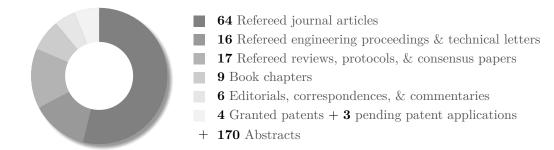
## ZHI-DE DENG

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Last Updated	December 29, 2024	
RESEARCH FOCUS	Noninvasive brain stimulation: Device development, modeling, stimulus parameter and dose optimization, translational and clinical applications	
	Computational electromagnetics	
	Electrophysiological and neuroimaging biomarker development	
	Neural plasticity and translational neuromodeling	
	Nonlinear dynamics of physiological systems	
EDUCATION	Ph.D., Electrical Engineering, Columbia University  2013 Dissertation: Electromagnetic Field Modeling of Transcranial Electric & Magnetic Stimulation: Targeting, Individualization, and Safety of Convulsive & Subconvulsive Applications	
	M.Phil., Electrical Engineering, Columbia University Graduate concentration in Neuroscience	
	M.Eng., Electrical Engineering & Computer Science, MIT  Thesis: Stochastic Chaos and Thermodynamic Phase Transitions: Theory and Bayesian Estimation Algorithms	
	S.B., Electrical Science & Engineering, MIT 2007	
	S.B., Physics, MIT Minor in Economics  2006	
POSTGRADUATE TRAINING & FELLOWSHIP APPOINTMENTS	Research Fellow, National Institute of Mental Health  Noninvasive Neuromodulation Unit  Experimental Therapeutics & Pathophysiology Branch  ✓ Richard J. Wyatt Memorial Fellowship for Translational Research	
	Postdoctoral Associate, Duke University School of Medicine Division of Brain Stimulation & Neurophysiology Department of Psychiatry & Behavioral Sciences	
Professional & Academic Appointments	Staff Scientist, NIMH  Noninvasive Neuromodulation Unit Experimental Therapeutics & Pathophysiology Branch	
	Adjunct Assistant Professor, Duke University School of Medicine2016 – 2024Division of Behavioral Medicine & NeurosciencesDepartment of Psychiatry & Behavioral SciencesNetwork Faculty, Duke Institute for Brain Sciences	
	Medical Instructor, Duke University School of Medicine Division of Brain Stimulation & Neurophysiology Department of Psychiatry & Behavioral Sciences  → Duke Translational Medicine Institute KL2 Fellow	

Nonprofit Leadership	Co-founder & Scientific Advisor Singula Institute	2017 –
RESEARCH ASSISTANTSHIPS	Visiting Graduate Research Assistant, Duke Psychiatry Division of Brain Stimulation & Neurophysiology	010 - 2013
& Internships	Graduate Research Assistant, Columbia Psychiatry Division of Brain Stimulation & Therapeutic Modulation  ✓ Irving Institute for Clinical and Translational Research T32 Fellow	007 - 2010
	Research Assistant, MIT Harvard-MIT Division of Health Sciences & Technology	005 - 2007
	<b>Executive Intern</b> , NewYork-Presbyterian/Weill Cornell Medical Center Department of Anesthesiology	2004
	Internship Coordinator, The New York Times Company Foundation	2003
	Newsroom Technology Intern, The New York Times Company	2002
Awards & Honors	NIMH Director's Award  For outstanding transdisciplinary scientific contributions to advance neuromodula nologies for the study and treatment of psychiatric disorders, NIMH	2024 ation tech-
	Elected Full Member Sigma Xi, The Scientific Research Honor Society	2024
	High Five Award  For excellent preparation for and presentation at the Noninvasive Neuromodulat.  Board of Scientific Counselors review, NIMH	2024 ion Unit's
	Scholar, Advanced Research Institute in Geriatric Mental Health Dartmouth College, supported by grant from NIH (R25MH068502)	023 - 2024
	NIMH Director's Award  For scientific innovation at the interface of computation and psychiatry, NIMH	2019
	Richard J. Wyatt Memorial Fellowship Award for Translational Research NIMH Intramural Research Program	n 2018
	New Investigator Award American Society of Clinical Psychopharmacology	2018
	Early Career Investigator Travel Fellowship Award Society of Biological Psychiatry	2018
	Research Colloquium for Junior Investigators American Psychiatric Association	2018
	Alies Muskin Career Development Leadership Program Anxiety & Depression Association of America	2018
	NARSAD Young Investigator Award Brain & Behavior Research Foundation	2017
	Career Development Institute for Psychiatry Stanford University	2017
	New Investigator Award International Society for CNS Clinical Trials and Methodology	2017
	Certificate for Highly Cited Research  Brain Stimulation, Elsevier	2016

Young Investigator Memorial Travel Award American College of Neuropsychopharmacology	2015
Scholar, Summer Research Institute in Geriatric Mental Health Weill Cornell Medical College, supported by grant from NIH (R25MH019946)	2015
Chair's Choice Award Society of Biological Psychiatry	2014
Innovative Research Poster Award National Network of Depression Centers	2014
Best Abstract Award International Society for ECT and Neurostimulation	2010
Presidential Teaching Award Finalist Columbia University	2010
Student Paper Competition Finalist IEEE Engineering in Medicine and Biology Society	2006
New York Times College Scholarship The New York Times Company Foundation	2002

RESEARCH OUTPUT SUMMARY



REFEREED JOURNAL ARTICLES

- \* Denotes first, joint first, or senior author
  - S. M. McClintock, **Z.-D. Deng**, M. M. Husain, V. J. Thakkar, E. Bernhardt, R. D. Weiner, B. Luber, and S. H. Lisanby, "Comparing the neurocognitive effects of right-unilateral ultrabrief pulse electroconvulsive therapy and magnetic seizure therapy for the treatment of major depressive episode," *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, vol. 10, no. 2, Feb. 2025.

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- N. I. Hasan, M. Dannhauer, D. Wang, **Z.-D. Deng**, and L. J. Gomez, "Real-time computation of brain E-field for enhanced transcranial magnetic stimulation neuronavigation and optimization," *Imaging Neuroscience*, online ahead of print, 2024. 

  PMCID: PMC10635016; DOI: 10.1162/imag\_a\_00412
  - Third Place in Best Student Paper (awarded to N. I. Hasan), Photonics and Electromagnetics Research Symposium, 2024.
- N. Khadka, **Z.-D. Deng**, S. H. Lisanby, M. Bikson, and J. A. Camprodon, "Computational models of high-definition electroconvulsive therapy (ECT) for focal or multitargeting treat-

ment," The Journal of ECT, online ahead of print, 2024.

