

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	2025 – 2026
	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 Faculty Network Member, Duke Institute for Brain Sciences	2016 – 2020
	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 – 2026
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 Mental Health and Aging	2023–2024
	Dartmouth College, supported by grant from NIH/NIMH R25 MH068502	
	Elevated to Senior Membership	2023
	Institute of Electrical and Electronics Engineers	
	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		74 Refereed original research articles
		21 Refereed conference proceedings & technical letters
		19 Refereed reviews, perspectives, protocols, & consensus papers
		11 Book chapters
		9 Editorials, commentaries, & correspondence
		4 Perma-preprints & technical reports
		10 IP filings (4 granted U.S. patents, 3 pending, 3 provisionals)
	+ 198 Abstracts	

* Denotes first, joint first, or senior author

REFEREED ORIGINAL RESEARCH ARTICLES	L. D. Oliver, D. M. Blumberger, Z.-D. Deng , C. Hawco, E. W. Dickie, J. Gallucci, J. Jeyachandra, S. Mansour, 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 personalized transcranial magnetic stimulation on social cognitive network functional connectivity in schizophrenia spectrum disorders: A double-blind, randomized, sham-controlled target engagement trial,” <i>Brain Stimul.</i> , vol. 19, no. 5, Art. no. 103172, Sep./Oct. 2026. DOI: 10.1016/j.brs.2026.103172; PMID: 42526755; Code available 
	L. Beynel, V. Roopchansingh, P. Taylor, R. Reynolds, L. Li, N. Baker, D. Bandy, K. Cameron, Z.-D. Deng , E. Ekpo, H. Gura, S. Menon, E. Wiener, Z. Rezaee, J. K. Rajendra, B. Lubner, and S. H. Lisanby, “Feasibility of integrating real-time fMRI neurofeedback with rTMS:

Study design, preliminary results, and technical challenges,” *Apert. Neuro*, vol. 6, Art. no. 165511, Aug. 2026.

DOI: 10.52294/001c.165511; Data available  Code available 

- * L. Beynel, E. Wiener, N. Baker, E. Greenstein, A. D. Neacsiu, E. Jones, B. Gindoff, S. M. Francis, C. Neige, M. Mondino, S. W. Davis, B. Lubner, S. H. Lisanby, and **Z.-D. Deng**, “Noninvasive brain stimulation combined with evidence-based psychotherapy for psychiatric disorders: A meta-analysis of optimal implementation parameters,” *Neurosci. Bio-behav. Rev.*, vol. 187, Art. no. 106786, Aug. 2026.

DOI: 10.1016/j.neubiorev.2026.106786; PMID: 42214517

- D. A. Drumm, G. M. Noetscher, H. Oppermann, J. Haueisen, **Z.-D. Deng**, and S. N. Makaroff, “Charge based boundary element method with residual driven adaptive mesh refinement for high resolution electrical stimulation modeling,” *Sci. Rep.*, online ahead of print, Jul. 2026.

DOI: 10.1038/s41598-026-61208-z; PMID: 42426139

- D. F. Gregory, I. Sun, M. Teferi, H. Gura, M. Patel, A. Casalvera, S. Chandrashekar, K. G. Lynch, D. H. Schultz, A. Jeyapratap, Q. Tate, W. Makhoul, **Z.-D. Deng**, D. J. Oathes, Y. I. Sheline, and N. L. Balderston, “The Philadelphia Theta Burst Project: A novel fMRI-guided electric-field modeling dataset with reliability metrics,” *Imaging Neurosci.*, online ahead of print, Jul. 2026.

DOI: 10.1162/IMAG.a.1314; Data available  Code available 

- * P. L. Robins, J. R. Gilbert, B. Lubner, N. Mustafa, E. Bharti, J. D. Stout, F. W. Carver, and **Z.-D. Deng**, “Selective modulation of evidence accumulation by hippocampal theta oscillations during mnemonic decision-making,” *Hum. Brain Mapp.*, vol. 47, no. 7, Art. no. e70529, May 2026.

DOI: 10.1002/hbm.70529; PMID: PMC13122434

- * D. A. Drumm, G. Nuñez Ponasso, A. Linke, S. Ganguly, A. Wang, G. M. Noetscher, B. Maess, T. R. Knösche, J. Haueisen, J. D. Lewine, C. C. Abbott, S. N. Makaroff, and **Z.-D. Deng**, “Improved source localization of auditory evoked fields using reciprocal BEM-FMM,” *Brain Topogr.*, vol. 39, no. 3, Art. no. 39, May 2026.

DOI: 10.1007/s10548-026-01190-x; PMID: PMC13035606

- 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,” *J. ECT*, vol. 41, no. 4, pp. 223–231, Dec. 2025.

DOI: 10.1097/YCT.0000000000001069; PMID: PMC12892304

★ Featured in Issue Highlights

- E. C. Ekpo, L. Beynel, B. Lubner, **Z.-D. Deng**, T. J. Strauman, and S. H. Lisanby, “Resting-state and task-based functional connectivity reveal distinct mPFC and hippocampal network alterations in major depressive disorder,” *Brain Sci.*, vol. 15, no. 11, Art. no. 1133, Oct. 2025.

DOI: 10.3390/brainsci15111133; PMID: PMC12650456; Data available 

 Part of Special Issue: *Applications of fMRI in neuropsychiatry and neurological disease* 

- 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,” *Biol. Psychiatry Glob. Open Sci.*, vol. 5, no. 3, Art. no. 100471, May 2025.

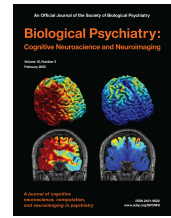
DOI: 10.1016/j.bpsgos.2025.100471; PMID: PMC11985115; Data available 

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,” *Biol. Psychiatry Cogn. Neurosci. Neuroimaging*, vol. 10, no. 2, pp. 175–185, Feb. 2025.

DOI: 10.1016/j.bpsc.2024.10.016; PMID: PMC12923074

 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 Stimul.*, 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 Neurosci.*, vol. 3, Art. no. 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,” *Cereb. Cortex*, vol. 34, no. 9, Art. no. 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; Code available 

 Commentary: vol. 50, no. 11, pp. 1752–1753, Oct. 2025. 

