


# ZHI-DE DENG

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RESEARCH  Noninvasive brain stimulation: technology development, modeling, device safety, translational  
SPECIALTIES and clinical applications

 Computational electromagnetics


 Electrophysiological and neuroimaging biomarker development

 Neural plasticity and translational neuromodeling

 Nonlinear dynamics of physiological systems

EDUCATION **Columbia University** New York, NY

Ph.D., Electrical Engineering 2013


 Dissertation: *Electromagnetic Field Modeling of Transcranial Electric and Magnetic Stimulation: Targeting, Individualization, and Safety of Convulsive and Subconvulsive Applications*

M.Phil., Electrical Engineering 2011

 Graduate concentration in Neuroscience

**Massachusetts Institute of Technology** Cambridge, MA

M.Eng., Electrical Engineering and Computer Science 2007

 Thesis: *Stochastic Chaos and Thermodynamic Phase Transitions: Theory and Bayesian Estimation Algorithms*

S.B., Electrical Science and Engineering 2007

S.B., Physics 2006

 Minor in Economics

PROFESSIONAL **National Institute of Mental Health** Bethesda, MD  
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APPOINTMENTS *Staff Scientist* 2019–

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



*Research Fellow* 2016–2019



































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 Richard J. Wyatt Memorial Fellowship for Translational Research





















	<b>Duke University School of Medicine</b>	Durham, NC
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	Department of Psychiatry & Behavioral Sciences, Division of Behavioral Medicine & Neurosciences	
	<i>Faculty Network Member</i>	2015–2024
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	Department of Psychiatry & Behavioral Sciences, Division of Brain Stimulation & Neurophysiology	
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	Department of Psychiatry & Behavioral Sciences, Division of Brain Stimulation & Neurophysiology, Neurocognitive Research Lab	
	<i>Visiting Graduate Research Assistant</i>	2010–2013
	Department of Psychiatry & Behavioral Sciences, Division of Brain Stimulation & Neurophysiology, Brain Stimulation Engineering Lab	
	<b>Columbia University College of Physicians &amp; Surgeons/New York State Psychiatric Institute</b>	New York, NY
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	Department of Psychiatry, Division of Brain Stimulation & Therapeutic Modulation, Technology Development Lab	
	§ Columbia Irving Institute for Clinical and Translational Research T32 Fellow	
	<b>Harvard–MIT Division of Health Sciences and Technology</b>	Cambridge, MA
	<i>Graduate Research Assistant</i>	2006–2007
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	<i>Undergraduate Research Assistant</i>	2005–2006
	Neurophysiology & Neuroengineering Lab	
NONPROFIT LEADERSHIP	<b>Singula Institute</b>	New York, NY
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INTERNSHIPS	<b>NewYork-Presbyterian/Weill Cornell Medical Center</b>	New York, NY
	<i>Executive Intern</i>	2004
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	<b>The New York Times Company, Inc.</b>	New York, NY
	<i>Internship Coordinator</i>	2003
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	<i>Newsroom Technology Intern</i>	2002


\* Denotes first, joint first, or senior author



- 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*, in press.  
-  First Place in Student Paper Award (awarded to N.I. Hasan), *International Applied Computational Electromagnetics Society Symposium*, 2024.
-  Third Place in Best Student Paper (awarded to N.I. Hasan), *Photonics & Electromagnetics Research Symposium*, 2024.
- 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 ultra-brief pulse electroconvulsive therapy and magnetic seizure therapy for the treatment of major depressive episode," *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, online ahead of print, Feb. 2025.  
- 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 multi-targeting," *The Journal of ECT*, online ahead of print, 2024.  
- 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.  
- M. Teferi, H. Gura, M. Patel, A. Casalvera, K. G. Lynch, W. Makhoul, **Z.-D. Deng**, D. J. Oathes, Y. I. Sheline, and N. L. Balderston, "Intermittent theta-burst stimulation to the right dorsolateral prefrontal cortex may increase potentiated startle in healthy individuals," *Neuropsychopharmacology*, vol. 49, no. 10, pp. 1619–1629, Sept. 2024.  
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- H. Nguyen, C. Q. Li, S. Hoffman, **Z.-D. Deng**, Y. Yang, and H. Lu, "Ultra-high frequency repetitive TMS at subthreshold intensity induces suprathreshold motor response via temporal summation," *Journal of Neural Engineering*, vol. 21, no. 4, 046044, Aug. 2024.  
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- S. K. Kar, A. Agrawal, A. Silva-dos-Santos, Y. Gupta, and **Z.-D. Deng**, "The efficacy of transcranial magnetic stimulation in the treatment of obsessive-compulsive disorder: An umbrella review of meta-analyses," *CNS Spectrums*, vol. 29, no. 2, pp. 109–118, Apr. 2024.  
- \* 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.  
-  Media coverage: *Psychiatric Times*, Feb. 2024. 
- \* P. L. Robins, S. N. Makaroff, M. Dib, S. H. Lisanby, and **Z.-D. Deng**, "Electric field characteristics of transcranial rotating permanent magnetic stimulation," *Bioengineering*, vol. 11, no. 3, 258, Mar. 2024.  
-  NIMH Intramural Research Program 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.    
 Commentary: vol. 81, no. 7, pp. 736–737.   
 Reply: vol. 81, no. 7, pp. 737–738, July 2024.   
 Media coverage: *Psychiatric News*, Feb. 2024.  · *MedPage Today*, Feb. 2024.  · *Brain & Behavior Research Foundation*, Jan. 2024.  · *NIMH Research Highlight*, Dec. 2023. 
- \* C. C. Abbott, J. Miller, D. Farrar, M. Argyelan, M. Lloyd, T. Squillaci, B. Kimbrell, S. Rymann, 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,” *Neuropsychopharmacology*, vol. 49, no. 4, pp. 640–648, Mar. 2024.    
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- W. A. Wartman, K. Weise, M. Rachh, L. Morales, **Z.-D. Deng**, A. R. Nummenmaa, and S. N. Makaroff, “An adaptive h-refinement method for the boundary element fast multipole method for quasi-static electromagnetic modeling,” *Physics in Medicine and Biology*, vol. 69, no. 4, 055030, Feb. 2024.     
 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. Olstedal, 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. Jørgensen, A. Jørgensen, O. B. Paulson, A. Yroni, 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. Hurlmann, 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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- \* **Z.-D. Deng**, P. L. Robins, M. Dannhauer, L. M. Haugen, J. D. Port, and P. E. Croarkin, “Optimizing TMS coil placement approaches for targeting the dorsolateral prefrontal cortex in depressed adolescents: An electric field modeling study,” *Biomedicine*, vol. 11, no. 8, 2320, Aug. 2023.    
 First Place in International Student Competition (awarded to P. L. Robins), *Brain & Human Body Modeling Conference*, 2022.
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- \* **Z.-D. Deng**, M. Argyelan, J. Miller, D. Quinn, M. Lloyd, T. R. Jones, J. Upston, E. Erhardt, S. M. McClintock, and C. C. Abbott, “Electroconvulsive therapy, electric field, neuroplasticity, and clinical outcomes,” *Molecular Psychiatry*, vol. 27, no. 3, pp. 1676–1682, Mar. 2022.    
 Commentary: vol. 27, no. 9, pp. 3571–3572, Sept. 2022.   
 Reply: vol. 29, no. 10, pp. 3289–3290, Oct. 2024. 
- N. L. Balderston, J. C. Beer, D. Seok, W. Makhoul, **Z.-D. Deng**, T. Girelli, M. Teferi, N. Smyk, M. Jaskir, D. J. Oathes, R. T. Shinohara, and Y. I. Sheline, “Proof of concept study to develop a novel connectivity-based electric-field modelling approach for individualized



