

ZHI-DE DENG

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LAST UPDATED December 21, 2024

RESEARCH SPECIALTIES Noninvasive brain stimulation: technology development, modeling, device safety, translational 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 & Computer Science 2007

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

S.B., Electrical Science & Engineering 2007

S.B., Physics 2006

Minor in Economics

PROFESSIONAL & ACADEMIC APPOINTMENTS **National Institute of Mental Health** Bethesda, MD

Staff Scientist 2019–

Division of Intramural Research Programs

Experimental Therapeutics & Pathophysiology Branch

Noninvasive Neuromodulation Unit

 Director, Computational Neurostimulation Research Program

Research Fellow 2016–2019

Division of Intramural Research Programs

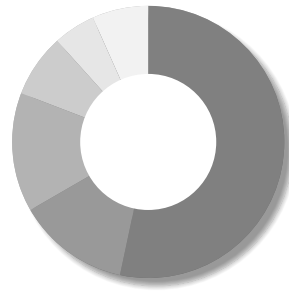
Experimental Therapeutics & Pathophysiology Branch

Noninvasive Neuromodulation Unit

 Richard J. Wyatt Memorial Fellowship for Translational Research



	Duke University School of Medicine	Durham, NC
	<i>Adjunct Assistant Professor</i> Department of Psychiatry & Behavioral Sciences Division of Behavioral Medicine & Neurosciences	2016–2024
	<i>Faculty Network Member</i> Duke Institute for Brain Sciences	2015–2024
	<i>Medical Instructor</i> Department of Psychiatry & Behavioral Sciences Division of Brain Stimulation & Neurophysiology  Duke Translational Medicine Institute KL2 Fellow	2014–2016
	<i>Postdoctoral Associate</i> Department of Psychiatry and Behavioral Sciences Division of Brain Stimulation & Neurophysiology Neurocognitive Research Lab	2013–2014
	<i>Visiting Graduate Research Assistant</i> Department of Psychiatry & Behavioral Sciences Division of Brain Stimulation & Neurophysiology Brain Stimulation Engineering Lab	2010–2013
	Columbia University College of Physicians & Surgeons New York State Psychiatric Institute	New York, NY
	<i>Graduate Research Assistant</i> Department of Psychiatry Division of Brain Stimulation & Therapeutic Modulation Technology Development Lab  Columbia Irving Institute for Clinical and Translational Research T32 Fellow	2007–2010
	Harvard–MIT Division of Health Sciences & Technology	Cambridge, MA
	<i>Research Assistant</i> Neurophysiology & Neuroengineering Lab	2005–2007
NONPROFIT LEADERSHIP	Singula Institute <i>Co-founder, Scientific Advisor</i>	New York, NY 2017–
INTERNSHIPS	NewYork-Presbyterian/Weill Cornell Medical Center <i>Executive Intern, Anesthesiology</i>	New York, NY 2004
	The New York Times Company, Inc. <i>Internship Coordinator</i> The New York Times Company Foundation/The Children’s Aid Society <i>Newsroom Technology Intern</i>	New York, NY 2003 2002


AWARDS & HONORS	NIMH Director's Award	2024
	For outstanding transdisciplinary scientific contributions to advance neuromodulation technologies for the study and treatment of psychiatric disorders, NIMH	
	High Five Award	2024
	For excellent preparation for and presentation at the Noninvasive Neuromodulation Unit's Board of Scientific Counselors review, NIMH	
	Scholar, Advanced Research Institute in Geriatric Mental Health	2023–2024
	Dartmouth College, supported by grant from NIH (R25MH068502)	
	NIMH Director's Award	2019
	For scientific innovation at the interface of computation and psychiatry, NIMH	
	Richard J. Wyatt Memorial Fellowship Award for Translational Research	2018
	NIMH Intramural Research Program	
	New Investigator Award	2018
	American Society of Clinical Psychopharmacology	
	Early Career Investigator Travel Fellowship Award	2018
	Society of Biological Psychiatry	
	Research Colloquium for Junior Investigators	2018
	American Psychiatric Association	
	Alies Muskin Career Development Leadership Program	2018
	Anxiety & Depression Association of America	
	NARSAD Young Investigator Award	2017
	Brain & Behavior Research Foundation	
	Career Development Institute for Psychiatry	2017
	Stanford University	
	New Investigator Award	2017
	International Society for CNS Clinical Trials and Methodology	
	Certificate for Highly Cited Research	2016
	<i>Brain Stimulation</i> , Elsevier	
	Young Investigator Memorial Travel Award	2015
	American College of Neuropsychopharmacology	
	Scholar, Summer Research Institute in Geriatric Mental Health	2015
	Weill Cornell Medical College, supported by grant from NIH (R25MH019946)	
	Chair's Choice Award	2014
	Society of Biological Psychiatry	
	Innovative Research Poster Award	2014
	National Network of Depression Centers	
	Best Abstract Award	2010
	International Society for ECT and Neurostimulation	
	Presidential Teaching Award Finalist	2010
	Columbia University	
	Student Paper Competition Finalist	2006
	IEEE Engineering in Medicine and Biology Society	
	New York Times College Scholarship	2002
	The New York Times Company Foundation	









- 64 Refereed journal articles
- 16 Refereed engineering proceedings & letters
- 17 Reviews, protocols, & consensus papers
- 9 Book chapters
- 6 Editorials, correspondences, & commentaries
- 8 Patents, patent applications
- + 170 Abstracts


* 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. Lubner, 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*, vol. 10, no. 2, Feb. 2025.  



 Journal cover



Z. Qi, G. M. Noetscher, A. Miles, K. Weise, T. R. Knösche, C. R. Cadman, A. R. Potashinsky, K. Liu, W. A. Wartman, G. Nuñez Ponasso, M. Bikson, H. Lu, **Z.-D. Deng**, A. R. Nummenmaa, and S. N. Makaroff, "Enabling electric field model of microscopically realistic brain," *Brain Stimulation*, online ahead of print, 2024.   

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.   



 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 multi-targeting," *The Journal of ECT*, online ahead of print, 2024.  







































B. Lubner, 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.  























* 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.  



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.  



L. Beynel, H. Gura, Z. Rezaee, E. C. Ekpo, **Z.-D. Deng**, J. O. Joseph, P. Taylor, B. Lubner, 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.   