* 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,” *Front. Psychiatry*, vol. 15, Art. no. 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,” *J. Neural Eng.*, vol. 21, no. 4, Art. no. 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, Art. no. 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 Spectr.*, 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 Disord.*, 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, Art. no. 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,” *Phys. Med. Biol.*, vol. 69, no. 5, Art. no. 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. Camprodon, G. Petrides, A. K. Malhotra, and C. C. Abbott, “Electroconvulsive therapy-induced volumetric brain changes converge on a common causal circuit in depression,” *Mol. 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,” *Sci. Rep.*, vol. 13, no. 1, Art. no. 18657, Oct. 2023.
DOI: 10.1038/s41598-023-45602-5; PMID: 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, Art. no. 2320, Aug. 2023.

DOI: 10.3390/biomedicines11082320; PMID: 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,” *J. Affect. Disord.*, vol. 335, pp. 349–357, Aug. 2023.

DOI: 10.1016/j.jad.2023.05.042; PMID: 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,” *Biol. Psychiatry Glob. Open Sci.*, vol. 3, no. 3, pp. 470–479, Jul. 2023.

DOI: 10.1016/j.bpsgos.2022.04.001; PMID: 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,” *Biol. Psychiatry Cogn. Neurosci. Neuroimaging*, vol. 8, no. 7, pp. 760–767, Jul. 2023.

DOI: 10.1016/j.bpsc.2023.03.001; PMID: 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,” *Front. Psychiatry*, vol. 14, Art. no. 1168672, May 2023.

DOI: 10.3389/fpsy.2023.1168672; PMID: 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,” *J. Neural Eng.*, vol. 20, no. 2, Art. no. 026016, Mar. 2023.

DOI: 10.1088/1741-2552/ac9a76; PMID: 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 Biol.*, vol. 21, no. 2, Art. no. e3001999, Feb. 2023.

DOI: 10.1371/journal.pbio.3001999; PMID: 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,” *Transl. Psychiatry*, vol. 13, no. 1, Art. no. 43, Feb. 2023.

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

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

DOI: 10.1186/s12916-022-02678-6; PMID: 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, Art. no. 119705, Dec. 2022.
DOI: 10.1016/j.neuroimage.2022.119705; PMID: 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,” *Sci. Data*, vol. 9, no. 1, Art. no. 616, Oct. 2022.
DOI: 10.1038/s41597-022-01695-7; PMID: 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,” *J. ECT*, vol. 38, no. 2, pp. 88–94, Jun. 2022.
DOI: 10.1097/YCT.0000000000000812; PMID: 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,” *J. Neural Eng.*, vol. 19, no. 2, Art. no. 026059, May 2022.
DOI: 10.1088/1741-2552/ac697c; PMID: 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, Art. no. 118863, Apr. 2022.
DOI: 10.1016/j.neuroimage.2021.118863; PMID: PMC8851689
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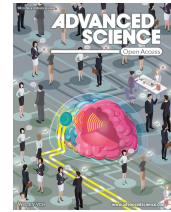
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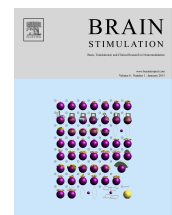
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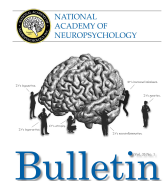
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DOI: 10.1016/B978-0-444-53497-2.00027-9; PMID: 24112906

📖 Part of Volume: *Brain stimulation* 📖

📎 Acknowledged for figure contribution

M. Wysocki, M.-N. Fiamma, C. Straus, C.-S. Poon, and T. Similowski, “Chaotic dynamics of resting ventilatory flow in humans assessed through noise titration,” *Respir. Physiol. Neurobiol.*, vol. 153, no. 1, pp. 54–65, Aug. 2006.

DOI: 10.1016/j.resp.2005.09.008; PMID: 16303337

📎 Acknowledged for noise titration computations

THESES

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

Available: *Columbia University Academic Commons*, DOI: 10.7916/D8F47WCS

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

Available: *DSpace@MIT*, HDL: 1721.1/41649

🗣️ Denotes oral presentation

ABSTRACTS (SELECTED, 2026 – 2027)

- *🗣️ **Z.-D. Deng**, “Portable ultra-low-field MRI for individualized electric-field modeling of TMS, tDCS, and ECT,” submitted to: *International Brain Stimulation Conference*, Feb. 2027.

Symposium: *Below threshold: Mechanisms and translation of low-intensity magnetic neuromodulation and imaging*

G. Bertazzoli, O. Shevtsov, M. Bulgari, P. J. Fried, G. Guidali, V. Iacovella, E. Marcantoni, T. O. Bergmann, F. Breuer, S. De Smet, **Z.-D. Deng**, M. Feurra, R. Gau, Y. O. Halchenko, J. C. Hernandez-Pavon, N. P. Holmes, A. Hopkins, S. Isabella, M. Makarova, G. Niso, D. Oathes, G. Pellegrino, N. Rotstein, V. H. Souza, S. Vijayakumar, M. C. Vinding, T. Kuhn, M. Bortoletto, and N. Rogasch, “NIBS-BIDS: An extension to the brain imaging data structure for non-invasive brain stimulation,” submitted to: *International Brain Stimulation Conference*, Feb. 2027.

N. Grüll, A. Gramser, M. Treiber, M. Deckert, B. Tesar-Böhm, M. Ludwig, F. Erhart, K. Novak, **Z.-D. Deng**, U. Willinger, and C. Kraus, “Differentiating responders and non-responders of antidepressant VNS: A P300 study,” submitted to: *International Brain Stimulation Conference*, Feb. 2027.

L. Beynel, V. Roopchansingh, P. Taylor, R. Reynolds, L. Linqing, N. Baker, H. Gura, **Z.-D. Deng**, and S. H. Lisanby, “A first attempt at integrating rTMS with real-time fMRI neurofeedback: Feasibility and methodological challenges,” submitted to: *International Brain Stimulation Conference*, Feb. 2027.