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N. L. Balderston, E. M. Beydler, C. Roberts, **Z.-D. Deng**, T. Radman, T. Lago, B. Lubner, S. H. Lisanby, M. Ernst, and C. Grillon, “Mechanistic link between right prefrontal cortical activity and anxious arousal revealed using transcranial magnetic stimulation in healthy subjects,” *Neuropsychopharmacology*, vol. 45, no. 4, pp. 694–702, Mar. 2020.  




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M. Argyelan, L. Olteidal, **Z.-D. Deng**, B. Wade, M. Bikson, A. Joanlanne, S. Sanghani, H. Bartsch, M. Cano, A. M. Dale, U. Dannlowski, A. Dols, V. Enneking, R. Espinoza, U. Kessler, K. L. Narr, K. J. Oedagaard, M. L. Oudega, R. Redlich, M. L. Stek, A. Takamiya, L. Emsell, F. Bouckaert, P. Sienaert, J. Pugol, I. Tendolkar, P. van Eijndhoven, G. Petrides, A. K. Malhotra, and C. Abbott, “Electric field causes volumetric changes in the human brain,” *eLife*, vol. 8, e49115, Oct. 2019.   



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- \* **Z.-D. Deng**, M. Hynd, Z. Rezaee, A. R. Brunoni, and S. H. Lisanby, “Sham response in transcranial magnetic stimulation depression trials is increasing over time,” *Neuropsychopharmacology*, vol. 47, supplement, p. 199, 2022.
- \* **Z.-D. Deng**, S. M. McClintock, M. M. Husain, and S. H. Lisanby, “Antidepressant response of electroconvulsive therapy and magnetic seizure therapy: Response trajectories by symptom clusters,” *Neuropsychopharmacology*, vol. 46, supplement, p. 226, 2021.
- M. Velez Afanador, **Z.-D. Deng**, and S. H. Lisanby, “Resting-state EEG source analysis in depressed patients treated with electroconvulsive therapy and magnetic seizure therapy,” *Biological Psychiatry*, vol. 83, no. 9, p. S405, 2018.  
 Outstanding Poster Award (awarded to M. Velez Afanador), *NIH Postbac Poster Day*, 2018.
- \* **Z.-D. Deng**, S. M. McClintock, and S. H. Lisanby, “EEG-based graph theoretical measures as biomarkers of clinical outcome in electroconvulsive and magnetic seizure therapy,” *The National Network of Depression Centers Annual Conference*, 2014.  
 Innovative Poster Award

INTELLECTUAL  
PROPERTY

- Z.-D. Deng**, J. Kim, G. R. Dold, B. A. Pritchard, R. H. Schor, and S. H. Lisanby, “Systems and methods for adjustable current individualized stimulation therapy,” U.S. Provisional Patent application 63/656,515, June 5, 2024.
- Z.-D. Deng**, B. A. Pritchard, J. Kim, G. R. Dold, R. H. Schor, and S. H. Lisanby, “Systems and methods for multichannel individualized stimulation therapy,” PCT/US24/23876, Apr. 10, 2024; U.S. Provisional Patent application 63/495,244, Apr. 10, 2023.
- C. C. Abbott, **Z.-D. Deng**, J. Upston, T. Jones, and A. Datta, “Systems and methods for E-field informed electroconvulsive therapy,” PCT WO/2024/148196, July 11, 2024; U.S. Provisional Patent application 63/437,017, Jan. 4, 2023.
- C. C. Abbott, A. Datta, J. Upston, T. Jones, and **Z.-D. Deng**, “Systems and methods for amplitude-determined seizure titrations and electric field modeling in electroconvulsive therapy,” U.S. Provisional Patent application 63/516,371, July 28, 2023.
- S. N. Makarov, G. M. Noetscher, V. S. Makarov, and **Z.-D. Deng**, “Whole body non-contact electrical stimulation device with variable parameters,” U.S. Patent 10,551,449, Feb. 4, 2020.
- C.-S. Poon and **Z.-D. Deng**, “Systems and methods for detecting a physiological abnormality in a patient by using cardiac or other chaos in combination with a non-increasing parasympathetic modulation,” U.S. Patent 9,737,258, Aug. 22, 2017; PCT WO/2014/120353, July 8, 2014.

A. V. Peterchev and **Z.-D. Deng**, “Transcranial magnetic stimulation coil with electronically switchable active and sham modes,” U.S. Provisional Patent application 61/525,922, Aug. 22, 2011.

A. V. Peterchev, S. H. Lisanby, and **Z.-D. Deng**, “Methods, apparatus, and systems for magnetic stimulation,” U.S. Patent 9,295,853 B2, Mar. 29, 2016; U.S. Patent 8,801,589, Aug. 12, 2014; PCT WO/2010/017249; U.S. Patent 2011/0184223 A1; U.S. Patent 2009/052768, Aug. 4, 2009.

