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Licensed Psychologist, California #26583; Pennsylvania #PS019496

Current Academic Positions

2015-present	Assistant Professor, Department of Psychiatry, University of Pennsylvania Perelman School of Medicine
2019-present	Associate Director, Penn Center for Neuromodulation in Depression and Stress (CNDS)
2021-present	Co-Director, Penn Brain Science, Translation, Innovation, and Modulation Center (brainSTIM)
2016-present	Neuroscience Graduate Group Faculty (Biomedical Graduate Studies) University of Pennsylvania Perelman School of Medicine

Previous Positions

2013-2015	Instructor and Research Associate, Department of Psychiatry Stanford School of Medicine and Palo Alto Veterans Institute for Research
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Education

2009-2013	Stanford University Department of Psychiatry and VA Palo Alto Postdoctoral Research Fellow
2006-2009	The University of Wisconsin-Madison Postdoctoral Fellow, Departments of Psychiatry and Psychology NRSA (NIMH F32): " <i>Temporal dynamics of emotional processing in anxiety</i> "
2006	Pennsylvania State University Ph.D. Clinical Psychology, minor Psychophysiology
2005-2006	V.A. Western New York Healthcare System Clinical Internship
2002	Pennsylvania State University M.S. Psychology
1999	California State University, Hayward (East Bay) B.A. magna cum laude, Psychology

Honors/Awards

Society of Biological Psychiatry, invited plenary speaker for annual meeting 2023
 Early Career Travel Award, First International Concurrent TMS-fMRI Workshop 2022
 American College of Neuropsychopharmacology, Associate Member (2021-)
 Neuromodec NYC 2020 Neuromodulation Conference Poster Award (2020)
 Google Cloud Platform Research Credit (\$15,000) for project “*Non-invasive brain stimulation optimized targeting using multi-modal MRI*” (2019-2020)
 Buffalo Innovation Lab Invitee, National Center for Advancing Translational Sciences of the National Institutes of Health – ‘Rapid Solutions to the Opioid Misuse Epidemic’ (2017) -declined
 Research Partner Program award for NARSAD grant, Brain & Behavior Research Foundation (2016-2017)
 University of Pennsylvania Department of Radiology Protocol Development Fund Award (2016)
 Mahoney Institute for Neurosciences Symposium Poster Award, University of Pennsylvania (2016)
 Anxiety and Depression Association of America (ADAA), Alies Muskin Career Development Leadership Award (Basic Neuroscience Track; 2016)
 Poster selected for ‘Poster Tours’ ADAA, Guide: Barbara Rothbaum, Ph.D. (2016)
 NIH Clinical Loan Repayment Award (2014-2016)
 Stanford Center for Cognitive and Neurobiological Imaging (CNI) Seed Grant Award (2013-2014 and 2015)
 NIH National Research Service Award (NRSA); Postdoctoral, NIMH F32 (2009-2012)
 War Related Illness and Injury Study Center (WRIISC) Fellowship, Palo Alto VA (2010-2013)
 Poster selected for Media Materials: ‘Hot Topics in Neuroscience,’ Society for Neuroscience (Chicago, October 2009)
 Wisconsin Symposium on Emotion, Poster Award (2009)
 Functional MRI workshop travel award, University of Michigan (May, 2007)
 Grant-in-Aid, Penn State Graduate School (Spring, 2004 & Summer, 2005)
 Tursky Student Poster Award, 43rd Annual Meeting of the Society for Psychophysiological Research (Chicago, October 2003)*
 Neuroscience Fellowship (National Institute of Neurological Disorders & Stroke, NIH, Summer 2003)
 Psychology Department Fellowship (summer tuition, 2003)
 Trumbo Travel Award, Penn State (2001 & 2002)
 Liberal Arts Travel Award, Penn State (2001, 2003, 2005, 2006)
 Bruce V. Moore Graduate Fellowship (travel expenses; 2002)
 Phi Theta Kappa Honor Society, Cal State Hayward (East Bay)
 Outstanding Psychology Student Award 1999, Cal State Hayward (East Bay)
 Psi Chi National Honor Society, Cal State Hayward (East Bay)