- * C. C. Abbott, D. Farrar, J. Upston, T. R. Jones, M. Lloyd, T. Squillaci, M. Argyelan, C. Beggs, J. David, B. Kimbrell, S. MacDonald, J. Miller, D. K. Quinn, S. Ryman, S. M. McClintock,

- E. Erhardt, A. Datta, and **Z.-D. Deng**, “Individualized vs fixed amplitude electroconvulsive therapy for depression: A randomized clinical trial,” submitted to: *Annual Meeting of the American College of Neuropsychopharmacology*, Jan. 2027; *International Brain Stimulation Conference*, Feb. 2027.
- L. Beynel, N. Baker, E. Wiener, E. Ekpo, M. Dannhauer, Z. Rezaee, C. Abboud, E. Feuer, M. Hynd, P. Rohde, B. Lubner, F. Mukhtar, E. Jones, W. Regenold, **Z.-D. Deng**, T. Strauman, and S.H. Lisanby, “Individualized fMRI-guided rTMS combined with self-system therapy in treatment-resistant depression: A randomized controlled trial,” submitted to: *Annual Meeting of the American College of Neuropsychopharmacology*, Jan. 2027.
- * E. Bharti, C. A. Zarate, Jr., V. Voon, and **Z.-D. Deng**, “Personalizing treatment: Ethical considerations of machine learning with neuroimaging for depression,” *Postgraduate Bioethics Conference, University of Warwick*, Sep. 2026.
- G. M. Noetscher, A. Miles, B. Danskin, D. Tang, M. Ingersoll, G. C. Nuñez Ponasso, C. Paxton, R. Ludwig, E. H. Burnham, **Z.-D. Deng**, H. Lu, K. Weise, T. R. Knösche, B. R. Rosen, M. Bikson, and S.N. Makaroff, “Direct reconstruction of DC and low-frequency cortical conductivity from large-scale electron microscopy data,” *BRAIN Initiative Conference*, Aug. 2026.
- D. Tang, C. Swenson, S. Small-Zlochower, G. Bizik, L. M. Christensen, T. Knoesche, J. Hau-eisen, R. Ludwig, G. Noetscher, G. N. Ponasso, **Z.-D. Deng**, and S.N. Makaroff, “Low-intensity multi-channel steering TMS array for network-level neuromodulation,” *BRAIN Initiative Conference*, Aug. 2026.
- * G. Noetscher, E. Neufeld, A. Cassara, B. Lloyd, H. Lu, and **Z.-D. Deng**, “Accurate deep-brain field prediction for ECT/TES: Why BEM-FMM matters,” *NYC Neuromodulation Conference*, Jul./Aug. 2026.
Workshop: *Beyond finite element method: Fast multipole method for high-resolution brain stimulation, brain recordings, and cellular-scale modeling*
- G. M. Noetscher, D. A. Drumm, E. Neufeld, **Z.-D. Deng**, and S. N. Makaroff, “A comparative analysis of simulation methods for predicting hippocampal electric fields during ECT,” *NYC Neuromodulation Conference*, Jul./Aug. 2026.
- N. Khadka, Y. Huang, **Z.-D. Deng**, D. Q. Truong, G. Venkatasubramanian, Y. Tu, C. C. Abbott, and A. Datta, “Model-based assessment of race, age, gender, and electrode montage in ECT,” *NYC Neuromodulation Conference*, Jul./Aug. 2026.
- D. Tang, C. Swenson, S. Small-Zlochower, **Z.-D. Deng**, and S. Makaroff, “Design of a multi-channel low-intensity TMS array,” *NYC Neuromodulation Conference*, Jul./Aug. 2026.
- D. A. Drumm, G. M. Noetscher, **Z.-D. Deng**, and S. Makaroff, “Charge-based BEM-FMM with residual-driven AMR for high definition TES modeling,” *NYC Neuromodulation Conference*, Jul./Aug. 2026; also presented at *BRAIN Initiative Conference*, Aug. 2026.
- S. B. S. Larsen, S. Makaroff, D. Tang, **Z.-D. Deng**, R. Ludwig, G. Noetscher, P. Kølbaek, R. E. Nielsen, and G. Bizik, “Transcranial pulsed electromagnetic fields (T-PEMF) for difficult-to-treat bipolar depression: Treatment outcomes, safety, and tolerability from a naturalistic cohort,” *NYC Neuromodulation Conference*, Jul./Aug. 2026.
- D. Tang, G. Bizik, **Z.-D. Deng**, R. Ludwig, G. Noetscher, and S. Makaroff, “Electric and magnetic field characteristics of the Re5 brain stimulation system,” *NYC Neuromodulation Conference*, Jul./Aug. 2026.
- * J. R. Gilbert, C. A. Zarate, Jr., and **Z.-D. Deng**, “Frontocingulate oscillatory and circuit-level dynamics shape ketamine efficacy in treatment-resistant depression,” *Biol. Psychiatry*, vol. 99, no. 10, p. S311, May 2026.

- * S. Dey and **Z.-D. Deng**, “Closed-loop neuromodulation through the lens of direct and indirect data-driven control,” *Biol. Psychiatry*, vol. 99, no. 10, p. S307, May 2026; also presented at *NIMH IRP Fellows’ Scientific Training Day*, Sep. 2025.
- N. Baker, L. Beynel, **Z.-D. Deng**, B. Luber, T. Strauman, and S. H. Lisanby, “Clinical changes following concurrent fMRI-guided rTMS and psychotherapy for patients with treatment-resistant depression,” *Biol. Psychiatry*, vol. 99, no. 10, pp. S162–S163, May 2026.
- * **Z.-D. Deng**, C. A. Zarate, Jr., and J. R. Gilbert, “Frontocingulate gamma power and connectivity as biomarkers of ketamine response in treatment-resistant depression,” *Neuropsychopharmacology*, vol. 51, suppl. 1, p. 128, Jan. 2026.
- ✂ Accepted for presentation, unable to attend conference due to government travel restrictions

INTELLECTUAL PROPERTY

- D. Tang, G. Bizik, L. Christensen, **Z.-D. Deng**, R. Ludwig, G. Noetscher, G. Nuñez Ponasso, and S. Makaroff, “Neuromodulation device and system,” U.S. Provisional Patent Application 64/063,720, filed on May 12, 2026.
- 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 WO 2025/254758 A1, Dec. 11, 2025. Assignee: National Institutes of Health, U.S. Department of Health and Human Services. ☑
- 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, Oct. 17, 2024. Assignee: National Institutes of Health, U.S. Department of Health and Human Services. ☑
- ☞ National-stage applications pending in US (Application 19/474,167, filed on Oct. 9, 2025) and Europe (Application 2024723369, Feb. 18, 2026)
- 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, Jul. 11, 2024. Assignee: University of New Mexico. ☑
- ☞ National-stage application pending in US (Application 2026/0027375 A1, Jan. 29, 2026)
- 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 on Jul. 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 B2, 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 B2, Aug. 22, 2017. Assignee: Massachusetts Institute of Technology. ☑
- 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. 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 B2, Aug. 12, 2014. Assignee: The Trustees of Columbia University in the City of New York. ☑
- 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 on Aug. 22, 2011.