- 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.  
 Part of the Special Issue on *Electric, Magnetic, and Electromagnetic Fields in Biology and Medicine: From Mechanisms to Biomedical Applications* 
 NIMH Intramural Research Program Trainee Travel Award (awarded to P. L. Robins), *NIMH IRP Fellows’ Scientific Training Day*, 2023.
- * **Z.-D. Deng**, B. Lubner, 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. 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,” *Neuropsychopharmacology*, vol. 49, no. 4, pp. 640–648, Mar. 2024.  
 Research highlight commentary: vol. 49, no. 4, pp. 635–636, Mar. 2024. 
- 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. 5, 055030, Feb. 2024.   
 Part of the Special Issue on *Electromagnetic Modeling for Brain Stimulation* 
 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. Olteidal, 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. 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.   
- S. N. Makaroff, Z. Qi, M. Rachh, W. A. Wartman, K. Weise, G. M. Noetscher, M. Daneshzand, **Z.-D. Deng**, L. Greengard, and A. R. Nummenmaa, “A fast direct solver for surface-based whole-head modeling of transcranial magnetic stimulation,” *Scientific Reports*, vol. 13, no. 8, 18657, Oct. 2023.   
- * **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,” *Biomedicines*, vol. 11, no. 8, 2320, Aug. 2023.  
- ✧ Part of the Special Issue on *Emerging Trends in Brain Stimulation* 
- 🏆 First Place in International Student Competition (awarded to P. L. Robins), *Brain & Human Body Modeling Conference*, 2022.
- 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.  
- M. Teferi, W. Makhoul, **Z.-D. Deng**, D. J. Oathes, Y. I. Sheline, and N. L. Balderston, “Continuous theta burst stimulation to the right dorsolateral prefrontal cortex may increase potentiated startle in healthy individuals,” *Biological Psychiatry: Global Open Science*, vol. 3, no. 3, pp. 470–479, July 2023.  
- J. Miller, T. R. Jones, J. Upston, **Z.-D. Deng**, S. M. McClintock, E. Erhardt, D. Farrar, D. K. Quinn, and C. C. Abbott, “Electric field, ictal theta power, and clinical outcomes in electroconvulsive therapy,” *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, vol. 8, no. 7, pp. 760–767, July 2023.  
- A. Guillen, C. C. Abbott, **Z.-D. Deng**, Y. Huang, P. Pascoal-Faria, D. Q. Truong, and A. Datta, “Impact of modeled field of view in electroconvulsive therapy current flow simulations,” *Frontiers in Psychiatry*, vol. 14, 1168672, May 2023.  
- 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.  
- X. Chen, R. Ma, W. Zhang, G. Q. Zeng, Q. Wu, A. Yimiti, X. Xia, J. Cui, Q. Liu, X. Meng, J. Bu, Q. Chen, Y. Pan, N. X. Yu, S. Wang, **Z.-D. Deng**, A. T. Sack, M. McLaughlin, and X. Zhang, “Alpha oscillatory activity is causally linked to working memory retention,” *PLOS Biology*, vol. 21, no. 2, e3001999, Feb. 2023.  
- Z. Fu, C. C. Abbott, J. Miller, **Z.-D. Deng**, S. M. McClintock, M. S. E. Sendi, J. Sui, and V. D. Calhoun, “Cerebro-cerebellar functional neuroplasticity mediates the effect of electric field on electroconvulsive therapy outcomes,” *Translational Psychiatry*, vol. 13, 43, Feb. 2023.   
- S. N. Makaroff, H. Nguyen, Q. Meng, H. Lu, A. Nummenmaa, and **Z.-D. Deng**, “Modeling transcranial magnetic stimulation coils with magnetic cores,” *Journal of Neural Engineering*, vol. 20, no. 1, 016028, Jan. 2023.   
- S. Qi, V. D. Calhoun, D. Zhang, J. Miller, **Z.-D. Deng**, K. L. Narr, Y. I. Sheline, S. M. McClintock, R. Jiang, X. Yang, J. Upston, T. R. 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. 22, 477, Dec. 2022.   
- ◇ Correction: vol. 21, 113, Mar. 2023. 
- H. Li, **Z.-D. Deng**, D. Oathes, and Y. Fan, “Computation of transcranial magnetic stimulation electric fields using self-supervised deep learning,” *NeuroImage*, vol. 264, 119705, Dec. 2022.  
- 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. 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, 616, Oct. 2022.   



- J. Miller, T. Jones, J. Upston, **Z.-D. Deng**, S.M. McClintock, S. Ryman, D. Quinn, and C.C. Abbott, “Ictal theta power as an electroconvulsive therapy safety biomarker: A pilot study,” *The Journal of ECT*, vol. 38, no. 2, pp. 88–94, June 2022.  
- H. Bagherzadeh, Q. Meng, **Z.-D. Deng**, H. Lu, E. Hong, Y. Yang, and F.-S. Choa, “Angle-tuned coils: Attractive building blocks for TMS with improved depth–spread performance,” *Journal of Neural Engineering*, vol. 19, no. 2, 026059, May 2022.  
- B. Luber, S.W. Davis, **Z.-D. Deng**, D. Murphy, A. Martella, A.V. Peterchev, and S.H. Lisanby, “Using diffusion tensor imaging to effectively target TMS to deep brain structures,” *NeuroImage*, vol. 249, 118863, Apr. 2022.  
- * **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 targeting of transcranial magnetic stimulation treatment,” *Neuropsychopharmacology*, vol. 47, no. 2, pp. 588–598, Jan. 2022.  
- 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. Lattoussakis, 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 geriatric major depressive disorder: Phase 2 of the PRIDE study,” *American Journal of Geriatric Psychiatry*, vol. 30, no. 1, pp. 15–28, Jan. 2022.  
- B. Kadriu, C.A. Farmer, P. Yuan, L.T. Park, **Z.-D. Deng**, R. Moaddel, I.D. Henter, B. Shovestul, E.D. Ballard, C. Kraus, P.W. Gold, R. Machado-Vieira, and C.A. Zarate, Jr., “The kynurenine pathway and bipolar disorder: Intersection of the monoaminergic and glutamatergic systems and immune response,” *Molecular Psychiatry*, vol. 26, no. 8, pp. 4085–4095, Aug. 2021.  
- A. Takamiya, F. Bouckaert, M. Laroy, J. Blommaert, A. Radwan, A. Khatoun, **Z.-D. Deng**, M. McLaughlin, W. Van Paesschen, F.-L. De Winter, J. Van den Stock, S. Sunaert, P. Sienaert, M. Vandembulcke, and L. Emsell, “Biophysical mechanisms of electroconvulsive therapy-induced volume expansion in the medial temporal lobe: A longitudinal *in vivo* human imaging study,” *Brain Stimulation*, vol. 14, no. 4, pp. 1038–1047, July–Aug. 2021.  
- E.A. Friðgeirsson, **Z.-D. Deng**, D. Denys, J.A. van Waarde, and G.A. van Wingen, “Electric field strength induced by electroconvulsive therapy may be associated with clinical outcome: A pilot study,” *NeuroImage: Clinical*, vol. 30, 102581, Feb. 2021.  
- P.J.C. Suen, S. Doll, M.C. Battistuzzo, G. Busatto, L.B. Razza, F. Padberg, E. Mezger, L. Bulubas, D. Keeser, **Z.-D. Deng**, and A.R. Brunoni, “Association between tDCS computational modeling and clinical outcomes in depression: Data from the ELECT-TDCS trial,” *European Archives of Psychiatry and Clinical Neuroscience*, vol. 271, no. 1, pp. 101–110, Feb. 2021.  
- C.C. Abbott, D. Quinn, J. Miller, E. Ye, S. Iqbal, M. Lloyd, T.R. Jones, J. Upston, **Z.-D. Deng**, E. Erhardt, and S.M. McClintock, “Electroconvulsive therapy pulse amplitude and





clinical outcomes,” *American Journal of Geriatric Psychiatry*, vol. 29, no. 2, pp. 166–178, Jan. 2021.  