Publications

Sydnor, V.J., Cieslak, M., Duprat, R., Scully, M., Long, H., Flounders, M.W., Bassett, D.S., Satterthwaite, T.D., & **Oathes, D.J.** (2022). Cortical-subcortical white matter supports transcranial magnetic stimulation engagement of the amygdala. *Science Advances*, 8(2), doi: 10.1126/sciadv.abn5803

Editorial: Philip, N.S. & LaBar, K.S. Mapping a pathway to improved neuropsychiatric treatments with prediction transcranial magnetic stimulation. *Science Advances*, 8(25), doi: 10.1126/sciadv.abn5803

Deluisi, J.A. & **Oathes, D.J.** (in press). Neuromodulatory mechanisms of rTMS. *Neuropsychopharmacology*.

Teferi, M., Makhoul, W., Deng, Z., **Oathes, D.J.**, Sheline, Y., & Balderston, N.L. (in press). Continuous theta-burst stimulation to the right dorsolateral prefrontal cortex increases anxiety potentiated startle. *Biological Psychiatry: Global Open Access*.

Adebimpe, A., Bertolero, M., Dolui, S., Cieslak, M., the ALLFTD Consortium, Murtha, K., Baller, E.B., Boeve, B., Boxer, A., Butler, E.R., Cook, P., Colcombe, S., Covitz, S., Davatzikos, C., Davila, D.G., Elliott, M.A., Flounders, M.W., Franco, A.R., Gur, R.E., Gur, R.C., Jaber, B., McMillan, C., Milham, M., Mutsaerts, H.J.M.M., **Oathes, D.J.**, Olm, C.A., Phillips, J.S., Tackett, W., Roalf, D.R., Rosen, H., Tapera, T.M., Tisdall, M.D., Esteban, O., Poldrack, R.A., Detre, J.A., Satterthwaite, T.D. (in press). ASLPrep: A generalizable platform for processing of arterial spin labeled MRI and quantification of regional brain perfusion. *Nature Methods*.

Zhao, K., Duka, B., **Oathes, D.J.**, Calhoun, V., & Zhang, Y. (in press). A novel dynamic graph convolutional neural network architecture to characterize the functional connectome reveals new insights into ADHD. *NeuroImage*.

Brethel-Haurwitz, K.M., **Oathes, D.**, & Kable, J.W. (in press). Causal role of the right temporoparietal junction in selfishness depends on the social partner. *Social Cognitive and Affective Neuroscience*.

Balderston, N.L., Beer, J.C., Seok, D., Makhoul, W., Deng, Z., Girelli, T., Teferi, M., Smyk, N., Jaskir, M., **Oathes, D.J.**, Sheline, Y.I. (in press). Proof of concept study to develop a novel connectivity-based electric-field modelling approach for individualized targeting of transcranial magnetic stimulation treatment. *Neuropsychopharmacology*.

Cieslak, M., Cook, P.A., He, X., Yeh, F-C., Dhollander, T., Adebimpe, A., Aguirre, G.K., Bassett, D.S., Bourque, J., Cabral, L., Davatzikos, C., Detre, J., Earl, E., Elliott, M.A., Fadnavis, S., Fair, D., Foran, W., Fotiadis, P., Garyfallidis, E., Giesbrecht, B., Gur, R.C., Gur, R.E., Kelz, M., Keshavan, A., Larsen, B., Luna, B., Mackey, A., Milham, M., **Oathes, D.J.**, Perrone, A., Pines, A., Roalf, D.R., Richie-Halford, A., Rokem, A., Sydnor, V.J., Tapera, T.M., Tooley, U., Vettel, J.M., Yeatman, J., Grafton, S.C., Satterthwaite, T.D. (2021) QSIPrep: An integrative platform for preprocessing and reconstructing diffusion MRI data. *Nature Methods*. <https://doi.org/10.1038/s41592-021-01185-5>