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.

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

NIH/NIMH R01 MH130490

2023.07 – 2028.05

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

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

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

NIH/NIMH U01 MH130447

2022.09 – 2027.06

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

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

Deciphering mechanisms of ECT outcomes and adverse effects (DECODE)

NIH/NIMH R01 MH128686/MH128690/MH128691/MH128692

2022.08 – 2027.05

Role: Intramural NIH collaborator; mPIs: Sheline, Narr, Espinoza, McClintock, Abbott

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

PENDING
RESEARCH
SUPPORT

Use of transcranial pulsed electromagnetic field (T-PEMF) therapy for bipolar depression: A randomized double-blind sham-controlled parallel-group multicenter trial

Independent Research Fund Denmark

2026.06

Role: Intramural NIH collaborator; mPIs: P. Kølbaek, G. Bizik

Neurocircuit-informed non-invasive neuromodulation to treat irritability in adults with major depressive disorder

NIH/NIMH R61/R33

2026.06

Role: Intramural NIH collaborator; mPIs: V. R. Steele, M. K. Jha, W.-L. Tseng

A dense low-power TMS array enabling whole-cortex steerable neuromodulation

NIH/NIMH PF5

2026.05

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

Individualized ECT electrode placement to improve clinical outcomes in older adults

NIH/NIMH R61/R33

2026.02

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

Accelerated intermittent theta burst for methamphetamine use disorder

NIH/NIMH R61/R33

2026.02

Role: Intramural NIH collaborator; mPIs: M. K. Jha, H. Ekhtiari, K. Brady, A. Datta

Analysis of two 1-mm³ cortical brain samples with boundary element fast multipole method to better understand brain stimulation

NIH R01

2025.12

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

PPrecision Optimally Targeted ECT (PROTECT) First in Human

NIH/NIMH UG3/UH3

2025.09

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

	<i>High-density theta burst stimulation at 100 Hz: Development and first trial in cocaine use disorder</i>	2025.09
	NIH UG3/UH3 Role: Intramural NIH collaborator; PI: H. Lu	
	<i>PRrecision Optimally Targeted ECT (PROTECT)</i>	2025.06
	NIH/NIMH R01 Role: mPI; collaborating PIs: C. C. Abbott, A. Datta	
	<i>Transdiagnostic trial to reduce default mode network connectivity in bipolar depression and major depressive disorder with accelerated iTBS</i>	2025.06
	NIH Role: Intramural NIH collaborator; PI: Y. I. Sheline	
COMPLETED RESEARCH SUPPORT	<i>ECT amplitude titration for improved clinical outcomes in late-life depression</i>	2021.02 – 2026.01
	NIH/NIMH R61/R33 MH125126 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>	2020.05 – 2023.04
	NIH/NIMH R61/R33 MH120188 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>ECT pulse amplitude and medial temporal lobe engagement</i>	2016.09 – 2020.07
	NIH/NINDS U01 MH111826 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>	2018.06 – 2020.06
	Brain & Behavior Research Foundation Young Investigator Award 26161 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.	
	<i>Fast-Fail Trials: Mood and Anxiety Spectrum Disorders (FAST-MAS)</i>	2016.06 – 2017.12
	NIMH 271201200006I-3-27100003-1 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.	
	<i>Transcranial direct current stimulation as a treatment for acute fear</i>	2015.04 – 2017.01
	NIH/NIMH R21 MH106772 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.	
	<i>Individualized optimally-targeted seizure therapy</i>	2014.07 – 2016.06
	NIH/NCATS KL2 TR001115 Role: Mentored 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: Mentored 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		30	Invited seminars
PRESENTATIONS		18	Invited symposia, webinars, & workshops
SUMMARY		7	Grand rounds
		25	Invited conference panels
		11	Contributed conference presentations

‡ Denotes Continuing Medical Education accredited presentation

INVITED SEMINARS	UCSD, Department of Psychiatry, Interventional Psychiatry Research Program <i>Computational neuroengineering for precision neuromodulation: Dose, device, and treatment optimization</i>	2026
	‡ The Ohio State University College of Medicine Center for Neuroimaging, Neurophenotyping, Neurocomputation, and Neuromodulation <i>Computational design of next-generation neurostimulation therapies</i>	2025
	UC Irvine, Department of Biomedical Engineering <i>Computational neuroengineering for precision psychiatry: Brain stimulation modeling, dosing, and device innovation</i>	2025
	Arizona State University, School for Biological and Health Systems Engineering <i>Model-driven neurostimulation: Computational approaches to device and dose optimization</i>	2025
	NIMH Intramural Research Program Investigators' Seminar <i>Reading tells: Using facial expression analysis to track emotional states in depression</i>	2025
	Virginia Commonwealth University, Department of Mechanical & Nuclear Engineering Co-hosted by IEEE Magnetics and EMBS Chapters <i>Recent advances in transcranial magnetic stimulation: Devices, modeling, and applications</i>	2025
	UT Southwestern, Department of Psychiatry <i>From models to medicine: Advancing precision neuromodulation through engineering</i>	2025
	UCSF, Department of Psychiatry & Behavioral Sciences <i>Engineering precision in neuromodulation: Computational models to clinical applications</i>	2025
	University of Pittsburgh, Geriatric Psychiatry Neuroimaging Laboratory <i>The full spectrum: Electromagnetic brain stimulation from minimal to maximal intensity</i>	2024
	UT Southwestern, Center for Depression Research and Clinical Care <i>Advancements in computational neurostimulation for depression treatment optimization and technology development</i>	2023
	University of Pittsburgh, Department of Psychiatry <i>Computational neurostimulation: Treatment optimization and technology development</i>	2023
	Global ECT-MRI Collaboration Young Researchers Collective <i>ECT, electric field, neuroplasticity, and clinical outcomes</i>	2022