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B. Luber, L. Beynel, **Z.-D. Deng**, L. G. Appelbaum, T. Jones, A. Harrison, D. L. K. Murphy, E. Lo, R. A. McKinley, and S. H. Lisanby, "Site- and frequency-specific enhancement of visual search performance with online individual alpha frequency (IAF) repetitive transcranial magnetic stimulation (rTMS) to the inferior frontal junction," *Cerebral Cortex*, vol. 34, no. 9, bhae371, Sept. 2024.

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\* M. Dib, J. D. Lewine, C. C. Abbott, and **Z.-D. Deng**, "Electroconvulsive therapy modulates loudness dependence of auditory evoked potentials: A pilot MEG study," *Frontiers in Psychiatry*, vol. 15, 1434434, Aug. 2024.

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- L. Beynel, H. Gura, Z. Rezaee, E. C. Ekpo, **Z.-D. Deng**, J. O. Joseph, P. Taylor, B. Luber, and S. H. Lisanby, "Lessons learned from an fMRI-guided rTMS study on performance in a numerical Stroop task," *PLOS ONE*, vol. 19, no. 5, e0302660, May 2024. 

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- \* B. Kadriu, **Z.-D. Deng**, C. Kraus, J. N. Johnston, A. Figtman, I. D. Henter, S. Kasper, and C. A. Zarate, Jr., "The impact of body mass index on clinical features of bipolar disorder: A STEP-BD study," *Bipolar Disorder*, vol. 26, no. 2, pp. 160–175, Mar. 2024.

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\* P. L. Robins, S. N. Makaroff, M. Dib, S. H. Lisanby, and **Z.-D. Deng**, "Electric field characteristics of rotating permanent magnet stimulation," *Bioengineering*, vol. 11, no. 3, 258, Mar. 2024.

PMCID: PMC10968657; DOI: 10.3390/bioengineering11030258

- Trainee Travel Award (awarded to P. L. Robins), NIMH IRP Fellows' Scientific Training Day, 2023.
- \* Z.-D. Deng, B. Luber, S. M. McClintock, R. D. Weiner, M. M. Husain, and S. H. Lisanby, "Clinical outcomes of magnetic seizure therapy vs electroconvulsive therapy for major depressive episode: A randomized clinical trial," *JAMA Psychiatry*, vol. 81, no. 3, pp. 240–249, Mar. 2024.

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\* C. C. Abbott, J. Miller, D. Farrar, M. Argyelan, M. Lloyd, T. Squillaci, B. Kimbrell, S. Ryman, T. R. Jones, J. Upston, D. K. Quinn, A. V. Peterchev, E. Erhardt, A. Datta, S. M. McClintock, and **Z.-D. Deng**, "Amplitude-determined seizure-threshold, electric field modeling, and electroconvulsive therapy antidepressant and cognitive outcomes," *Neuropsy-chopharmacology*, vol. 49, no. 4, pp. 640–648, Mar. 2024.

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- Third Place in International Student Competition (awarded to W. A. Wartman), Brain & Human Body Modeling Conference, 2023.
- M. Argyelan, **Z.-D. Deng**, O. T. Ousdal, L. Oltedal, B. Angulo, M. Baradits, A. J. Spitzberg, U. Kessler, A. Sartorius, A. Dols, K. L. Narr, R. Espinoza, J. A. van Waarde, I. Tendolkar, P. van Eijndhoven, G. A. van Wingen, A. Takamiya, T. Kishimoto, M. B. Jorgensen, A. Jorgensen, O. B. Paulson, A. Yrondi, P. Péran, C. Soriano-Mas, N. Cardoner, M. Cano, L. van Diermen, D. Schrijvers, J.-B. Belge, L. Emsell, F. Bouckaert, M. Vandenbulcke, M. Kiebs, R. Hurlemann, P. C. R. Mulders, R. Redlich, U. Dannlowski, E. Kavakbasi, M. D. Kritzer, K. K. Ellard, J. A. Camprodon, G. Petrides, A. K. Malhotra, and C. C. Abbott, "Electroconvulsive therapy-induced volumetric brain changes converge on a common causal circuit in depression," *Molecular Psychiatry*, vol. 29, no. 2, pp. 229–237, Feb. 2024. 

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- C. Kraus, A. Kautzky, V. Watzal, A. Gramser, B. Kadriu, Z.-D. Deng, L. Bartova, C. A. Zarate, Jr., R. Lanzenberger, D. Souery, S. Montgomery, J. Mendlewicz, J. Zohar, G. Fanelli, A. Serretti, and S. Kasper, "Body mass index and clinical outcomes in individuals with major depressive disorder: Finding from the GSRD European Multicenter Database," Journal of Affective Disorder, vol. 335, pp. 349–357, Aug. 2023.

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- M. Alawi, P. F. Lee, **Z.-D. Deng**, Y. K. Goh, and P. E. Croarkin, "Modelling the differential effects of age on transcranial magnetic stimulation induced electric fields," *Journal of Neural Engineering*, vol. 20, no. 2, 026016, Mar. 2023.

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\* S. N. Makaroff, H. Nguyen, Q. Meng, H. Lu, A. R. Nummenmaa, and **Z.-D. Deng**, "Modeling transcranial magnetic stimulation coils with magnetic cores," *Journal of Neural Engineering*, vol. 20, no. 1, 016028, Jan. 2023.

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S. Qi, V. D. Calhoun, D. Zhang, J. Miller, **Z.-D. Deng**, K. L. Narr, Y. Sheline, S. M. McClintock, R. Jiang, X. Yang, J. Upston, T. Jones, J. Sui, and C. C. Abbott, "Links between electroconvulsive therapy responsive and cognitive impairment multimodal brain networks in late-life major depressive disorder," *BMC Medicine*, vol. 20, no. 1, 477, Dec. 2022. 

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A. Richie-Halford, M. Cieslak, L. Ai, S. Caffarra, S. Covitz, A. R. Franco, I. I. Karipidis, J. Kruper, M. Milham, B. Avelar-Pereira, E. Roy, V. J. Sydnor, J. D. Yeatman, The Fibr Community Science Consortium [including **Z.-D. Deng**], T. D. Satterthwaite, and A. Rokem, "An analysis-ready and quality controlled resource for pediatric brain white-matter research," *Scientific Data*, vol. 9, no. 1, 616, Oct. 2022.

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- N. L. Balderston, J. C. Beer, D. Seok, W. Makhoul, Z.-D. Deng, T. Girelli, M. Teferi, N. Smyk, M. Jaskir, D. J. Oathes, and Y. I. Sheline, "Proof of concept study to develop a novel connectivity-based electric-field modelling approach for individualized targeting of transcranial magnetic stimulation treatment," Neuropsychopharmacology, vol. 47, no. 2, pp. 588–598, Jan. 2022.

