, Grand Rounds, University of Kentucky, Department of Psychiatry, Louisville, KY, October, 2019
- “Mapping the Meditative Mind”, 3-day workshop, Sivananda Yoga Center, Bahamas, October, 2019
- “Self-regulatory Mechanisms of Mindfulness: Mental and Physical Health Implications”, Grand Rounds, Texas Christian University, Department of Psychology and Religion studies, Fort Worth, TX, November, 2019