	National Center of Neuromodulation for Rehabilitation, MUSC <i>Model-driven design for brain stimulation therapies</i> 	2022
	NIMH Intramural Research Program Investigators' Seminar <i>Seizure therapies: The next generation</i>	2022
	Brown University/Butler Hospital, Department of Psychiatry & Human Behavior <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 <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
INVITED SYMPOSIA, WEBINARS, & WORKSHOPS	OHBM Annual Meeting <i>Individualized head modeling and electric field simulation in tDCS, ECT, and TMS: Current and emerging approaches</i> Educational course: <i>Using neuroimaging to inform brain stimulation (TES, TMS, tFUS)</i>	2026
‡	Clinical TMS Society Annual Meeting Plenary: <i>From physics to practice: Understanding electric field modeling in clinical TMS</i>	2026

	§ International Society for ECT and Neurostimulation Webinar <i>Advancing ECT through computational modeling, dose optimization, and device innovation</i>	2025
	International Symposium on Novel Neuromodulation Techniques <i>Model-driven brain stimulation treatments</i>	2024
	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 <i>Challenges and strategies in implementing effective sham stimulation for noninvasive brain stimulation trials</i> 	2024
	Brain and Human Body Modeling Conference <i>Effects of low intensity magnetic stimulation</i>	2023
	International Network of tES-fMRI Webinar <i>Electric field modeling and optimization approaches for individualized targeting</i>	2022
	International College of Neuropsychopharmacology Virtual World Congress <i>Next generation seizure therapy and neuromodulation</i>	2021
	Society for Brain Mapping & Therapeutics Annual Congress <i>Advances in electroconvulsive therapy for treatment of depression</i>	2021
	University of Minnesota Non-Invasive Brain Stimulation Workshop <i>Use of individual electric field models in clinical research</i> 	2020
	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
	Bergen Workshop of the Global ECT-MRI Collaboration <i>Electric field modeling for electroconvulsive therapy</i>	2018
	Neuropsychiatric Drug Development Summit <i>Targeted intermittent device delivered interventions will ultimately prove superior to maintenance treatment with drugs for brain disorders</i>	2018
	Joint NYC Neuromodulation Conference & NANS Summer Series <i>Overview of electric field modeling</i> Preconference workshop: Computational modeling in neuromodulation	2018
	NYC Neuromodulation Conference <i>Low field magnetic stimulation</i>	2017
	NIMH Non-Invasive Brain Stimulation Electric Field Modeling Workshop <i>Use of individual electric field models in clinical research</i> 	2017
	NIMH Workshop on Transcranial Electrical Stimulation: Mechanisms, Technology, and Therapeutic Applications <i>Effect of anatomical variability on electric field characteristics of tES</i>	2016
	§ International Society for ECT and Neurostimulation Annual Meeting Workshop: <i>Spatial targeting with transcranial magnetic stimulation</i>	2015
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

INVITED CONFERENCE PANELS	⌘ 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>	
	⌘ International College of Neuropsychopharmacology Congress	2026
	<i>Next-generation seizure therapy: Balancing efficacy and cognition with optimized waveforms and personalized targeting</i>	
	Symposium: <i>Precision neuromodulation to improve treatment outcomes in mood disorders & OCD</i>	
	Electroconvulsive Therapy Conference & GEMRIC Workshop	2025
	<i>ECT time machine: What yesterday's devices teach about tomorrow's therapy</i>	
	Panel: <i>Therapeutic components of ECT: Electric field</i>	
	⌘ American Neuropsychiatric Association Annual Meeting	2025
	<i>Advancing personalized seizure therapy: Magnetic seizure therapy and Multichannel Individualized Stimulation Therapy</i>	
	Symposium: <i>Interventional neuropsychiatry: From mechanisms to clinical decision making</i>	
	International Brain Stimulation Conference	2025
	<i>Multichannel Individualized Stimulation Therapy: A targeted approach to optimize ECT</i>	
	Symposium: <i>ECT reimaged: Precision, prediction, and personalized care</i>	
	✂ Accepted for presentation, unable to attend due to government travel restrictions	
	International Society for Magnetic Resonance in Medicine Annual Meeting	2024
	<i>TMS devices and modeling</i>	
	Workshop: <i>From basics to applications: MRI of neuromodulation using TMS and FUS</i>	
	International Conference of the IEEE Engineering in Medicine and Biology Society	2023
	<i>Modeling of TMS and ECT in the treatment of depression</i>	
	Panel: <i>Computational analysis of non-invasive neuromodulation constructs: Brain & spine</i>	
	⌘ ADAA Anxiety and Depression Conference	2023
	<i>Modeling and dose optimization for TMS and ECT</i>	
	Panel: <i>Parsing through syndromic heterogeneity in youths with mental illness to identify neuro-circuit mechanisms and develop novel treatments</i>	
	⌘ International Society for Magnetic Resonance in Medicine	2022
	<i>Modeling of TMS</i> 📄	
	Workshop: <i>MRI of neuromodulation: Target engagement, neural mechanism, & biomarker development</i>	
	Bergen Workshop of the Global ECT–MRI Collaboration	2022
	<i>ECT device development</i> 📄	
	Panel: <i>Dosing strategies and future of neurostimulation techniques in ECT</i>	
	Brain and Human Body Modeling Conference	2022
	<i>ECT, electric field, neuroplasticity, and clinical outcomes</i>	
	Panel: <i>Modeling of transcranial electrical stimulation and deep brain stimulation</i>	
	European Conference of Brain Stimulation in Psychiatry	2022
	<i>Symptom dimensions and response trajectories in ECT and MST</i>	
	Panel: <i>Beyond clinical syndromes: Understanding mechanisms of neuromodulation from a dimensional perspective</i>	
	⌘ Society of Biological Psychiatry Annual Meeting	2022
	<i>Depressive symptom dimensions in seizure therapy</i>	