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S. H. Lisanby, S. M. McClintock, W. V. McCall, R. G. Knapp, C. M. Cullum, M. Mueller, **Z.-D. Deng**, A. A. Teklehaimanot, M. V. Rudorfer, E. Bernhardt, G. Alexopoulos, S. H. Bailine, M. C. Briggs, E. T. Geduldig, R. M. Greenberg, M. M. Husain, S. Kaliora, V. Latoussakis, L. S. Liebman, G. Petrides, J. Prudic, P. B. Rosenquist, S. Sampson, K. G. Tobias, R. D. Weiner, R. C. Young, C. H. Kellner, Prolonging Remission in Depressed Elderly (PRIDE) Work Group, "Longitudinal neurocognitive effects of combined electroconvulsive therapy (ECT) and pharmacotherapy in major depressive disorder in older adults: Phase 2 of the PRIDE study," *American Journal of Geriatric Psychiatry*, vol. 30, no. 1, pp. 15–28, Jan. 2022.

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# SELECTED ABSTRACTS (PRIOR 3 YEARS)

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### INTELLECTUAL PROPERTY

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### NIH Protocols

A feasibility study of Transcranial Electric Stimulation Therapy (TEST) for treatment resistant depression

NIMH Protocol 21-M-0031

2021 -

Role: Associate investigator; PI: S. H. Lisanby

Role of GABAergic transmission in auditory processing in Autism Spectrum Disorder NIMH Protocol 20-M-0159

Role: Associate investigator; PI: S. H. Lisanby

Safety and feasibility of individualized low amplitude seizure therapy

NIMH Protocol 19-M-0073

2019 -

2020 -

Role: Associate investigator; PI: S. H. Lisanby

Mechanism of action underlying ketamine's antidepressant effects: An investigation of the AMPA throughput theory in patients with treatment-resistant major depression

NIMH Protocol 19-M-0107

2019 -

Role: Associate investigator; PI: C. A. Zarate, Jr.

 $Concurrent\ fMRI$ -guided rTMS and  $cognitive\ therapy\ for\ the\ treatment\ of\ major\ depressive\ episodes$ 

NIMH Protocol 17-M-0147

2017 -

Role: Associate investigator; PI: S. H. Lisanby

Development of non-invasive brain stimulation techniques

NIMH Protocol 18-M-0015

Role: Associate investigator; PI: S. H. Lisanby

2017 -

Development of functional and structural magnetic resonance imaging techniques for the study of mood and anxiety disorders

NIMH Protocol 07-M-0021

2017 -

Role: Associate investigator; PI: A. C. Nugent

Identifying neurobiological mechanisms that underlie acute nicotine withdrawal and drive early relapse in smokers

NIDA Protocol 12-DA-N474

2017 -

Role: Associate investigator; PI: A. Janes

Neuropharmacologic imaging and biomarker assessments of response to acute and repeateddosed ketamine infusions in major depressive disorder

NIMH Protocol 17-M-0060

2016 -

Role: Associate investigator; PI: C. A. Zarate, Jr.

Evaluation of patients with mood and anxiety disorders and healthy volunteers

NIMH Protocol 01-M-0254

2016 -

Role: Associate investigator; PI: C. A. Zarate, Jr.

Modulation of the parieto-frontal communication

NINDS Protocol 18-N-0054

2018 - 2019

Role: Associate investigator; PI: M. Hallett

Effect of TMS to frontoparietal attention network on anxiety potentiated startle

NIMH Protocol 17-M-0042

2017 - 2019

Role: Associate investigator; PI: C. Grillon

ONGOING RESEARCH SUPPORT ADEPT: Adaptive trial for the treatment of depression associated with concussion using repetitive transcranial magnetic stimulation protocols

Congressionally Directed Medical Research Programs Award TP220072

2024 -

Role: Intramural NIH collaborator; PI: D. L. Brody

This study aims to compare different types of TMS that may alleviate depressive symptoms in US military service members with a history of concussion.

Charge-based brain modeling engine with boundary element fast multipole method

NIH/NIMH R01 MH130490

2023.07 - 2028.05

Role: Intramural NIH collaborator; PI: S. N. Makaroff

This project seeks to create a new brain modeling engine that employs boundary element and fast multipole methods to achieve superior spatial resolution and accuracy in electromagnetic modeling.

Novel electric-field modeling approach to quantify changes in resting state functional connectivity following theta burst stimulation

NIH/NIMH U01 MH130447

2022.09 - 2027.06

Role: Intramural NIH collaborator; PI: N. L. Balderston

This study aims to develop a model using whole-brain estimates of the TMS-induced electric field to predict changes in resting state functional connectivity following neuro-modulatory TMS, and validate this model in a large cohort of healthy volunteers receiving multiple doses of either intermittent or continuous theta burst stimulation.

Development of a novel, scalable, neurobiologically-guided transcranial magnetic stimulation protocol for the treatment of cannabis use disorder

Centre for Addiction and Mental Health, Toronto, ON, Canada

2023.02 -

Role: Consultant; PI: V. M. Tang

This proof-of-concept clinical trial will evaluate the feasibility and tolerability of a 4-week

course of rTMS to the prefrontal cortex and insula as a treatment for cannabis use disorder.

Deciphering mechanisms of ECT outcomes and adverse effects (DECODE)

NIH/NIMH R01 MH128686/MH128690/MH128691/MH128692

2022.08 - 2027.05

Role: Intramural NIH collaborator; mPIs: Y. I. Sheline, K. L. Narr, R. Espinoza, S. M. McClintock, C. C. Abbott

This multi-site prospective study aims to study the mechanism of ECT-induced antidepressant benefits and cognitive adverse effects to determine optimal ECT dose.

ECT amplitude titration for improved clinical outcomes in late-life depression

NIH/NIMH R61/R33 MH125126

2021.02 - 2023.01

Role: Intramural NIH collaborator; PI: C. C. Abbott

This study uses titrated amplitude ECT, individualized based on seizure threshold, to improve clinical response while minimizing cognitive impairment in geriatric depression.

 $Neuromodulation\ of\ social\ cognitive\ circuitry\ in\ people\ with\ schizophrenia\ spectrum\ disorders\\ NIH/NIMH\ R61/R33\ MH120188 \\ 2020.05-2023.04$ 

Role: Intramural NIH collaborator; mPIs: A. N. Voineskos, D. M. Blumberger

This study uses advanced brain imaging, and compare different brain stimulation techniques, to determine whether targeting the dorsomedial prefrontal cortex can engage social cognitive brain circuitry in people with schizophrenia spectrum disorders.