M. L. Cox, **Z.-D. Deng**, H. Palmer, A. Watts, L. Beynel, J. R. Young, S. H. Lisanby, J. Migaly, and L. G. Appelbaum, “Utilizing transcranial direct current stimulation to enhance laparoscopic technical skills training: A randomized controlled trial,” *Brain Stimulation*, vol. 13, no. 3, pp. 863–872, May–June 2020.  



S. Aronson Fischell, T. J. Ross, **Z.-D. Deng**, B. J. Salmeron, and E. A. Stein, “Transcranial direct current stimulation applied to the dorsolateral and ventromedial prefrontal cortices in smokers modifies cognitive circuits implicated in the nicotine withdrawal syndrome,” *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, vol. 5, no. 4, pp. 448–460, Apr. 2020.  




S. H. Lisanby, S. M. McClintock, G. Alexopoulos, S. H. Bailine, E. Bernhardt, M. C. Briggs, C. M. Cullum, **Z.-D. Deng**, M. Dooley, E. T. Geduldig, R. M. Greenberg, M. M. Husain, S. Kaliora, R. G. Knapp, V. Latoussakis, L. S. Liebman, W. V. McCall, M. Mueller, G. Petrides, J. Prudic, P. B. Rosenquist, M. V. Rudorfer, S. Sampson, A. A. Teklehaimanot, K. G. Tobias, R. D. Weiner, R. C. Young, C. H. Kellner, on behalf of the CORE/PRIDE Work Group, “Neurocognitive effects of combined electroconvulsive therapy (ECT) and venlafaxine in geriatric depression: Phase 1 of the PRIDE study,” *American Journal of Geriatric Psychiatry*, vol. 28, no. 3, pp. 304–316, Mar. 2020.  
 Commentary: vol. 28, no. 3, pp. 317–319, Mar. 2020. 




N. L. Balderston, E. M. Beydler, C. Roberts, **Z.-D. Deng**, T. Radman, T. Lago, B. Luber, 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.  




































L.-Z. Yang, W. Zhang, W. Wang, Z. Yang, H. Wang, **Z.-D. Deng**, C. Li, B. Qiu, D.-R. Zhang, R. Cohen Kadosh, H. Li, and X. Zhang, “Neural and psychological predictors of cognitive enhancement and impairment due to neurostimulation,” *Advanced Science*, vol. 7, no. 4, 1902863, Feb. 2020.  
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N. L. Balderston, E. M. Beydler, M. Goodwin, **Z.-D. Deng**, T. Radman, B. Luber, S. H. Lisanby, M. Ernst, and C. Grillon, “Low-frequency parietal repetitive transcranial magnetic stimulation reduces fear and anxiety,” *Translational Psychiatry*, vol. 10, no. 1, 68, Feb. 2020.  












T. Dufor, S. Grehl, A. D. Tang, M. Doulazmi, M. Traoré, N. Debray, C. Dubacq, **Z.-D. Deng**, J. Mariani, A. M. Lohof, and R. M. Sherrard, “Neural circuit repair by low-intensity magnetic stimulation requires cellular magnetoreceptors and specific stimulation patterns,” *Science Advances*, vol. 5, no. 10, eaav9847, Oct. 2019.  

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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DISSERTATION & THESIS

- * **Z.-D. Deng**, “Electromagnetic Field Modeling of Transcranial Electric and Magnetic Stimulation: Targeting, Individualization, and Safety of Convulsive and Subconvulsive Applications,” Ph.D. dissertation, Columbia University, Department of Electrical Engineering, New York, NY, 2013. Sponsor: K. L. Shepard. Available: Columbia University Academic Commons 


- * **Z.-D. Deng**, “Stochastic Chaos and Thermodynamic Phase Transitions: Theory and Bayesian Estimation Algorithms,” M.Eng. thesis, Massachusetts Institute of Technology, Department of Electrical Engineering and Computer Science, Cambridge, MA, 2007. Sponsor: C.-S. Poon. Available: DSpace@MIT 

SELECTED ABSTRACTS (PRIOR 3 YEARS)

 **Denotes oral presentation**

L. Beynel, V. Roopchansingh, R. Reynolds, P. Taylor, **Z.-D. Deng**, L. Li, N. Baker, D. Brandy, K. Cameron, H. Gura, E. Ekpo, S. Menon, E. Wiener, Z. Rezaee, J. K. Rajendra, B. Lubner, and S. H. Lisanby, “A journey towards an objective control of brain state: Concurrent rTMS during real time fMRI neurofeedback,” *International Society for CNS Clinical Trials and Methodology Annual Scientific Meeting*, accepted 2025.

- * **Z.-D. Deng**, “Multichannel Individualized Stimulation Therapy (MIST): A targeted approach to optimize electroconvulsive therapy,” *International Brain Stimulation Conference*, accepted 2025.






 S. Francis, Z. Rezaee, C. Reid, E. Bharti, M. Jaime, E. Greenstein, **Z.-D. Deng**, B. Lubner, C. Zrenner, and S. H. Lisanby, “Enhancing TMS response through real-time EEG-triggered paired associative stimulation of mu rhythm,” *International Brain Stimulation Conference*, accepted 2025.

D. Tang, W. Wartman, A. Nummenmaa, M. Daneshzand, G. Noetscher, H. Lu, **Z.-D. Deng**, and S. N. Makaroff, “A BEM-FMM TMS coil designer using MATLAB platform,” *International Brain Stimulation Conference*, accepted 2025; also presented at *NYC Neuromodulation Conference*, 2024.


L. D. Oliver, D. M. Blumberger, C. Hawco, E. W. Dickie, J. Gallucci, J. Jeyachandra, S. Mansour, **Z.-D. Deng**, S. M. Hare, J. M. Gold, G. Foussias, M. Argyelan, Z. J. Daskalakis, R. W. Buchanan, A. K. Malhotra, and A. N. Voineskos, “Effects of individualized transcranial magnetic stimulation on social cognitive network functional connectivity in schizophrenia spectrum disorders: A target engagement study,” *Neuropsychopharmacology*, vol. 49, supplement, p. 420, 2024.

- * C. C. Abbott, T. L. Squillaci, B. A. Kimbrell, J. David, J. Upston, T. Jones, A. Datta, and **Z.-D. Deng**, “Predictive biomarkers to inform ECT parameter selection,” *Neuropsychopharmacology*, vol. 49, supplement, p. 411, 2024.