Yu, M., Cullen, N., Linn, K.A., **Oathes, D.J.**, Seok, D., Cook, P.A., Duprat, R., Aselcioglu, I., Moore, T.M., Davatzikos, C., Oquendo, M.A., Weissman, M.M., Shinohara, R.T., Sheline, Y.I. (2021). Structural brain measures linked to clinical phenotypes in major depression replicate across clinical centers. *Molecular Psychiatry*. <https://doi.org/10.1038/s41380-021-01039-8>

Oathes, D.J., Balderston, N., Kording, K.P., Deluisi, J., Perez, G., Medaglia, J.D., Fan, Y.,

Duprat, R., Satterthwaite, T.D., Sheline, Y.I. Linn, K.A. (2021). Interleaved TMS/fMRI for probing and modulating circuits relevant to affective disorders. *WIREs Cognitive Science*. <https://doi.org/10.1002/wcs.1553>

Oathes, D.J., Zimmerman, J., Duprat, R., Japp, S., Scully, M., Rosenberg, B., Flounders, M.W., Long, H., Deluisi, J.A., Elliott, M., Shandler, G., Shinohara, R.T., & Linn, K.A. (2021). Resting fMRI guided TMS results in subcortical and brain network modulation indexed by interleaved TMS/fMRI. *Experimental Brain Research*, 239(4), 1165-1178. [10.1007/s00221-021-06036-5](https://doi.org/10.1007/s00221-021-06036-5)

Fonzo, G.A., Goodkind, M.S., **Oathes, D.J.**, Zaiko, Y.V., Harvey, M., Peng, K.K., Weiss, M.E., Thompson, A.L., Zack, S.E., Lindley, S.E., Arnow, B.A., Jo, B., Rothbaum, B.O., Etkin, A. (2021). Amygdala and insula connectivity changes following psychotherapy for posttraumatic stress disorder: A randomized clinical trial. *Biological Psychiatry*, 89 (9), 857-867. <https://doi.org/10.1016/j.biopsych.2020.11.021>

Editorial: Kaye, A.P. Amygdala-insula circuit computations in posttraumatic stress disorder, (2021). *Biological Psychiatry*, 89 (9), e49-e50.

Cui, Z., Stiso, J., Baum, G.L., Kim, J.Z., Roalf, D.R., Betzel, R.F., Gu, S., Lu, Z., Xia, C.H., He, X., Ciric, R., **Oathes, D.J.**, Moore, T.M., Shinohara, R.T., Ruparel, K., Davatzikos, C., Pasqualetti, F., Gur, R.E., Gur, R.C., Bassett, D.S., Satterthwaite, T.D. (2020). Optimization of energy state transition trajectory supports the development of executive function during youth. *eLife*, e53060. <https://doi.org/10.7554/eLife.53060>

Pines, A.R., Cieslak, M., Baum, G.L., Cook, P.A., Adebimpe, A., Davila, D.G., Elliott, M., Jirsaraie, R., Murtha, K., **Oathes, D.J.**, Piiwaa, K., Rosen, A.F.G., Rush, S., Shinohara, R.T., Bassett, D.S., Roalf, D.R., Satterthwaite, T.D. (2020). Advantages of multi-shell diffusion models for studies of brain development in youth. *Developmental Cognitive Neuroscience*, 43. <https://doi.org/10.1016/j.dcn.2020.100788>.

Cui, Z., Li, H., Xia, D.H., Larsen, B., Adebimpe, A., Baum, G.L., Cieslak, M., Gur, R.E., Gur, R.C., Moore, T.M., **Oathes, D.J.**, Raznahan, A., Roalf, D.R., Shinohara, R.T., Wolf, D.H., Fair, D.A., Bassett, D.S., Davatzikos, C., Fan, Y., Satterthwaite, T.D. (2020). Individual variation in control network topography supports executive function in youth. *Neuron*, 106(2), 340-353. <https://doi.org/10.1016/j.neuron.2020.01.029>.