Panel: *Dimensional approaches to device neuromodulation*

- ⌘ American Academy of Child and Adolescent Psychiatry Annual Meeting 2021
Introduction to computational psychiatry
 Panel: *Recent work with contemporary computational methods and artificial intelligence to advance the practice of child and adolescent psychiatry*
- European College of Neuropsychopharmacology Congress 2021
Precision neurostimulation: Electroconvulsive therapy
 Panel: *Neurobiology of rapid mood changes*
- European Conference of Brain Stimulation in Psychiatry 2020
Electric field modeling to inform ECT dosing and device development
 Panel: *What can we learn from ECT: Insights from the GEMRIC consortium*
- NYC Neuromodulation Online 2020
 Discussant, *Noninvasive vagus nerve stimulation applied to stress management, opioid withdrawal, and neurocognitive disorders*
- American Society of Clinical Psychopharmacology Annual Meeting 2020
Advancing seizure therapy: Rational design for precision outcomes
 Panel: *New developments in neurostimulation*
 ⚙ Accepted for presentation; conference was canceled due to COVID-19 pandemic
- ⌘ American College of Neuropsychopharmacology Annual Meeting 2019
Rational design of precision seizure therapy
 Panel: *Precision neurostimulation for treatment of psychiatric disorders*
- International College of Neuropsychopharmacology International Meeting 2019
Individualized seizure therapy: Reinventing ECT
 Workshop: *Neurobiological and clinical characterization, and treatment development for treatment resistant depression*
- International Brain Stimulation Conference 2019
Individualized electroconvulsive therapy for treatment of depression
 Panel: *Individualized brain stimulation: Addressing heterogeneity across modalities*
- Joint NYC Neuromodulation Conference & NANS Summer Series 2018
High-density ECT: Optimizing stimulation arrays and high-density EEG for brain targeting
 Panel: *New targets and technology of electroconvulsive therapy*
- International Conference of the IEEE Engineering in Medicine and Biology Society 2018
Electric field induced by TMS: Applications in depression and anxiety
 Panel: *Computational human models for brain stimulation*
- ⌘ American Psychiatric Association Annual Conference 2018
Individualized neurotargeted seizure therapy: Reinventing ECT
 Presidential Symposium: *ECT in the era of new brain stimulation treatments*
- ⌘ ADAA Anxiety and Depression Conference 2018
Individualized neurotargeted seizure therapy: Reinventing ECT
 Panel: *Personalized medicine for treatment resistant depressed patients: Novel strategies to optimize treatment with antidepressant medications, ketamine, and ECT*
- CONTRIBUTED
 CONFERENCE
 PRESENTATIONS
- International Conference of the IEEE Engineering in Medicine and Biology Society 2026
 ☞ *Assessing ultra-low-field MRI-derived head models for electric field simulation in TMS, ECT, and tDCS: Within-subject agreement with 3 T*
 ⚡ *Polarity-asymmetric HD-tDCS of the dorsolateral prefrontal and inferior parietal cortices biases mind-wandering via a fronto-parietal push-pull mechanism* (presented on behalf of A. Singh and coauthors)
- Duke CTSA KL2 Symposium 2016
Computational modeling in electroconvulsive therapy

	Duke CTSA KL2 Symposium <i>Reengineering electroconvulsive therapy</i>	2015
	International Conference of the IEEE Engineering in Medicine and Biology Society ⊕ <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>	2010
	Annual National Predoctoral Clinical Research Training Program Meeting <i>Coil design for deep-brain transcranial magnetic stimulation</i>	2009
	TRANSFORM Research Day, Irving Institute for Clinical and Translational Research <i>Electromagnetic field shaping and coil design for transcranial brain stimulation</i>	2009
	International Conference of the IEEE Engineering in Medicine and Biology Society <i>Coil design considerations for deep brain transcranial magnetic stimulation</i>	2008
	Annual Meeting of the Society for Neuroscience <i>Heart rate variability is more chaotic in REM than NREM sleep in children</i>	2006
	International Conference of the IEEE Engineering in Medicine and Biology Society <i>Heart rate variability in pediatric obstructive sleep apnea</i>	2006
TEACHING & MENTORING APPOINTMENTS	Capstone Mentor , Harvard Medical School <i>Master of Science in Bioethics Program</i> (research/practicum mentorship)	2026 –
	Guest Lecturer , NIH National Institute of Mental Health <i>Basic Training Course on Transcranial Magnetic Stimulation</i> 🇪🇺	2020
	<i>fMRI Summer Course</i> 🇪🇺	2017
	National Institute of Neurological Disorders and Stroke <i>Clinical Neuroscience Program Lecture Series</i>	2017, 2019
	Capstone Mentor , University of Maryland, College Park Fischell Department of Bioengineering	2018 – 2019
	Faculty , Duke University Department of Psychology & Neuroscience <i>Research Independent Study</i>	2016
	Matching Undergraduates to Science and Engineering Research Program	2015 – 2016
	Biosciences Collaborative for Research Engagement	2015 – 2016
	Department Psychiatry & Behavioral Sciences 💰 <i>Visiting Fellowship in Electroconvulsive Therapy</i>	2015
	💰 <i>Visiting Fellowship in Transcranial Magnetic Stimulation</i>	2014 – 2016
	Teaching Assistant , Columbia University Department of Electrical Engineering <i>Analog Systems in VLSI</i> (graduate level; 33 students + 1 auditor)	Spring 2010
	<i>The Digital Information Age</i> (25 students + 2 auditors)	Fall 2009
	Recitation Instructor , Columbia University Mailman School of Public Health Department of Biostatistics <i>Biostatistics</i> (graduate level; 26 students + 1 auditor)	Fall 2009
	Teaching Assistant , MIT Concourse Program <i>Multivariable Calculus</i>	Fall 2003 – 2006
	<i>Differential Equations</i>	Spring 2004 – 2007