PENDING RESEARCH SUPPORT Improving ECT clinical outcomes through seizure- and model-guided stimulation parameters NIH UH3/UG3 2024.10

Role: mPI; collaborating PIs: C. C. Abbott, A. Datta

Development of high-density theta burst TMS technology and initial testing in humans

NIH UH3/UG3

Role: Intramural NIH collaborator; PI: H. Lu

Improving the optimization of TMS coil placement with precise calculation of electric fields and robust computation of personalized functional networks

NIH/NIMH R01 2024.10

Role: Intramural NIH collaborator; PI: Y. Fan

Targeting the causal depression network with electroconvulsive therapy

NIH/NIMH R33/R61

Role: Intramural NIH collaborator; PI: M. Argyelan

Development of a next generation ECT system: PRecision Optimally Targeted ECT

NIH/NIMH UG3/UH3 2024.06

Role: Intramural NIH collaborator; PI: C. C. Abbott

COMPLETED RESEARCH SUPPORT

ECT pulse amplitude and medial temporal lobe engagement

NIH/NINDS U01 MH111826

2016.09 - 2020.07

2024.09

2024.02

Role: Co-I; PI: C. C. Abbott

This study explores the impact of targeted hippocampal engagement with varying levels of electroconvulsive therapy current amplitude in elderly patients with clinical, neuropsychological and neuroimaging assessments.

Individualized low amplitude seizure therapy (iLAST)

Brain & Behavior Research Foundation Young Investigator Award 26161 2018.06 – 2020.06 Role: PI

This study aims to develop a novel form of seizure therapy for depression that avoids the neurocognitive side effects of electroconvulsive therapy by using computational modeling to direct multi-electrode configurations that provide targeted and individualized dosing.

Fast-Fail Trials: Mood and Anxiety Spectrum Disorders (FAST-MAS)

NIMH 271201200006I-3-27100003-1

2016.06 - 2017.12

Role: Data analyst; PI: A. D. Krystal

The goal of this project is to establish the kappa opiate receptor occupancy and mu opiate

receptor effects after two weeks of daily dosing with the investigational agent LY2456302, which has been demonstrated to be a selective kappa opiate receptor antagonist.

Transcranial direct current stimulation as a treatment for acute fear

NIH/NIMH R21 MH106772

2015.04 - 2017.01

Role: Co-I; PI: A.D. Krystal

This study investigates the utility of transcranial direct current stimulation to engage a target neural circuit, which could serve as the basis for developing better therapies for those suffering from acute fear related difficulties.

Individualized optimally-targeted seizure therapy

NIH/NCATS KL2 TR001115

2014.07 - 2016.06

Role: PI; Training Grant PI: R. M. Califf

This award from the Duke Translational Medicine Institute prepares the fellow for a successful career as a multidisciplinary independent researcher. The goal of the project is to develop a novel individualized neurotargeted seizure therapy.

Safety and feasibility of low amplitude electroconvulsive therapy

Duke University School of Medicine, Pilot fund

2015.03 - 2016.06

Role: PI

This study evaluates whether neurocognitive side effects of electroconvulsive therapy can be improved by reducing the current pulse amplitude.

Prolonging Remission In Depressed Elderly (PRIDE)

NIH/NIMH U01 MH084241

2009.04 - 2016.03

Role: Data analyst; PI: S. H. Lisanby

This study evaluates the efficacy and neurocognitive effects of combined electroconvulsive and pharmacotherapy in prolonging remission in elderly patients with major depression.

Low field magnetic stimulation coil design

Tal Medical

2015.04 - 2016.06

Role: Co-I; PI: A. V. Peterchev

This project develops a novel coil system for low field magnetic stimulation.

Concurrent cognitive behavioral therapy and transcranial magnetic stimulation in obsessive-compulsive disorder

American Psychiatric Association Research Scholarship

2015.11 - 2016.06

Role: Acting PI; Grantee: Y. Hu

The purpose of this pilot study is to evaluate the feasibility of repetitive transcranial magnetic stimulation of the supplementary motor area concurrently with elements of exposure and response prevention in patients with obsessive-compulsive disorder.

 $\label{lem:eq:control} Evoked\ potentials\ as\ markers\ of\ ketamine-induced\ cortical\ plasticity\ in\ patients\ with\ major\ depressive\ disorder$ 

Janssen Research & Development, LLC

2014.01 - 2015.12

Role: Co-I; PI: A. D. Krystal

This open-label trial evaluates the utility of somatosensory, motor, and transcranial magnetic stimulation-based evoked potentials as markers of cortical plasticity in response to a single intravenous infusion of ketamine in patients with depression.

Magnetic seizure therapy for the treatment of depression

Stanley Medical Research Institute

2005.07 - 2011.07

Role: Postdoctoral fellow; PI: S. H. Lisanby

This two-center, randomized, double-blind controlled trial compares the antidepressant efficacy and side effects of magnetic seizure therapy and electroconvulsive therapy.

Translational research evaluating neurocognitive memory processes

NIH/NIMH K23 MH087739

2010.07 - 2015.01

Role: Postdoctoral fellow; PI: S. M. McClintock

This study informs the cognitive component processes underlying memory impairment

after electroconvulsive the rapy.  $\,$ 

	Rational dosing for electric and magnetic seizure therapy NIH/NIMH R01 MH091083 Role: Graduate research assistant, contributed to grant writing; PI: S. I This study aims to optimize stimulus parameters of electric and magnet through computational modeling and preclinical studies of seizure induces	tic seizure the	
	Field shaping and coil design for transcranial magnetic stimulation NIH/NCRR TL1 RR024158 Role: PI; Training Grant PI: H. N. Ginsberg This award from the Columbia University Irving Institute for Clinical Research supports clinical research training for predoctoral students in The goal of the project is to develop novel coil design for transcranial mag	the basic scie	tional ences.
	Development of a novel TMS device with controllable pulse shape NIH/NIBIB R21 EB006855 Role: Graduate research assistant; PI: A. V. Peterchev This project develops an efficient transcranial magnetic stimulation dev nearly rectangular pulses with adjustable amplitude, width, and direction		
	Nonlinear analysis of heart rate variability NIH/NHLBI R01 HL079503 Role: Graduate research assistant; PI: CS. Poon This project develops advanced nonlinear estimation and adaptive cont the modeling and analysis of the cardiovascular system.	2005.11-20 crol algorithm	
Grand Rounds	Advanced Research Institute Grand Rounds in Mental Health and Aging I Advancing neurostimulation treatment optimization and technology inno		2023
	Westmead Hospital, Sydney, Australia  Advances in neuromodulation: Electroconvulsive therapy		2020
	Clinical TMS Society Transcranial magnetic stimulation: Physics, devices, and modeling		2018
	University of New Mexico, Department of Psychiatry & Behavioral Science Toward individualized electroconvulsive therapy for treatment of depress		2017
	Central Regional Hospital, Butner, NC Individualized seizure therapy		2015
	Duke University School of Medicine, Department of Psychiatry & Behavior Toward next generation seizure therapy	ral Sciences	2015
Invited Seminars	NIMH Intramural Research Program Investigators' Seminar Series  Reading faces: Using facial expression analysis to track emotional states	Upcoming s in depression	
	UCSF Department of Psychiatry & Behavioral Sciences  Engineering precision in neuromodulation: Computational models and cl	Upcoming linical applications	
	University of Pittsburgh, Geriatric Psychiatry Neuroimaging Laboratory  The full spectrum: Electromagnetic brain stimulation from minimal to re-	$naximal\ inter$	$2024 \\ nsity$
	University of Texas Southwestern, Center for Depression Research and Clin Advancements in computational neurostimulation for depression treatment technology development		2023 zation
	University of Pittsburgh, Department of Psychiatry  Computational neurostimulation: Treatment optimization and technolog	y developmer	2023 $nt$
	MUSC National Center of Neuromodulation for Rehabilitation		2022

