

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 (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		74 Refereed original research articles
		21 Refereed conference proceedings & technical letters
		19 Refereed reviews, perspectives, protocols, & consensus papers
		10 Book chapters
		9 Editorials, commentaries, & correspondence
		10 IP filings (4 granted U.S. patents, 3 pending, 3 provisionals)
		+ 190 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> , online ahead of print, Jul. 2026. DOI: 10.1016/j.brs.2026.103172; PMID: 42526755; Code available 
	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," <i>Sci. Rep.</i> , 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

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*, accepted, Jun. 2026.

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

* 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* 

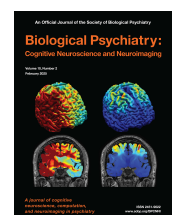
A. V. Peterchev, **Z.-D. Deng**, C. Sikes-Keilp, E. C. Feuer, M. A. Rosa, and S. H. Lisanby, “Optimal frequency for seizure induction with electroconvulsive therapy and magnetic seizure therapy in nonhuman primates,” *Biol. Psychiatry Glob. Open Sci.*, vol. 5, no. 3, Art. no. 100471, May 2025.

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. 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. Luber, L. Beynel, **Z.-D. Deng**, L. G. Appelbaum, T. Jones, A. Harrison, D. L. K. Murphy, E. Lo, R. A. McKinley, and S. H. Lisanby, “Site- and frequency-specific enhancement of visual search performance with online individual alpha frequency (IAF) repetitive transcranial magnetic stimulation (rTMS) to the inferior frontal junction,” *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/fpsyt.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. Luber, and S. H. Lisanby, “Lessons learned from an fMRI-guided rTMS study on performance in a numerical Stroop task,” *PLOS ONE*, vol. 19, no. 5, 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. Hurlmann, 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,” *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,” *Biomedicine*, vol. 11, no. 8, Art. no. 2320, Aug. 2023.
DOI: 10.3390/biomedicine11082320; 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/fpsyt.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.
DOI: 10.1038/s41398-023-02312-w; PMID: 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,” *J. Neural Eng.*, vol. 20, no. 1, Art. no. 016028, Jan. 2023.
DOI: 10.1088/1741-2552/acae0d; PMID: 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 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

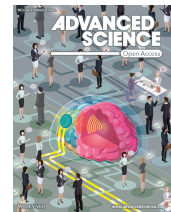
- A. Richie-Halford, M. Cieslak, L. Ai, S. Caffarra, S. Covitz, A. R. Franco, I. I. Karipidis, J. Kruper, M. Milham, B. Avelar-Pereira, E. Roy, V. J. Sydnor, J. D. Yeatman, The Fibr Community Science Consortium [including **Z.-D. Deng**], T. D. Satterthwaite, and A. Rokem, “An analysis-ready and quality 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. Lubner, 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
 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,” *Mol. Psychiatry*, vol. 27, no. 3, pp. 1676–1682, Mar. 2022.
DOI: 10.1038/s41380-021-01380-y; PMID: PMC9095458
 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; PMID: 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,” *Am. J. Geriatr. Psychiatry*, vol. 30, no. 1, pp. 15–28, Jan. 2022.
DOI: 10.1016/j.jagp.2021.04.006; PMID: PMC8595359
 Editorial: pp. 29–31. 
- 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,” *Mol. 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 Stimul.*, 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 Clin.*, vol. 30, Art. no. 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,” *Eur. Arch. Psychiatry Clin. Neurosci.*, vol. 271, no. 1, pp. 101–110, Feb. 2021.
DOI: 10.1007/s00406-020-01127-w; PMID: PMC8100980
☞ Part of Collection: *Brain stimulation in psychiatry* ☞
- C. C. Abbott, D. Quinn, J. Miller, E. Ye, S. Iqbal, M. Lloyd, T. R. Jones, J. Upston, **Z.-D. Deng**, E. Erhardt, and S. M. McClintock, “Electroconvulsive therapy pulse amplitude and clinical outcomes,” *Am. J. Geriatr. Psychiatry*, vol. 29, no. 2, pp. 166–178, Jan. 2021.
DOI: 10.1016/j.jagp.2020.06.008; PMID: PMC7744398
- N. L. Balderston, C. Roberts, E. M. Beydler, **Z.-D. Deng**, T. Radman, B. Lubner, S. H. Lisanby, M. Ernst, and C. Grillon, “A generalized workflow for conducting electric field-optimized, fMRI-guided, transcranial magnetic stimulation,” *Nat. Protoc.*, vol. 15, no. 11, pp. 3595–3614, Nov. 2020.
DOI: 10.1038/s41596-020-0387-4; PMID: PMC8123368; Code available ☞
☞ Part of Collection: *Cognitive neuroscience framework protocols* ☞
- M. L. Cox, **Z.-D. Deng**, H. Palmer, A. Watts, L. Beynel, J. R. Young, S. H. Lisanby, J. Migaly, and L. G. Appelbaum, “Utilizing transcranial direct current stimulation to enhance laparoscopic technical skills training: A randomized controlled trial,” *Brain Stimul.*, vol. 13, no. 3, pp. 863–872, May/Jun. 2020.
DOI: 10.1016/j.brs.2020.03.009; PMID: PMC8474665
- S. Aronson Fischell, T. J. Ross, **Z.-D. Deng**, B. J. Salmeron, and E. A. Stein, “Transcranial direct current stimulation applied to the dorsolateral and ventromedial prefrontal cortices in smokers modifies cognitive circuits implicated in the nicotine withdrawal syndrome,” *Biol. Psychiatry Cogn. Neurosci. Neuroimaging*, vol. 5, no. 4, pp. 448–460, Apr. 2020.
DOI: 10.1016/j.bpsc.2019.12.020; PMID: PMC7150637
- S. H. Lisanby, S. M. McClintock, G. Alexopoulos, S. H. Bailine, E. Bernhardt, M. C. Briggs, C. M. Cullum, **Z.-D. Deng**, M. Dooley, E. T. Geduldig, R. M. Greenberg, M. M. Husain, S. Kaliora, R. G. Knapp, V. Latoussakis, L. S. Liebman, W. V. McCall, M. Mueller, G. Petrides, J. Prudic, P. B. Rosenquist, M. V. Rudorfer, S. Sampson, A. A. Teklehaimanot, K. G. Tobias, R. D. Weiner, R. C. Young, C. H. Kellner, CORE/PRIDE Work Group, “Neurocognitive effects of combined electroconvulsive therapy (ECT) and venlafaxine in geriatric depression: Phase 1 of the PRIDE study,” *Am. J. Geriatr. Psychiatry*, vol. 28, no. 3, pp. 304–316, Mar. 2020.
DOI: 10.1016/j.jagp.2019.10.003; PMID: PMC7050408
☞ Commentary: pp. 317–319. ☞
- N. L. Balderston, E. M. Beydler, C. Roberts, **Z.-D. Deng**, T. Radman, T. Lago, B. Lubner, S. H. Lisanby, M. Ernst, and C. Grillon, “Mechanistic link between right prefrontal cortical activity and anxious arousal revealed using transcranial magnetic stimulation in healthy subjects,” *Neuropsychopharmacology*, vol. 45, no. 4, pp. 694–702, Mar. 2020.
DOI: 10.1038/s41386-019-0583-5; PMID: PMC7021903

L.-Z. Yang, W. Zhang, W. Wang, Z. Yang, H. Wang, **Z.-D. Deng**, C. Li, B. Qiu, D.-R. Zhang, R. Cohen Kadosh, H. Li, and X. Zhang, “Neural and psychological predictors of cognitive enhancement and impairment from neurostimulation,” *Adv. Sci.*, vol. 7, no. 4, Art. no. 1902863, Feb. 2020.

DOI: 10.1002/advs.201902863; PMCID: PMC7029648

 Journal inside back cover 



N. L. Balderston, E. M. Beydler, M. Goodwin, **Z.-D. Deng**, T. Radman, B. Luber, S. H. Lisanby, M. Ernst, and C. Grillon, “Low-frequency parietal repetitive transcranial magnetic stimulation reduces fear and anxiety,” *Transl. Psychiatry*, vol. 10, no. 1, Art. no. 68, Feb. 2020.

DOI: 10.1038/s41398-020-0751-8; PMCID: PMC7026136

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

DOI: 10.1126/sciadv.aav9847; PMCID: PMC6821463

M. Argyelan, L. Oltedal, **Z.-D. Deng**, B. Wade, M. Bikson, A. Joanlanne, S. Sanghani, H. Bartsch, M. Cano, A. M. Dale, U. Dannlowski, A. Dols, V. Enneking, R. Espinoza, U. Kessler, K. L. Narr, K. J. Oedagaard, M. L. Oudega, R. Redlich, M. L. Stek, A. Takamiya, L. Emsell, F. Bouckaert, P. Sienaert, J. Pugol, I. Tendolkar, P. van Eijndhoven, G. Petrides, A. K. Malhotra, and C. Abbott, “Electric field causes volumetric changes in the human brain,” *eLife*, vol. 8, Art. no. e49115, Oct. 2019.

