

ZHI-DE DENG







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EDUCATION	Ph.D., Columbia University Electrical Engineering	2013
	M.Phil., Columbia University Electrical Engineering, graduate concentration in Neuroscience	2011
	M.Eng., Massachusetts Institute of Technology Electrical Engineering & Computer Science	2007
	S.B., Massachusetts Institute of Technology Electrical Science & Engineering	2007
	S.B., Massachusetts Institute of Technology Physics, minor in Economics	2006
ACADEMIC & GOVERNMENT APPOINTMENTS	Senior Associate Scientist (Research Professor equivalent 🔗) National Institute of Mental Health Experimental Therapeutics & Pathophysiology Branch Noninvasive Neuromodulation Unit	2025 –
	Staff Scientist National Institute of Mental Health Experimental Therapeutics & Pathophysiology Branch Noninvasive Neuromodulation Unit	2019 – 2025
	Adjunct Assistant Professor Duke University School of Medicine Department of Psychiatry & Behavioral Sciences Division of Behavioral Medicine & Neurosciences <i>Faculty Network Member, Duke Institute for Brain Sciences</i>	2016 – 2024
	Medical Instructor Duke University School of Medicine Department of Psychiatry & Behavioral Sciences Division of Brain Stimulation & Neurophysiology	2014 – 2016
RESEARCH PROGRAM LEADERSHIP	Director, Computational Neurostimulation Research Program National Institute of Mental Health Experimental Therapeutics & Pathophysiology Branch Noninvasive Neuromodulation Unit	2019 –
POSTGRADUATE TRAINING & FELLOWSHIP APPOINTMENTS	Research Fellow National Institute of Mental Health Experimental Therapeutics & Pathophysiology Branch Noninvasive Neuromodulation Unit	2016 – 2019
	Postdoctoral Associate Duke University School of Medicine Department of Psychiatry & Behavioral Sciences Division of Brain Stimulation & Neurophysiology	2013 – 2014

PREDOCTORAL RESEARCH ASSISTANTSHIPS & INTERNSHIPS	Visiting Graduate Research Assistant , Duke Psychiatry	2010–2013
	Graduate Research Assistant , Columbia Psychiatry	2007–2010
	Research Assistant , Harvard–MIT Division of Health Sciences & Technology	2005–2007
	Executive Intern , Weill Cornell Medicine Anesthesiology	Summer 2004
	Internship Coordinator , Children’s Aid Society	Summer 2003
	Newsroom Technology Intern , The New York Times Company	Summer 2002
AWARDS & HONORS: INTERNATIONAL & NATIONAL	Certificate for Top Cited Article	2025
	<i>Bipolar Disorders</i> , International Society for Bipolar Disorders/Wiley	
	Elected to Full Membership	2024
	Sigma Xi, The Scientific Research Honor Society	
	Scholar, Advanced Research Institute in Geriatric Mental Health	2023–2024
	Dartmouth College, supported by grant from NIH/NIMH R25 MH068502	
	Elevated to Senior Membership	2023
	Institute of Electrical and Electronics Engineers (IEEE)	
	Elected to Associate Membership	2023
	American College of Neuropsychopharmacology	
	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	
	Scholar, Career Development Institute for Psychiatry	2017
	Stanford University/University of Pittsburgh	
	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 NIH/NIMH R25 MH019946	
	Chair’s Choice Travel Fellowship Award	2015
	Society of Biological Psychiatry	
	Innovative Research Poster Award	2014
	National Network of Depression Centers	
	Best Abstract Award	2010
	International Society for Neurostimulation	
	New York Times College Scholarship	2002–2006
	The New York Times Company Foundation	

AWARDS & HONORS: INSTITUTIONAL & LOCAL	Special Act Award	2025
	For outstanding scholarship advancing precision neuromodulation, NIMH	
	NIMH Director's Award	2024
	For outstanding transdisciplinary scientific contributions to advance neuromodulation technologies for the study and treatment of psychiatric disorders	
	High Five Award	2024
	For excellent preparation for and presentation at the Noninvasive Neuromodulation Unit's Board of Scientific Counselors review, NIMH	
	First Place Winner, Science as Art Competition	2022
	NIMH Intramural Research Program Fellows' Scientific Training Day	
	NIMH Director's Award	2019
	For scientific innovation at the interface of computation and psychiatry	
	Richard J. Wyatt Memorial Fellowship Award for Translational Research	2018
	NIMH Intramural Research Program	
	KL2 Career Development Award	2014–2016
	Duke Translational Medicine Institute, supported by NIH/NCATS KL2 TR001115	
	Presidential Award for Outstanding Teaching, Finalist	2010
	Columbia University	
	CTSA T32 Certificate Award	2008–2009
	Columbia University Irving Institute for Clinical and Translational Research, supported by NIH/NCRR TL1 RR024158	


RESEARCH FOCUS	⚡ Neurostimulation: Technology development, computational modeling, stimulus parameter and dose optimization, translational and clinical applications
	⚡ Computational electromagnetics and bioelectricity
	⚡ Electrophysiological and neuroimaging biomarker development
	⚡ Nonlinear dynamics of physiological systems




RESEARCH OUTPUT SUMMARY		66 Refereed original research articles
		22 Refereed conference proceedings & technical notes
		17 Refereed reviews, trial protocols, & consensus papers
		10 Book chapters
		5 Editorials, commentaries, & correspondence
		9 IP filings (4 granted U.S. patents, 3 pending, 2 unconverted provisionals)
	+ 182 Abstracts	

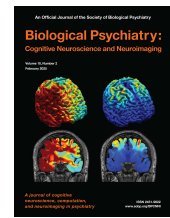
REFEREED ORIGINAL RESEARCH ARTICLES	* Denotes first, joint first, or senior author
	A. V. Peterchev, Z.-D. Deng , C. Sikes-Keilp, E. C. Feuer, M. A. Rosa, and S. H. Lisanby, "Optimal frequency for seizure induction with electroconvulsive therapy and magnetic seizure therapy in nonhuman primates," <i>Biological Psychiatry: Global Open Science</i> , vol. 5, no. 3, 100471, May 2025.
	DOI: 10.1016/j.bpsgos.2025.100471; PMID: PMC11985115; Data available 

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, pp. 175–185, Feb. 2025.

DOI: 10.1016/j.bpsc.2024.10.016; PMID: 39515580





 Journal cover

 Media coverage: *Brain & Behavior Research Foundation*  | *UT Southwestern News Release*, Jan. 2025. 





Z. Qi, G. M. Noetscher, A. Miles, K. Weise, T. R. Knösche, C. R. Cadman, A. R. Potashinsky, K. Liu, W. A. Wartman, G. Nunez 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*, vol. 18, no. 1, pp. 77–93, Jan./Feb. 2025.