#### ONGOING RESEARCH SUPPORT

Congressionally Directed Medical Research Programs (PI: D. L. Brody) 2024–  
*ADEPT: Adaptive trial for the treatment of depression associated with concussion using repetitive transcranial magnetic stimulation protocols*

Role: Intramural NIH collaborator

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

NIH/NIMH R01 MH130490 (PI: S. N. Makaroff) 2023.07–2028.05  
*Charge-based brain modeling engine with boundary element fast multipole method*

Role: Intramural NIH collaborator

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, outperforming traditional approaches based on the finite element method.

NIH/NIMH U01 MH130447 (PI: N. L. Balderston) 2022.09–2027.06  
*Novel electric-field modeling approach to quantify changes in resting state functional connectivity following theta burst stimulation*

Role: Intramural NIH collaborator

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 neuromodulatory TMS, and validate this model in a large cohort of healthy volunteers receiving multiple doses of either intermittent or continuous theta burst stimulation.

Centre for Addiction and Mental Health, Toronto, ON, Canada (PI: V. M. Tang) 2023.02–  
*Development of a novel, scalable, neurobiologically-guided transcranial magnetic stimulation protocol for the treatment of cannabis use disorder*

Role: Consultant

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.

NIH/NIMH R01 (MH128686 PI: Y. I. Sheline; MH128690 PIs: K. L. Narr, R. Espinoza; MH128691 PI: S. M. McClintock; MH128692 PI: C. C. Abbott) 2022.08–2027.05  
*Deciphering mechanisms of ECT outcomes and adverse effects (DECODE)*

Role: Intramural NIH collaborator

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

NIH/NIMH R61/R33 MH125126 (PI: C. C. Abbott) 2021.02–2023.01  
*Electroconvulsive therapy amplitude titration for improved clinical outcomes in late-life depression*

Role: Intramural NIH collaborator

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

NIH/NIMH R61/R33 MH120188 (PIs: A. N. Voineskos, D. M. Blumberger) 2020.05–2023.04  
*Neuromodulation of social cognitive circuitry in people with schizophrenia spectrum disorders*

Role: Intramural NIH collaborator



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

- NIH UH3/UG3 (mPIs: C. C. Abbott, **Z.-D. Deng**, A. Datta) 2024.10  
*Improving ECT clinical outcomes through seizure- and model-guided stimulation parameters*
- NIH UH3/UG3 (PI: H. Lu) 2024.09  
Role: Intramural NIH collaborator  
*Development of high-density theta burst transcranial magnetic stimulation (TMS) technology and initial testing in humans*
- NIH/NIMH R01 (PI: Y. Fan) 2024.10  
Role: Intramural NIH collaborator  
*Improving the optimization of TMS coil placement with precise calculation of electric fields and robust computation of personalized functional networks*
- NIH/NIMH R33/R61 (PI: M. Argyelan) 2024.02  
Role: Intramural NIH collaborator  
*Targeting the causal depression network with electroconvulsive therapy*
- NIH/NIMH UG3/UH3 (PI: C. C. Abbott) 2024.06  
Role: Intramural NIH collaborator  
*Development of a next generation ECT system: PRecision Optimally Targeted ECT (PROTECT)*

NIH  
PROTOCOLS

- NIMH Protocol 21-M-0031 (PI: S. H. Lisanby) 2021–  
*A feasibility study of Transcranial Electric Stimulation Therapy (TEST) for treatment resistant depression*  
Role: Associate investigator
- NIMH Protocol 20-M-0159 (PI: S. H. Lisanby) 2020–  
*Role of GABAergic transmission in auditory processing in Autism Spectrum Disorder*  
Role: Associate investigator
- NIMH Protocol 19-M-0073 (PI: S. H. Lisanby) 2019–  
*Safety and feasibility of individualized low amplitude seizure therapy*  
Role: Associate investigator
- NIMH Protocol 19-M-0107 (PI: C. A. Zarate, Jr.) 2019–  
*Mechanism of action underlying ketamine's antidepressant effects: An investigation of the AMPA throughput theory in patients with treatment-resistant major depression*  
Role: Associate investigator
- NIMH Protocol 17-M-0147 (PI: S. H. Lisanby) 2017–  
*Concurrent fMRI-guided rTMS and cognitive therapy for the treatment of major depressive episodes*  
Role: Associate investigator
- NIMH Protocol 18-M-0015 (PI: S. H. Lisanby) 2017–  
*Development of non-invasive brain stimulation techniques*  
Role: Associate investigator
- NIMH Protocol 07-M-0021 (PI: A. C. Nugent) 2017–  
*Development of functional and structural magnetic resonance imaging techniques for the study of mood and anxiety disorders*  
Role: Associate investigator
- NIDA Protocol 12-DA-N474 (PI: A. Janes) 2017–  
*Identifying neurobiological mechanisms that underlie acute nicotine withdrawal and drive early relapse in smokers*

	Role: Associate investigator	
	NIMH Protocol 17-M-0060 (PI: C. A. Zarate, Jr.) <i>Neuropharmacologic imaging and biomarker assessments of response to acute and repeated-dosed ketamine infusions in major depressive disorder</i> Role: Associate investigator	2016–
	NIMH Protocol 01-M-0254 (PI: C. A. Zarate, Jr.) <i>Evaluation of patients with mood and anxiety disorders and healthy volunteers</i> Role: Associate investigator	2016–
	NINDS Protocol 18-N-0054 (PI: M. Hallett) <i>Modulation of the parieto-frontal communication</i> Role: Associate investigator	2018–2019
	NIMH Protocol 17-M-0042 (PI: C. Grillon) <i>Effect of TMS to frontoparietal attention network on anxiety potentiated startle</i> Role: Associate investigator	2017–2019
COMPLETED RESEARCH SUPPORT	NIH/NINDS U01 MH111826 (PI: C. C. Abbott) <i>ECT pulse amplitude and medial temporal lobe engagement</i> Role: Co-I 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.	2016.09–2020.07
	Brain & Behavior Research Foundation Young Investigator Award 26161 <i>Individualized low amplitude seizure therapy (iLAST)</i> 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.	2018.06–2020.06
	NIMH 271201200006L-3-27100003-1 (PI: A. D. Krystal) <i>Fast-Fail Trials: Mood and Anxiety Spectrum Disorders (FAST-MAS)</i> Role: Data analyst 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.	2016.06–2017.12
	NIH/NIMH R21 MH106772 (PI: A. D. Krystal) <i>Transcranial direct current stimulation as a treatment for acute fear</i> Role: Co-I 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.	2015.04–2017.01
	NIH/NCATS KL2 TR001115 (Training Grant PI: R. M. Califf) <i>Individualized optimally-targeted seizure therapy</i> Role: PI This award from the Duke Translational Medicine Institute prepares the fellow for a successful career as a multidisciplinary independent investigator in the field of brain stimulation. The goal of the project is to develop a novel individualized neurotargeted seizure therapy.	2014.07–2016.06
	Duke University School of Medicine, Pilot fund <i>Safety and feasibility of low amplitude electroconvulsive therapy</i> Role: PI This study evaluates whether neurocognitive side effects of electroconvulsive therapy can be improved by reducing the current pulse amplitude.	2015.03–2016.06