DOI: 10.7554/eLife.49115; PMCID: PMC6874416; Code available 

* L. Beynel, L. G. Appelbaum, B. Luber, C. A. Crowell, S. A. Hilbig, W. Lim, D. Nguyen, N. A. Chrapliwy, S. W. Davis, R. Cabeza, S. H. Lisanby, and **Z.-D. Deng**, “Effects of online repetitive transcranial magnetic stimulation (rTMS) on cognitive processing: A meta-analysis and recommendations for future studies,” *Neurosci. Biobehav. Rev.*, vol. 107, pp. 47–58, Dec. 2019.

DOI: 10.1016/j.neubiorev.2019.08.018; PMCID: PMC7654714

S. M. Goetz, S. M. Madhi Alavi, **Z.-D. Deng**, and A. V. Peterchev, “Statistical model of motor-evoked potentials,” *IEEE Trans. Neural Syst. Rehabil. Eng.*, vol. 27, no. 8, pp. 1539–1545, Aug. 2019.

DOI: 10.1109/TNSRE.2019.2926543; PMCID: PMC6719775; Code available 

T. Popa, L. S. Morris, R. Hunt, **Z.-D. Deng**, S. Horovitz, K. Mente, H. Shitara, K. Baek, M. Hallett, and V. Voon, “Modulation of resting connectivity between the mesial frontal cortex and basal ganglia,” *Front. Neurol.*, vol. 10, Art. no. 587, Jun. 2019.

DOI: 10.3389/fneur.2019.00587; PMCID: PMC6593304

 Part of Research Topic: *Innovative technologies and clinical applications for invasive and non-invasive neuromodulation: From the workbench to the bedside* 

M. J. Dubin, I. P. Ilieva, **Z.-D. Deng**, J. Thomas, A. Cochran, K. Kravets, B. D. Brody, P. J. Christos, J. H. Kocsis, C. Liston, and F. M. Gunning, “A double-blind pilot dosing study of low field magnetic stimulation (LFMS) for treatment-resistant depression (TRD),” *J. Affect. Disord.*, vol. 249, pp. 286–293, Apr. 2019.

DOI: 10.1016/j.jad.2019.02.039; PMCID: PMC6486658

P. E. Croarkin, P. A. Nakonezny, **Z.-D. Deng**, M. Romanowicz, J. L. Vande Voort, D. Doruk Camsari, K. M. Schak, J. D. Port, and C. P. Lewis, “High frequency repetitive TMS for suicidal ideation in adolescents with depression,” *J. Affect. Disord.*, vol. 239, pp. 282–290, Oct. 2018.

DOI: 10.1016/j.jad.2018.06.048; PMCID: PMC6431788

 Part of Special Issue: *Suicide* 

B. Wang, M. R. Shen, **Z.-D. Deng**, J. E. Smith, J. J. Tharayil, C. J. Gurrey, L. J. Gomez, and A. V. Peterchev, “Redesigning existing transcranial magnetic stimulation coils to reduce energy: Application to low field magnetic stimulation,” *J. Neural Eng.*, vol. 15, no. 3, Art. no. 036022, Apr. 2018.

DOI: 10.1088/1741-2552/aaa505; PMCID: PMC5929994

S. Grehl, D. Martina, C. Goyenvalle, **Z.-D. Deng**, J. Rodger, and R. M. Sherrard, “*In vitro* magnetic stimulation: A simple stimulation device to deliver defined low intensity electro-magnetic fields,” *Front. Neural Circuits*, vol. 10, Art. no. 85, Nov. 2016.

DOI: 10.3389/fncir.2016.00085; PMCID: PMC5093126

☐ Part of Research Topic: *There’s method in our magnets: Understanding rTMS from models, mice and men* ☑

- * **Z.-D. Deng**, S. H. Lisanby, and A. V. Peterchev, “Effects of anatomical variability on electric field characteristics of electroconvulsive therapy and magnetic seizure therapy: A parametric modeling study,” *IEEE Trans. Neural Syst. Rehabil. Eng.*, vol. 23, no. 1, pp. 22–31, Jan. 2015.

DOI: 10.1109/TNSRE.2014.2339014; PMCID: PMC4289667

J. K. Mueller, E. M. Grigsby, V. Prevosto, F. W. Petraglia, III, H. Rao, **Z.-D. Deng**, A. V. Peterchev, M. A. Sommer, T. Egner, M. L. Platt, and W. M. Grill, “Simultaneous transcranial magnetic stimulation and single-neuron recording in alert non-human primates,” *Nat. Neurosci.*, vol. 17, no. 8, pp. 1130–1136, Aug. 2014.

DOI: 10.1038/nn.3751; PMCID: PMC4115015

☐ Part of Collection: *Department of Biomedical Engineering at Duke University* ☑

- * **Z.-D. Deng**, S. H. Lisanby, and A. V. Peterchev, “Coil design considerations for deep transcranial magnetic stimulation,” *Clin. Neurophysiol.*, vol. 125, no. 6, pp. 1202–1212, Jun. 2014.

DOI: 10.1016/j.clinph.2013.11.038; PMCID: PMC4020988

☐ Part of Special Issue: *Transcranial brain stimulation* ☑ ⚠ Editorial: pp. 1077–1078. ☑

☞ Commentary: vol. 126, no. 7, pp. 1455–1456, Jul. 2015. ☑ ☞ Reply: pp. 1456–1457. ☑

- * **Z.-D. Deng**, S. H. Lisanby, and A. V. Peterchev, “Controlling stimulation strength and focality in electroconvulsive therapy via current amplitude and electrode size and spacing: Comparison with magnetic seizure therapy,” *J. ECT*, vol. 29, no. 4, pp. 325–335, Dec. 2013.

DOI: 10.1097/YCT.0b013e3182a4b4a7; PMCID: PMC3905244

🏆 Best Abstract Award, *International Society for Neurostimulation Annual Meeting*, 2010.

B. Lubner, J. Steffner, A. Tucker, C. Habeck, A. V. Peterchev, **Z.-D. Deng**, R. C. Basner, Y. Stern, and S. H. Lisanby, “Extended remediation of sleep deprived-induced working memory deficits using fMRI-guided transcranial magnetic stimulation,” *Sleep*, vol. 36, no. 6, pp. 857–871, Jun. 2013.

DOI: 10.5665/sleep.2712; PMCID: PMC3649828

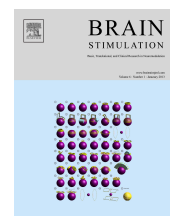
- * **Z.-D. Deng**, S. H. Lisanby, and A. V. Peterchev, “Electric field depth–focality tradeoff in transcranial magnetic stimulation: Simulation comparison of 50 coil designs,” *Brain Stimul.*, vol. 6, no. 1, pp. 1–13, Jan. 2013.

DOI: 10.1016/j.brs.2012.02.005; PMCID: PMC3568257

☞ Commentary 1: pp. 14–15. ☑ Commentary 2: p. 15. ☑

📖 Journal cover and featured in Issue Highlights

🏆 Highly Cited Research, awarded by Elsevier, 2016.



W. H. Lee, **Z.-D. Deng**, T.-S. Kim, A. F. Laine, S. H. Lisanby, and A. V. Peterchev, “Regional electric field induced by electroconvulsive therapy in a realistic head model: Influence of white matter anisotropic conductivity,” *NeuroImage*, vol. 59, no. 3, pp. 2110–2123, Feb. 2012.

DOI: 10.1016/j.neuroimage.2011.10.029; PMCID: PMC3495594

- * **Z.-D. Deng**, S. H. Lisanby, and A. V. Peterchev, “Electric field strength and focality in electroconvulsive therapy and magnetic seizure therapy: A finite element simulation study,”

J. Neural Eng., vol. 8, no. 1, Art. no. 016007, Jan. 2011.

DOI: 10.1088/1741-2560/8/1/016007; PMID: PMC3903509

N. M. Arzeno, **Z.-D. Deng**, and C.-S. Poon, “Analysis of first-derivative based QRS detection algorithms,” *IEEE Trans. Biomed. Eng.*, vol. 55, no. 2, pp. 478–484, Feb. 2008.

DOI: 10.1109/TBME.2007.912658; PMID: PMC2532677

REFEREED
CONFERENCE
PROCEEDINGS
& TECHNICAL
LETTERS

* **Z.-D. Deng**, “Assessing ultra-low-field MRI-derived head models for electric field simulation in TMS, ECT, and tDCS: Within-subject agreement with 3 T,” *2026 48th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, Toronto, Canada, Jul. 2026, pp. 200–204.

D. Tang, **Z.-D. Deng**, A. Nummenmaa, R. Ludwig, G. Noetscher, S. Makaroff, and G. Bizik, “Electric and magnetic field characteristics of the Re5 brain stimulation system,” *Brain Stimul.*, vol. 19, no. 3, Art. no. 103074, May/Jun. 2026.