MENTORING SUMMARY	6 K award advising 2 Research fellows & postdoctoral fellows 1 Sponsored thesis 4 Thesis examination committees 4 Graduate students 6 Post-baccalaureate trainees 12 Undergraduate students 4 Interns	
K AWARD ADVISING	D. A. Drumm, Ph.D., Worcester Polytechnic Institute 2026 – “Adaptive mesh refinement algorithms for brain stimulation simulation” S. K. Conroy, M.D., Ph.D., Indiana University School of Medicine 2024 – “Targeting negative self-referential processing in depression with transcranial magnetic stimulation” (K23 in resubmission) D. C. Farrar, M.D., Ph.D., University of New Mexico School of Medicine 2026 – NIH/NIMH K23 MH144291 “CEASE-LD: Characterizing brain excitability, adequacy of seizures, and efficacy in late-life depression with ECT” S. M. Hare, Ph.D., University of Maryland School of Medicine 2024 – NIH/NIMH K01 MH133116 “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 “Personalized circuit-based neuromodulation targets for depression” Klerman Prize for Exceptional Clinical Research, <i>Brain & Behavior Research Foundation</i> , 2022. N. L. Balderston, Ph.D., NIMH / University of Pennsylvania Perelman School of Medicine NIH/NIMH K01 MH121777 2019 – 2023 “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.	
RESEARCH FELLOWS & POSTDOCS	S. Dey, Ph.D., NIMH Visiting Postdoctoral Fellow 2024 – 2026 Career progression: Visiting Postdoctoral Fellow, Evolutionary Genomics Research Group, Computational Biology Branch, NCBI/NLM/NIH M. Dannhauer, Ph.D., NIMH Research Fellow 2022 – 2024 Career progression: Assistant Professor, Computer Science, East Carolina University	
SPONSORED THESES	G. Asturias, Psychology & Neuroscience, Duke University 2015 – 2017 B.S. 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	
THESIS EXAMINATION COMMITTEES	D. Tang, Electrical & Computer Engineering, Worcester Polytechnic Institute 2026 – Ph.D. thesis committee M.S. thesis: “Computational and experimental approaches to brain stimulation: TMS simulation, coil measurement, and neural structure analysis.” Sponsor: S. N. Makaroff. 2025 Available: <i>Digital WPI</i> , URL: https://digital.wpi.edu/show/6h440x853 S. J. Bolland, Biomedical Engineering, University of Western Australia 2025 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.	

	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.	
	Available: <i>Digital WPI</i> , URL: https://digital.wpi.edu/show/sq87c029w	
	D. Q. Truong, Biomedical Engineering, CUNY City College	2019
	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	
GRADUATE STUDENTS	E. Makaroff, M.S. student, Bioethics, Harvard Medical School	2026 –
	Capstone project	
	J. David, Ph.D. candidate, Neuroscience, University of New Mexico	2026 –
	“Effects of ECT electric pulse shape on motor threshold” (F31 NRSA in review)	
	Role: Co-mentor. Primary mentor: Prof. C. C. Abbott (University of New Mexico)	
	E. Bharti, Ph.D. candidate, NIH–Cambridge Scholars Program	2024 –
	Co-advised with Prof. V. Voon (University of Cambridge)	
	M. Kshirsagar, M.S. student, Biomedical Engineering, Duke University	2012
	Career progression: Consultant, Deloitte Consulting	
POSTBACS	P. L. Robins, B.A., NIMH Intramural Research Training Award (IRTA) Fellow	2021 – 2024
	🏅 Trainee Travel Award, NIMH Intramural Research Program, 2023.	
	🏆 First Place in Student Competition, <i>Brain & Human Body Modeling Conference</i> , 2022.	
	Career progression: Lead interventional technician, Columbia Mental Health	
	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	M. Dib, Biomedical Engineering, University of Maryland, College Park	2017 – 2019
	NIH summer intern (2017); continued undergraduate mentorship through senior capstone design project: <i>Detection of brain-to-brain synchrony for improved psychotherapy</i>	
	Career progression: Medical student, Weill Cornell Medicine	
	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 Career progression: Medical student, Texas A&M College of Medicine	2015 – 2016
	F. M. Mercer, Gender, Sexuality and Feminist Studies, Duke University Career progression: Analyst, Morgan Stanley	2015 – 2016
	E. Shinder, Biology, Duke University ⊗ Graduated with Distinction Career progression: Medical student, Stony Brook School of Medicine	2015 – 2016
	E. P. Vienneau, Biomedical Engineering, Duke University ⊗ Howard G. Clark Award for Excellence in Research Career progression: Ph.D. student, Vanderbilt University	2015 – 2016
	S. H. Lee, Biomedical Engineering, Duke University Career progression: Manager, Strategy & Operations, Tempus Labs	2015
	R. Shah, Psychology & Neuroscience, Duke University Career progression: Medical student, Yale School of Medicine	2015
	J. R. Lilien, Electrical & Computer Engineering, Duke University ⊗ Walter J. Seeley Scholastic Award Career progression: Machine learning engineer, Amazon	2014 – 2016
INTERNS	E. Chung, Psychology, University of Maryland, College Park Career progression: Medical student, Touro University Nevada	2017
	A. L. Halberstadt, Biology and Psychology, Carnegie Mellon University Career progression: Ph.D. student, Penn State University	Summer 2017
	C. M. Prevost, Biomedical Engineering, Clemson University Career progression: Medical student, University South Carolina School of Medicine Greenville	Summer 2015
	J. V. McCall, Biomedical Engineering, North Carolina State University Career progression: Ph.D. student, North Carolina State University	Summer 2013
PROFESSIONAL SOCIETIES MEMBERSHIP	Institute of Electrical and Electronics Engineers 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	American College of Neuropsychopharmacology Program Committee Mentor, Travel Award Program Mentee: Y. Lee, Ph.D., National Institute of Mental Health The Global ECT–MRI Research Collaboration (GEMRIC) Data Processing and MRI Working Group	2026 – 2026 2025 –