- NIH/NIMH U01 MH084241 (PI: S. H. Lisanby) 2009.04–2016.03  
*Prolonging Remission In Depressed Elderly (PRIDE)*  
 Role: Data analyst  
 This study evaluates the efficacy and neurocognitive effects of combined electroconvulsive and pharmacotherapy in prolonging remission in elderly patients with major depression.
- Tal Medical (PI: A. V. Peterchev) 2015.04–2016.06  
*Low field magnetic stimulation coil design*  
 Role: Co-I  
 This project develops a novel coil system for low field magnetic stimulation.
- American Psychiatric Association Research Scholarship (Grantee: Y. Hu) 2015.11–2016.06  
*Concurrent cognitive behavioral therapy and transcranial magnetic stimulation in obsessive-compulsive disorder*  
 Role: Acting PI  
 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.
- Janssen Research & Development, LLC (PI: A. D. Krystal) 2014.01–2015.12  
*Evoked potentials as markers of ketamine-induced cortical plasticity in patients with major depressive disorder*  
 Role: Co-I  
 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.
- Stanley Medical Research Institute (PI: S. H. Lisanby) 2005.07–2011.07  
*Magnetic seizure therapy for the treatment of depression*  
 Role: Postdoctoral fellow  
 This two-center, randomized, double-blind controlled trial compares the antidepressant efficacy and side effects of magnetic seizure therapy and electroconvulsive therapy.
- NIH/NIMH K23 MH087739 (PI: S. M. McClintock) 2010.07–2015.01  
*Translational research evaluating neurocognitive memory processes*  
 Role: Postdoctoral fellow  
 This study informs the cognitive component processes underlying memory impairment after electroconvulsive therapy.
- NIH/NIMH R01 MH091083 (PI: S. H. Lisanby) 2010.07–2015.12  
*Rational dosing for electric and magnetic seizure therapy*  
 Role: Graduate research assistant, contributed to grant writing  
 This study lays a foundation for optimizing stimulus parameters of electric and magnetic seizure therapy through computational modeling and preclinical studies of seizure induction.
- NIH/NCRR TL1 RR024158 (Training Grant PI: H. N. Ginsberg) 2010.09–2011.06  
*Field shaping and coil design for transcranial magnetic stimulation*  
 Role: PI  
 This award from the Columbia University Irving Institute for Clinical and Translational Research supports clinical research training for predoctoral students in the basic sciences. The goal of the project is to develop novel coil design for deep transcranial magnetic stimulation.
- NIH/NIBIB R21 EB006855 (PI: A. V. Peterchev) 2007.08–2009.07  
*Development of a novel TMS device with controllable pulse shape*  
 Role: Graduate research assistant  
 This project develops an efficient transcranial magnetic stimulation device that produces nearly rectangular pulses with adjustable amplitude, width, and directionality.

NIH/NHLBI R01 HL079503 (PI: C.-S. Poon) 2005.11–2009.06  
*Nonlinear analysis of heart rate variability*  
 Role: Graduate research assistant  
 This project develops advanced nonlinear estimation and adaptive control algorithms for the modeling and analysis of the cardiovascular system.

SCHOLARSHIPS, FELLOWSHIPS, & HONORS	<b>NIMH Director's Award</b>	2024
	For outstanding transdisciplinary scientific contributions to advance neuromodulation technologies for the study and treatment of psychiatric disorders, NIMH Intramural Research Program	
	<b>High Five Award</b>	2024
	For excellent preparation for and presentation at the Noninvasive Neuromodulation Unit's Board of Scientific Counselors review, NIMH Intramural Research Program	
	<b>Scholar, Advanced Research Institute in Geriatric Mental Health,</b>	2023–2024
	Dartmouth College, supported by grant from NIH (R25MH068502)	
	<b>NIMH Director's Award</b>	2019
	For scientific innovation at the interface of computation and psychiatry, NIMH Intramural Research Program	
	<b>Richard J. Wyatt Memorial Fellowship Award for Translational Research</b>	2018
	NIMH Intramural Research Program	
	<b>New Investigator Award</b>	2018
	American Society of Clinical Psychopharmacology	
	<b>Early Career Investigator Travel Fellowship Award</b>	2018
	Society of Biological Psychiatry	
	<b>Research Colloquium for Junior Investigators</b>	2018
	American Psychiatric Association	
	<b>Alies Muskin Career Development Leadership Program</b>	2018
	Anxiety & Depression Association of America	
	<b>NARSAD Young Investigator Award</b>	2017
	Brain & Behavior Research Foundation	
	<b>Career Development Institute for Psychiatry</b>	2017
	Stanford University	
	<b>New Investigator Award</b>	2017
	International Society for CNS Clinical Trials and Methodology	
	<b>Certificate for Highly Cited Research</b>	2016
	<i>Brain Stimulation</i> , Elsevier	
	<b>Young Investigator Memorial Travel Award</b>	2015
	American College of Neuropsychopharmacology	
	<b>Scholar, Summer Research Institute in Geriatric Mental Health</b>	2015
	Weill Cornell Medical College, supported by grant from NIH (R25MH019946)	
	<b>Chair's Choice Award</b>	2014
	Society of Biological Psychiatry	
	<b>Innovative Poster Award</b>	2014
	National Network of Depression Centers	
	<b>Best Abstract Award</b>	2010
	International Society for ECT and Neurostimulation	