DOI: 10.1016/j.brs.2026.103074; PMID: PMC13103953

* S. Dey, E. Bharti, and **Z.-D. Deng**, “Controllability analysis of macaque structural connectome from an edge centric perspective,” *2025 47th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, Copenhagen, Denmark, Jul. 2025, pp. 1–6.

DOI: 10.1101/2025.03.07.642125; PMID: 41336911

L. D. Oliver, J. Jeyachandra, E. W. Dickie, C. Hawco, S. Mansour, S. M. Hare, R. W. Buchanan, A. K. Malhotra, D. M. Blumberger, **Z.-D. Deng**, and A. N. Voineskos, “Bayesian Optimization Of NeuroStimulation (BOONStim),” *Brain Stimul.*, vol. 18, no. 2, pp. 112–115, Mar./Apr. 2025.

DOI: 10.1016/j.brs.2025.01.020; PMID: PMC13151959; Code available 

N. I. Hasan, M. Dannhauer, D. Wang, **Z.-D. Deng**, and L. J. Gomez, “Real-time computation of E-Field in transcranial magnetic stimulation for neuronavigation and optimization,” *2025 United States National Committee of URSI National Radio Science Meeting (USNC-URSI NRSM)*, Boulder, CO, USA, Jan. 2025, p. 238.

DOI: 10.23919/USNC-URSINRSM66067.2025.10906846

D. Tang, W. Wartman, A. Nummenmaa, M. Daneshzand, G. M. Noetscher, H. Lu, **Z.-D. Deng**, and S. N. Makaroff, “A BEM-FMM TMS coil designer using MATLAB platform,” *Brain Stimul.*, vol. 18, no. 1, pp. 128–130, Jan./Feb. 2025.

DOI: 10.1016/j.brs.2024.11.011; PMID: PMC12013522; Code available 

N. I. Hasan, M. Dannhauer, D. Wang, **Z.-D. Deng**, and L. J. Gomez, “Real-time computation of E-field in transcranial magnetic stimulation for neuronavigation and optimization,” *2024 IEEE 1st Latin American Conference on Antennas and Propagation (LACAP)*, Cartagena de Indias, Colombia, Dec. 2024, pp. 1–2.

DOI: 10.1109/LACAP63752.2024.10876352

N. I. Hasan, M. Dannhauer, D. Wang, **Z.-D. Deng**, and L. J. Gomez, “Real-time computation of E-field for transcranial magnetic stimulation,” *2024 International Applied Computational Electromagnetics Society Symposium (ACES)*, Orlando, FL, USA, May 2024, pp. 1–2.

URL: <https://ieeexplore.ieee.org/document/10580138>

 First Place in Student Paper Award (awarded to N. I. Hasan)

M. Alawi, P. F. Lee, Y. K. Goh, **Z.-D. Deng**, and P. E. Croarkin, “Modelling of transcranial magnetic stimulation (TMS) induced fields in different age groups,” in *3rd International Conference for Innovation in Biomedical Engineering and Life Sciences (ICIBEL 2019)*, F. Ibrahim, J. Usman, M. Y. Ahmad, and N. Hamzah, Eds., IFMBE Proceedings, vol. 81, Cham, Switzerland: Springer, Jan. 2021, pp. 68–75.

DOI: 10.1007/978-3-030-65092-6_8

- * **Z.-D. Deng** and S. H. Lisanby, “Electric field characteristics of low-field synchronized transcranial magnetic stimulation (sTMS),” *2017 39th International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, Jeju, South Korea, Jul. 2017, pp. 1445–1448.
DOI: 10.1109/EMBC.2017.8037106; PMID: 29060150
- * **Z.-D. Deng**, S. M. McClintock, and S. H. Lisanby, “Brain network properties in depressed patients receiving seizure therapy: A graph theoretical analysis of peri-treatment resting EEG,” *2015 37th International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, Milan, Italy, Aug. 2015, pp. 2203–2206.
DOI: 10.1109/EMBC.2015.7318828; PMID: 26736728
- * **Z.-D. Deng**, A. V. Peterchev, A. D. Krystal, B. Luber, S. M. McClintock, M. M. Husain, and S. H. Lisanby, “Topography of seizures induced by electroconvulsive therapy and magnetic seizure therapy,” *2013 6th International IEEE/EMBS Conference on Neural Engineering (NER)*, San Diego, CA, USA, Nov. 2013, pp. 577–580.
DOI: 10.1109/NER.2013.6696000
- W. H. Lee, **Z.-D. Deng**, A. F. Laine, S. H. Lisanby, and A. V. Peterchev, “Influence of white matter conductivity anisotropy on electric field strength induced by electroconvulsive therapy,” *2011 Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, Boston, MA, USA, Aug. 2011, pp. 5473–5476.
DOI: 10.1109/IEMBS.2011.6091396; PMID: 22255576
- * **Z.-D. Deng** and A. V. Peterchev, “Transcranial magnetic stimulation coil with electronically switchable active and sham modes,” *2011 Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, Boston, MA, USA, Aug. 2011, pp. 1993–1996.
DOI: 10.1109/IEMBS.2011.6090561; PMID: 22254725
- * **Z.-D. Deng**, S. H. Lisanby, and A. V. Peterchev, “Transcranial magnetic stimulation in the presence of deep brain stimulation implants: Induced electrode currents,” *2010 Annual International Conference of the IEEE Engineering in Medicine and Biology*, Buenos Aires, Argentina, Aug. 2010, pp. 6821–6824.
DOI: 10.1109/IEMBS.2010.5625958; PMID: 21095849
- * **Z.-D. Deng**, D. E. Hardesty, S. H. Lisanby, and A. V. Peterchev, “Electroconvulsive therapy in the presence of deep brain stimulation implants: Electric field effects,” *2010 Annual International Conference of the IEEE Engineering in Medicine and Biology*, Buenos Aires, Argentina, Aug. 2010, pp. 2049–2052.
DOI: 10.1109/IEMBS.2010.5626517; PMID: 21096149
- * W. H. Lee, **Z.-D. Deng**, T.-S. Kim, A. F. Laine, S. H. Lisanby, and A. V. Peterchev, “Regional electric field induced by electroconvulsive therapy: A finite element simulation study,” *2010 Annual International Conference of the IEEE Engineering in Medicine and Biology*, Buenos Aires, Argentina, Aug. 2010, pp. 2045–2048.
DOI: 10.1109/IEMBS.2010.5626553; PMID: 21096148
- * **Z.-D. Deng**, S. H. Lisanby, and A. V. Peterchev, “Effect of anatomical variability on neural stimulation strength and focality in electroconvulsive therapy (ECT) and magnetic seizure therapy (MST),” *2009 Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, Minneapolis, MN, USA, Sep. 2009, pp. 682–688.
DOI: 10.1109/IEMBS.2009.5334091; PMID: 19964484
- * **Z.-D. Deng**, A. V. Peterchev, and S. H. Lisanby, “Coil design considerations for deep-brain transcranial magnetic stimulation (dTMS),” *2008 30th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, Vancouver, BC, Canada, Aug. 2008, pp. 5675–5679.
DOI: 10.1109/IEMBS.2008.4650502; PMID: 19164005