Moc	del-driven design for brain stimulation therapies 🖺	
	Intramural Research Program Investigators' Seminar Series zure therapies: The next generation	2022
	Hospital, Brown University nputational model driven design for brain stimulation	2021
	rsity of Pennsylvania, Center for Neuromodulation in Depression and Stress extromagnetic brain stimulation from low to high intensity	2021
Harvai	ston Healthcare System, Boston University School of Medicine rd Medical School Neuropsychiatry Translational Research Fellowship Seminar cision neurostimulation: History, physics, computational modeling, and engineeri	2020 $ng$
	al University of Vienna, Neuroimaging Lab cision seizure therapy	2020
	Sinai Icahn School of Medicine, Depression and Anxiety Center sional design of individualized noninvasive brain stimulation	2019
	Intramural Research Program Investigators' Seminar Series  nputational neurostimulation: Engineering better brain stimulation therapies	2018
	Brain Mapping Center nputational neurostimulation: Engineering better brain stimulation therapies	2018
Neuro	Semel Institute for Neuroscience and Human Behavior modulation Division deling and design for magnetic stimulation	2018
	Mark and Mary Stevens Neuroimaging and Informatics Institute inputational neurostimulation	2018
	Neuroimaging Research Branch vances in transcranial magnetic stimulation technology	2016
Neurol	Clinic College of Medicine, Department of Molecular Pharmacology biology of Alcoholism and Drug Addiction Lab anscranial magnetic stimulation technology development	2016
Neural	Clinic College of Medicine, Department of Neurologic Surgery l Engineering Lab timizing transcranial magnetic stimulation	2016
	, Experimental Therapeutics & Pathophysiology Branch gineering better electromagnetic brain stimulation therapies	2016
	University School of Medicine, Department of Psychiatry & Behavioral Sciences air's round: Fundamentals of transcranial electric and magnetic stimulation dosin	2015 g
	Cornell Medical College, Department of Biomedical Engineering inscranial magnetic stimulation: Pulse source, coil design, & concurrent neuroima	2015 $aging$
	University, Department of Biomedical Engineering deling and coil design considerations for transcranial magnetic stimulation	2014
	ational Society for ECT and Neurostimulation Annual Meeting Upcoming ltichannel Individualized Stimulation Therapy	2025
Par Cor	can Neuropsychiatric Association Annual Meeting Upcoming nel: Interventional neuropsychiatry: From mechanisms to clinical decision-making ntributed talk: Advancing personalized seizure therapy: Magnetic seizure therapy ltichannel Individualized Stimulation Therapy	•

CONFERENCE TALKS, WORKSHOPS, & PANELS

	ning 2025
Symposium: ECT reimagined: Precision, prediction, and personalized care Contributed talk: Multichannel Individualized Stimulation Therapy (MIST): A approach to optimize electroconvulsive therapy	l targeted
IEEE Brain Discovery & Neurotechnology Workshop, University of Illinois Chicago A model-driven approach to personalized neuromodulation treatment	2024
$\label{lem:condition} \begin{tabular}{l} International Symposium on Novel Neuromodulation Techniques \\ \textit{Model-driven brain stimulation treatments} \end{tabular}$	2024
NIMH Workshop on The Placebo Effect: Key Questions for Translational Research Challenges and strategies in implementing effective sham stimulation for noninvastimulation trials	
International Society for Magnetic Resonance in Medicine Annual Meeting Workshop: From basics to applications: MRI of neuromodulation using TMS an Contributed talk: TMS devices and modeling	2024 d FUS
Brain and Human Body Modeling Conference The Martinos Center for Biomedical Imaging, Massachusetts General Hospital Chair: New modeling methods and targets: Spinal cord stimulation and novel sti Chair: Development and assessment of modeling methods Contributed talk: Effects of low intensity magnetic stimulation	2023 mulation
International Conference of the IEEE Engineering in Medicine and Biology Society Panel: Computational analysis of non-invasive neuromodulation: Brain and spir Contributed talk: Modeling of TMS and ECT in the treatment of depression	
ADAA Anxiety and Depression Conference Panel: Parsing through syndromic heterogeneity in youths with mental illness to neurocircuit mechanisms and develop novel treatments Contributed talk: Modeling and dose optimization for TMS and ECT	2023 o identify
International Brain Stimulation Conference Symposium chair: Insights and challenges in preclinical models of TMS: Multivestigations across animal species Symposium chair: Advanced computational modeling and optimization methods for vasive brain stimulation	
International Network of tES-fMRI (INTF) Webinar Series  Electric field modeling and optimization approaches for individualized targeting	2022
International Society for Magnetic Resonance in Medicine Workshop: MRI of neuromodulation: Target engagement, neural mechanism, marker development Contributed talk: Modeling of TMS	$\begin{array}{c} 2022 \\ and \ bio- \end{array}$
Bergen Workshop of the Global ECT–MRI Collaboration $ECT$ device development $\Box$	2022
International Congress of Clinical Neurophysiology Chair: Towards optimized TMS targeting approaches	2022
Brain and Human Body Modeling Conference The Martinos Center for Biomedical Imaging, Massachusetts General Hospital Chair: Modeling of transcranial electrical stimulation and deep brain stimulation Contributed talk: ECT, electric field, neuroplasticity, and clinical outcomes	2022
European Conference of Brain Stimulation in Psychiatry Panel: Beyond clinical syndromes: Understanding mechanisms of neuromodulation dimensional perspective Contributed talk: Symptom dimensions and response trajectories in ECT and M.	