DOI: 10.1016/j.brs.2024.12.1192; PMID: PMC11867869; Data available 

 Commentary: vol. 18, no. 3, pp. 897–899, May/Jun. 2025.   Reply: vol. 18, no. 4, pp. 1150–1152, Jul./Aug. 2025. 

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*, vol. 3, imag_a_00412, Jan. 2025.

DOI: 10.1162/imag_a_00412; PMID: PMC12319877; Code available 

 First Place in Best Student Paper (awarded to N. I. Hasan), *International Applied Computational Electromagnetics Society Symposium*, 2024.

 Third Place in Best Student Paper (awarded to N. I. Hasan), *Photonics and Electromagnetics Research Symposium*, 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, Sep. 2024.

DOI: 10.1093/cercor/bhae371; PMID: PMC11405677

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, Sep. 2024.

DOI: 10.1038/s41386-024-01871-w; PMID: PMC11319663

N. Khadka, **Z.-D. Deng**, S. H. Lisanby, M. Bikson, and J. A. Camprodon, “Computational models of high-definition electroconvulsive therapy for focal or multitargeting treatment,” *The Journal of ECT*, online ahead of print, Aug. 2024.

DOI: 10.1097/YCT.0000000000001069; PMID: 39185880


* 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.

DOI: 10.3389/fpsy.2024.1434434; PMID: PMC11345267

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.

DOI: 10.1088/1741-2552/ad692f; PMID: PMC11307324

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.

DOI: 10.1371/journal.pone.0302660; PMID: PMC11073721; Code available 



- * 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.
DOI: 10.1017/S1092852923006387; PMID: PMC11524532
- * 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.
DOI: 10.1111/bdi.13370; PMID: PMC10839568
📌 Top Cited Article, awarded by Wiley, 2025.
📺 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 rotating permanent magnet stimulation,” *Bioengineering*, vol. 11, no. 3, 258, Mar. 2024.
DOI: 10.3390/bioengineering11030258; PMID: PMC10968657
📖 Part of Special Issue: *Electric, Magnetic, and Electromagnetic Fields in Biology and Medicine: From Mechanisms to Biomedical Applications: 2nd Edition* 📄
🏆 Trainee Travel Award (awarded to P. L. Robins), *NIMH 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.
DOI: 10.1001/jamapsychiatry.2023.4599; PMID: PMC10701670
📖 Commentary: vol. 81, no. 7, pp. 736–737, Jul. 2024. 📄 📄 Reply: pp. 737–738. 📄
📺 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.
DOI: 10.1038/s41386-023-01780-4; PMID: PMC10876627
📌 Research highlight commentary: pp. 635–636. 📄
- W. A. Wartman, K. Weise, M. Rachh, 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,” *Physics in Medicine and Biology*, vol. 69, no. 5, 055030, Feb. 2024.
DOI: 10.1088/1361-6560/ad2638; PMID: PMC10902857; Data available 📄
📖 Part of Special Issue: *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. Jorgensen, A. Jorgensen, 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. Hurlemann, P. C. R. Mulders, R. Redlich, U. Dannlowski, E. Kavakbasi, M. D. Kritzer, K. K. Ellard, J. A. Camprodón, 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.
DOI: 10.1038/s41380-023-02318-2; PMID: PMC11116108; Code available 📄
- 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. 1, 18657, Oct. 2023.

DOI: 10.1038/s41598-023-45602-5; PMCID: PMC10618282; Code available 

- * **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.

DOI: 10.3390/biomedicines11082320; PMCID: PMC10452519

 Part of Special Issue: *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. Fannelli, 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.

DOI: 10.1016/j.jad.2023.05.042; PMCID: PMC10502963

- M. Teferi, W. Makhoul, **Z.-D. Deng**, D. J. Oathes, Y. 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, Jul. 2023.



DOI: 10.1016/j.bpsgos.2022.04.001; PMCID: PMC10382694

- J. Miller, T. Jones, J. Upston, **Z.-D. Deng**, S. M. McClintock, E. Erhardt, D. Farrar, 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, Jul. 2023.

DOI: 10.1016/j.bpsc.2023.03.001; PMCID: PMC10329999

- 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.

DOI: 10.3389/fpsy.2023.1168672; PMCID: PMC10232815

 Part of Research Topic: *Translational Approaches in Neurostimulation Research: Challenges and Opportunities for Neuropsychiatry* 


- 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.

DOI: 10.1088/1741-2552/ac9a76; PMCID: PMC10278869

- 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.











DOI: 10.1371/journal.pbio.3001999; PMCID: PMC9983870

- 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, no. 1, 43, Feb. 2023.

DOI: 10.1038/s41398-023-02312-w; PMCID: PMC9902462; Code available 

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

DOI: 10.1088/1741-2552/acae0d; PMCID: PMC10481791; Code available 

- S. Qi, V. D. Calhoun, D. Zhang, J. Miller, **Z.-D. Deng**, K. L. Narr, Y. Sheline, S. M. McClintock, R. Jiang, X. Yang, J. Upston, T. Jones, J. Sui, and C. C. Abbott, “Links between electroconvulsive therapy responsive and cognitive impairment multimodal brain networks in late-life major depressive disorder,” *BMC Medicine*, vol. 20, no. 1, 477, Dec. 2022.
DOI: 10.1186/s12916-022-02678-6; PMCID: PMC9733153; Code available 
- 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.
DOI: 10.1016/j.neuroimage.2022.119705; PMCID: PMC9854270
- A. Richie-Halford, M. Cieslak, L. Ai, S. Caffarra, S. Covitz, A. R. Franco, I. I. Karipidis, J. Kruper, M. Milham, B. Avelar-Pereira, E. Roy, V. J. Sydnor, J. D. Yeatman, The Fibr Community Science Consortium [including **Z.-D. Deng**], T. D. Satterthwaite, and A. Rokem, “An analysis-ready and quality controlled resource for pediatric brain white-matter research,” *Scientific Data*, vol. 9, no. 1, 616, Oct. 2022.
DOI: 10.1038/s41597-022-01695-7; PMCID: PMC9556519; Code available  Data available 
- 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, Jun. 2022.
DOI: 10.1097/YCT.0000000000000812; PMCID: PMC10680084
- 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.
DOI: 10.1088/1741-2552/ac697c; PMCID: PMC10644970
- 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.
DOI: 10.1016/j.neuroimage.2021.118863; PMCID: PMC8851689
 Part of Special Issue: *Neuromodulation and Neuroimaging for Targeted Brain Networks Interrogation* 
 Media coverage: *NIMH Research Highlight*, Mar. 2022. 
- * **Z.-D. Deng**, M. Argyelan, J. Miller, D. K. 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.
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 Commentary: vol. 27, no. 9, pp. 3571–3572, Sep. 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, 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.
DOI: 10.1038/s41386-021-01110-6; PMCID: PMC8674270
- S. H. Lisanby, S. M. McClintock, W. V. McCall, R. G. Knapp, C. M. Cullum, M. Mueller, **Z.-D. Deng**, A. A. Teklehaimanot, M. V. Rudorfer, E. Bernhardt, G. Alexopoulos, S. H. Bailine, M. C. Briggs, E. T. Geduldig, R. M. Greenberg, M. M. Husain, S. Kaliora, V. Latoussakis, L. S. Liebman, G. Petrides, J. Prudic, P. B. Rosenquist, S. Sampson, K. G. Tobias, R. D. Weiner, R. C. Young, C. H. Kellner, Prolonging Remission in Depressed Elderly (PRIDE) Work Group, “Longitudinal neurocognitive effects of combined electroconvulsive therapy (ECT) and pharmacotherapy in major depressive disorder in older adults: Phase 2 of the PRIDE study,” *American Journal of Geriatric Psychiatry*, vol. 30, no. 1, pp. 15–28,