Baum, G.L., Cui, Z., Roalf, D.R., Ciric, R., Betzel, R.F., Larsen, B., Cieslak, M., Cook, P.A., Xia, C.H., Moore, T.M., Ruparel, K., **Oathes, D.J.**, Alexander-Bloch, A.F., Shinohara, R.T., Raznahan, A., Gur, R.C., Gur, R.E., Bassett, D.S., Satterthwaite, T.D. (2020). Development of structure-function coupling in human brain networks during youth. *Proceedings of the National Academy of Sciences*, 117, 1, 771-778.

Yu, M., Linn, K.A., Shinohara, R.T., **Oathes, D.J.**, Cook, P.A., Duprat, R., Moore, T., Oquendo, M., Phillips, M.L., McInnis, M., Fava, M., Trivedi, M.H., McGrath, P.J., Parsey, R., Weissman, M.M., & Sheline, Y.I. (2019). Childhood trauma history is linked to abnormal brain connectivity in major depression. *Proceedings of the National Academy of Sciences*, 116, 17, 8582-8590.

Etkin, A., Maron-Katz, A., Wu, W., Fonzo, G.A., Huemer, J., Vertes, P.E., Patenaude, B., Richiardi, J., Goodkind, M.S., Keller, C.J., Cejudo, J.R., Zaiko, Y.V., Peng, K.K., Shipgel, E., Longwell, P., Toll, R.T., Thompson, A., Zack, S., Gonzalez, B., Edelstein, R., Chen, J., Akingbade, I., Weiss, E., Hart, R., Mann, S., Durkin, K., Baete, S., Boada, F., Genfi, A., Autea, J., Newman, J., **Oathes, D.J.**, Lindley, S.E., Abu-Amara, D., Arnow, B.A., Crossley, N., Hallmayer, J., Fossati, S., Rothbaum, B.A. Marmer, C.R., Bullmore, E.T., O'Hara, R. (2019). Using fMRI connectivity to define a treatment-resistant form of post-traumatic stress disorder. *Science Translational Medicine*, 11, 486, eaal3236, DOI: 10.1126/scitranslmed.aal3236.

Yang, Z., Gu, S., Honnorat, N., Linn, K., Shinohara, R., Aselcioglu, I., Bruce, S., **Oathes, D.J.**, Davatzikos, C., Satterthwaite, T., Bassett, D., Sheline, Y.I. (2018). Network changes associated with transdiagnostic depressive symptom improvement following cognitive behavioral therapy in MDD and PTSD. *Molecular Psychiatry*, 23, 2314-2323.

Yang, Z., **Oathes, D.J.**, Bruce, S.E., Linn, K.A., Satterthwaite, T.D., Cook, P.A., Satchell, E.K., Shou, Haochang., Sheline, Y.I. (2018). Cognitive behavioral therapy is associated with enhanced cognitive control network activity in major depression and post-traumatic stress disorder. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, 3, 311-319.

Fonzo, G.A., Goodkind, M.S., **Oathes, D.J.**, Zaiko, Y.V., Harvey, M., Peng, K.P., Weiss, M.E., Thompson, A.L., Zack, S.E., Lindley, S.E., Arnow, B.A., Jo, B., Gross, J.J., Rothbaum, B.O., Etkin, E. (2017). PTSD psychotherapy outcome predicted by brain activation during emotional reactivity and regulation. *American Journal of Psychiatry*, 174(12), 1163-1174.

Fonzo, G.A., Goodkind, M.S., **Oathes, D.J.**, Zaiko, Y.V., Harvey, M., Peng, K.P., Weiss, M.E., Thompson, A.L., Zack, S.E., Mills-Finnerty, C.E., Rosenberg, B.M., Edelstein, R., Wright, R.N., Kole, C.A., Lindley, S.E., Arnow, B.A., Jo, B., Gross, J.J., Rothbaum, B.O., Etkin, E. (2017). Selective effects of psychotherapy on frontopolar cortical function in post-traumatic stress disorder. *American Journal of Psychiatry*, 174(12), 1175-1184.