- * **Z.-D. Deng**, J. Kim, B. A. Pritchard, R. H. Schor, G. R. Dold, and S. H. Lisanby, “Multichannel Individualized Stimulation Therapy (MIST): Precision through computational modeling and multitargeted stimulation,” *Neuropsychopharmacology*, vol. 49, supplement, p. 192, 2024.
- E. Jones, T. Torrico, L. Beynel, **Z.-D. Deng**, D. Nielson, E. Wiener, S. Menon, B. Lubner, E. Ekpo, W. Regenold, and S. H. Lisanby, “Accelerated intermittent theta burst stimulation for depression,” *American Psychiatric Nurses Association Annual Conference*, 2024.
- * E. Bharti, S. Dey, V. Voon, S. M. Goetz, C. A. Zarate, Jr., S. H. Lisanby, and **Z.-D. Deng**, “Personalized brain modeling of psychiatric treatments,” *NIMH IRP Fellows’ Scientific Training Day*, 2024.
- * S. Dey and **Z.-D. Deng**, “A robust state estimation strategy for brain stimulation,” *NIMH IRP Fellows’ Scientific Training Day*, 2024.
- E. Greenstein, Z. Rezaee, **Z.-D. Deng**, L. Oberman, and S. H. Lisanby, “Exploring individual variability in TMS effects: The case for E-field modeling in research,” *NIMH IRP Fellows’ Scientific Training Day*, 2024.
- Z. Qi, G. M. Noetscher, A. Miles, K. Weise, T. R. Knösche, C. R. Cadman, A. R. Potashinsky, K. Liu, W. A. Wartman, G. Nuñez Ponasso, M. Bikson, H. Lu, **Z.-D. Deng**, A. R. Nummenmaa, and S. N. Makaroff, “Enabling electric field model of microscopically realistic brain,” *NYC Neuromodulation Conference*, 2024.
- E. Ekpo, L. Beynel, **Z.-D. Deng**, B. Lubner, W. T. Regenold, E. Jones, and S. H. Lisanby, “Functional connectivity in depression: Task-based vs resting state fMRI,” *Annual Biomedical Research Conference for Minoritized Scientists*, 2024.
- N. I. Hasan, M. Dannhauer, D. Wang, **Z.-D. Deng**, and L. J. Gomez, “Real-time computation of E-field for transcranial magnetic stimulation,” *National Radio Science Meeting*, 2025.
- 🏆 Third Place in Best Student Paper (awarded to N. I. Hasan), *Photonics and Electromagnetics Research Symposium*, 2024.
- S. M. Francis, S. N. Menon, L. Beynel, P. L. Robins, **Z.-D. Deng**, A. Thurm, T. White, F. Pereira, L. M. Oberman, and S. H. Lisanby, “Identifying domain-specific nodes using network controllability to determine potential TMS targets for ASD,” *Annual Meeting of the International Society for Autism Research*, 2024.
- L. Beynel, B. Lubner, H. Gura, Z. Rezaee, E. Ekpo, **Z.-D. Deng**, O. Joseph, P. Taylor, and S. H. Lisanby, “When the target is a moving target: Practical issues in using task fMRI for rTMS targeting,” *Aperture Neuro*, vol. 4, no. Suppl 1, pp. 1457–1458, 2024.
- L. D. Oliver, D. M. Blumberger, C. Hawco, E. W. Dickie, J. Gallucci, J. Jeyachandra, **Z.-D. Deng**, J. M. Gold, G. Foussias, M. Argyelan, Z. J. Daskalakis, R. W. Buchanan, A. K. Malhotra, and A. N. Voineskos, “Effects of personalized transcranial magnetic stimulation on social cognitive network functional connectivity in schizophrenia spectrum disorders,” *Biological Psychiatry*, vol. 95, no. 10, pp. S278–S279, 2024; also presented at *Annual Congress of the Schizophrenia International Research Society*, 2024.
- * P. L. Robins, J. R. Gilbert, and **Z.-D. Deng**, “Characterizing hippocampal activation with magnetoencephalography using the mnemonic similarity task in healthy participants,” *Biological Psychiatry*, vol. 95, no. 10, p. S205, 2024; also in *Aperture Neuro*, vol. 4, no. Suppl 1, p. 1713, 2024; and *NIH Postbac Poster Day*, 2024.
- E. Ekpo, L. Beynel, **Z.-D. Deng**, B. Lubner, W. T. Regenold, E. Jones, and S. H. Lisanby, “Goal priming: Using a task to assess functional connectivity in depression,” *Biological Psychiatry*, vol. 95, no. 10, pp. S192–S193, 2024.
- * C. C. Abbott, J. Miller, M. Argyelan, S. M. McClintock, and **Z.-D. Deng**, “Individualized amplitude and electroconvulsive therapy,” *Biological Psychiatry*, vol. 95, no. 10, p. S31, 2024.

- M. Argyelan, **Z.-D. Deng**, O. T. Ousdal, L. Olteidal, G. Petrides, A. Malhotra, and C. C. Abbott, “Electroconvulsive therapy-induced volumetric brain changes converge on a common causal circuit in depression,” *Biological Psychiatry*, vol. 95, no. 10, pp. S29–S30, 2024.
- P. L. Robins, S. H. Lisanby, and **Z.-D. Deng**, “Quantifying aliasing in paper electroencephalography (EEG) during electroconvulsive therapy (ECT),” *International Society for ECT and Neurostimulation Annual Meeting*, 2024.
- M. Teferi, M. Patel, A. Casalvera, **Z.-D. Deng**, K. Lynch, D. Oathes, Y. Sheline, and N. Balderston, “Both cTBS and iTBS increase anxiety when delivered to the right dlPFC in healthy volunteers,” *Neuropsychopharmacology*, vol. 46, supplement, p. 83, 2023.
- M. Jaime, L. M. Oberman, S. M. Francis, J. Stout, **Z.-D. Deng**, P. L. Robins, J. W. van der Veen, and S. H. Lisanby, “An experimental methods based approach to understanding the mechanisms underlying MEG indices of auditory/language processing,” *MEG North America Workshop*, 2023.
- M. Jaime, E. Ekpo, L. M. Oberman, S. M. Francis, L. Beynel, M. Hynd, P. L. Robins, **Z.-D. Deng**, J. Stout, J. W. van der Veen, A. Thurm, and S. H. Lisanby, “Design and methodology for a proof of mechanism study of individualized neuronavigated continuous theta burst stimulation for auditory processing in adolescents with autism spectrum disorder,” *NIMH IRP Fellows’ Scientific Training Day*, 2023.
- E. Ekpo, H. Gura, Z. Rezaee, **Z.-D. Deng**, B. Luber, S. H. Lisanby, and L. Beynel, “Effects of practice and fMRI-Guided rTMS on a numerical Stroop task,” *NIMH IRP Fellows’ Scientific Training Day*, 2023.
- * M. Dannhauer, S. H. Lisanby, and **Z.-D. Deng**, “The next generation of Dosing Optimization for Transcranial Magnetic Stimulation (DO-TMS),” *NIMH IRP Fellows’ Scientific Training Day*, 2023.
- * P. L. Robins, S. N. Makaroff, and **Z.-D. Deng**, “Electric field characteristics of rotating permanent magnet stimulation,” *Biomedical Engineering Society Annual Meeting*, 2023; also presented at *NIMH IRP Fellows’ Scientific Training Day*, 2023.
 NIMH IRP Trainee Travel Award
- E. Jones, **Z.-D. Deng**, Z. Rezaee, P. Rohde, P. L. Robins, W. T. Regenold, and S. H. Lisanby, “Transcranial electric stimulation therapy for treatment resistant depression,” *American Psychiatric Nurses Association Annual Conference*, 2023.
-  S. N. Menon, S. M. Francis, L. Beynel, P. L. Robins, **Z.-D. Deng**, A. Thurm, T. White, F. Pereira, P. Taylor, L. M. Oberman, and S. H. Lisanby, “Localizing brain networks in autism: A protocol to identify potential rTMS targets,” *NIH Julius Axelrod Symposium*, 2024; also presented at *NIMH IRP Fellows’ Scientific Training Day*, 2023.
-  W. A. Wartman, K. Weise, M. Rach, L. Morales, **Z.-D. Deng**, A. Nummenmaa, and S. N. Makaroff, “An adaptive h-refinement method for the boundary element fast multipole method for quasi-static electromagnetic modeling,” *Brain & Human Body Modeling Conference*, 2023.
 Third Place in International Student Competition (awarded to W. A. Wartman)
-  S. N. Makaroff, W. A. Wartman, **Z.-D. Deng**, and A. Nummenmaa, “Charge-based brain modeling engine at mesoscale and multiscale,” *WPI Research, Discovery, and Innovation (ReDI) Annual Symposium*, 2023.
- * J. Kim, B. A. Pritchard, R. H. Schor, G. R. Dold, S. H. Lisanby, and **Z.-D. Deng**, “Multichannel Individualized Stimulation Therapy (MIST) system for treatment of depression,” *Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, 2023.