- * **Z.-D. Deng**, C.-S. Poon, N. M. Arzeno, and E. S. Katz, “Heart rate variability in pediatric obstructive sleep apnea,” *2006 International Conference of the IEEE Engineering in Medicine and Biology Society*, New York, NY, USA, Aug. 2006, pp. 3565–3568.
DOI: 10.1109/IEMBS.2006.260139; PMID: 17946187
- * N. M. Arzeno, C.-S. Poon, and **Z.-D. Deng**, “Quantitative analysis of QRS detection algorithms based on the first derivative of the ECG,” *2006 International Conference of the IEEE Engineering in Medicine and Biology Society*, New York, NY, USA, Aug. 2006, pp. 1788–1791.
DOI: 10.1109/IEMBS.2006.260051; PMID: 17946480
📎 Student paper competition finalist (awarded to N. M. Arzeno)
- * C. A. Denckla, P. M. Bamonti, C. J. Stevens, L. J. Parker, S. Gujral, M. Garcia, M. Shepherd-Banigan, T. Wolfe, and **Z.-D. Deng**, “Advanced Research Institute scholars’ perspectives on program success: A self-determination theory evaluation,” *Am. J. Geriatr. Psychiatry*, vol. 34, no. 7, pp. 914–924, Jul. 2026.
DOI: 10.1016/j.jagp.2026.03.208; PMCID: PMC13280989
📎 Commentary: online ahead of print, Jul. 2026. 📎 Reply: online ahead of print, Jul. 2026. 📎
- I. Laakso, M. M. Paulides, S. Kodera, S. Ahn, C. L. Brace, M. Cavagnaro, J. Chen, **Z.-D. Deng**, V. De Santis, Y. Diao, L. Farrugia, M. Feliziani, S. Fiocchi, F. Fioranelli, T. Hikage, S. Makaroff, M. Mizuno, A. Opitz, E. Pickwell-MacPherson, P. Prakash, D. B. Rodrigues, K. Sasaki, T. Sakamoto, Z. Taylor, H. J. Visser, D. T. B. Yeo, and A. Hirata, “Roadmap towards personalized approaches and safety considerations in non-ionizing radiation: From dosimetry to therapeutic and diagnostic applications,” *Phys. Med. Biol.*, vol. 71, no. 3, Art. no. 03RM01, Feb. 2026.
DOI: 10.1088/1361-6560/ae22b8; PMCID: PMC12902664
📎 Part of Special Issue: *Dosimetry for non-ionizing radiation* 📎
- L. M. Oberman, A. I. Penefiel, R. Dieterich, C. T. Phan, Y.-Y. Chou, D. L. Pham, M. M. Adamson, C. E. Hines, Z. Rezaee, **Z.-D. Deng**, H. Pal, S. H. Lisanby, and D. L. Brody, “Adaptive trial for the treatment of depressive symptoms associated with concussion using accelerated intermittent theta burst stimulation (ADEPT): Rationale, design and methods,” *Front. Neurol.*, vol. 16, Art. no. 1605157, Jun. 2025.
DOI: 10.3389/fneur.2025.1605157; PMCID: PMC12202228
📎 Part of Research Topic: *Neurological and neuropsychiatric disorders affecting military personnel and veterans - Volume II* 📎
- J. R. Young, C. S. Polick, A. M. Michael, M. Dannhauer, J. T. Galla, M. K. Evans, A. Troutman, A. C. Kirby, M. F. Dennis, C. W. Papanikolas, **Z.-D. Deng**, S. D. Moore, E. A. Dederdt, M. A. Addicott, L. G. Appelbaum, and J. C. Beckham, “Multimodal smoking cessation treatment combining repetitive transcranial magnetic stimulation, cognitive behavioral therapy, and nicotine replacement in veterans with posttraumatic stress disorder: A feasibility randomized controlled trial protocol,” *PLOS ONE*, vol. 19, no. 9, Art. no. e0291562, Sep. 2024.
DOI: 10.1371/journal.pone.0291562; PMCID: PMC11379281
- * M. Dannhauer, L. J. Gomez, P. L. Robins, D. Wang, N. I. Hasan, A. Thielscher, H. R. Siebner, Y. Fan, and **Z.-D. Deng**, “Electric field modeling in personalizing transcranial magnetic stimulation interventions,” *Biol. Psychiatry*, vol. 95, no. 6, pp. 494–501, Mar. 2024.
DOI: 10.1016/j.biopsych.2023.11.022; PMCID: PMC10922371
📎 Part of Special Issue: *Transcranial magnetic stimulation* 📎
- L. M. Oberman, S. M. Francis, L. Beynel, M. Hynd, M. Jaime, P. L. Robins, **Z.-D. Deng**, J. Stout, J. W. van der Veen, 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,” *Front. Psychiatry*, vol. 15, Art. no. 1304528, Feb. 2024.
DOI: 10.3389/fpsyt.2024.1304528; PMCID: PMC10881663

- * **Z.-D. Deng**, P. L. Robins, W. Regenold, P. Rohde, M. Dannhauer, and S. H. Lisanby, “How electroconvulsive therapy works in the treatment of depression: Is it the seizure, the electricity, or both?” *Neuropsychopharmacology*, vol. 49, no. 1, pp. 150–162, Jan. 2024.

DOI: 10.1038/s41386-023-01677-2; PMID: PMC10700353

Part of Series: *2024 Neuropsychopharmacology Reviews: Rapid and novel treatments in psychiatry*

A. R. Brunoni, H. Ekhtiari, A. Antal, P. Auvichayapat, C. Baeken, I. M. Benseñor, M. Bikson, P. Boggio, B. Borroni, F. Brighina, J. Brunelin, S. Carvalho, W. Caumo, P. Ciechanski, L. Charvet, V. P. Clark, R. Cohen Kadosh, M. Cotelli, A. Datta, **Z.-D. Deng**, R. De Raedt, D. De Ridder, P. B. Fitzgerald, A. Floel, F. Frohlich, M. S. George, P. Ghobadi-Azbari, S. Goerigk, R. H. Hamilton, S. J. Jaberzadeh, K. Hoy, D. J. Kidgell, A. Khojasteh Zonoozi, A. Kirton, S. Laureys, M. Lavidor, K. Lee, J. Leite, S. H. Lisanby, C. Loo, D. M. Martin, C. Miniussi, M. Mondino, K. Monte-Silva, L. Morales-Quezada, M. A. Nitsche, A. H. Okano, C. S. Oliveira, B. Onarheim, K. Pacheco-Barrios, F. Padberg, E. M. Nakamura-Palacios, U. Palm, W. Paulus, C. Plewnia, A. Priori, T. K. Rajji, L. B. Razza, E. M. Rehn, G. Ruffini, K. Schellhorn, M. Zare-Bidoky, M. Simis, P. Skorupinski, P. Suen, A. Thibaut, L. C. L. Valiengo, M.-A. Vanderhasselt, S. Vanneste, G. Venkatasubramanian, I. R. Violante, A. Wexler, A. J. Woods, and F. Fregni, “Digitalized transcranial electrical stimulation: A consensus statement,” *Clin. Neurophysiol.*, vol. 143, pp. 154–165, Nov. 2022.

DOI: 10.1016/j.clinph.2022.08.018; PMID: PMC10031774

Part of Special Issue: *IFCN-endorsed guidelines and consensus papers*

L. Borriore, P. C. Cirillo, L. V. M. Aparicio, B. A. Cavendish, L. Valiengo, D. O. Moura, J. P. de Souza, M. S. Luethi, I. Klein, B. Bariani, J. Gallucci-Neto, P. Suen, F. Padberg, S. Goerigk, M.-A. Vanderhasselt, **Z.-D. Deng**, J. O’Shea, P. A. Lotufo, I. M. Bensenor, and A. R. Brunoni, “A study protocol for an ongoing multi-arm, randomized, double-blind, sham-controlled clinical trial with digital features, using portable transcranial electrical stimulation and internet-based behavioral therapy for major depression disorders: The PSYLECT study,” *Expert Rev. Neurother.*, vol. 22, no. 6, pp. 513–523, Jun. 2022.

DOI: 10.1080/14737175.2022.2083959; PMID: PMC10627342

W. T. Regenold, **Z.-D. Deng**, and S. H. Lisanby, “Noninvasive neuromodulation of the prefrontal cortex in mental health disorders,” *Neuropsychopharmacology*, vol. 47, no. 1, pp. 361–372, Jan. 2022.

DOI: 10.1038/s41386-021-01094-3; PMID: PMC8617166

Part of Series: *2022 Neuropsychopharmacology Reviews: Prefrontal cortex*

L. Borriore, H. Bellini, L. B. Razza, A. G. Avila, C. Baeken, A.-K. Brem, G. Busatto, A. F. Carvalho, A. Chekroud, Z. J. Daskalakis, **Z.-D. Deng**, J. Downar, W. Gattaz, C. Loo, P. A. Lotufo, M. D. G. M. Martin, S. M. McClintock, J. O’Shea, F. Padberg, I. C. Passos, G. A. Salum, M.-A. Vanderhasselt, R. Fraguas, I. Benseñor, L. Valiengo, and A. R. Brunoni, “Precision non-implantable neuromodulation therapies: A perspective for the depressed brain,” *Braz. J. Psychiatry*, vol. 42, no. 4, pp. 403–419, Jul./Aug. 2020.

DOI: 10.1590/1516-4446-2019-0741; PMID: PMC7430385

B. Kadriu, **Z.-D. Deng**, C. Kraus, I. D. Henter, S. H. Lisanby, and C. A. Zarate, Jr., “Not so fast: Recent successes and failures in treating depression,” *J. Clin. Psychiatry*, vol. 81, no. 4, Art. no. 19ac13138, May 2020.

DOI: 10.4088/JCP.19ac13138; PMID: PMC7681914

- * **Z.-D. Deng**, B. Luber, N. L. Balderston, M. Velez Afanador, M. M. Noh, J. Thomas, W. C. Altekruuse, S. L. Exley, S. Awasthi, and S. H. Lisanby, “Device-based modulation of neurocircuits as a therapeutic for psychiatric disorders,” *Annu. Rev. Pharmacol. Toxicol.*, vol. 60, pp. 591–614, Jan. 2020.

DOI: 10.1146/annurev-pharmtox-010919-023253; PMID: PMC8100981

E. Kallioniemi, S. M. McClintock, **Z.-D. Deng**, M. M. Husain, and S. H. Lisanby, “Magnetic seizure therapy: Towards personalized seizure therapy for major depression,” *Pers. Med. Psychiatry*, vol. 17–18, pp. 37–42, Nov./Dec. 2019.