Society of Biological Psychiatry Annual Meeting Panel: Dimensional approaches to device neuromodulation Contributed talk: Depressive symptom dimensions in seizure therapy	2022
Global ECT–MRI Collaboration Young Researchers Collective ECT, electric field, neuroplasticity, and clinical outcomes	2022
American Academy of Child and Adolescent Psychiatry Annual Meeting Panel: Recent work with contemporary computational methods and artificial intellig advance the practice of child and adolescent psychiatry Contributed talk: Introduction to computational psychiatry	2021 gence to
European College of Neuropsychopharmacology Congress Panel: Neurobiology of rapid mood changes Contributed talk: Precision neurostimulation: Electroconvulsive therapy	2021
Society for Brain Mapping & Therapeutics Annual Congress Advances in electroconvulsive therapy for treatment of depression	2021
American Society of Clinical Psychopharmacology Annual Meeting Early Career Workshop: <i>How to give a virtual talk</i>	2021
International College of Neuropsychopharmacology Virtual World Congress  Next generation seizure therapy and neuromodulation	2021
European Conference of Brain Stimulation in Psychiatry Panel: What can we learn from ECT: Insights from the GEMRIC consortium Contributed talk: Electric field modeling to inform ECT dosing and device develop	2020 $pment$
University of Minnesota Non-Invasive Brain Stimulation Workshop Use of individual electric field models in clinical research	2020
American Society of Clinical Psychopharmacology Annual Meeting Panel: New developments in neurostimulation $\#$ coronacancelled	2020
NYC Neuromodulation Online Discussant: Noninvasive vagus nerve stimulation applied to stress management, withdrawal, and neurocognitive disorders	2020 $opioid$
American College of Neuropsychopharmacology Annual Meeting Panel: Precision neurostimulation for treatment of psychiatric disorders Contributed talk: Rational design of precision seizure therapy	2019
International Symposium on Advancing Stimulation Precision Medicine of Brain Dis Copenhagen University Hospital Hvidovre, Danish Research Centre for Magnetic Res Rational design of precision seizure therapy	
International College of Neuropsychopharmacology Meeting Workshop: Neurobiological and clinical characterization, and treatment developm treatment resistant depression Contributed talk: Individualized seizure therapy: Reinventing ECT	2019 nent for
American Society of Clinical Psychopharmacology Annual Meeting Co-chair: Treatment-resistant mood disorders across the lifespan: Novel therapeuti	2019 cs
International Brain Stimulation Conference Panel: Individualized brain stimulation: Addressing heterogeneity across modalities Contributed talk: Individualized electroconvulsive therapy for treatment of depressing	
Bergen Workshop of the Global ECT–MRI Collaboration Electric field modeling for electroconvulsive therapy	2018
Joint NYC Neuromodulation Conference & NANS Summer Series Optimizing high-density stimulation arrays for brain targeting	2018

Neuropsychiatric Drug Development Summit  Targeted intermittent device delivered interventions will ultimately prove tenance treatment with drugs for brain disorders	2018 superior to main-
International Conference of the IEEE Engineering in Medicine and Biolog Chair: Computational human models for brain stimulation Contributed talk: Electric field induced by TMS: Applications in depres	·
American Psychiatric Association Annual Conference Presidential symposium: ECT in the era of new brain stimulation treat Contributed talk: Individualized neurotargeted seizure therapy: Reinven	
ADAA Anxiety and Depression Conference Panel: Personalized medicine for treatment resistant depressed patients to optimize treatment with antidepressant medications, ketamine, and E Contributed talk: Individualized neurotargeted seizure therapy: Reinven	ECT
NIMH Non-Invasive Brain Stimulation Electric Field Modeling Workshop Use of individual electric field models in clinical research	2017
NYC Neuromodulation Conference  Low field magnetic stimulation	2017
NIMH Workshop on Transcranial Electrical Stimulation: Mechanisms, Techapeutic Applications  Effect of anatomical variability on electric field characteristics of tES	nnology, and Ther- 2016
International Society for ECT and Neurostimulation Annual Meeting Workshop: Spatial targeting with transcranial magnetic stimulation	2015
International Conference of the IEEE Engineering in Medicine and Biolog TMS in the presence of deep brain stimulation implants: Induced electric ECT in the presence of deep brain stimulation implants: Electric field expressions and the presence of the IEEE Engineering in Medicine and Biolog TMS in the presence of the IEEE Engineering in Medicine and Biolog TMS in the presence of the IEEE Engineering in Medicine and Biolog TMS in the presence of the IEEE Engineering in Medicine and Biolog TMS in the presence of the presence of the IEEE Engineering in Medicine and Biolog TMS in the presence of the pre	ode currents
Annual National Predoctoral Clinical Research Training Program Meeting Coil design for deep-brain transcranial magnetic stimulation	2009
TRANSFORM Research Day, Irving Institute for Clinical and Translation Electromagnetic field shaping and coil design for transcranial brain stim	
International Conference of the IEEE Engineering in Medicine and Biolog Coil design considerations for deep brain transcranial magnetic stimular	
Annual Meeting of the Society for Neuroscience  Heart rate variability is more chaotic in REM than NREM sleep in chil	2006
International Conference of the IEEE Engineering in Medicine and Biolog Heart rate variability in pediatric obstructive sleep apnea	y Society 2006
Educational Counselor, MIT	2022 -
Research Mentor, University of Maryland, College Park Fischell Department of Bioengineering Capstone project: Detection of brain-to-brain synchrony for improve	2018-2019 d psychotherapy
Lecturer, NIH	
National Institute of Mental Health  Basic Training Course on Transcranial Magnetic Stimulation  fMRI Course	2020 Summer 2017
National Institute of Neurological Disorders and Stroke	
Clinical Neuroscience Program Lecture Series	2017, 2019

TEACHING & MENTORING APPOINTMENTS

	Facult	y, Duke	University
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Department of Psychology & Neuroscience

Research Independent Study 2016
Matching Undergraduates to Science and Engineering Research Program 2015 – 2016

Biosciences Collaborative for Research Engagement

Department Psychiatry & Behavioral Sciences

Visiting Fellowship in Electroconvulsive Therapy (CME accredited) 2015

Visiting Fellowship in Transcranial Magnetic Stimulation (CME accredited) 2014–2016

### Teaching Assistant, Columbia University

Department of Electrical Engineering

Analog Systems in VLSI (graudate level)
The Digital Information Age

### Recitation Instructor, Columbia University Mailman School of Public Health

Department of Biostatistics

Biostatistics (graduate level)

Fall 2009

Fall 2009

Spring 2010

2015 - 2016

#### Teaching Assistant, MIT

Concourse Program

 $Multivariable \ Calculus$  Fall 2003-2006  $Differential \ Equations$  Spring 2004-2007