- P. L. Robins, P. Rohde, **Z.-D. Deng**, W. T. Regenold, and S. H. Lisanby, "Feasibility method for magnetoencephalography data collection and analysis for patients receiving electroconvulsive therapy," *NIH Postbac Poster Day*, 2023.
- P. Rohde, P. L. Robins, Z. Rezaee, **Z.-D. Deng**, E. Jones, W. T. Regenold, and S. H. Lisanby, "A feasibility study of transcranial electric stimulation (TEST) for treatment resistant depression investigating the necessity of seizure in electroconvulsive therapy," *NIH Postbac Poster Day*, 2023.
- A. Guillen, C. C. Abbott, **Z.-D. Deng**, D. Truong, and A. Datta, "Impact of modeled field of volume in ECT current flow simulations," *International Brain Stimulation Conference*, 2023.
- B. Lubner, S. Davis, **Z.-D. Deng**, D. Murphy, A. V. Peterchev, and S. H. Lisanby, "Targeting deep brain structures with TMS using diffusion tensor imaging," *Brain Stimulation*, vol. 16, no. 1, p. 180, 2023.
- W. Wartman, A. Miles, G. Hartwigsen, T. Knösche, **Z.-D. Deng**, and K. Weise, "How important are extracerebral brain compartments for TES, TMS, and ECT modeling predictions?" *Brain Stimulation*, vol. 16, no. 1, p. 138, 2023.
- *✉ M. Dannhauer and **Z.-D. Deng**, "Optimizing the placements of multielectrode tES montages from EEG dipole modeling," *Brain Stimulation*, vol. 16, no. 1, pp. 136–137, 2023.
- ✉ J. Ferreira, L. Morales, R. Lemdiasov, H. Lu, **Z.-D. Deng**, and S. N. Makaroff, "TMS coil and TMS coil array designer with fast multipole method," *Brain Stimulation*, vol. 16, no. 1, p. 136, 2023.
- * **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.
- * H. Gura, E. Feuer, C. Abboud Chalhoub, S. Awasthi, M. Noh, B. Lubner, and S. H. Lisanby, and **Z.-D. Deng**, "Effect of intertrain interval on theta burst induced changes in motor cortical excitability," Program No. 752.18. *Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience*, 2022.
- E. Jones, **Z.-D. Deng**, Z. Rezaee, F. Mukhtar, E. Feuer, P. Rohde, P. L. Robins, W. T. Regenold, and S. H. Lisanby, "Innovative electroconvulsive therapy: Individualized Low Amplitude Seizure Therapy," *American Psychiatric Nurses Association Annual Conference*, 2022.
- 🏆 Poster Award (awarded to the Noninvasive Neuromodulation Unit), *NIMH 75th Anniversary Event*, 2023.
- *✉ P. L. Robins and **Z.-D. Deng**, "Comparison of coil localization approaches and induced electric fields in depressed adolescents receiving repetitive transcranial magnetic stimulation," *NIMH IRP Fellows' Scientific Training Day*, 2022.
- *✉ P. L. Robins, M. Dannhauer, L. M. Haugen, J. D. Port, P. E. Croarkin, and **Z.-D. Deng**, "Comparison of coil localization approaches and induced electric fields in depressed adolescents receiving repetitive transcranial magnetic stimulation," *Brain & Human Body Modeling Conference*, 2022.
- 🏆 First Place in International Student Competition (awarded to P. L. Robins)
- M. Argyelan, C. C. Abbott, **Z.-D. Deng**, B. Wade, GEMRIC Consortium, G. Petrides, and A. Malhotra, "Personalizing electroconvulsive therapy with electrical field modeling," *Biological Psychiatry*, vol. 91, no. 9, p. S210, 2022.
- *✉ C. C. Abbott, S. M. McClintock, M. Argyelan, and **Z.-D. Deng**, "Individualizing electroconvulsive therapy (ECT) amplitude to improve clinical outcomes," *Biological Psychiatry*, vol. 91, no. 9, pp. S54–S55, 2022.

* **Z.-D. Deng**, S. M. McClintock, M. Husain, and S. H. Lisanby, “Depressive symptom dimensions and response trajectories in electroconvulsive therapy and magnetic seizure therapy,” *Biological Psychiatry*, vol. 91, no. 9, p. S21, 2022.

E. C. Feuer, **Z.-D. Deng**, A. V. Peterchev, C. Sikes-Keilp, M. A. Rosa, and S. H. Lisanby, “Effects of stimulus frequency and individualized current amplitude on EEG and EMG characteristics in electroconvulsive therapy and magnetic seizure therapy,” *International Society for ECT and Neurostimulation Annual Meeting*; also presented at *NIH Julius Axelrod Symposium*, 2022.

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.

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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.

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 2020–
Role: Associate investigator; PI: S. H. Lisanby

Safety and feasibility of individualized low amplitude seizure therapy

NIMH Protocol 19-M-0073 2019–
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.

	<i>Concurrent fMRI-guided rTMS and cognitive therapy for the treatment of major depressive episodes</i> NIMH Protocol 17-M-0147 2017– Role: Associate investigator; PI: S. H. Lisanby
	<i>Development of non-invasive brain stimulation techniques</i> NIMH Protocol 18-M-0015 2017– Role: Associate investigator; PI: S. H. Lisanby
	<i>Development of functional and structural magnetic resonance imaging techniques for the study of mood and anxiety disorders</i> NIMH Protocol 07-M-0021 2017– Role: Associate investigator; PI: A. C. Nugent
	<i>Identifying neurobiological mechanisms that underlie acute nicotine withdrawal and drive early relapse in smokers</i> NIDA Protocol 12-DA-N474 2017– Role: Associate investigator; PI: A. Janes
	<i>Neuropharmacologic imaging and biomarker assessments of response to acute and repeated-dosed ketamine infusions in major depressive disorder</i> NIMH Protocol 17-M-0060 2016– Role: Associate investigator; PI: C. A. Zarate, Jr.
	<i>Evaluation of patients with mood and anxiety disorders and healthy volunteers</i> NIMH Protocol 01-M-0254 2016– Role: Associate investigator; PI: C. A. Zarate, Jr.
	<i>Modulation of the parieto-frontal communication</i> NINDS Protocol 18-N-0054 2018–2019 Role: Associate investigator; PI: M. Hallett
	<i>Effect of TMS to frontoparietal attention network on anxiety potentiated startle</i> NIMH Protocol 17-M-0042 2017–2019 Role: Associate investigator; PI: C. Grillon
ONGOING RESEARCH SUPPORT	<i>ADEPT: Adaptive trial for the treatment of depression associated with concussion using repetitive transcranial magnetic stimulation protocols</i> Congressional 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.
	<i>Charge-based brain modeling engine with boundary element fast multipole method</i> 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 electro-magnetic modeling.
	<i>Novel electric-field modeling approach to quantify changes in resting state functional connectivity following theta burst stimulation</i> 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.
	<i>Development of a novel, scalable, neurobiologically-guided transcranial magnetic stimulation</i>