Drysdale, A.T., Grosenick, L., Downar, J., Dunlop, K., Mansouri, F., Meng, Y., Fetcho, R., Zebley, B., **Oathes, D.J.**, Etkin, A., Schatzberg, A.F., Sudheimer, K., Keller, J., Mayberg, H.S., Gunning, F.M., Alexopoulos, G.S., Fox, M.D., Pascual-Leone, A., Voss, H.U., Casey, B.J., Dubin, M.J., Liston, C. (2017). Resting state connectivity biomarkers define neurophysiological biotypes of depression. *Nature Medicine*, 23 (1), 28-38.

Editorial: Wager, T. & Woo, C-W. Imaging biomarkers and biotypes for depression. (2017). *Nature Medicine*, 23 (1), 16-17.

Jiang, Y., **Oathes, D.J.**, Hush, J., Darnall, B., Charvat, M., Mackey, S., Etkin, A. (2016). Perturbed connectivity of the amygdala and its subregions with the central executive and default mode networks in chronic pain. *Pain*, 157 (9), 1970-1978.

Oathes, D.J., Patenaude, B., Schatzberg, A.F., & Etkin, A. (2015). Neurobiological signatures of anxiety and depression in resting fMRI. *Biological Psychiatry*, 77 (4), 385-393.

Goodkind, M.S., Eickhoff, S.B., **Oathes, D.J.**, Jiang, Y., Chang, A., Jones-Hagata, L.B.,

- Ortega, B.N., Zaiko, Y.V., Roach, E.L., & Etkin, A. (2015). Identification of a common neurobiological substrate for mental illness. *JAMA Psychiatry*, 72 (4), 305-315.
- Oathes, D.J.**, Hilt, L.M., & Nitschke, J.B. (2015). Affective neural responses modulated by serotonin transporter genotype in generalized anxiety disorder, social anxiety disorder, and depression. *PLoS ONE*, 10(2): e0115820.
- Chen, C.N., **Oathes, D.J.**, Chang, C., Zhou, Z., Williams, L.M., Glover, G., Deisseroth, K., & Etkin, A. (2013). Causal interactions between fronto-parietal central executive and default-mode networks in humans. *Proceedings of the National Academy of Sciences*, 110(49), 19944-19949.
- Grupe, D.W., **Oathes, D.J.**, & Nitschke, J.B. (2013). Dissecting the anticipation of aversion reveals dissociable neural networks. *Cerebral Cortex*, 23(8), 1874-1883.
- Tromp, D.P.M., Grupe, D.W., **Oathes, D.J.**, McFarlin, D.R., Hernandez, P.J., Kral, T.R.A., Lee, J.E., Adams, M., Alexander, A.L., & Nitschke, J.B. (2012). Reduced structural connectivity of a major frontolimbic pathway in generalized anxiety disorder. *JAMA Psychiatry*, 69(9), 925-934. [*Archives of General Psychiatry*]
- Oathes, D.J.**, Siegle, G.J. & Ray, W.J. (2011). Chronic worry and the temporal dynamics of emotional processing. *Emotion*, 11(1), 101-114.
- Oathes, D.J.**, Squillante, C.M., Ray, W.J. & Nitschke, J.B. (2010). The effects of worry on attention and threat vigilance. *PLoS ONE*, 5(10): e13411.
- Nitschke, J.B., Sarinopoulos I., **Oathes, D.J.**, Johnstone, T., Whalen, P.J., Davidson, R.J., & Kalin, N.H. (2009). Anticipatory processing in the amygdala and anterior cingulate in generalized anxiety disorder and prediction of treatment response. *American Journal of Psychiatry*, 166, 302-310.
- Oathes, D.J.** & Nitschke, J.B. (2008). State of the union between cognitive neuroscience and emotion. *Expert Review of Neurotherapeutics*, 8(7), 1025-1027.
- Oathes, D.J.**, Bruce, J.M., & Nitschke, J.B. (2008). Worry facilitates corticospinal motor response to transcranial magnetic stimulation. *Depression and Anxiety*, 25(11), 969-976.
- Oathes, D.J.**, Ray, W.J., Yamasaki, A.S., Borkovec, T.D., Newman, M.G., Castonguay, L.G., & Nitschke, J.B. (2008). Worry, generalized anxiety disorder, and negative affect: Evidence from EEG gamma before and after psychotherapy. *Biological Psychology*, 69, 165-170.
- Oathes, D.J.**, & Ray, W.J. (2008). Dissociative tendencies and facilitated emotional processing. *Emotion*, 8(5), 653-661.
- Oathes, D.J.** & Ray, W.J. (2006). Depressed mood, index finger force and motor cortex stimulation: A transcranial magnetic stimulation (TMS) study. *Biological Psychology*, 72(3), 271-277.
- Ray, W.J. & **Oathes, D.J.** (2003). Brain imaging techniques. *International Journal of Clinical*