	<b>Presidential Teaching Award Finalist</b> Columbia University	2010
	<b>Student Paper Competition Finalist</b> IEEE Engineering in Medicine and Biology Society	2006
	<b>New York Times College Scholarship</b> The New York Times Company Foundation	2002
GRAND ROUNDS	Advanced Research Institute Grand Rounds in Mental Health and Aging Research <i>Advancing neurostimulation treatment optimization and technology innovation</i>	2023
	Westmead Hospital, Sydney, Australia <i>Advances in neuromodulation: Electroconvulsive therapy</i>	2020
	Clinical TMS Society <i>Transcranial magnetic stimulation: Physics, devices, and modeling</i>	2018
	University of New Mexico, Department of Psychiatry & Behavioral Sciences <i>Toward individualized electroconvulsive therapy for treatment of depression</i>	2017
	Central Regional Hospital, Butner, NC <i>Individualized seizure therapy</i>	2015
	Duke University School of Medicine, Department of Psychiatry & Behavioral Sciences <i>Toward next generation seizure therapy</i>	2015
INVITED SEMINARS, WORKSHOPS, & PANELS	International Society for ECT and Neurostimulation Annual Meeting <i>Multichannel Individualized Stimulation Therapy</i>	Upcoming 2025
	NIMH Intramural Research Program Investigators' Seminar Series Meeting <i>Reading faces: Application of facial expression analysis for tracking emotional states in depression</i>	Upcoming 2025
	American Neuropsychiatric Association Annual Meeting Panel: <i>Interventional neuropsychiatry: From mechanisms to clinical decision-making</i>	Upcoming 2025
	International Brain Stimulation Conference On-demand symposium: <i>ECT reimaged: Precision, prediction, and personalized care</i>	Upcoming 2025
	UCSF Department of Psychiatry & Behavioral Sciences <i>Engineering precision in neuromodulation: Computational models and clinical applications</i>	Upcoming 2025
	IEEE Brain Discovery & Neurotechnology Workshop, University of Illinois Chicago <i>A model-driven approach to personalized neuromodulation treatment</i>	2024
	International Symposium on Novel Neuromodulation Techniques for Neurocognitive Disorders <i>Model-driven brain stimulation treatments</i>	2024
	University of Pittsburgh, Geriatric Psychiatry Neuroimaging Laboratory <i>The full spectrum: Electromagnetic brain stimulation from minimal to maximal intensity</i>	2024
	NIMH Workshop on The Placebo Effect: Key Questions for Translational Research <i>Challenges and strategies in implementing effective sham stimulation for noninvasive brain stimulation trials</i> 	2024
	International Society for Magnetic Resonance in Medicine Annual Meeting Workshop: <i>From basics to applications: MRI of neuromodulation using TMS and FUS</i> Contributed talk: <i>TMS devices and modeling</i>	2024
	University of Texas Southwestern, Center for Depression Research and Clinical Care <i>Advancements in computational neurostimulation for depression treatment optimization and technology development</i>	2023

- Brain and Human Body Modeling Conference, The Martinos Center for Biomedical Imaging,  
Massachusetts General Hospital 2023  
Chair: *New modeling methods and targets: Spinal cord stimulation and novel stimulation*  
Chair: *Development and assessment of modeling methods*  
Contributed talk: *Effects of low intensity magnetic stimulation*  
Judge: Student competition
- International Conference of the IEEE Engineering in Medicine and Biology Society 2023  
Panel: *Computational analysis of non-invasive neuromodulation: Brain and spine*  
Contributed talk: *Modeling of TMS and ECT in the treatment of depression*
- University of Pittsburgh, Department of Psychiatry 2023  
*Computational neurostimulation: Approach to treatment optimization and technology development*
- ADAA Anxiety and Depression Conference 2023  
Panel: *Parsing through syndromic heterogeneity in youths with mental illness to identify neurocircuit mechanisms and develop novel treatments*  
Contributed talk: *Modeling and dose optimization for TMS and ECT*
- International Brain Stimulation Conference 2023  
Symposium chair: *Insights and challenges in preclinical models of TMS: Multimodal investigations across animal species*  
Fast-track oral symposium chair: *Advanced computational modeling and optimization methods for noninvasive brain stimulation*
- International Network of tES–fMRI (INTF) Webinar Series 2022  
*Electric field modeling and optimization approaches for individualized targeting*
- International Society for Magnetic Resonance in Medicine 2022  
Workshop: *MRI of neuromodulation: Target engagement, neural mechanism, and bio-marker development*  
Contributed talk: *Modeling of TMS* 
- Bergen Workshop of the Global ECT–MRI Collaboration 2022  
*ECT device development* 
- International Congress of Clinical Neurophysiology 2022  
Chair: *Towards optimized TMS targeting approaches*
- Brain and Human Body Modeling Conference, The Martinos Center for Biomedical Imaging,  
Massachusetts General Hospital 2022  
Chair: *Modeling of transcranial electrical stimulation and deep brain stimulation*  
Contributed talk: *ECT, electric field, neuroplasticity, and clinical outcomes*
- European Conference of Brain Stimulation in Psychiatry 2022  
Panel: *Beyond clinical syndromes: Understanding mechanisms of neuromodulation from a dimensional perspective*  
Contributed talk: *Symptom dimensions and response trajectories in ECT and MST*
- Medical University of South Carolina, National Center of Neuromodulation for Rehabilitation  
*Model-driven design for brain stimulation therapies*  2022
- Society of Biological Psychiatry Annual Meeting 2022  
Panel: *Dimensional approaches to device neuromodulation*  
Contributed talk: *Depressive symptom dimensions in seizure therapy*
- NIMH Intramural Research Program Investigators’ Seminar Series 2022  
*Seizure therapies: The next generation*
- Global ECT–MRI Collaboration Young Researchers Collective 2022  
*ECT, electric field, neuroplasticity, and clinical outcomes*