DOI: 10.1016/j.pmip.2019.04.003; PMCID: PMC7442165

- * M. Bikson, A. R. Brunoni, L. E. Charvet, V. P. Clark, L. G. Cohen, **Z.-D. Deng**, J. Dmochowski, D. J. Edwards, F. Frohlich, E. S. Kappenman, K. O. Lim, C. Loo, A. Mantovani, D. P. McMullen, L. C. Parra, M. Pearson, J. D. Richardson, J. M. Rumsey, P. Sehatpour, D. Sommers, G. Unal, E. M. Wassermann, A. J. Woods, and S. H. Lisanby, “Rigor and reproducibility in research with transcranial electrical stimulation: An NIMH-sponsored workshop,” *Brain Stimul.*, vol. 11, no. 3, pp. 465–480, May/Jun. 2018.

DOI: 10.1016/j.brs.2017.12.008; PMCID: PMC5997279

- * S. M. Goetz and **Z.-D. Deng**, “The development and modeling of devices and paradigms for transcranial magnetic stimulation,” *Int. Rev. Psychiatry*, vol. 29, no. 2, pp. 115–145, Apr. 2017.

DOI: 10.1080/09540261.2017.1305949; PMCID: PMC5484089

☐ Part of Special Issue: *Brain stimulation* ☐

- * **Z.-D. Deng**, S. M. McClintock, N. E. Oey, B. Lubner, and S. H. Lisanby, “Neuromodulation for mood and memory: From the engineering bench to the patient bedside,” *Curr. Opin. Neurobiol.*, vol. 30, pp. 38–43, Feb. 2015.

DOI: 10.1016/j.conb.2014.08.015; PMCID: PMC4342851

☐ Part of Special Issue: *Neuropsychiatry* ☐

S. M. McClintock, J. Choi, **Z.-D. Deng**, L. G. Appelbaum, A. D. Krystal, and S. H. Lisanby, “Multifactorial determinants of the neurocognitive effects of electroconvulsive therapy,” *J. ECT*, vol. 30, no. 2, pp. 165–176, Jun. 2014.

DOI: 10.1097/YCT.0000000000000137; PMCID: PMC4143898

A. V. Peterchev, M. A. Rosa, **Z.-D. Deng**, J. Prudic, and S. H. Lisanby, “Electroconvulsive therapy stimulus parameters: Rethinking dosage,” *J. ECT*, vol. 26, no. 3, pp. 159–174, Sep. 2010.

DOI: 10.1097/YCT.0b013e3181e48165; PMCID: PMC2933093

BOOK CHAPTERS

S. Reeves, **Z.-D. Deng**, and J. R. Young, “A history of transcranial magnetic stimulation,” in *TMS and Neuroethics*, V. Dubljević and J. R. Young, Eds., Cham, Switzerland: Springer, 2025, pp. 11–27.

DOI: 10.1007/978-3-031-92401-9

- * **Z.-D. Deng** and S. H. Lisanby, “Next-generation seizure therapy,” in *The Oxford Handbook of Transcranial Stimulation*, E. M. Wassermann, A. V. Peterchev, U. Ziemann, H. R. Siebner, V. Walsh, and S. H. Lisanby, Eds., 2nd ed. Oxford, UK: Oxford University Press, 2024, ch. 45, pp. 1188–1210.

DOI: 10.1093/oxfordhb/9780198832256.013.41

R. J. Ilmoniemi, **Z.-D. Deng**, L. Gomez, L. M. Koponen, J. O. Nieminen, A. V. Peterchev, and C. M. Epstein, “Transcranial magnetic stimulation coils,” in *The Oxford Handbook of Transcranial Stimulation*, E. M. Wassermann, A. V. Peterchev, U. Ziemann, H. R. Siebner, V. Walsh, and S. H. Lisanby, Eds., 2nd ed. Oxford, UK: Oxford University Press, 2024, ch. 4, pp. 102–123.

DOI: 10.1093/oxfordhb/9780198832256.013.4

J. Thomas, **Z.-D. Deng**, S. Awasthi, and S. H. Lisanby, “Magnetic seizure therapy,” in *Neuropsychology of Depression*, S. M. McClintock and J. Choi, Eds., New York: Guilford Press, 2022, ch. 21, pp. 383–406.

URL: <https://www.guilford.com/books/Neuropsychology-of-Depression>

B. Kadriu, S. Subramanian, **Z.-D. Deng**, I.D. Henter, L.T. Park, and C.A. Zarate, Jr., “Rapid-acting antidepressants,” in *Depression*, M.H. Trivedi, Ed., Oxford, UK: Oxford University Press, 2019, ch. 13, pp. 218–240.

DOI: 10.1093/med/9780190929565.003.0013; PsyArXiv 

- * S. Makarov, G. Bogdanov, G. Noetscher, W. Appleyard, R. Ludwig, J. Joutsa, and **Z.-D. Deng**, “Design and analysis of a whole-body noncontact electromagnetic subthreshold stimulation device with field modulation targeting nonspecific neuropathic pain,” in *Brain and Human Body Modeling: Computational Human Modeling at EMBC 2018*, S. Makarov, M. Horner, and G. Noetscher, Eds., Cham, Switzerland: Springer, 2019, ch. 5, pp. 85–123.

DOI: 10.1007/978-3-030-21293-3_5; PMID: 31725237

- * **Z.-D. Deng**, C. Liston, F.M. Gunning, M.J. Dubin, E.A. Fridgeirsson, J. Lilien, G. van Wingen, and J. van Waarde, “Electric field modeling for transcranial magnetic stimulation and electroconvulsive therapy,” in *Brain and Human Body Modeling: Computational Human Modeling at EMBC 2018*, S. Makarov, M. Horner, and G. Noetscher, Eds., Cham, Switzerland: Springer, 2019, ch. 4, pp. 75–84.

DOI: 10.1007/978-3-030-21293-3_4; PMID: 31725245

B. Luber and **Z.-D. Deng**, “Application of non-invasive brain stimulation in psychophysiology,” in *Handbook of Psychophysiology*, J.T. Cacioppo, L.G. Tassinary, and G.G. Berntson, Eds., 4th ed. Cambridge, UK: Cambridge University Press, 2016, ch. 7, pp. 116–150.

DOI: 10.1017/9781107415782.007

A.V. Peterchev, **Z.-D. Deng**, and S.M. Goetz, “Advances in transcranial magnetic stimulation technology,” in *Brain Stimulation: Methodologies and Interventions*, I.M. Reti, Ed., Hoboken, NJ: Wiley-Blackwell, 2015, ch. 10, pp. 165–190.

DOI: 10.1002/9781118568323.ch10

S.H. Lisanby and **Z.-D. Deng**, “Magnetic seizure therapy for the treatment of depression,” in *Brain Stimulation: Methodologies and Interventions*, I.M. Reti, Ed., Hoboken, NJ: Wiley-Blackwell, 2015, ch. 8, pp. 123–148.

DOI: 10.1002/9781118568323.ch8

EDITORIALS, COMMENTARIES, & CORRESPONDENCE

- * C.A. Denckla, P.M. Bamonti, and **Z.-D. Deng**, “Expanding the evidence base for mentoring programs in geriatric mental health,” *Am. J. Geriatr. Psychiatry*, online ahead of print, Jul. 2026.

DOI: 10.1016/j.jagp.2026.07.002

- * C.C. Abbott, A. Datta, and **Z.-D. Deng**, “The enemy of good is not precision: Advancing contemporary electroconvulsive therapy practice,” *J. ECT*, online ahead of print, Apr. 2026.

DOI: 10.1097/YCT.0000000000001262; PMID: 41931633

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. Nummenmaa, and S.N. Makaroff, “Importance of considering microscopic structures in modeling brain stimulation,” *Brain Stimul.*, vol. 18, no. 4, pp. 1150–1152, Jul./Aug. 2025.

DOI: 10.1016/j.brs.2025.06.003; PMCID: PMC13107343

- * **Z.-D. Deng**, M. Argyelan, J. Miller, T.R. Jones, J. Upston, S.M. McClintock, and C.C. Abbott, “On assumptions and key issues in electric field modeling for ECT,” *Mol. Psychiatry*, vol. 29, no. 10, pp. 3289–3290, Oct. 2024.

DOI: 10.1038/s41380-024-02567-9; PMCID: PMC11449792

S.K. Kar, A. Silva-dos-Santos, M.A. Lebedev, and **Z.-D. Deng**, “Editorial: How does brain stimulation work? Neuroversion and other putative mechanisms of action,” *Front. Psychiatry*, vol. 15, Art. no. 1488846, Sep. 2024.