SPONSORED THESES G. Asturias, Psychology & Neuroscience, Duke University

2015 - 2017

Q Graduated with Distinction

Undergraduate honors thesis: "Effect of repetitive transcranial magnetic stimulation on the structural and functional connectome in patients with major depressive disorder," *DukeSpace*. HDL: 10161/14299

Post-training position: Medical student, Stanford University School of Medicine

THESIS
EXAMINATION
COMMITTEE
MEMBERSHIP

W. A. Wartman, Electrical & Computer Engineering, Worcester Polytechnic Institute 2024 Ph.D. dissertation: "Adaptive mesh refinement for quasistatic electromagnetic modeling of brain stimulation and recording methods" Sponsor: S. N. Makaroff

Sponsor. S. IV. Makaron

D. Q. Troung, Biomedical Engineering, CUNY City College

Ph.D. dissertation: "Translational modeling of non-invasive electrical stimulation,"

CUNY Academic Works. URL: academicworks.cuny.edu/cc etds theses/774

Sponsor: M. Bikson

CAREER
DEVELOPMENT
AWARD
ADVISORY

S. K. Conroy, M.D., Ph.D., Indiana University School of Medicine 2024 – Project: "Targeting the medial prefrontal cortex with theta burst stimulation to reduce negative self-referential processing in major depression"

S. M. Hare, Ph.D., University of Maryland School of Medicine

NIH/NIMH K01 MH133116

2024 - 2029

2019

Project: "Cognitive and neural correlates of TMS motor intracortical inhibition in schizophrenia"

S. H. Siddiqi, M.D., Brigham & Women's Hospital

NIH/NIMH K23 MH121657

2020 - 2025

Project: "Personalized circuit-based neuromdulation targets for depression"

Sklerman Prize for Exceptional Clinical Research, Brain & Behavior Research Foundation

N. L. Balderston, Ph.D., University of Pennsylvania Perelman School of Medicine NIH/NIMH K01 MH121777 2019-2023

Project: "Examining the mechanisms of anxiety regulation using a novel, sham-controlled, fMRI-guided rTMS protocol and a translational laboratory model of anxiety"

Rieman Prize for Exceptional Clinical Research, Brain & Behavior Research Foundation

RESEARCH	S. Dey, Ph.D., NIMH Visiting Postdoctoral Fellow	2024 -
Fellows & Postdocs	M. Dannhauer, Ph.D., NIMH Research Fellow Post-training position: Assistant Professor, Department of Computer Scient olina University	2022 – 2024 ce, East Car-
GRADUATE	E. Bharti, Ph.D. candidate, NIH Oxford-Cambridge Scholars Program	2024 -
STUDENTS	M. Kshirsagar, M.S., Biomedical Engineering, Duke University Post-training position: Consultant, Deloitte Consulting	2012
Postbacs	P. L. Robins, B.A., NIMH Intramural Research Training Award (IRTA) Fellow NIMH Intramural Research Program Trainee Travel Award First Place in Student Competition, Brain & Human Body Modeling Conference Post-training position: TMS technician, Columbia Associates	2023
	M. R. Hynd, B.S., NIMH IRTA Fellow Post-training position: Ph.D. student, University of North Carolina at Chap	2020 – 2022 pel Hill
	S. Awasthi, B.S., NIMH IRTA Fellow Post-training position: Medical student, Stanford University School of Medi	2018 - 2020 cine
	M. M. Noh, S.B., NIMH IRTA Fellow Post-training position: Medical student, University of Cincinnati College of	$\begin{array}{c} 2018-2019 \\ \text{Medicine} \end{array}$
	J. Thomas, M.S., NIMH IRTA Fellow Post-training position: Program officer, National Academies of Sciences, Eng Medicine	2017-2019 gineering, and
	<ul> <li>M. Velez Afanador, B.S., NIMH IRTA Fellow</li> <li>Quistanding Poster Award, NIH Postbac Poster Day</li> <li>Post-training position: Medical student, Howard University College of Medical</li> </ul>	2016 – 2019 2018 cine
Undergrads	D. T. Weaver, Biology, Duke University Post-training position: M.D./Ph.D. student, Case Western Reserve University	2016 ty
	<ul> <li>E. F. Salgado, Psychology &amp; Neuroscience, Duke University</li> <li>Graduated with Distinction</li> <li>Post-training position: Ph.D. student, Indiana University-Purdue University</li> </ul>	2016  / Indianapolis
	Z. Feng, Biomedical Engineering and Biology, Duke University Post-training position: Medical student, University of Colorado School of M	2015 – 2016 fedicine
	M. L. Glidewell, Biomedical Engineering, Duke University Post-training position: Senior strategy consultant, IBM	2015 - 2016
	W. Lim, Biomedical Engineering, Duke University Post-training position: Medical student, Texas A&M College of Medicine	2015 - 2016
	F. M. Mercer, Gender, Sexuality and Feminist Studies, Duke University Post-training position: Analyst, Morgan Stanley	2015 - 2016
	<ul><li>E. Shinder, Biology, Duke University</li><li>Graduated with Distinction</li><li>Post-training position: Medical student, Stony Brook School of Medicine</li></ul>	2015 - 2016
	<ul> <li>E. P. Vienneau, Biomedical Engineering, Duke University</li> <li>Howard G. Clark Award for Excellence in Research</li> <li>Post-training position: Ph.D. student, Vanderbilt University</li> </ul>	2015 - 2016
	S. H. Lee, Biomedical Engineering, Duke University Post-training position: Manager, Strategy & Operations, Tempus Labs	2015
	R. Shah, Psychology & Neuroscience, Duke University Post-training position: Medical student, Yale School of Medicine	2015