Jan. 2022.

DOI: 10.1016/j.jagp.2021.04.006; PMID: PMC8595359

- 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.

DOI: 10.1038/s41380-019-0589-8; PMID: PMC7225078

- 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. Vandenbulcke, 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, Jul./Aug. 2021.

DOI: 10.1016/j.brs.2021.06.011; PMID: PMC8474653

- E. A. Fridgeirsson, **Z.-D. Deng**, D. Denys, J. A. van Waarde, and G. A. van Wingen, “Electric field strength induced by electroconvulsive therapy is associated with clinical outcome,” *NeuroImage: Clinical*, vol. 30, 102581, Feb. 2021.

DOI: 10.1016/j.nicl.2021.102581; PMID: PMC7895836

- P. J. C. Suen, S. Doll, M. C. Batistuzzo, 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.

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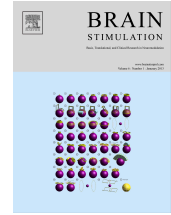
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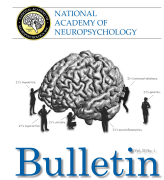
OTHER CONTRIBUTIONS:
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 🏆 Third Place in Best Student Paper (awarded to N. I. Hasan), *Photonics and Electromagnetics Research Symposium*, Apr. 2024.
- D. Tang, W. Wartman, A. Nummenmaa, M. Daneshzand, G. Noetscher, H. Lu, **Z.-D. Deng**, and S. N. Makaroff, “A BEM-FMM TMS coil designer using MATLAB platform,” *Brain Stimulation*, vol. 18, no. 1, p. 428, Jan./Feb. 2025; also presented at *NYC Neuromodulation Conference*, Aug. 2024.
- * **Z.-D. Deng**, “Multichannel Individualized Stimulation Therapy (MIST): A targeted approach to optimize electroconvulsive therapy,” *Brain Stimulation*, vol. 18, no. 1, p. 346, Jan./Feb. 2025.
 ✉ Accepted for presentation, unable to attend conference due to government travel restrictions
- Z. Qi, G. Noetscher, A. Miles, K. Weise, T. Knösche, C. Cadman, A. Potashinsky, K. Liu, W. Wartman, G. Ponasso, M. Bikson, H. Lu, **Z.-D. Deng**, A. Nummenmaa, and S. Makaroff, “Why and how do microscopic field perturbations lower activating thresholds?” *Brain Stimulation*, vol. 18, no. 1, p. 217, Jan./Feb. 2025.
- 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, Dec. 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, Dec. 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, Dec. 2024.
- E. Jones, T. Torrico, L. Beynel, **Z.-D. Deng**, D. Nielson, E. Wiener, S. Menon, B. Luber, E. Ekpo, W. Regenold, and S. H. Lisanby, “Accelerated intermittent theta burst stimulation for depression,” *American Psychiatric Nurses Association Annual Conference*, Oct. 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*, Sep. 2024.
- * S. Dey and **Z.-D. Deng**, “A robust state estimation strategy for brain stimulation,” *NIMH IRP Fellows’ Scientific Training Day*, Sep. 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*, Sep. 2024.
- * P. L. Robins, S. H. Lisanby, and **Z.-D. Deng**, “Quantifying aliasing in paper electroencephalography (EEG) during electroconvulsive therapy (ECT),” *The Journal of ECT*, vol. 40, no. 3, p. e20, Sep. 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. Nunez 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*, Aug. 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*, Nov. 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*, May 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, Jun. 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, May 2024; also presented at *Annual Congress of the Schizophrenia International Research Society*, Apr. 2024.
- * P. L. Robins, J. R. Gilbert, and **Z.-D. Deng**, “Characterizing hippocampal activation with magnetoencephalography using the mnemonic similarity task in healthy participants,” *Aperture Neuro*, vol. 4, no. Suppl 1, p. 1713, Jun. 2024; also in *Biological Psychiatry*, vol. 95, no. 10, p. S205, May 2024; and *NIH Postbac Poster Day*, Apr. 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, May 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, May 2024.
- M. Argyelan, **Z.-D. Deng**, O. T. Ousdal, L. Olteagal, 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, May 2024.
- ✂ 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*, Apr. 2024; also presented at *NIMH IRP Fellows’ Scientific Training Day*, Sep. 2023.
- 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, Dec. 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*, Nov. 2023.
- 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*, Oct. 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*, Sep. 2023.
- E. Ekpo, H. Gura, Z. Rezaee, **Z.-D. Deng**, B. Lubner, S. H. Lisanby, and L. Beynel, "Effects of practice and fMRI-Guided rTMS on a numerical Stroop task," *NIMH IRP Fellows' Scientific Training Day*, Sep. 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*, Sep. 2023.
- * P. L. Robins, S. N. Makaroff, and **Z.-D. Deng**, "Electric field characteristics of rotating permanent magnet stimulation," *Biomedical Engineering Society Annual Meeting*, Oct. 2023; also presented at *NIMH IRP Fellows' Scientific Training Day*, Sep. 2023.
 NIMH IRP Trainee Travel Award (awarded to P. L. Robins)
- ✍ 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*, Aug. 2023.
 Third Place in International Student Competition (awarded to W. A. Wartman)
- * 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*, Jul. 2023.
- ✍ 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 Annual Symposium*, May 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*, Apr. 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*, Apr. 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," *Brain Stimulation*, vol. 16, no. 2, p. 10, Mar./Apr. 2023.
- B. Lubner, S. Davis, **Z.-D. Deng**, D. Murphy, A. Peterchev, and S. H. Lisanby, "Targeting deep brain structures with TMS using diffusion tensor imaging," *Brain Stimulation*, vol. 16, no. 1, p. 190, Jan./Feb. 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, Jan./Feb. 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, Jan./Feb. 2023.