DOI: 10.3389/fpsy.2024.1488846; PMCID: PMC11464472

- * **Z.-D. Deng**, R. D. Wiener, and S. H. Lisanby, “Magnetic seizure therapy vs electroconvulsive therapy for major depressive episode—Reply,” *JAMA Psychiatry*, vol. 81, no. 7, pp. 737–738, Jul. 2024.
DOI: 10.1001/jamapsychiatry.2024.0695; PMID: 38656323
- A. R. Brunoni, **Z.-D. Deng**, and F. Padberg, “Enhancing repetitive transcranial magnetic stimulation effects for depression treatment: *Navigare necesse est*—and smart clinical trial designs,” *Biol. Psychiatry Cogn. Neurosci. Neuroimaging*, vol. 7, no. 6, pp. 527–529, Jun. 2022.
DOI: 10.1016/j.bpsc.2022.03.006; PMCID: PMC13096937
- * **Z.-D. Deng**, S. H. Lisanby, and A. V. Peterchev, “On the characterization of coils for deep transcranial magnetic stimulation,” *Clin. Neurophysiol.*, vol. 126, no. 7, pp. 1456–1457, Jul. 2015.
DOI: 10.1016/j.clinph.2014.10.144; PMID: 25468237
- * **Z.-D. Deng**, S. H. Lisanby, and A. V. Peterchev, “On the stimulation depth of transcranial magnetic stimulation coils,” *Clin. Neurophysiol.*, vol. 126, no. 4, pp. 843–844, Apr. 2015.
DOI: 10.1016/j.clinph.2014.06.048; PMID: 25088734

OTHER CONTRIBUTIONS:
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& CREATIVE
WORKS

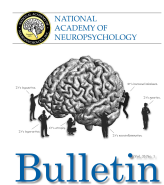
G. Bertazzoli, O. Shevtsov, M. Bulgari, P. J. Fried, G. Guidali, V. Iacovella, E. Marcantoni, T. O. Bergmann, F. Breuer, S. De Smet, **Z.-D. Deng**, M. Feurra, R. Gau, Y. O. Halchenko, J. C. Hernandez-Pavon, N. P. Holmes, A. Hopkins, S. Isabella, M. Makarova, G. Niso, D. Oathes, G. Pellegrino, N. Rotstein, 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,” *Zenodo*, Mar. 2026.
DOI: 10.5281/zenodo.19337642; Specification available 
 BIDS Extension Proposal: BEP037 

American Psychiatric Association Task Force on Electroconvulsive Therapy, *The Practice of Electroconvulsive Therapy: Recommendations for Treatment, Training, and Privileging*, 3rd ed. Washington, DC: American Psychiatric Association Publishing, 2024.
 Acknowledged for illustrations of ECT configurations and computational models

- * **Z.-D. Deng**, “Brain: An intricate web,” artwork, *NIMH IRP Fellows’ Scientific Training Day*, Sep. 2022. 
 Voted First Place in Science as Art Competition

T. R. Lago, K. S. Blair, G. Alvarez, A. Thongdarong, J. R. Blair, M. Ernst, and C. Grillon, “Threat-of-shock decreases emotional interference on affective Stroop performance in healthy controls and anxiety patients,” *Eur. J. Neurosci.*, vol. 55, no. 9–10, pp. 2519–2528, May 2022.
DOI: 10.1111/ejn.14624; PMCID: PMC7448696
 Part of Special Issue: *Stress brain and behavior* 
 Acknowledged for design and creation of the graphical abstract

- * **Z.-D. Deng**, “Blind researchers and the pathologic brain,” *National Academy of Neuropsychology Bulletin*, vol. 33, no. 1, 2020.
URL: <https://www.e-ditionaleditions.com/i/1241418-2020/0?>
 Cover artwork



R. C. Klein, S. M. Goetz, W. B. Liedtke, S. D. Moore, and A. V. Peterchev, “Static magnetic field modulates excitatory activity in layer II/III pyramidal neurons of the rat motor cortex,” in *Proceedings of the 2013 6th International IEEE/EMBS Conference on Neural Engineering (NER)*, San Diego, CA, USA, Nov. 2013, pp. 1190–1193.
DOI: 10.1109/NER.2013.6696152
 Acknowledged for magnetic field simulation and figure

W. Paulus, A. V. Peterchev, and M. Ridding, “Transcranial electric and magnetic stimulation: Technique and paradigms,” in *Handbook of Clinical Neurology*, 3rd Series, A. M. Lozano and M. Hallett, Eds., Amsterdam, The Netherlands: Elsevier, 2013, ch. 27, vol. 116, pp. 329–342.

DOI: 10.1016/B978-0-444-53497-2.00027-9; PMID: 24112906

📄 Part of Volume: *Brain stimulation* ☑

🙏 Acknowledged for figure contribution

- * **Z.-D. Deng** and A. V. Peterchev, “Safety of transcranial magnetic stimulation and electroconvulsive therapy in patients with a deep brain stimulation implant,” St. Jude Medical / Advanced Neuromodulation System, Plano, TX, Technical Report, Jan. 2010.

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

IN SUBMISSION,
PREPRINTS, &
PREREGISTRATION

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.”

H. Jie, N. Pothayee, **Z.-D. Deng**, K. Sharer, and A. P. Koretsky, “Reactivated thalamocortical plasticity shapes learning and memory.”

D. Tang, C. Swenson, S. Small-Zlochower, G. Bizik, L. M. Christensen, T. R. Knösche, J. Hau-eisen, R. Ludwig, G. Noetscher, **Z.-D. Deng**, and S. N. Makaroff, “Low intensity multi-channel steering TMS array for network level neuromodulation.”

F. Gholamali Nezhad, H. Yu, Y. Liu, Q. Lin, J. Joseph, H. F. Al-Shamali, I. Demchenko, S. Chegini, I. Tailor, R. Janssen-Aguilar, G. Li, C. Li, S. Meshkat, W. Lou, A. Kever, L. Charvet, M. K. Jha, K. Dunlop, **Z.-D. Deng**, Z. J. Daskalakis, A. J. Flint, T. K. Rajji, D. M. Blumberger, B. H. Mulsant, and V. Bhat, “Acute and long-term cognitive outcomes of non-invasive brain stimulation in major depression: A systematic review and meta-analysis.”

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 cortical conductivity from large-scale electron microscopy data,” *bioRxiv*, Mar. 2026.

DOI: 10.64898/2026.03.23.713806; PMCID: PMC13060349; Code available 📄

D. Tang, **Z.-D. Deng**, B. Danskin, D. Berger, M. Ingersoll, H. Lu, B. Rosen, M. Bikson, G. Noetscher, and S. Makaroff, “Are synaptic clefts directionally oriented?” *bioRxiv*, Feb. 2026.

DOI: 10.64898/2026.01.30.702623; PMCID: PMC12889479

A. R. Guillen, Y. Huang, D. Q. Truong, N. Khadka, Y. Z. Valter, C. C. Abbott, **Z.-D. Deng**, and A. Datta, “Assessing suitability of ultra-low-field MRI for TES electric field models,” *bioRxiv*, Jan. 2026.

DOI: 10.1101/2025.05.09.653081

C. Lu, **Z.-D. Deng**, and F.-S. Choa, “Augmenting transcranial magnetic stimulation coil with magnetic material: An optimization approach,” *bioRxiv*, Jan. 2022.

DOI: 10.1101/2022.01.21.477303

🏆 Third Place in International Student Competition (awarded to C. Lu), *Brain & Human Body Modeling Conference*, 2021.

- * **Z.-D. Deng**, N. M. Arzeno, E. S. Katz, H. Chang, C. L. Marcus, and C.-S. Poon, “Non-high frequency heart rate chaos: A noninvasive marker of REM sleep and obstructive sleep apnea syndrome in children,” *bioRxiv*, Oct. 2018.