	Biomedical Engineering Society	
	Awards Committee	2025 – 2028
	Mid-Career Award Subcommittee	
	Reviewer, Chapter Development Report	2025
	American Society of Clinical Psychopharmacology	
	Technology Committee	2023 – 2029
	Early Career Committee	2023 – 2027
	Technology Task Force	2020 – 2023
	Mentor, New Investigator Award Program	2019
	Mentee: J. P. Stange, Ph.D., University of Illinois	
	Co-founder & Scientific Advisor, Singula Institute	2017 – 2025
INSTITUTIONAL SERVICE	Educational Counselor, MIT Alumni Association	2022 – 2025
	Reviewer, NIH Intramural AIDS Research Fellowships	2025
	Judge, NIH Fellows Award for Research Excellence Competition	2025
	NIH Research Workforce Diversity and Equity Outreach Special Interest Group	2023 – 2025
	Judge, NIMH Training Day Three-Minute Talks competition	2022
	Judge/Lead Judge, NIH Postbac Poster Day	2017 – 2025
	NIH Noninvasive Brain Stimulation Special Interest Group	2017 – 2025
GRANT REVIEW	Reviewer, University of Ottawa Institute of Mental Health Research at The Royal University Medical Research Fund	2026
	Remote Referee, European Research Council	2026
	Technical Reviewer, NIH BluePrint MedTech Program	2021 – 2025
	Expert Reviewer, UK Research and Innovation	2025
	Ad hoc Reviewer, NIH Center for Scientific Review Biophysics of Neural Systems Study Section	2021.10
	Reviewer, Duke Institute for Brain Sciences, Research Incubator Awards	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 & Biology</i>	2024
	Special Issue: <i>Electromagnetic modeling for brain stimulation</i> ☞	

Acta Psychiatrica Scandinavica
AIP Advances
American Journal of Psychiatry
Asian Journal of Psychiatry
Australasian Physical and Engineering Sciences in Medicine
Bioelectromagnetics
Biological Psychiatry
Biological Psychiatry: Global Open Science
BioMedical Engineering OnLine
Biomedical Signal Processing and Control
Biomedicines
BMJ Mental Health
Brain Research Bulletin
Brain Sciences
Brain Stimulation
Cerebral Cortex
Chaos, Solitons & Fractals
Clinical EEG and Neuroscience
Clinical Neurophysiology
CNS Spectrums
Computational and Mathematical Methods in Medicine
Computer Methods and Programs in Biomedicine
Computer Methods in Biomechanics and Biomedical Engineering
Cortex
Depression and Anxiety
Epilepsy & Behavior Reports
European Psychiatry
Frontiers in Cell and Developmental Biology
Frontiers in Computational Neuroscience
Frontiers in Medicine: Intensive Care Medicine and Anesthesiology
Frontiers in Neurology: Applied Neuroimaging
Frontiers in Neuroscience: Brain Imaging Methods
IEEE Access
IEEE Antennas and Propagation Magazine
IEEE Journal of Electromagnetics, RF, and Microwaves in Medicine and Biology
IEEE Transactions on Biomedical Engineering
IEEE Transactions on Neural Systems & Rehabilitation Engineering
IEEE Transactions on Magnetics
Imaging Neuroscience
Journal of Affective Disorders
Journal of ECT
Journal of Neural Engineering
Journal of Neuroscience Methods
Journal of Psychiatric Research
JoVE
Lancet Psychiatry
Medical & Biological Engineering & Computing
Medical Hypotheses
Molecular Psychiatry
Nature Mental Health
Nature Protocols
NeuroImage
NeuroImage Clinical
Neuromodulation
Neuroscience Letters

PLOS Computational Biology
PLOS ONE
Psychological Medicine
Scientific Reports
Translational Psychiatry

	Reviewer, conference proceedings and abstracts	2008–
	Biomedical Engineering Society Annual Meeting	
	IEEE EMBS International Conference on Biomedical and Health Informatics	
	IEEE EMBS International Conference on Neural Engineering	
	International Conference of the IEEE Engineering in Medicine and Biology Society	
	Organization for Human Brain Mapping Annual Meeting	
CONFERENCE & WORKSHOP ORGANIZATION	International Brain Stimulation Conference	2027
	Symposium Chair: <i>Below threshold: Mechanisms and translation of low-intensity magnetic neuromodulation and imaging</i> (in submission)	
	International Conference of the IEEE Engineering in Medicine and Biology Society	2026
	Session Chair: <i>Emotion and affective signal processing</i>	
	American Society of Clinical Psychopharmacology Annual Meeting	2023, 2026
	Program Review Subcommittee Member	
	Brain and Human Body Modeling Conference	2023
	Organizing Committee Member	
	Student Competition Judge	
	Panel Chair: <i>New modeling methods: Spinal cord stimulation and novel stimulation</i>	
	Panel Chair: <i>Development and assessment of modeling methods</i>	
	International Brain Stimulation Conference	2023
	Symposium Chair: <i>Insights and challenges in preclinical models of TMS: Multimodal investigations across animal species</i>	
	Symposium Chair: <i>Advanced computational modeling and optimization methods for non-invasive brain stimulation</i>	
	Bergen Workshop of the Global ECT–MRI Collaboration	2022
	Panel Chair: <i>Dosing strategies and future of neurostimulation techniques in ECT</i>	
	International Congress of Clinical Neurophysiology	2022
	Panel Chair: <i>Towards optimized TMS targeting approaches</i>	
	Brain and Human Body Modeling Conference	2022
	Organizing Committee Member	
	Panel Chair: <i>Modeling of transcranial electrical stimulation and deep brain stimulation</i>	
	NIH Workshop on TMS–EEG Methodology and Data Integration	2020
	Organizer	
	⚙ Funding awarded; event was canceled due to COVID-19 pandemic	
	American Society of Clinical Psychopharmacology Annual Meeting	2019
	Panel Chair: <i>Treatment-resistant mood disorders across the lifespan: Novel therapeutics</i>	
	International Conference of the IEEE Engineering in Medicine and Biology Society	2018
	Panel Chair: <i>Computational human models for brain stimulation</i>	
	Joint NYC Neuromodulation Conference & NANS Summer Series	2018
	Workshop Director: <i>Computational modeling in neuromodulation: Tools for engineers, clinicians, and researchers</i>	

COMMUNITY INVOLVEMENT, OUTREACH, & SCIENCE ADVOCACY	Producer, <i>Psychopharm Today</i> podcast 	2024 – 2026
	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	August 31, 2026	