 J. Ferreira, L. Morales, R. Lemdiasov, H. Lu, **Z.-D. Deng**, and S. Makaroff, “TMS coil and TMS coil array designer with fast multipole method,” *Brain Stimulation*, vol. 16, no. 1, p. 136, Jan./Feb. 2023.


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,” International Patent Application, PCT/US2025/27755, filed May 5, 2025. Assignee: National Institutes of Health, U.S. Department of Health and Human Services.

C. C. Abbott, **Z.-D. Deng**, J. Upston, T. Jones, and A. Datta, “Systems and methods for electroconvulsive therapy,” International Patent Application, WO 2024/148196 A1, filed Jul. 11, 2024. Assignee: University of New Mexico. 


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,” International Patent Application, WO 2024/215761 A1, filed Apr. 10, 2024. Assignee: National Institutes of Health, U.S. Department of Health and Human Services. 


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, filed Jul. 28, 2023. Not converted to non-provisional.

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. Assignee: NEVA Electromagnetics, LLC. 

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 non-increasing parasympathetic modulation,” U.S. Patent 9,737,258, Aug. 22, 2017. Assignee: Massachusetts Institute of Technology. 

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, filed Aug. 22, 2011. Not converted to non-provisional.

A. V. Peterchev, S. H. Lisanby, and **Z.-D. Deng**, “Methods, apparatus, and systems for magnetic stimulation,” U.S. Patent 9,295,853, Mar. 29, 2016. Assignee: The Trustees of Columbia University in the City of New York. 

A. V. Peterchev, S. H. Lisanby, and **Z.-D. Deng**, “Methods, apparatus, and systems for magnetic stimulation,” U.S. Patent 8,801,589, Aug. 12, 2014. Assignee: The Trustees of Columbia University in the City of New York. 

ONGOING RESEARCH SUPPORT

ADEPT: Adaptive trial for the treatment of depressive symptoms associated with concussion using repetitive transcranial magnetic stimulation protocols

Congressionally Directed Medical Research Programs Award TP220072 2024.12–2026.12

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

This study aims to compare TMS protocols that may alleviate depressive symptoms in US military service members with a history of concussion/mild traumatic brain injury.

	<p><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.</p>
	<p><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 neuromodulatory TMS, and validate this model in a large cohort of healthy volunteers receiving multiple doses of either intermittent or continuous theta burst stimulation.</p>
	<p><i>Development of a novel, scalable, neurobiologically-guided transcranial magnetic stimulation 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.</p>
	<p><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: Sheline, Narr, Espinoza, McClintock, 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.</p>
	<p><i>ECT amplitude titration for improved clinical outcomes in late-life depression</i> NIH/NIMH R61/R33 MH125126 2021.02 – 2026.01 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.</p>
PENDING RESEARCH SUPPORT	<p><i>PRrecision Optimally Targeted ECT (PROTECT)</i> NIH/NIMH R01 2025.09 Role: mPI; collaborating PIs: C. C. Abbott, A. Datta</p>
	<p><i>High-density theta burst stimulation at 100 Hz: Development and first trial in cocaine use disorder</i> NIH UG3/UH3 2025.09 Role: Intramural NIH collaborator; PI: H. Lu</p>
	<p><i>Transdiagnostic trial to reduce default mode network connectivity in bipolar depression and major depressive disorder with accelerated iTBS</i> NIH 2025.06 Role: Intramural NIH collaborator; PI: Y. I. Sheline</p>
	<p><i>Electromagnetic brain stimulation modeling at the synaptic level</i> NIH R21 2025.02 Role: Intramural NIH collaborator; PI: S. N. Makaroff</p>
	<p><i>Improving ECT clinical outcomes through seizure- and model-guided stimulation parameters</i> NIH UG3/UH3 2024.10 Role: mPI; collaborating PIs: C. C. Abbott, A. Datta</p>
COMPLETED RESEARCH SUPPORT	<p><i>Neuromodulation of social cognitive circuitry in people with schizophrenia spectrum disorders</i> NIH/NIMH R61/R33 MH120188 2020.05 – 2023.04 Role: Intramural NIH collaborator; mPIs: A. N. Voineskos, D. M. Blumberger</p>

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.

ECT pulse amplitude and medial temporal lobe engagement

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.

Individualized low amplitude seizure therapy (iLAST)

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

Role: PI

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

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

NIMH 271201200006I-3-27100003-1

2016.06 – 2017.12

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

The goal of this project is to establish the kappa opiate receptor occupancy and mu opiate receptor effects after two weeks of daily dosing with the investigational agent LY2456302, which has been demonstrated to be a selective kappa opiate receptor antagonist.

Transcranial direct current stimulation as a treatment for acute fear

NIH/NIMH R21 MH106772

2015.04 – 2017.01

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

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

Individualized optimally-targeted seizure therapy

NIH/NCATS KL2 TR001115

2014.07 – 2016.06

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

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

Safety and feasibility of low amplitude electroconvulsive therapy

Duke University School of Medicine, Pilot fund

2015.03 – 2016.06

Role: PI

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

Prolonging Remission In Depressed Elderly (PRIDE)

NIH/NIMH U01 MH084241

2009.04 – 2016.03

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

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

Low field magnetic stimulation coil design

Tal Medical

2015.04 – 2016.06

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

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

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

American Psychiatric Association Research Scholarship

2015.11 – 2016.06

Role: Acting PI; Grantee: Y. Hu

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

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.

Translational research evaluating neurocognitive memory processes

NIH/NIMH K23 MH087739 2013.07 – 2014.06

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

This study informs the cognitive component processes underlying memory impairment after electroconvulsive therapy.

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.

Rational dosing for electric and magnetic seizure therapy

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.

Field shaping and coil design for transcranial magnetic stimulation

NIH/NCRR TL1 RR024158 2008.07 – 2009.06

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.

Development of a novel TMS device with controllable pulse shape

NIH/NIBIB R21 EB006855 2007.08 – 2008.06

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.




Nonlinear analysis of heart rate variability

NIH/NHLBI R01 HL079503 2005.11 – 2007.05

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.