PENDING RESEARCH SUPPORT	<i>protocol for the treatment of cannabis use disorder</i>	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.	
	<i>Deciphering mechanisms of ECT outcomes and adverse effects (DECODE)</i>	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.	
	<i>ECT amplitude titration for improved clinical outcomes in late-life depression</i>	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.	
	<i>Neuromodulation of social cognitive circuitry in people with schizophrenia spectrum disorders</i>	NIH/NIMH R61/R33 MH120188	2020.05–2023.04
COMPLETED RESEARCH SUPPORT		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.	
	<i>Improving ECT clinical outcomes through seizure- and model-guided stimulation parameters</i>	NIH UH3/UG3	2024.10
		Role: mPI; collaborating PIs: C. C. Abbott, A. Datta	
	<i>Development of high-density theta burst TMS technology and initial testing in humans</i>	NIH UH3/UG3	2024.09
		Role: Intramural NIH collaborator; PI: H. Lu	
	<i>Improving the optimization of TMS coil placement with precise calculation of electric fields and robust computation of personalized functional networks</i>	NIH/NIMH R01	2024.10
		Role: Intramural NIH collaborator; PI: Y. Fan	
	<i>Targeting the causal depression network with electroconvulsive therapy</i>	NIH/NIMH R33/R61	2024.02
		Role: Intramural NIH collaborator; PI: M. Argyelan	
	<i>Development of a next generation ECT system: PRecision Optimally Targeted ECT</i>	NIH/NIMH UG3/UH3	2024.06
		Role: Intramural NIH collaborator; PI: C. C. Abbott	
	<i>ECT pulse amplitude and medial temporal lobe engagement</i>	NIH/NINDS U01 MH111826	2016.09–2020.07
		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.		
	<i>Individualized low amplitude seizure therapy (iLAST)</i>	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.
- 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.

	<i>Translational research evaluating neurocognitive memory processes</i> 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 therapy.
	<i>Rational dosing for electric and magnetic seizure therapy</i> NIH/NIMH R01 MH091083 2010.07–2015.12 Role: Graduate research assistant, contributed to grant writing; PI: S. H. Lisanby This study aims to optimize stimulus parameters of electric and magnetic seizure therapy through computational modeling and preclinical studies of seizure induction.
	<i>Field shaping and coil design for transcranial magnetic stimulation</i> NIH/NCRR TL1 RR024158 2010.09–2011.06 Role: PI; Training Grant PI: H. N. Ginsberg 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 transcranial magnetic stimulation.
	<i>Development of a novel TMS device with controllable pulse shape</i> NIH/NIBIB R21 EB006855 2007.08–2009.07 Role: Graduate research assistant; PI: A. V. Peterchev This project develops an efficient transcranial magnetic stimulation device that produces nearly rectangular pulses with adjustable amplitude, width, and directionality.
	<i>Nonlinear analysis of heart rate variability</i> NIH/NHLBI R01 HL079503 2005.11–2009.06 Role: Graduate research assistant; PI: C.-S. Poon This project develops advanced nonlinear estimation and adaptive control algorithms for the modeling and analysis of the cardiovascular system.
GRAND ROUNDS	Advanced Research Institute Grand Rounds in Mental Health and Aging Research 2023 <i>Advancing neurostimulation treatment optimization and technology innovation</i> Westmead Hospital, Sydney, Australia 2020 <i>Advances in neuromodulation: Electroconvulsive therapy</i> Clinical TMS Society 2018 <i>Transcranial magnetic stimulation: Physics, devices, and modeling</i> University of New Mexico, Department of Psychiatry & Behavioral Sciences 2017 <i>Toward individualized electroconvulsive therapy for treatment of depression</i> Central Regional Hospital, Butner, NC 2015 <i>Individualized seizure therapy</i> Duke University School of Medicine, Department of Psychiatry & Behavioral Sciences 2015 <i>Toward next generation seizure therapy</i>
INVITED SEMINARS	NIMH Intramural Research Program Investigators' Seminar Series Upcoming 2025 <i>Reading faces: Application of facial expression analysis for tracking emotional states in depression</i> UCSF Department of Psychiatry & Behavioral Sciences Upcoming 2025 <i>Engineering precision in neuromodulation: Computational models and clinical applications</i> University of Pittsburgh, Geriatric Psychiatry Neuroimaging Laboratory 2024 <i>The full spectrum: Electromagnetic brain stimulation from minimal to maximal intensity</i> University of Texas Southwestern, Center for Depression Research and Clinical Care 2023 <i>Advancements in computational neurostimulation for depression treatment optimization</i>

and technology development

University of Pittsburgh, Department of Psychiatry <i>Computational neurostimulation: Approach to treatment optimization and technology development</i>	2023
Medical University of South Carolina National Center of Neuromodulation for Rehabilitation <i>Model-driven design for brain stimulation therapies</i> 	2022
NIMH Intramural Research Program Investigators' Seminar Series <i>Seizure therapies: The next generation</i>	2022
Butler Hospital, Brown University <i>Computational model driven design for brain stimulation</i>	2021
University of Pennsylvania, Center for Neuromodulation in Depression and Stress <i>Electromagnetic brain stimulation from low to high intensity</i>	2021
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
Medical University of Vienna, Neuroimaging Lab <i>Precision seizure therapy</i>	2020
Mount Sinai Icahn School of Medicine, Depression and Anxiety Center <i>Rational design of individualized noninvasive brain stimulation</i>	2019
NIMH Intramural Research Program Investigators' Seminar Series <i>Computational neurostimulation: Engineering better brain stimulation therapies</i>	2018
UCLA Brain Mapping Center <i>Computational neurostimulation: Engineering better brain stimulation therapies</i>	2018
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 <i>Computational neurostimulation</i>	2018
NIDA, Neuroimaging Research Branch <i>Advances in transcranial magnetic stimulation technology</i>	2016
Mayo Clinic College of Medicine, Department of Molecular Pharmacology Neurobiology of Alcoholism and Drug Addiction Lab <i>Transcranial magnetic stimulation technology development</i>	2016
Mayo Clinic College of Medicine, Department of Neurologic Surgery Neural Engineering Lab <i>Optimizing transcranial magnetic stimulation</i>	2016
NIMH, Experimental Therapeutics & Pathophysiology Branch <i>Engineering better electromagnetic brain stimulation therapies</i>	2016
Duke University School of Medicine, Department of Psychiatry & Behavioral Sciences Chair's round: <i>Fundamentals of transcranial electric and magnetic stimulation dosing</i>	2015
Weill Cornell Medical College, Department of Biomedical Engineering <i>Transcranial magnetic stimulation: Pulse source, coil design, & concurrent neuroimaging</i>	2015
Duke University, Department of Biomedical Engineering <i>Modeling and coil design considerations for transcranial magnetic stimulation</i>	2014