Butler Hospital, Brown University <i>Computational model driven design for brain stimulation</i>	2021
American Academy of Child and Adolescent Psychiatry Annual Meeting Panel: <i>Recent work with contemporary computational methods and artificial intelligence to advance the practice of child and adolescent psychiatry</i> Contributed talk: <i>Introduction to computational psychiatry</i>	2021
European College of Neuropsychopharmacology Congress Panel: <i>Neurobiology of rapid mood changes</i> Contributed talk: <i>Precision neurostimulation: Electroconvulsive therapy</i>	2021
University of Pennsylvania, Center for Neuromodulation in Depression and Stress <i>Electromagnetic brain stimulation from low to high intensity</i>	2021
Society for Brain Mapping & Therapeutics Annual Congress <i>Advances in electroconvulsive therapy for treatment of depression</i>	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 <i>Next generation seizure therapy and neuromodulation</i>	2021
European Conference of Brain Stimulation in Psychiatry Panel: <i>What can we learn from ECT: Insights from the GEMRIC consortium</i> Contributed talk: <i>Electric field modeling to inform ECT dosing and device development</i>	2020
NIH Basic Training Course on Transcranial Magnetic Stimulation <i>TMS physics, devices, modeling</i> 	2020
University of Minnesota Non-Invasive Brain Stimulation Workshop <i>Use of individual electric field models in clinical research</i> 	2020
American Society of Clinical Psychopharmacology Annual Meeting Panel: <i>New developments in neurostimulation</i> #coronacancelled	2020
VA Boston Healthcare System, Boston University School of Medicine, Harvard Medical School Neuropsychiatry Translational Research Fellowship Seminar <i>Precision neurostimulation: History, physics, computational modeling, and engineering</i>	2020
NYC Neuromodulation Online Discussant: <i>Noninvasive vagus nerve stimulation applied to stress management, opioid withdrawal, and neurocognitive disorders</i>	2020
Medical University of Vienna, Neuroimaging Lab <i>Precision seizure therapy</i>	2020
American College of Neuropsychopharmacology Panel: <i>Precision neurostimulation for treatment of psychiatric disorders</i> Contributed talk: <i>Rational design of precision seizure therapy</i>	2019
International Symposium on Advancing Stimulation Precision Medicine of Brain Disorders, Copenhagen University Hospital Hvidovre, Danish Research Centre for Magnetic Resonance <i>Rational design of precision seizure therapy</i>	2019
International College of Neuropsychopharmacology Meeting Workshop: <i>Neurobiological and clinical characterization, and treatment development for treatment resistant depression</i> Contributed talk: <i>Individualized seizure therapy: Reinventing ECT</i>	2019
American Society of Clinical Psychopharmacology Annual Meeting Co-chair: <i>Treatment-resistant mood disorders across the lifespan: Novel therapeutics</i>	2019
Mount Sinai Icahn School of Medicine, Depression and Anxiety Center	2019



*Rational design of individualized noninvasive brain stimulation*

International Brain Stimulation Conference	2019
Panel: <i>Individualized brain stimulation: Addressing heterogeneity across modalities</i>	
Contributed talk: <i>Individualized electroconvulsive therapy for treatment of depression</i>	
NIMH Intramural Research Program Investigators' Seminar Series	2018
<i>Computational neurostimulation: Engineering better brain stimulation therapies</i>	
UCLA Brain Mapping Center	2018
<i>Computational neurostimulation: Engineering better brain stimulation therapies</i>	
UCLA Semel Institute for Neuroscience and Human Behavior, Neuromodulation Division	
<i>Modeling and design for magnetic stimulation</i>	2018
USC Mark and Mary Stevens Neuroimaging and Informatics Institute	2018
<i>Computational neurostimulation</i>	
2 <sup>nd</sup> Bergen Workshop of the Global ECT-MRI Collaboration	2018
<i>Electric field modeling for electroconvulsive therapy</i>	
Joint NYC Neuromodulation Conference & NANS Summer Series	2018
Preconference workshop director: <i>Computational modeling in neuromodulation: Tools for engineers, clinicians, and researchers</i>	
Contributed talk: <i>Optimizing high-density stimulation arrays for brain targeting</i>	
Neuropsychiatric Drug Development Summit	2018
<i>Targeted intermittent device delivered interventions will ultimately prove superior to maintenance treatment with drugs for brain disorders</i>	
International Conference of the IEEE Engineering in Medicine and Biology Society	2018
Chair: <i>Computational human models for brain stimulation</i>	
Contributed talk: <i>Electric field induced by TMS: Applications in depression and anxiety</i>	
APA Annual Conference Presidential Symposium	2018
Presidential symposium: <i>ECT in the era of new brain stimulation treatments</i>	
Contributed talk: <i>Individualized neurotargeted seizure therapy: Reinventing ECT</i>	
ADAA Anxiety and Depression Conference	2018
Panel: <i>Personalized medicine for treatment resistant depressed patients: Novel strategies to optimize treatment with antidepressant medications, ketamine, and ECT</i>	
Contributed talk: <i>Individualized neurotargeted seizure therapy: Reinventing ECT</i>	
NIMH Non-Invasive Brain Stimulation Electric Field Modeling Workshop	2017
<i>Use of individual electric field models in clinical research</i> 	
NYC Neuromodulation Conference	2017
<i>Low field magnetic stimulation</i>	
NIDA, Neuroimaging Research Branch	2016
<i>Advances in transcranial magnetic stimulation technology</i>	
NIMH Workshop on Transcranial Electrical Stimulation: Mechanisms, Technology, and Therapeutic Applications	2016
<i>Effect of anatomical variability on electric field characteristics of tES</i>	
Mayo Clinic College of Medicine, Department of Molecular Pharmacology, Neurobiology of Alcoholism and Drug Addiction Lab	2016
<i>Transcranial magnetic stimulation technology development</i>	
Mayo Clinic College of Medicine, Department of Neurologic Surgery, Neural Engineering Lab	2016
<i>Optimizing transcranial magnetic stimulation</i>	
NIMH, Experimental Therapeutics & Pathophysiology Branch	2016
<i>Engineering better electromagnetic brain stimulation therapies</i>	

TEACHING & MENTORING EXPERIENCE	International Society for ECT and Neurostimulation Annual Meeting	2015
	Workshop: <i>Spatial targeting with transcranial magnetic stimulation</i>	
	Duke University School of Medicine, Department of Psychiatry & Behavioral Sciences	2015
	Chair's round: <i>Fundamentals of transcranial electric and magnetic stimulation dosing</i>	
	Weill Cornell Medical College, Department of Biomedical Engineering	2015
	<i>Transcranial magnetic stimulation: Pulse source, coil design, &amp; concurrent neuroimaging</i>	
	Duke University, Department of Biomedical Engineering	2014
	<i>Modeling and coil design considerations for transcranial magnetic stimulation</i>	
	<b>National Institutes of Health</b>	Bethesda, MD
	<i>Lecturer</i> , NINDS Clinical Neuroscience Program Lecture Series	2017, 2019
	<i>Lecturer</i> , NIMH fMRI Course	2017
	<b>University of Maryland, College Park</b>	College Park, MD
	<i>Research Mentor</i> , Fischell Department of Bioengineering	2018–2019
	Capstone project: <i>Detection of brain-to-brain synchrony for improved psychotherapy</i>	
	<b>Duke University</b>	Durham, NC
	<i>Instructor</i> , Department of Psychology & Neuroscience Research Independent Study	2016
	<i>Faculty</i> , Department of Psychiatry & Behavioral Sciences Visiting Fellowship in Transcranial Magnetic Stimulation & Electroconvulsive Therapy Fellowship (Continuing Medical Education)	2014–2016
	<i>Research Mentor</i> , Matching Undergraduates to Science and Engineering Research Program	2015–2016
	<i>Faculty</i> , Biosciences Collaborative for Research Engagement	2015–2016
	<b>Columbia University</b>	New York, NY
	<i>Teaching Assistant</i> , Department of Electrical Engineering Analog Systems in VLSI (graduate level)	Spring 2010
	<i>Teaching Assistant</i> , Department of Electrical Engineering The Digital Information Age	Fall 2009
	<i>Recitation Instructor</i> , Department of Biostatistics Biostatistics (graduate level)	Fall 2009
	<b>Massachusetts Institute of Technology</b>	Cambridge, MA
	<i>Educational Counselor</i>	2022–
	<i>Teaching Assistant</i> , Department of Mathematics Multivariable Calculus, Differential Equations	2003–2007
	<i>Grader</i> , Department of Electrical Engineering & Computer Science Signals and Systems	Fall 2004