PROFESSIONAL
PRESENTATIONS
SUMMARY

 30 Invited seminars & webinars
 7 Grand rounds
 43 Conference talks & workshops

INVITED
SEMINARS &
WEBINARS


 Denotes Continuing Medical Education accredited presentation

 International Society for ECT and Neurostimulation Webinar 2025
Advancing ECT through computational modeling, dose optimization, and device innovation

Arizona State University, School for Biological and Health Systems Engineering 2025

<i>Model-driven neurostimulation: Computational approaches to device and dose optimization</i>	
NIMH Intramural Research Program Investigators' Seminar	2025
<i>Reading tells: Using facial expression analysis to track emotional states in depression</i>	
IEEE Magnetics and EMBS Chapters	2025
Virginia Commonwealth University Mechanical & Nuclear Engineering Department Seminar	
<i>Recent advances in transcranial magnetic stimulation: Devices, modeling, and applications</i>	
University of Texas Southwestern, Department of Psychiatry	2025
<i>From models to medicine: Advancing precision neuromodulation through engineering</i>	
University of California, San Francisco, Department of Psychiatry & Behavioral Sciences	2025
<i>Engineering precision in neuromodulation: Computational models to clinical applications</i>	
International Symposium on Novel Neuromodulation Techniques	2024
<i>Model-driven brain stimulation treatments</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 and technology development</i>	
University of Pittsburgh, Department of Psychiatry	2023
<i>Computational neurostimulation: Treatment optimization and technology development</i>	
National Center of Neuromodulation for Rehabilitation, MUSC	2022
<i>Model-driven design for brain stimulation therapies</i> 	
International Network of tES-fMRI Webinar	2022
<i>Electric field modeling and optimization approaches for individualized targeting</i>	
NIMH Intramural Research Program Investigators' Seminar	2022
<i>Seizure therapies: The next generation</i>	
Brown University/Butler Hospital, Department of Psychiatry & Human Behavior	2021
<i>Computational model driven design for brain stimulation</i>	
University of Pennsylvania, Center for Neuromodulation in Depression and Stress	2021
<i>Electromagnetic brain stimulation from low to high intensity</i>	
VA Boston Healthcare System, Boston University School of Medicine	2020
Harvard Medical School Neuropsychiatry Translational Research Fellowship Seminar	
<i>Precision neurostimulation: History, physics, computational modeling, and engineering</i>	
Medical University of Vienna, Neuroimaging Lab	2020
<i>Precision seizure therapy</i>	
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
Mount Sinai Icahn School of Medicine, Depression and Anxiety Center	2019
<i>Rational design of individualized noninvasive brain stimulation</i>	
NIMH Intramural Research Program Investigators' Seminar	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	2018
<i>Modeling and design for magnetic stimulation</i>	

	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
GRAND ROUNDS	✚ Barrow Neurological Institute, Phoenix, AZ <i>Innovating neurostimulation: From treatment optimization to next-generation technology</i>	2025
	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
CONFERENCE TALKS & WORKSHOPS	Electroconvulsive Therapy Conference & GEMRIC Workshop <i>ECT time machine: What yesterday's devices teach about tomorrow's therapy</i>	2025
	✚ American Neuropsychiatric Association Annual Meeting <i>Advancing personalized seizure therapy: Magnetic seizure therapy and Multichannel Individualized Stimulation Therapy</i> Part of Program Committee Symposium: <i>Interventional neuropsychiatry: From mechanisms to clinical decision making</i>	2025
	International Brain Stimulation Conference <i>Multichannel Individualized Stimulation Therapy: A targeted approach to optimize ECT</i> Part of symposium: <i>ECT reimagined: Precision, prediction, and personalized care</i>	2025
	✚ Accepted for presentation, unable to attend due to government travel restrictions	
	IEEE Brain Discovery & Neurotechnology Workshop, University of Illinois Chicago <i>A model-driven approach to personalized neuromodulation treatment</i>	2024
	NIMH Workshop on The Placebo Effect: Key Questions for Translational Research	2024

Challenges and strategies in implementing effective sham stimulation for noninvasive brain stimulation trials 

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|---|------|
| International Society for Magnetic Resonance in Medicine Annual Meeting
<i>TMS devices and modeling</i>
Part of workshop: <i>From basics to applications: MRI of neuromodulation using TMS and FUS</i> | 2024 |
| Brain and Human Body Modeling Conference
<i>Effects of low intensity magnetic stimulation</i> | 2023 |
| International Conference of the IEEE Engineering in Medicine and Biology Society
<i>Modeling of TMS and ECT in the treatment of depression</i>
Part of panel: <i>Computational analysis of non-invasive neuromodulation constructs: Brain & spine</i> | 2023 |
|  ADAA Anxiety and Depression Conference
<i>Modeling and dose optimization for TMS and ECT</i>
Part of panel: <i>Parsing through syndromic heterogeneity in youths with mental illness to identify neurocircuit mechanisms and develop novel treatments</i> | 2023 |
|  International Society for Magnetic Resonance in Medicine
<i>Modeling of TMS</i> 
Part of workshop: <i>MRI of neuromodulation: Target engagement, neural mechanism, & biomarker development</i> | 2022 |
| Bergen Workshop of the Global ECT–MRI Collaboration
<i>ECT device development</i>  | 2022 |
| Brain and Human Body Modeling Conference
<i>ECT, electric field, neuroplasticity, and clinical outcomes</i>
Part of panel: <i>Modeling of transcranial electrical stimulation and deep brain stimulation</i> | 2022 |
| European Conference of Brain Stimulation in Psychiatry
<i>Symptom dimensions and response trajectories in ECT and MST</i>
Part of panel: <i>Beyond clinical syndromes: Understanding mechanisms of neuromodulation from a dimensional perspective</i> | 2022 |
|  Society of Biological Psychiatry Annual Meeting
<i>Depressive symptom dimensions in seizure therapy</i>
Part of panel: <i>Dimensional approaches to device neuromodulation</i> | 2022 |
| Global ECT–MRI Collaboration Young Researchers Collective
<i>ECT, electric field, neuroplasticity, and clinical outcomes</i> | 2022 |
|  American Academy of Child and Adolescent Psychiatry Annual Meeting
<i>Introduction to computational psychiatry</i>
Part of panel: <i>Recent work with contemporary computational methods and artificial intelligence to advance the practice of child and adolescent psychiatry</i> | 2021 |
| European College of Neuropsychopharmacology Congress
<i>Precision neurostimulation: Electroconvulsive therapy</i>
Part of panel: <i>Neurobiology of rapid mood changes</i> | 2021 |
| Society for Brain Mapping & Therapeutics Annual Congress
<i>Advances in electroconvulsive therapy for treatment of depression</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
<i>Electric field modeling to inform ECT dosing and device development</i>
Part of panel: <i>What can we learn from ECT: Insights from the GEMRIC consortium</i> | 2020 |
| University of Minnesota Non-Invasive Brain Stimulation Workshop
<i>Use of individual electric field models in clinical research</i>  | 2020 |