CONFERENCE TALKS, WORKSHOPS, & PANELS	International Society for ECT and Neurostimulation Annual Meeting <i>Multichannel Individualized Stimulation Therapy</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
	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 <i>Model-driven brain stimulation treatments</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
	Brain and Human Body Modeling Conference The Martinos Center for Biomedical Imaging, Massachusetts General Hospital Chair: <i>New modeling methods and targets: Spinal cord stimulation and novel stimulation</i> Chair: <i>Development and assessment of modeling methods</i> Contributed talk: <i>Effects of low intensity magnetic stimulation</i> Judge: Student competition	2023
	International Conference of the IEEE Engineering in Medicine and Biology Society Panel: <i>Computational analysis of non-invasive neuromodulation: Brain and spine</i> Contributed talk: <i>Modeling of TMS and ECT in the treatment of depression</i>	2023
	ADAA Anxiety and Depression Conference Panel: <i>Parsing through syndromic heterogeneity in youths with mental illness to identify neurocircuit mechanisms and develop novel treatments</i> Contributed talk: <i>Modeling and dose optimization for TMS and ECT</i>	2023
	International Brain Stimulation Conference Symposium chair: <i>Insights and challenges in preclinical models of TMS: Multimodal investigations across animal species</i> Fast-track oral symposium chair: <i>Advanced computational modeling and optimization methods for noninvasive brain stimulation</i>	2023
	International Network of tES-fMRI (INTF) Webinar Series <i>Electric field modeling and optimization approaches for individualized targeting</i>	2022
	International Society for Magnetic Resonance in Medicine Workshop: <i>MRI of neuromodulation: Target engagement, neural mechanism, and bio-marker development</i> Contributed talk: <i>Modeling of TMS</i> 	2022
	Bergen Workshop of the Global ECT-MRI Collaboration <i>ECT device development</i> 	2022
	International Congress of Clinical Neurophysiology Chair: <i>Towards optimized TMS targeting approaches</i>	2022
	Brain and Human Body Modeling Conference The Martinos Center for Biomedical Imaging, Massachusetts General Hospital Chair: <i>Modeling of transcranial electrical stimulation and deep brain stimulation</i> Contributed talk: <i>ECT, electric field, neuroplasticity, and clinical outcomes</i>	2022

European Conference of Brain Stimulation in Psychiatry	2022
Panel: <i>Beyond clinical syndromes: Understanding mechanisms of neuromodulation from a dimensional perspective</i>	
Contributed talk: <i>Symptom dimensions and response trajectories in ECT and MST</i>	
Society of Biological Psychiatry Annual Meeting	2022
Panel: <i>Dimensional approaches to device neuromodulation</i>	
Contributed talk: <i>Depressive symptom dimensions in seizure therapy</i>	
Global ECT–MRI Collaboration Young Researchers Collective	2022
<i>ECT, electric field, neuroplasticity, and clinical outcomes</i>	
American Academy of Child and Adolescent Psychiatry Annual Meeting	2021
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>	
European College of Neuropsychopharmacology Congress	2021
Panel: <i>Neurobiology of rapid mood changes</i>	
Contributed talk: <i>Precision neurostimulation: Electroconvulsive therapy</i>	
Society for Brain Mapping & Therapeutics Annual Congress	2021
<i>Advances in electroconvulsive therapy for treatment of depression</i>	
American Society of Clinical Psychopharmacology Annual Meeting	2021
Early Career Workshop: <i>How to give a virtual talk</i>	
International College of Neuropsychopharmacology Virtual World Congress	2021
<i>Next generation seizure therapy and neuromodulation</i>	
European Conference of Brain Stimulation in Psychiatry	2020
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>	
University of Minnesota Non-Invasive Brain Stimulation Workshop	2020
<i>Use of individual electric field models in clinical research</i> 	
American Society of Clinical Psychopharmacology Annual Meeting	2020
Panel: <i>New developments in neurostimulation</i> #coronacancelled	
NYC Neuromodulation Online	2020
Discussant: <i>Noninvasive vagus nerve stimulation applied to stress management, opioid withdrawal, and neurocognitive disorders</i>	
American College of Neuropsychopharmacology Annual Meeting	2019
Panel: <i>Precision neurostimulation for treatment of psychiatric disorders</i>	
Contributed talk: <i>Rational design of precision seizure therapy</i>	
International Symposium on Advancing Stimulation Precision Medicine of Brain Disorders, Copenhagen University Hospital Hvidovre, Danish Research Centre for Magnetic Resonance	2019
<i>Rational design of precision seizure therapy</i>	
International College of Neuropsychopharmacology Meeting	2019
Workshop: <i>Neurobiological and clinical characterization, and treatment development for treatment resistant depression</i>	
Contributed talk: <i>Individualized seizure therapy: Reinventing ECT</i>	
American Society of Clinical Psychopharmacology Annual Meeting	2019
Co-chair: <i>Treatment-resistant mood disorders across the lifespan: Novel therapeutics</i>	
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>	

2 nd 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
<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>	
American Psychiatric Association Annual Conference	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>	
NIMH Workshop on Transcranial Electrical Stimulation: Mechanisms, Technology, and Therapeutic Applications	2016
<i>Effect of anatomical variability on electric field characteristics of tES</i>	
International Society for ECT and Neurostimulation Annual Meeting	2015
Workshop: <i>Spatial targeting with transcranial magnetic stimulation</i>	

TEACHING &
MENTORING
APPOINTMENTS

National Institutes of Health	Bethesda, MD
<i>Lecturer, NINDS</i>	
Clinical Neuroscience Program Lecture Series	2017, 2019
<i>Lecturer, NIMH</i>	
NIH Basic Training Course on Transcranial Magnetic Stimulation	2020
fMRI Course	2017
University of Maryland, College Park	College Park, MD
<i>Research Mentor, Fischell Department of Bioengineering</i>	2018–2019
Duke University	Durham, NC
<i>Instructor, Department of Psychology & Neuroscience</i>	
Research Independent Study	2016
<i>Faculty, Department of Psychiatry & Behavioral Sciences</i>	
Visiting Fellowship in Transcranial Magnetic Stimulation & Electroconvulsive Therapy Fellowship (Continuing Medical Education accredited)	2014–2016
<i>Research Mentor</i>	
Matching Undergraduates to Science and Engineering Research Program	2015–2016
<i>Faculty, Biosciences Collaborative for Research Engagement</i>	2015–2016