SUPERVISED THESES	G. Asturias, “Effect of repetitive transcranial magnetic stimulation on the structural and functional connectome in patients with major depressive disorder,” Undergraduate Honors Thesis, Duke University, Department of Psychology and Neuroscience, Durham, NC, 2017. Available: DukeSpace. 
THESIS EXAMINATION COMMITTEES	W. A. Wartman, “BEM-FMM with adaptive mesh refinement for brain modeling,” Ph.D. dissertation, Worcester Polytechnic Institute, Department of Electrical and Computer Engineering, Worcester, MA, 2024. Sponsor: S. N. Makaroff.  D. Q. Troung, “Translational modeling of non-invasive electrical stimulation,” Ph.D. dissertation, City College of the City University of New York, Department of Biomedical Engineering, New York, NY, 2019. Sponsor: M. Bikson. Available: CUNY Academic Works. 
CAREER DEVELOPMENT AWARD ADVISORY	S. M. Hare, Ph.D., University of Maryland, Baltimore NIH/NIMH K01 MH133116 2024–2029 <i>Cognitive and neural correlates of TMS motor intracortical inhibition in schizophrenia</i>  S. H. Siddiqi, M.D., Brigham & Women’s Hospital NIH/NIMH K23 MH121657 2020–2025 <i>Personalized circuit-based neuromodulation targets for depression</i>  N. L. Balderston, Ph.D., NIH/University of Pennsylvania NIH/NIMH K01 MH121777 2019–2023 <i>Examining the mechanisms of anxiety regulation using a novel, sham-controlled, fMRI-guided rTMS protocol and a translational laboratory model of anxiety</i>
RESEARCH FELLOWS & POSTDOCS	S. Dey, Ph.D., NIH 2024–  M. Dannhauer, Ph.D., NIH 2022–2024 Post-training position: Assistant Professor, Department of Computer Science, East Carolina University
GRADUATE STUDENTS	E. Bharti, Ph.D. candidate, University of Cambridge (NIH–OxCam Program) 2024–  M. Kshirsagar, M.S., Biomedical Engineering, Duke University 2012 Post-training position: Consultant, Deloitte Consulting
NIH POSTBAC TRAINEES	P. L. Robins, B.A., Physics, Lawrence University 2021–2024  NIMH Intramural Research Program Trainee Travel Award 2023  First Place in Student Competition, <i>Brain &amp; Human Body Modeling Conference</i> 2022 Post-training position: TMS technician, Columbia Associates  S. M. Awasthi, B.S., Biomedical Engineering, Johns Hopkins University 2018–2020 Post-training position: Medical student, Stanford University School of Medicine  M. Noh, S.B., Bioengineering, MIT 2018–2019 Post-training position: Medical student, University of Cincinnati College of Medicine  J. Thomas, M.S., Physiology and Biophysics, Georgetown University 2017–2019 Post-training position: Program Officer, National Academies of Sciences, Engineering, and Medicine  M. Velez Afanador, B.S., Microbiology, University of Puerto Rico 2016–2019  Outstanding Poster Award, <i>NIH Postbac Poster Day</i> 2018 Post-training position: Medical student, Howard University College of Medicine
UNDERGRAD STUDENTS	G. Asturias, Psychology & Neuroscience, Duke University 2015–2017  Graduated with Distinction  Z. Feng, Biomedical Engineering and Biology, Duke University 2015–2016  M. Glidewell, Biomedical Engineering, Duke University 2015–2016

	S. Lee, Biomedical Engineering, Duke University	2015–2016
	W. Lim, Biomedical Engineering, Duke University	2015–2016
	F. M. Mercer, Women’s Studies, Duke University	2015–2016
	E. Salgado, Psychology & Neuroscience, Duke University 🏆 Graduated with Distinction	2015–2016
	R. Shah, Psychology & Neuroscience, Duke University	2015–2016
	E. Shinder, Biology, Duke University 🏆 Graduated with Distinction	2015–2016
	E. P. Vienneau, Biomedical Engineering, Duke University 🏆 Howard G. Clark Award for Excellence in Research	2015–2016
	D. T. Weaver, Biology, Duke University	2015–2016
	J. R. Lilien, Electrical & Computer Engineering, Duke University 🏆 Walter J. Seeley Scholastic Award	2014–2016
SUMMER INTERNS	M. Dib, Biomedical Engineering, University of Maryland, College Park	2018
	E. Chung, Psychology, University of Maryland, College Park	2017
	A. L. Halberstadt, Biology and Psychology, Carnegie Mellon University	2017
	G. Asturias, Psychology & Neuroscience, Duke University	2016
	C. M. Prevost, Biomedical Engineering, Clemson University	2015
	J. V. McCall, Biomedical Engineering, North Carolina State University	2013
PROFESSIONAL & SCHOLASTIC SOCIETIES MEMBERSHIP	<b>IEEE</b> , Engineering in Medicine and Biology Society Senior Member	2023–
	Member	2013–2023
	Student Member	2004–2013
	<b>American Society of Clinical Psychopharmacology</b> Member	2019–
	Early Career Committee	2023–2027
	Technology Committee	2023–2025
	Program Review Sub-Committee	2023
	Technology Task Force	2020–2023
	<b>Biomedical Engineering Society</b> Member	2021–
	<b>American College of Neuropsychopharmacology</b> Associate Member	2023–
	<b>Sigma Xi, The Scientific Research Honor Society</b> Full Member	2024–
	<b>Anxiety and Depression Association of America</b> Member	2017–2018
	<b>International Society for CNS Clinical Trials and Methodology</b> Member	2017–2019
	<b>Organization for Human Brain Mapping</b> Member	2014–2019
	<b>Society for Industrial and Applied Mathematics</b> Student Member	2008–2012