NYC Neuromodulation Online	2020
Discussant, <i>Noninvasive vagus nerve stimulation applied to stress management, opioid withdrawal, and neurocognitive disorders</i>	
American Society of Clinical Psychopharmacology Annual Meeting	2020
<i>Advancing seizure therapy: Rational design for precision outcomes</i>	
Part of panel: <i>New developments in neurostimulation</i>	
☒ Accepted for presentation; conference was canceled due to COVID-19 pandemic	
☒ American College of Neuropsychopharmacology Annual Meeting	2019
<i>Rational design of precision seizure therapy</i>	
Part of panel: <i>Precision neurostimulation for treatment of psychiatric disorders</i>	
International College of Neuropsychopharmacology Meeting	2019
<i>Individualized seizure therapy: Reinventing ECT</i>	
Part of workshop: <i>Neurobiological and clinical characterization, and treatment development for treatment resistant depression</i>	
International Brain Stimulation Conference	2019
<i>Individualized electroconvulsive therapy for treatment of depression</i>	
Part of panel: <i>Individualized brain stimulation: Addressing heterogeneity across modalities</i>	
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
<i>Electric field induced by TMS: Applications in depression and anxiety</i>	
Part of panel: <i>Computational human models for brain stimulation</i>	
☒ American Psychiatric Association Annual Conference	2018
<i>Individualized neurotargeted seizure therapy: Reinventing ECT</i>	
Part of Presidential Symposium: <i>ECT in the era of new brain stimulation treatments</i>	
☒ ADAA Anxiety and Depression Conference	2018
<i>Individualized neurotargeted seizure therapy: Reinventing ECT</i>	
Part of panel: <i>Personalized medicine for treatment resistant depressed patients: Novel strategies to optimize treatment with antidepressant medications, ketamine, and 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>	
International Conference of the IEEE Engineering in Medicine and Biology Society	2010
<i>TMS in the presence of deep brain stimulation implants: Induced electrode currents</i>	
<i>ECT in the presence of deep brain stimulation implants: Electric field effects</i>	
Annual National Predoctoral Clinical Research Training Program Meeting	2009
<i>Coil design for deep-brain transcranial magnetic stimulation</i>	

TRANSFORM Research Day, Irving Institute for Clinical and Translational Research	2009
<i>Electromagnetic field shaping and coil design for transcranial brain stimulation</i>	
International Conference of the IEEE Engineering in Medicine and Biology Society	2008
<i>Coil design considerations for deep brain transcranial magnetic stimulation</i>	
Annual Meeting of the Society for Neuroscience	2006
<i>Heart rate variability is more chaotic in REM than NREM sleep in children</i>	
International Conference of the IEEE Engineering in Medicine and Biology Society	2006
<i>Heart rate variability in pediatric obstructive sleep apnea</i>	

TEACHING & MENTORING APPOINTMENTS

Lecturer, NIH

National Institute of Mental Health

Basic Training Course on Transcranial Magnetic Stimulation 
fMRI Course

2020
Summer 2017

National Institute of Neurological Disorders and Stroke

Clinical Neuroscience Program Lecture Series

2017, 2019

Research Mentor, University of Maryland, College Park

2018–2019

Fischell Department of Bioengineering

Capstone project: *Detection of brain-to-brain synchrony for improved psychotherapy*

Faculty, Duke University

Department of Psychology & Neuroscience

Research Independent Study

2016

Matching Undergraduates to Science and Engineering Research Program

2015–2016

Biosciences Collaborative for Research Engagement

2015–2016

Department Psychiatry & Behavioral Sciences

☞ *Visiting Fellowship in Electroconvulsive Therapy*

2015

☞ *Visiting Fellowship in Transcranial Magnetic Stimulation*

2014–2016

Teaching Assistant, Columbia University

Department of Electrical Engineering

Analog Systems in VLSI (graduate level)

Spring 2010

The Digital Information Age

Fall 2009

Recitation Instructor, Columbia University Mailman School of Public Health

Department of Biostatistics

Biostatistics (graduate level)

Fall 2009

Teaching Assistant, MIT

Concourse Program

Multivariable Calculus

Fall 2003–2006

Differential Equations

Spring 2004–2007

Grader, MIT

Department of Electrical Engineering & Computer Science

Signals and Systems

Fall 2004

MENTORING SUMMARY

	5 Faculty
	2 Research fellows & postdoctoral fellows
	1 Sponsored thesis
	4 Thesis examination committees
	2 Graduate students
	6 Post-baccalaureate fellows
	11 Undergraduate students
	6 Interns

FACULTY ADVISORY	D. C. Farrar, M.D., Ph.D., University of New Mexico School of Medicine Project: “CEASE-LD: Characterizing brain excitability, adequacy of seizures, and efficacy in late-life depression with ECT”	2025 –
	S. K. Conroy, M.D., Ph.D., Indiana University School of Medicine Project: “Targeting negative self-referential processing in depression with transcranial magnetic stimulation”	2024 –
	S. M. Hare, Ph.D., University of Maryland School of Medicine NIH/NIMH K01 MH133116 Project: “Cognitive and neural correlates of TMS motor intracortical inhibition in schizophrenia”	2024 – 2029
	S. H. Siddiqi, M.D., Brigham & Women’s Hospital NIH/NIMH K23 MH121657 Project: “Personalized circuit-based neuromodulation targets for depression” 🏆 Klerman Prize for Exceptional Clinical Research, <i>Brain & Behavior Research Foundation</i> , 2022.	2020 – 2025
	N. L. Balderston, Ph.D., University of Pennsylvania Perelman School of Medicine NIH/NIMH K01 MH121777 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> , 2021.	2019 – 2023
RESEARCH FELLOWS & POSTDOCS	S. Dey, Ph.D., NIMH Visiting Postdoctoral Fellow	2024 –
	M. Dannhauer, Ph.D., NIMH Research Fellow Career progression: Assistant Professor, Computer Science, East Carolina University	2022 – 2024
SPONSORED THESES	G. Asturias, Psychology & Neuroscience, Duke University Undergraduate honors thesis: “Effect of repetitive transcranial magnetic stimulation on the structural and functional connectome in patients with major depressive disorder.” Available: <i>DukeSpace</i> , HDL: 10161/14299 🏆 Graduated with Distinction Career progression: Medical student, Stanford University School of Medicine	2015 – 2017
THESIS EXAMINATION COMMITTEES	S. J. Bolland, Biomedical Engineering, University of Western Australia Ph.D. dissertation: “A comparative study of transcranial magnetic stimulation induced electrical field distributions in neural tissue: A translational pipeline for finite element method analysis using MRI modalities.” Sponsor: J. Rodger. Available: <i>UWA Research Repository</i> , DOI: 10.26182/7vwg-p536	2025
	D. Tang, Electrical & Computer Engineering, Worcester Polytechnic Institute M.S. thesis: “Computational and experimental approaches to brain stimulation: TMS simulation, coil measurement, and neural structure analysis.” Sponsor: S. N. Makaroff. Available: <i>Digital WPI</i> , URL: https://digital.wpi.edu/show/6h440x853	2025
	W. A. Wartman, Electrical & Computer Engineering, Worcester Polytechnic Institute Ph.D. dissertation: “Adaptive mesh refinement for quasistatic electromagnetic modeling of brain stimulation and recording methods.” Sponsor: S. N. Makaroff. Available: <i>Digital WPI</i> , URL: https://digital.wpi.edu/show/sq87c029w	2024
	D. Q. Troung, Biomedical Engineering, CUNY City College Ph.D. dissertation: “Translational modeling of non-invasive electrical stimulation.” Sponsor: M. Bikson. Available: <i>CUNY Academic Works</i> , URL: https://academicworks.cuny.edu/cc_etds_theses/774	2019
	E. Bharti, Ph.D. cand., NIH–Cambridge Scholars Program	2024 –
GRADUATE STUDENTS	M. Kshirsagar, M.S., Biomedical Engineering, Duke University Career progression: Consultant, Deloitte Consulting	2012
POSTBACS	P. L. Robins, B.A., NIMH Intramural Research Training Award (IRTA) Fellow	2021 – 2024