DOI: 10.1101/457630

- * **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

- * 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. 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. Eufeld, **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.
- 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
- C. N. Bakir, I. Azamet, L. Sangster-Carrasco, K. Delaney, M. Dib, **Z.-D. Deng**, and P. E. Croarkin, “Comparison of two motor threshold determination methods in adolescents undergoing treatment with transcranial magnetic stimulation,” *J. Am. Acad. Child Adolesc. Psychiatry*, vol. 64, no. 10, p. S332, Oct. 2025.
- ✎ L. Beynel, V. Roopchansingh, R. Reynolds, P. A. Taylor, **Z.-D. Deng**, L. Li, N. Baker, D. Bandy, K. Cameron, H. Gura, E. Ekpo, S. Menon, E. Wiener, J. K. Rajendra, B. Lubner, and S. H. Lisanby, “Using real-time fMRI neurofeedback to control brain state during rTMS: A proof-of-concept study,” *International Workshop on Concurrent TMS/fMRI*, Sep. 2025.
 ✎ Accepted for presentation, unable to attend conference due to government travel restrictions
- L. D. Oliver, J. Jeyachandra, E. W. Dickie, C. Hawco, S. Mansour, S. M. Hare, R. W. Buchanan, A. K. Malhotra, D. M. Blumberger, **Z.-D. Deng**, and A. N. Voineskos, “Individualized transcranial magnetic stimulation targeting using Bayesian Optimization Of NeuroStimulation (BOONStim),” *University of Toronto Department of Psychiatry Research Day*, Jun. 2025.
- B. H. Chandler, D. K. Greenstein, K. T. Hurst, L. R. Waldman, C. A. Zarate, Jr., **Z.-D. Deng**, and E. D. Ballard, “Tracking affective correlates of ketamine response in treatment-resistant depression,” *NIH Postbac Poster Day*, May 2025.
- L. Oliver, D. Blumberger, C. Hawco, E. Dickie, J. Gallucci, J. Jeyachandra, S. Mansour, **Z.-D. Deng**, S. Hare, J. Gold, G. Foussias, M. Argyelan, Z. Daskalakis, R. Buchanan, A. Malhotra, and A. Voineskos, “Individualized transcranial magnetic stimulation targeting social cognitive network functional connectivity in schizophrenia spectrum disorders,” *Biol. Psychiatry*, vol. 97, no. 9, p. S48, May 2025.
- * E. Wiener, L. Beynel, N. Baker, E. Greenstein, A. D. Neacsu, E. Jones, B. Gindoff, S. M. Francis, C. Neige, S. W. Davis, B. Lubner, S. H. Lisanby, and **Z.-D. Deng**, “Efficacy of non-invasive brain stimulation combined with evidence-based psychotherapy for psychiatric disorders: A meta-analysis,” *Annual Meeting of the Social and Affective Neuroscience Society*, Apr. 2025.
- B. H. Chandler, D. K. Greenstein, K. T. Hurst, L. R. Waldman, C. A. Zarate, Jr., **Z.-D. Deng**, and E. D. Ballard, “Exploring facial emotional expression as a biomarker for depression severity and treatment response,” *Washington Psychiatric Society Spring Presidential Symposium and Gala*, Apr. 2025.
 ✎ Accepted for presentation, unable to attend conference due to government travel restrictions
- C. Reid, S. Francis, E. Bharti, E. Greenstein, Z. Rezaee, B. Lubner, **Z.-D. Deng**, C. Zrenner, and S. H. Lisanby, “Phase-triggered TMS using real-time mu rhythm EEG to enhance paired associative stimulation,” *Washington Psychiatric Society Spring Presidential Symposium and Gala*, Apr. 2025.
 ✎ Accepted for presentation, unable to attend conference due to government travel restrictions
- L. Beynel, V. Roopchansingh, R. Reynolds, P. A. Taylor, **Z.-D. Deng**, L. Li, N. Baker, D. Bandy, K. Cameron, H. Gura, E. Ekpo, S. Menon, E. Wiener, Z. Rezaee, J. K. Rajendra, B. Lubner, and S. H. Lisanby, “A journey towards an objective control of brain state: Concurrent rTMS during real time fMRI neurofeedback,” *International Society for CNS Clinical Trials and Methodology Annual Scientific Meeting*, Feb. 2025.
 ✎ Accepted for presentation, unable to attend conference due to government travel restrictions
- ✎ S. Francis, Z. Rezaee, C. Reid, E. Bharti, M. Jaime, E. Greenstein, **Z.-D. Deng**, B. Lubner, C. Zrenner, and S. H. Lisanby, “Enhancing TMS response through real-time EEG-triggered paired associative stimulation of mu rhythm,” *International Brain Stimulation Conference*, Feb. 2025.

✂ Accepted for presentation, unable to attend conference due to government travel restrictions

- ✂ N.I. Hasan, M. Dannhauer, D. Wang, **Z.-D. Deng**, and L.J. Gomez, “Real-time computation of E-Field in transcranial magnetic stimulation for neuronavigation and optimization,” *Brain Stimul.*, vol. 18, no. 1, pp. 575–576, Jan./Feb. 2025; also in *Photonics and Electromagnetics Research Symposium*, Apr. 2024.

🏆 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 Stimul.*, 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 Stimul.*, 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 Stimul.*, vol. 18, no. 1, p. 217, Jan./Feb. 2025.

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

	<i>Accelerated intermittent theta burst for methamphetamine use disorder</i>	
	NIH/NIMH R61/R33	2026.02
	Role: Intramural NIH collaborator; mPIs: M. K. Jha, H. Ekhtiari, K. Brady, A. Datta	
	<i>Analysis of two 1-mm³ cortical brain samples with boundary element fast multipole method to better understand brain stimulation</i>	
	NIH R01	2025.12
	Role: Intramural NIH collaborator; PI: S. N. Makaroff	
	<i>PRrecision Optimally Targeted ECT (PROTECT) First in Human</i>	
	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>	
	NIH UG3/UH3	2025.09
	Role: Intramural NIH collaborator; PI: H. Lu	
	<i>PRrecision Optimally Targeted ECT (PROTECT)</i>	
	NIH/NIMH R01	2025.06
	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>	
	NIH	2025.06
	Role: Intramural NIH collaborator; PI: Y. I. Sheline	
COMPLETED RESEARCH SUPPORT	<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.	
	<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	
	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>	
	NIH/NINDS U01 MH111826	2016.09 – 2020.07
	Role: Co-I; PI: C. C. Abbott	
	This study explores the impact of targeted hippocampal engagement with varying levels of electroconvulsive therapy current amplitude in elderly patients with clinical, neuropsychological and neuroimaging assessments.	
	<i>Individualized low amplitude seizure therapy (iLAST)</i>	
	Brain & Behavior Research Foundation Young Investigator Award 26161	2018.06 – 2020.06
	Role: PI	
	This study aims to develop a novel form of seizure therapy for depression that avoids the neurocognitive side effects of electroconvulsive therapy by using computational modeling to direct multi-electrode configurations that provide targeted and individualized dosing.	
	<i>Fast-Fail Trials: Mood and Anxiety Spectrum Disorders (FAST-MAS)</i>	
	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
	18 Invited symposia, webinars, & workshops
	7 Grand rounds
	25 Invited conference panels
	10 Contributed conference presentations

⌘ **Denotes Continuing Medical Education accredited presentation**

INVITED SEMINARS

UCSD, Department of Psychiatry, Interventional Psychiatry Research Program	2026
<i>Computational neuroengineering for precision neuromodulation: Dose, device, and treatment optimization</i>	
⌘ The Ohio State University College of Medicine	2025
Center for Neuroimaging, Neurophenotyping, Neurocomputation, and Neuromodulation	
<i>Computational design of next-generation neurostimulation therapies</i>	
UC Irvine, Department of Biomedical Engineering	2025
<i>Computational neuroengineering for precision psychiatry: Brain stimulation modeling, dosing, and device innovation</i>	
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>	
Virginia Commonwealth University, Department of Mechanical & Nuclear Engineering	2025
Co-hosted by IEEE Magnetics and EMBS Chapters	
<i>Recent advances in transcranial magnetic stimulation: Devices, modeling, and applications</i>	
UT Southwestern, Department of Psychiatry	2025
<i>From models to medicine: Advancing precision neuromodulation through engineering</i>	
UCSF, Department of Psychiatry & Behavioral Sciences	2025
<i>Engineering precision in neuromodulation: Computational models to clinical applications</i>	