	Columbia University	New York, NY
	<i>Teaching Assistant</i> , Department of Electrical Engineering	
	Analog Systems in VLSI (graduate level)	Spring 2010
	The Digital Information Age	Fall 2009
	<i>Recitation Instructor</i> , Department of Biostatistics, Mailman School of Public Health	
	Biostatistics (graduate level)	Fall 2009
	Massachusetts Institute of Technology	Cambridge, MA
	<i>Educational Counselor</i>	2022–
	<i>Teaching Assistant</i> , Concourse Program	
	Multivariable Calculus	Fall 2003–2006
	Differential Equations	Spring 2004–2007
	<i>Grader</i> , Department of Electrical Engineering & Computer Science	
	Signals and Systems	Fall 2004
SPONSORED THESES	G. Asturias, Psychology & Neuroscience, Duke University	2015–2017
	🎓 Graduated with Distinction	
	Undergraduate honors thesis: “Effect of repetitive transcranial magnetic stimulation on the structural and functional connectome in patients with major depressive disorder,”	
	<i>DukeSpace</i> 	
	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	
	D. Q. Troung, Biomedical Engineering, CUNY City College	2019
	Ph.D. dissertation: “Translational modeling of non-invasive electrical stimulation,”	
	<i>CUNY Academic Works</i> 	
	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
	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 neuromodulation targets for depression”	
	🎓 Klerman Prize for Exceptional Clinical Research, <i>Brain & Behavior Research Foundation</i>	
	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”	
	🎓 Klerman Prize for Exceptional Clinical Research, <i>Brain & Behavior Research Foundation</i>	

RESEARCH FELLOWS & POSTDOCS	S. Dey, Ph.D., NIMH Visiting Postdoctoral Fellow	2024–
	M. Dannhauer, Ph.D., NIMH Research Fellow Post-training position: Assistant Professor, Department of Computer Science, East Carolina University	2022–2024
GRADUATE STUDENTS	E. Bharti, Ph.D. candidate, NIH Oxford-Cambridge Scholars Program	2024–
	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	2021–2024
	🏅 NIMH Intramural Research Program Trainee Travel Award	2023
	🏅 First Place in Student Competition, <i>Brain & Human Body Modeling Conference</i> Post-training position: TMS technician, Columbia Associates	2022
	M. R. Hynd, B.S., NIMH IRTA Fellow Post-training position: PhD student, University of North Carolina at Chapel Hill	2020–2022
	S. M. Awasthi, B.S., NIMH IRTA Fellow Post-training position: Medical student, Stanford University School of Medicine	2018–2020
	M. Noh, S.B., NIMH IRTA Fellow Post-training position: Medical student, University of Cincinnati College of Medicine	2018–2019
	J. Thomas, M.S., NIMH IRTA Fellow Post-training position: Program officer, National Academies of Sciences, Engineering, and Medicine	2017–2019
	M. Velez Afanador, B.S., NIMH IRTA Fellow 🏅 Outstanding Poster Award, <i>NIH Postbac Poster Day</i> Post-training position: Medical student, Howard University College of Medicine	2016–2019 2018
UNDERGRADS	M. Dib, Biomedical Engineering, University of Maryland, College Park Supervised as a summer intern at the NIH, provided ongoing mentorship during academic terms, including advising Capstone design project: “Detection of brain-to-brain synchrony for improved psychotherapy” Post-training position: Medical student, Weill Cornell Medicine	2018–2019
	D. T. Weaver, Biology, Duke University Post-training position: MD/PhD student, Case Western Reserve University	2016
	E. F. Salgado, Psychology & Neuroscience, Duke University 🏅 Graduated with Distinction Post-training position: PhD student, Indiana University–Purdue University Indianapolis	2016
	Z. Feng, Biomedical Engineering and Biology, Duke University Post-training position: Medical student, University of Colorado School of Medicine	2015–2016
	M. L. Glidewell, Biomedical Engineering, Duke University Post-training position: Analyst, Dean & Company	2015–2016
	S. H. Lee, Biomedical Engineering, Duke University Post-training position: Manager, Strategy & Operations, Tempus Labs	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
	R. Shah, Psychology & Neuroscience, Duke University Post-training position: Medical student, Yale School of Medicine	2015–2016
	E. Shinder, Biology, Duke University	2015–2016

	 Graduated with Distinction Post-training position: Medical student, Stony Brook School of Medicine	
	E. P. Vienneau, Biomedical Engineering, Duke University	2015–2016
	 Howard G. Clark Award for Excellence in Research Post-training position: PhD student, Vanderbilt University	
	J. R. Lilien, Electrical & Computer Engineering, Duke University	2014–2016
	 Walter J. Seeley Scholastic Award Post-training position: Machine Learning Engineer, Amazon	
INTERNS	E. Chung, Psychology, University of Maryland, College Park	2017
	A. L. Halberstadt, Biology and Psychology, Carnegie Mellon University	2017
	C. M. Prevost, Biomedical Engineering, Clemson University	2015
	J. V. McCall, Biomedical Engineering, North Carolina State University	2013
PROFESSIONAL & SCHOLASTIC SOCIETIES MEMBERSHIP	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 Producer, <i>Psychopharm Today</i> podcast  Technology Task Force	 2019– 2023–2027 2023–2025 2024– 2020–2023
	Biomedical Engineering Society Member	 2021–
	American College of Neuropsychopharmacology Associate Member	 2023–
	Sigma Xi, The Scientific Research Honor Society Full Member	 2024–
	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 ROLES	Deputy Editor, <i>Transcranial Magnetic Stimulation</i>	2024–
	Associate Editor, <i>Frontiers in Psychiatry</i>	2022–
	Sections: Neurostimulation, Neuroimaging	
	Co-Editor on Research Topic: How Does Brain Stimulation Work? Neuroversion and Other	

Putative Mechanisms of Action 	2024
Review Editor, <i>Frontiers in Psychology</i> Sections: Addictive Behaviors, Consciousness Research	2022–
Review Editor, <i>Frontiers in Psychiatry</i> Sections: Neurostimulation, Neuroimaging	2016–2022
Guest Associate Editor, <i>Frontiers in Pharmacology: Neuropharmacology</i> Co-Editor on Research Topic: Neurobiology of Rapid Mood Changes 	2020
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>	
<i>Australasian Physical and Engineering Sciences in Medicine</i>	
<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 Antennas and Propagation Magazine</i>	
<i>IEEE Journal of Electromagnetics, RF, and Microwaves in Medicine and Biology</i>	
<i>IEEE Transactions on Biomedical Engineering</i>	
<i>IEEE Transactions on Neural Systems & 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>Journal of Psychiatric Research</i>	
<i>JoVE</i>	
<i>Medical & Biological Engineering & 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>	
<i>Scientific Reports</i>	
<i>Translational Psychiatry</i>	

	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	
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	Organizing committee, Brain and Human Body Modeling Conference	2022–2023
ORGANIZING	Program review subcommittee	2023
COMMITTEE	American Society of Clinical Psychopharmacology Annual Meeting	
	Preconference workshop director, NYC Neuromodulation Conference	2018
	Workshop: <i>Computational modeling in neuromodulation: Tools for engineers, clinicians, and researchers</i>	
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
SCIENCE	Presentation: <i>Fundamentals of transcranial brain stimulation</i>	
ADVOCACY	Jewish Social Service Agency	2020
	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>	

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 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