	<p>🏆 Trainee Travel Award, NIMH Intramural Research Program, 2023.</p> <p>🏆 First Place in Student Competition, <i>Brain & Human Body Modeling Conference</i>, 2022.</p> <p>Career progression: Lead interventional technician, Columbia Mental Health</p>	
	M. R. Hynd, B.S., NIMH IRTA Fellow	2020 – 2022
	Career progression: Ph.D. student, University of North Carolina at Chapel Hill	
	S. Awasthi, B.S., NIMH IRTA Fellow	2018 – 2020
	Career progression: Medical student, Stanford University School of Medicine	
	M. M. Noh, S.B., NIMH IRTA Fellow	2018 – 2019
	Career progression: Medical student, University of Cincinnati College of Medicine	
	J. Thomas, M.S., NIMH IRTA Fellow	2017 – 2019
	Career progression: Program officer, National Academies of Sciences, Engineering, & Medicine	
	M. Velez Afanador, B.S., NIMH IRTA Fellow	2016 – 2019
	🏆 Outstanding Poster Award, <i>NIH Postbac Poster Day</i> , 2018.	
	Career progression: Medical student, Howard University College of Medicine	
UNDERGRADS	D. T. Weaver, Biology, Duke University	2016
	Career progression: M.D./Ph.D. student, Case Western Reserve University	
	E. F. Salgado, Psychology & Neuroscience, Duke University	2016
	🏆 Graduated with Distinction	
	Career progression: Ph.D. student, Indiana University–Purdue University Indianapolis	
	Z. Feng, Biomedical Engineering and Biology, Duke University	2015 – 2016
	Career progression: Medical student, University of Colorado School of Medicine	
	M. L. Glidewell, Biomedical Engineering, Duke University	2015 – 2016
	Career progression: Senior strategy consultant, IBM	
	W. Lim, Biomedical Engineering, Duke University	2015 – 2016
	Career progression: Medical student, Texas A&M College of Medicine	
	F. M. Mercer, Gender, Sexuality and Feminist Studies, Duke University	2015 – 2016
	Career progression: Analyst, Morgan Stanley	
	E. Shinder, Biology, Duke University	2015 – 2016
	🏆 Graduated with Distinction	
	Career progression: Medical student, Stony Brook School of Medicine	
	E. P. Vienneau, Biomedical Engineering, Duke University	2015 – 2016
	🏆 Howard G. Clark Award for Excellence in Research	
	Career progression: Ph.D. student, Vanderbilt University	
	S. H. Lee, Biomedical Engineering, Duke University	2015
	Career progression: Manager, Strategy & Operations, Tempus Labs	
	R. Shah, Psychology & Neuroscience, Duke University	2015
	Career progression: Medical student, Yale School of Medicine	
	J. R. Lilien, Electrical & Computer Engineering, Duke University	2014 – 2016
	🏆 Walter J. Seeley Scholastic Award	
	Career progression: Machine learning engineer, Amazon	
INTERNS	M. Dib, Biomedical Engineering, University of Maryland, College Park	2018 – 2019
	Supervised as a summer intern at the NIH, provided ongoing mentorship during academic terms, including advising Capstone design project	
	Career progression: Medical student, Weill Cornell Medicine	
	E. Chung, Psychology, University of Maryland, College Park	2017
	A. L. Halberstadt, Biology and Psychology, Carnegie Mellon University	Summer 2017
	Career progression: Ph.D. student, Penn State University	

	C. M. Prevost, Biomedical Engineering, Clemson University	Summer 2015
	Career progression: Medical student, University South Carolina School of Medicine Greenville	
	J. V. McCall, Biomedical Engineering, North Carolina State University	Summer 2013
	Career progression: Ph.D. student, North Carolina State University	
PROFESSIONAL SOCIETIES MEMBERSHIP	Institute of Electrical and Electronics Engineers (IEEE) Senior Member (2023 –), Member (2013 – 2023), Student Member (2004 – 2013) Engineering in Medicine and Biology Society Brain Technical Community	2004 – 2025 –
	American College of Neuropsychopharmacology , Associate Member	2023 –
	Biomedical Engineering Society , Member	2021 –
	American Society of Clinical Psychopharmacology , Member	2019 –
	<i>Past memberships:</i> Anxiety and Depression Association of America, Member International Society for CNS Clinical Trials and Methodology, Member Organization for Human Brain Mapping, Member Society for Industrial and Applied Mathematics, Student Member Society for Neuroscience, Student Member American Physical Society, Student Member	2017 – 2018 2017 – 2019 2014 – 2019 2008 – 2012 2005 – 2012 2004 – 2009
PROFESSIONAL SERVICE & ADVISORY ROLES	Advisory Board, Center for Multiscale Bioelectromagnetic Studies of the Brain Department of Electrical & Computer Engineering, Worcester Polytechnic Institute Board Member, The Global ECT–MRI Research Collaboration (GEMRIC) Data Processing and MRI Working Group Biomedical Engineering Society Mid-Career Award Subcommittee Chapter Development Report Reviewers American Society of Clinical Psychopharmacology Early Career Committee Technology Committee Technology Task Force	2025 – 2025 – 2025 2025 2023 – 2027 2023 – 2025 2020 – 2023
INSTITUTIONAL SERVICE	Reviewer, NIH Intramural AIDS Research Fellowships Judge, NIH Fellows Award for Research Excellence Competition Educational Counselor, MIT NIH Research Workforce Diversity and Equity Outreach Special Interest Group Judge, NIMH Training Day Three-Minute Talks competition Judge/Lead Judge, NIH Postbac Poster Day NIH Noninvasive Brain Stimulation Special Interest Group	2025 2025 2022 – 2025 2023 – 2025 2022 2017 – 2025 2017 – 2025
GRANT REVIEW	Reviewer, NIH BluePrint MedTech Program Reviewer, NIH Center for Scientific Review Biophysics of Neural Systems Study Section Reviewer, Duke Institute for Brain Sciences, Research Incubator Awards	2021 – 2024 2021.10 2018, 2021