EDITORIAL ROLES	<b>Society for Neuroscience</b>	
	Student Member	2005–2012
	<b>American Physical Society</b>	
	Student Member	2004–2009
	Deputy Editor, <i>Transcranial Magnetic Stimulation</i>	2024–
	Associate Editor, <i>Frontiers in Psychiatry: Neurostimulation</i>	2022–
	Associate Editor, <i>Frontiers in Psychiatry: Neuroimaging</i>	2022–
	Co-Editor on Research Topic: How Does Brain Stimulation Work? Neuroversion and Other Putative Mechanisms of Action 	2024
	Guest Associate Editor, <i>Frontiers in Pharmacology: Neuropharmacology</i>	
	Co-Editor on Research Topic: Neurobiology of Rapid Mood Changes 	2020
	Review Editor, <i>Frontiers in Psychology: Addictive Behaviors</i>	2022–
	Review Editor, <i>Frontiers in Psychology: Consciousness Research</i>	2022–
	Guest Editor, <i>Physics in Medicine and Biology</i>	
	Special Issue: Electromagnetic Modeling for Brain Stimulation 	2024
	<i>Ad hoc</i> journal reviewer	2010–
	<i>AIP Advances</i>	
	<i>American Journal of Psychiatry</i>	
	<i>Asian Journal of Psychiatry</i>	
	emphAustralasian Physical and Engineering Sciences in Medicine	
	<i>Biological Psychiatry</i>	
	<i>BioMedical Engineering OnLine</i>	
	<i>Brain Sciences</i>	
	<i>Brain Stimulation</i>	
	<i>Cerebral Cortex</i>	
	<i>Clinical EEG and Neuroscience</i>	
	<i>Clinical Neurophysiology</i>	
	<i>CNS Spectrums</i>	
	<i>Computational and Mathematical Methods in Medicine</i>	
	<i>Computer Methods and Programs in Biomedicine</i>	
	<i>Cortex</i>	
	<i>European Psychiatry</i>	
	<i>Frontiers in Cell and Developmental Biology</i>	
	<i>Frontiers in Medicine: Intensive Care Medicine and Anesthesiology</i>	
	<i>Frontiers in Neurology: Applied Neuroimaging</i>	
	<i>Frontiers in Neuroscience: Brain Imaging Methods</i>	
	<i>IEEE Transactions on Biomedical Engineering</i>	
	<i>IEEE Transactions on Neural Systems &amp; Rehabilitation Engineering</i>	
	<i>IEEE Transactions on Magnetics</i>	
	<i>Imaging Neuroscience</i>	
	<i>Journal of ECT</i>	
	<i>Journal of Neural Engineering</i>	
	<i>Journal of Neuroscience Methods</i>	
	<i>JoVE</i>	
	<i>Medical &amp; Biological Engineering &amp; Computing</i>	
	<i>Medical Hypotheses</i>	
	<i>Nature Mental Health</i>	
	<i>NeuroImage; NeuroImage Clinical</i>	
	<i>Neuromodulation: Technology at the Neural Interface</i>	
	<i>Neuroscience Letters</i>	
	<i>PLOS ONE</i>	

*Scientific Reports*  
*Translational Psychiatry*

	Reviewer, Conference Proceedings & 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	
	American Society of Clinical Psychopharmacology Annual Meeting	
GRANT	Reviewer, NIH BluePrint MedTech Program	2022–2024
REVIEW	<i>Ad hoc</i> reviewer, NIH Early Career Reviewer Program	2021
PANELS	Biophysics of Neural Systems Study Section	
	Reviewer, Duke Institute for Brain Sciences, Research Incubator Awards	2018, 2021
CONFERENCE	Brain and Human Body Modeling Conference, The Martinos Center for Biomedical Imaging,	
ORGANIZING	Massachusetts General Hospital	2022–2023
COMMITTEE		
COMMUNITY	NIH Research Workforce Diversity and Equity Outreach Special Interest Group	2023–
INVOLVEMENT,	Judge, NIMH Training Day Three-Minute Talks competition	2022
OUTREACH, &	Mental Health Association of Maryland	2020
SPECIAL	Presentation: <i>Fundamentals of transcranial brain stimulation</i>	
INTEREST	Jewish Social Service Agency	2020
GROUPS	Presentation: <i>Basics of brain stimulation devices: What are they and how do they work</i>	
	Exhibitor, USA Science & Engineering Festival #coronacancelled	2020
	University of Pennsylvania, Wharton Undergraduate Health Care Club	2019
	Presentation: <i>Research in mental health treatment</i>	
	Judge, MIT Hacking Medicine: DC Grand Hack	2019
	NIH High School Scientific Training and Enrichment Program	2019
	Presentation: <i>Bioelectricity and brain stimulation</i>	
	NIH Take Your Child to Work Day	2019
	Presentation: <i>How to fool your brain</i>	
	UCLA, CruX Neurotech Organization	2019
	Presentation: <i>Neuromodulation in psychiatry</i>	
	University of Pennsylvania, Wharton Undergraduate Health Care Club	2018
	Presentation: <i>Technology and the future of mental health treatment</i>	
	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	2016
	Duke Psychiatry, Mood Disorders Support and Education Group	
	Presentation: <i>Brain stimulation treatments for severe mood disorders</i>	2016
	Presentation: <i>New frontiers in treatments for mood disorders</i>	2015
	Duke Translational Medicine Institute, Undergraduate Research Society	2016
	Presentation: <i>Engineering meets psychiatry</i>	

CONTINUING EDUCATION & PROFESSIONAL DEVELOPMENT	Mid-Level Leadership Program, NIH	2023
	Diversity and Inclusion Certificate Program, NIH	2021–2022
	Non-invasive Transcranial Brain Stimulation Course, Danish Research Centre for Magnetic Resonance, Copenhagen University Hospital Hvidovre	2019
	Health Disparities Research Curriculum, Duke Translational Medicine Institute	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	renewed 2023