	<ul> <li>J. R. Lilien, Electrical &amp; Computer Engineering, Duke University</li> <li>Walter J. Seeley Scholastic Award</li> <li>Post-training position: Machine learning engineer, Amazon</li> </ul>	2014 - 2016
Interns	M. Dib, Biomedical Engineering, University of Maryland, College Park Supervised as a summer intern at the NIH, provided ongoing mentorshit terms, including advising Capstone design project Post-training position: Medical student, Weill Cornell Medicine	2018 – 2019 ip during academic
	A. L. Halberstadt, Biology and Psychology, Carnegie Mellon University Post-training position: Ph.D. student, Penn State University	Summer 2017
	C. M. Prevost, Biomedical Engineering, Clemson University Post-training position: Medical student, University of South Carolina S	Summer 2015 School of Medicine
	J. V. McCall, Biomedical Engineering, North Carolina State University Post-training position: Ph.D. student, North Carolina State University	Summer 2013
Professional Societies Membership & Service	IEEE, Engineering in Medicine and Biology Society Senior Member Member Student Member	2023 - 2013 - 2023 $2004 - 2013$
	American Society of Clinical Psychopharmacology Member Early Career Committee Technology Committee Technology Task Force	$2019 - \\ 2023 - 2027 \\ 2023 - 2025 \\ 2020 - 2023$
	Biomedical Engineering Society Member	2021-
	American College of Neuropsychopharmacology Associate Member	2023 -
	Anxiety and Depression Association of America Member	2017 - 2018
	International Society for CNS Clinical Trials and Methodology Member	2017 - 2019
	Organization for Human Brain Mapping Member	2014 - 2019
	Society for Industrial and Applied Mathematics Student Member	2008 - 2012
	Society for Neuroscience Student Member	2005 - 2012
	American Physical Society Student Member	2004 - 2009
Editorial	Deputy Editor, Transcranial Magnetic Stimulation	2024-
Roles	Associate Editor, Frontiers in Psychiatry	2022 -
	Sections: Neurostimulation, Neuroimaging Co-Editor on Research Topic: How Does Brain Stimulation Work? Other Putative Mechanisms of Action	
	Review Editor, Frontiers in Psychology Sections: Addictive Behaviors, Consciousness Research	2022 –

2016 - 2022Review Editor, Frontiers in Psychiatry Sections: Neurostimulation, Neuroimaging Guest Associate Editor, Frontiers in Pharmacology: Neuropharmacology 2020 Co-Editor on Research Topic: Neurobiology of Rapid Mood Changes Guest Editor, Physics in Medicine and Biology 2024 Special Issue: Electromagnetic Modeling for Brain Stimulation Ad hoc journal reviewer 2010 -AIP Advances

American Journal of Psychiatry

Asian Journal of Psychiatry

Australasian Physical and Engineering Sciences in Medicine

Biological Psychiatry

BioMedical Engineering OnLine

Brain Sciences

Brain Stimulation

Cerebral Cortex

Chaos. Solitons & Fractals

Clinical EEG and Neuroscience

Clinical Neurophysiology

CNS Spectrums

Computational and Mathematical Methods in Medicine

Computer Methods and Programs in Biomedicine

Cortex

European Psychiatry

Frontiers in Cell and Developmental Biology

Frontiers in Medicine: Intensive Care Medicine and Anesthesiology

Frontiers in Neurology: Applied Neuroimaging Frontiers in Neuroscience: Brain Imaging Methods

IEEE Antennas and Propagation Magazine

IEEE Journal of Electromagnetics, RF, and Microwaves in Medicine and Biology

IEEE Transactions on Biomedical Engineering

IEEE Transactions on Neural Systems & Rehabilitation Engineering

IEEE Transactions on Magnetics

Imaging Neuroscience

Journal of ECT

Journal of Neural Engineering

Journal of Neuroscience Methods

Journal of Psychiatric Research

Jo VE

Medical & Biological Engineering & Computing

Medical Hypotheses

Nature Mental Health

NeuroImage; NeuroImage Clinical

Neuromodulation: Technology at the Neural Interface

Neuroscience Letters

PLOS ONE

Scientific Reports

Translational Psychiatry

Reviewer, Conference Proceedings and Abstract

2008 -

International Conference of the IEEE Engineering in Medicine and Biology Society

IEEE/EMBS International Conference on Neural Engineering

IEEE/EMBS International Conference on Biomedical and Health Informatics

Biomedical Engineering Society Annual Meeting

Grant	Reviewer, NIH BluePrint MedTech Program	2022-
REVIEW PANELS	Ad hoc reviewer, NIH Early Career Reviewer Program Biophysics of Neural Systems Study Section	2021
	Reviewer, Duke Institute for Brain Sciences, Research Incubator Awards	2018, 2021
Conference Organizing	Organizing committee, and judge in student competition Brain and Human Body Modeling Conference	2022 - 2023
Сомміттее	Program review subcommittee American Society of Clinical Psychopharmacology Annual Meeting	2023
	Preconference workshop director, NYC Neuromodulation Conference Workshop: Computational modeling in neuromodulation: Tools for engineers and researchers	2018 s, clinicians,
Community Involvement,	Producer, <i>Psychopharm Today</i> podcast   Hosted by the American Society of Clinical Psychopharmacology	2024 –
OUTREACH, & SCIENCE	NIH Research Workforce Diversity and Equity Outreach Special Interest Group	2023 -
ADVOCACY	Judge, NIMH Training Day Three-Minute Talks competition	2022
	Mental Health Association of Maryland Presentation: Fundamentals of transcranial brain stimulation	2020
	Jewish Social Service Agency Presentation: Basics of brain stimulation devices: What are they and how do	$\begin{array}{c} 2020 \\ they \ work \end{array}$
	Exhibitor, USA Science & Engineering Festival $\#$ coronacancelled	2020
	University of Pennsylvania, Wharton Undergraduate Health Care Club Presentation: Research in mental health treatment	2019
	Judge, MIT Hacking Medicine: DC Grand Hack	2019
	NIH High School Scientific Training and Enrichment Program Presentation: Bioelectricity and brain stimulation	2019
	NIH Take Your Child to Work Day Presentation: How to fool your brain	2019
	UCLA, CruX Neurotech Organization Presentation: Neuromodulation in psychiatry	2019
	University of Pennsylvania, Wharton Undergraduate Health Care Club Presentation: Technology and the future of mental health treatment	2018
	NIH Noninvasive Brain Stimulation Special Interest Group	2017 -
	Judge/Lead Judge, NIH Postbac Poster Day	2017 - 2019
	Innovation Leader, Psychiatry Innovation Lab, American Psychiatric Association	n 2016
	Duke Psychiatry, Mood Disorders Support and Education Group Presentation: Brain stimulation treatments for severe mood disorders Presentation: New frontiers in treatments for mood disorders	2016 2015
	Duke Translational Medicine Institute, Undergraduate Research Society Presentation: $Engineering\ meets\ psychiatry$	2016

PROFESSIONAL DEVELOPMENT & CONTINUING EDUCATION	Mid-Level Leadership Program, NIH	2023
	Diversity and Inclusion Certificate Program, NIH	2021-2022
	Non-invasive Transcranial Brain Stimulation Course, Danish Research Centre f Resonance, Copenhagen University Hospital Hvidovre	For Magnetic 2019
	thm:lemma	2015 - 2016
	Tackling the Challenges of Big Data, MIT Professional Education Program	2015
	Clinical Research Training Program, Duke University	2014 - 2015
	Transcranial magnetic stimulation administration certified, Columbia University Irving Medical Center/New York State Psychiatric Institute 2009	
	Basic Life Support, American Heart Association Recert	ified 2023.07