EDITORIAL ROLES	Editorial Board Member, <i>Brain Stimulation</i>	2025 –
	Deputy Editor, <i>Transcranial Magnetic Stimulation</i>	2024 –
	Associate Editor, <i>Frontiers in Psychiatry</i>	2022 –
	Sections: Neurostimulation, Neuroimaging	
	Co-Editor on Research Topic: <i>How Does Brain Stimulation Work? Neuroversion and Other Putative Mechanisms of Action</i> 	2024
	Community Reviewer (formerly Review Editor), <i>Frontiers in Psychology</i>	2022 –
	Sections: Addictive Behaviors, Consciousness Research	
	Review Editor, <i>Frontiers in Psychiatry</i>	2016 – 2022
	Sections: Neurostimulation, Neuroimaging	
	Guest Associate Editor, <i>Frontiers in Pharmacology: Neuropharmacology</i>	2020
	Co-Editor on Research Topic: <i>Neurobiology of Rapid Mood Changes</i> 	
	Guest Editor, <i>Physics in Medicine and Biology</i>	2024
	Special Issue: <i>Electromagnetic Modeling for Brain Stimulation</i> 	
	<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>Bioelectromagnetics</i>	
	<i>Biological Psychiatry</i>	
	<i>Biological Psychiatry: Global Open Science</i>	
	<i>BioMedical Engineering OnLine</i>	
	<i>BMJ Mental Health</i>	
	<i>Brain Research Bulletin</i>	
	<i>Brain Sciences</i>	
	<i>Brain Stimulation</i>	
	<i>Cerebral Cortex</i>	
	<i>Chaos, Solitons & Fractals</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>Computer Methods in Biomechanics and Biomedical Engineering</i>	
	<i>Cortex</i>	
	<i>Depression and Anxiety</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 Access</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>	

Journal of Psychiatric Research
JoVE
Medical & Biological Engineering & Computing
Medical Hypotheses
Nature Mental Health
NeuroImage
NeuroImage Clinical
Neuromodulation
Neuroscience Letters
PLOS Computational Biology
PLOS ONE
Scientific Reports
Translational Psychiatry

	Reviewer, conference proceedings and abstracts	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	
CONFERENCE & WORKSHOP ORGANIZATION	Brain and Human Body Modeling Conference	2023
	Organizing committee, and judge in student competition	
	Chair of panel: <i>New modeling methods: Spinal cord stimulation and novel stimulation</i>	
	Chair of panel: <i>Development and assessment of modeling methods</i>	
	American Society of Clinical Psychopharmacology Annual Meeting	2023
	Program review subcommittee	
	International Brain Stimulation Conference	2023
	Chair of symposium: <i>Insights and challenges in preclinical models of TMS: Multimodal investigations across animal species</i>	
	Chair of symposium: <i>Advanced computational modeling and optimization methods for non-invasive brain stimulation</i>	
	International Congress of Clinical Neurophysiology	2022
	Chair of panel: <i>Towards optimized TMS targeting approaches</i>	
	Brain and Human Body Modeling Conference	2022
	Organizing committee	
	Chair of panel: <i>Modeling of transcranial electrical stimulation and deep brain stimulation</i>	
	NIH Workshop on TMS-EEG Methodology and Data Integration	2020
	Organizer and funding applicant	
	☒ Funding awarded; event was canceled due to COVID-19 pandemic	
	American Society of Clinical Psychopharmacology Annual Meeting	2019
	Chair of panel: <i>Treatment-resistant mood disorders across the lifespan: Novel therapeutics</i>	
	International Conference of the IEEE Engineering in Medicine and Biology Society	2018
	Chair of panel: <i>Computational human models for brain stimulation</i>	
	NYC Neuromodulation Conference	2018
	Director of preconference workshop: <i>Computational modeling in neuromodulation: Tools for engineers, clinicians, and researchers</i>	

COMMUNITY INVOLVEMENT, OUTREACH, & SCIENCE ADVOCACY	Producer, <i>Psychopharm Today</i> podcast 	2024 –
	Hosted by the American Society of Clinical Psychopharmacology	
	ASCP Early Career Workshop	2021
	📺 Presentation: <i>Engaging presentation strategies for any audience</i>	
	Mental Health Association of Maryland	2020
	Presentation: <i>Fundamentals of transcranial brain stimulation</i>	
	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	2020
	☒ Event was canceled due to COVID-19 pandemic	
	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>	
PROFESSIONAL DEVELOPMENT & CONTINUING EDUCATION	University of Pennsylvania, Wharton Undergraduate Health Care Club	2018
	Presentation: <i>Technology and the future of mental health treatment</i>	
	Innovation Leader, Psychiatry Innovation Lab, American Psychiatric Association	2016
	Duke Translational Medicine Institute, Undergraduate Research Society	2016
	Presentation: <i>Engineering meets psychiatry</i>	
	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
	Mid-Level Leadership Program, NIH	2023
	Structural Equation Modeling, CenterStat by Curran-Bauer Analytics	2022
	Diversity and Inclusion Certificate Program, NIH	2021 – 2022
	FSL Course, University of Oxford FMRIB Analysis Group	2020
	Non-invasive Transcranial Brain Stimulation Course	2019
	Danish Research Centre for Magnetic Resonance, Copenhagen University Hospital Hvidovre	
	AFNI+SUMA Training Workshop, NIH	2018
	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	2009
	Columbia University Medical Center/New York State Psychiatric Institute	
	Basic Life Support, American Heart Association	Recertified 2023.07
LAST UPDATED	October 6, 2025	