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

INVITED SYMPOSIA, WEBINARS, & WORKSHOPS	Weill Cornell Medical College, Department of Biomedical Engineering	2015
	<i>Transcranial magnetic stimulation: Pulse source, coil design, & concurrent neuroimaging</i>	
	Duke University, Department of Biomedical Engineering	2014
	<i>Modeling and coil design considerations for transcranial magnetic stimulation</i>	
	OHBM Annual Meeting	2026
	<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>	
	⌘ Clinical TMS Society Annual Meeting	2026
	Plenary: <i>From physics to practice: Understanding electric field modeling in clinical TMS</i>	
	⌘ International Society for ECT and Neurostimulation Webinar	2025
	<i>Advancing ECT through computational modeling, dose optimization, and device innovation</i>	
	International Symposium on Novel Neuromodulation Techniques	2024
	<i>Model-driven brain stimulation treatments</i>	
	IEEE Brain Discovery & Neurotechnology Workshop, University of Illinois Chicago	2024
	<i>A model-driven approach to personalized neuromodulation treatment</i>	
	NIMH Workshop on The Placebo Effect: Key Questions for Translational Research	2024
	<i>Challenges and strategies in implementing effective sham stimulation for noninvasive brain stimulation trials</i> 	
	Brain and Human Body Modeling Conference	2023
	<i>Effects of low intensity magnetic stimulation</i>	
	International Network of tES-fMRI Webinar	2022
	<i>Electric field modeling and optimization approaches for individualized targeting</i>	
	International College of Neuropsychopharmacology Virtual World Congress	2021
	<i>Next generation seizure therapy and neuromodulation</i>	
	Society for Brain Mapping & Therapeutics Annual Congress	2021
	<i>Advances in electroconvulsive therapy for treatment of depression</i>	
	University of Minnesota Non-Invasive Brain Stimulation Workshop	2020
	<i>Use of individual electric field models in clinical research</i> 	
	International Symposium on Advancing Stimulation Precision Medicine of Brain Disorders, Copenhagen University Hospital Hvidovre, Danish Research Centre for Magnetic Resonance	2019
	<i>Rational design of precision seizure therapy</i>	
	Bergen Workshop of the Global ECT-MRI Collaboration	2018
	<i>Electric field modeling for electroconvulsive therapy</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>	
	Joint NYC Neuromodulation Conference & NANS Summer Series	2018
	<i>Overview of electric field modeling</i>	
	Preconference workshop: Computational modeling in neuromodulation	
	NYC Neuromodulation Conference	2017
	<i>Low field magnetic stimulation</i>	
	NIMH Non-Invasive Brain Stimulation Electric Field Modeling Workshop	2017
	<i>Use of individual electric field models in clinical research</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>	
GRAND ROUNDS	⌘ Barrow Neurological Institute, Phoenix, AZ	2025
	<i>Innovating neurostimulation: From treatment optimization to next-generation technology</i>	
	Advanced Research Institute Grand Rounds in Mental Health and Aging Research	2023
	<i>Advancing neurostimulation treatment optimization and technology innovation</i>	
	Westmead Hospital, Sydney, Australia	2020
	<i>Advances in neuromodulation: Electroconvulsive therapy</i>	
	⌘ Clinical TMS Society	2018
	<i>Transcranial magnetic stimulation: Physics, devices, and modeling</i>	
	⌘ University of New Mexico, Department of Psychiatry & Behavioral Sciences	2017
	<i>Toward individualized electroconvulsive therapy for treatment of depression</i>	
	⌘ Central Regional Hospital, Butner, NC	2015
	<i>Individualized seizure therapy</i>	
	⌘ Duke University School of Medicine, Department of Psychiatry & Behavioral Sciences	2015
	<i>Toward next generation seizure therapy</i>	
INVITED CONFERENCE PANELS	⌘ 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 neurocircuit 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 <i>ECT device development</i>  Panel: <i>Dosing strategies and future of neurostimulation techniques in ECT</i>	2022
Brain and Human Body Modeling Conference <i>ECT, electric field, neuroplasticity, and clinical outcomes</i> 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> 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> Panel: <i>Dimensional approaches to device neuromodulation</i>	2022
⌘ American Academy of Child and Adolescent Psychiatry Annual Meeting <i>Introduction to computational psychiatry</i> 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> Panel: <i>Neurobiology of rapid mood changes</i>	2021
European Conference of Brain Stimulation in Psychiatry <i>Electric field modeling to inform ECT dosing and device development</i> Panel: <i>What can we learn from ECT: Insights from the GEMRIC consortium</i>	2020
NYC Neuromodulation Online Discussant, <i>Noninvasive vagus nerve stimulation applied to stress management, opioid withdrawal, and neurocognitive disorders</i>	2020
American Society of Clinical Psychopharmacology Annual Meeting <i>Advancing seizure therapy: Rational design for precision outcomes</i> Panel: <i>New developments in neurostimulation</i>	2020
⚙ Accepted for presentation; conference was canceled due to COVID-19 pandemic	
⌘ American College of Neuropsychopharmacology Annual Meeting <i>Rational design of precision seizure therapy</i> Panel: <i>Precision neurostimulation for treatment of psychiatric disorders</i>	2019
International College of Neuropsychopharmacology International Meeting <i>Individualized seizure therapy: Reinventing ECT</i> Workshop: <i>Neurobiological and clinical characterization, and treatment development for treatment resistant depression</i>	2019
International Brain Stimulation Conference <i>Individualized electroconvulsive therapy for treatment of depression</i> Panel: <i>Individualized brain stimulation: Addressing heterogeneity across modalities</i>	2019
Joint NYC Neuromodulation Conference & NANS Summer Series <i>High-density ECT: Optimizing stimulation arrays and high-density EEG for brain targeting</i> Panel: <i>New targets and technology of electroconvulsive therapy</i>	2018
International Conference of the IEEE Engineering in Medicine and Biology Society <i>Electric field induced by TMS: Applications in depression and anxiety</i> Panel: <i>Computational human models for brain stimulation</i>	2018
⌘ American Psychiatric Association Annual Conference <i>Individualized neurotargeted seizure therapy: Reinventing ECT</i> Presidential Symposium: <i>ECT in the era of new brain stimulation treatments</i>	2018

	⌘ ADAA Anxiety and Depression Conference 2018 <i>Individualized neurotargeted seizure therapy: Reinventing ECT</i> Panel: <i>Personalized medicine for treatment resistant depressed patients: Novel strategies to optimize treatment with antidepressant medications, ketamine, and ECT</i>
CONTRIBUTED CONFERENCE PRESENTATIONS	International Conference of the IEEE Engineering in Medicine and Biology Society 2026 <i>Assessing ultra-low-field MRI-derived head models for electric field simulation in TMS, ECT, and tDCS: Within-subject agreement with 3 T</i> Duke CTSA KL2 Symposium 2016 <i>Computational modeling in electroconvulsive therapy</i> Duke CTSA KL2 Symposium 2015 <i>Reengineering electroconvulsive therapy</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	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 Research Mentor, University of Maryland, College Park 2018–2019 Fischell Department of Bioengineering 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
Multivariable Calculus
Differential Equations

Fall 2003 – 2006
Spring 2004 – 2007

MENTORING
SUMMARY

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

FACULTY
ADVISORY
(CO-MENTOR,
NIH K
AWARD)

D. C. Farrar, M.D., Ph.D., University of New Mexico School of Medicine NIH/NIMH K23 MH144291	2026 –
“CEASE-LD: Characterizing brain excitability, adequacy of seizures, and efficacy in late-life depression with ECT”	
S. K. Conroy, M.D., Ph.D., Indiana University School of Medicine	2024 –
“Targeting negative self-referential processing in depression with transcranial magnetic stimulation”	
S. M. Hare, Ph.D., University of Maryland School of Medicine NIH/NIMH K01 MH133116	2024 – 2029
“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: Postdoctoral Fellow, Evolutionary Genomics Research Group, National Center for Biotechnology Information, National Library of Medicine, 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	
- Ph.D. thesis committee	2026 –
- 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. Available: <i>UWA Research Repository</i> , DOI: 10.26182/7vwg-p536
	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” Co-mentor (F31 NRSA, submitted 2026). Primary mentor: Prof. Christopher Abbott (University of New Mexico)
	E. Bharti, Ph.D. candidate, NIH–Cambridge Scholars Program 2024 – Co-advised with Prof. Valerie 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 Career progression: Medical student, University of Colorado School of Medicine	2015 – 2016
	M. L. Glidewell, Biomedical Engineering, Duke University Career progression: Senior strategy consultant, IBM	2015 – 2016
	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 (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	American College of Neuropsychopharmacology	
	Program Committee	2026 –
	Mentor, Travel Award Program	2026
	Mentee: Y. Lee, Ph.D., National Institute of Mental Health	
	Advisory Board, Center for Multiscale Bioelectromagnetic Studies of the Brain	2025 –
	Department of Electrical & Computer Engineering, Worcester Polytechnic Institute	
	Board Member, The Global ECT–MRI Research Collaboration (GEMRIC)	2025 –
	Data Processing and MRI Working Group	
	Biomedical Engineering Society	
	Awards Committee	2025 – 2028
	Mid-Career Award Subcommittee	2025
	Reviewer, Chapter Development Report	2025
	American Society of Clinical Psychopharmacology	
INSTITUTIONAL SERVICE	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
	Reviewer, NIH Intramural AIDS Research Fellowships	2025
	Judge, NIH Fellows Award for Research Excellence Competition	2025
	Educational Counselor, MIT	2022 – 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	2026
	University Medical Research Fund	
	Remote Referee, European Research Council	2026
	Technical Reviewer, NIH BluePrint MedTech Program	2021 – 2025
	Expert Reviewer, UK Research and Innovation	2025
	Reviewer, NIH Center for Scientific Review	
	Biophysics of Neural Systems Study Section	2021.10
EDITORIAL ROLES	Reviewer, Duke Institute for Brain Sciences, Research Incubator Awards	2018, 2021
	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> Sections: Addictive Behaviors, Consciousness Research	2022 –
Review Editor, <i>Frontiers in Psychiatry</i> Sections: Neurostimulation, Neuroimaging	2016 – 2022
Guest Associate Editor, <i>Frontiers in Pharmacology: Neuropsychopharmacology</i> Co-Editor on Research Topic: <i>Neurobiology of rapid mood changes</i> 	2020
Guest Editor, <i>Physics in Medicine & Biology</i> Special Issue: <i>Electromagnetic modeling for brain stimulation</i> 	2024
<i>Ad hoc</i> journal reviewer	2010 –
<i>Acta Psychiatrica Scandinavica</i>	
<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>Biomedical Signal Processing and Control</i>	
<i>Biomedicines</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>Epilepsy & Behavior Reports</i>	
<i>European Psychiatry</i>	
<i>Frontiers in Cell and Developmental Biology</i>	
<i>Frontiers in Computational Neuroscience</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 Affective Disorders</i>	
<i>Journal of ECT</i>	
<i>Journal of Neural Engineering</i>	
<i>Journal of Neuroscience Methods</i>	
<i>Journal of Psychiatric Research</i>	
<i>JoVE</i>	

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 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 –
	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>	
	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
PROFESSIONAL DEVELOPMENT & CONTINUING EDUCATION	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 1, 2026