and *Experimental Hypnosis*, 51(2), 97-104.

In Progress Manuscripts

- Tong, X., Xie, H., Carlisle, N., Fonzo, G.A., **Oathes, D.J.**, & Zhang, Y. (submitted). *Transdiagnostic connectome signatures from resting-state fMRI predict individual-level intellectual capacity.*
- Li, H., Dhivya, S., Cui, A., Zhuo, C., **Oathes, D.J.**, Davatzikos, C., Satterthwaite, T.D., & Fan, Y. (submitted). *Computing personalized brain functional networks from fMRI using self-supervised deep convolutional neural networks.*
- Duprat, R., Linn, K.A., Satterthwaite, T.D., Sheline, Y.I., Liang, X., Bagdon, G., Flounders, M.W., Robinson, H., Platt, M., Kable, J., Long, H., Scully, M., Deluisi, J.A., Lyu, M., Thase, M., Cristancho, M., Shinohara, R.T., & **Oathes, D.J.** (submitted). *Relationship between resting fMRI connectivity and TMS evoked subgenual anterior cingulate response in depression.*
- Oathes, D.J.**, Linn, K.A., Long, H., Scully, M., Sheline, Y.I., Liang, X., Duprat, R. (submitted). *Non-invasively targeting, probing and modulating a deep brain circuit for depression remediation.*
- Oathes, D.J.**, Lyu, M., Scully, M., Figueroa-Gonzalez, A., Hosseini, G., Long, H., Duprat, R., Scott, J.C., Cristancho, M., Thase, M.E., Sheline, Y.I., Linn, K.A. (in prep). *Trauma and psychological context in fMRI-guided rTMS for PTSD and trauma related depression.*
- Cieslak, M., Cook, P.A., Tapera, T.M., Radhakrishnan, H., Elliott, M., Roalf, D., **Oathes, D.J.**, Bassett, D.S., Tisdall, M.D., Rokem, A., Grafton, S.T., Satterthwaite, T. (in prep). *Diffusion MRI head motion correction methods are highly accurate but impacted by denoising and sampling scheme.*

Research Support

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|--|----------------------------|-----------|
| P41 NIH | Reddy PI/Oathes Project PI | 2022-2027 |
| <i>Developing TMS/MRI in ultra-high field</i> | | |
| With an industry partner, developing and testing a TMS coil that can deliver neuromodulation with online MRI recordings at 7 Tesla field strength. | | |
| Role: Project PI | | |
| The Hart Fund in Cognitive Neuroscience | Oathes | 2022-2028 |
| <i>Decoding and modulating affective brain states</i> | | |
| Targeting individual brain networks related to affective dysregulation and repetitive thinking, we aim to disrupt these brain patterns using rTMS. | | |
| Role: PI | | |
| AE Foundation | Kable | 2021-2023 |
| <i>Enhancing the ability to build trust through excitatory transcranial magnetic stimulation to the temporal-parietal junction</i> | | |

As a model for treating patients with related behavioral deficits, we plan to establish a causal link between the TPJ and decision-making involving trust.

Role: Co-Investigator

R01 MH120811 Oathes/Fan 09/01/19-06/30/24

Individualized closed loop TMS for working memory enhancement

This tool development and validation study will use a deep learning approach to decode a multi-modal imaging based working memory brain state that will be stimulated in closed-loop fashion with interleaved rTMS/fMRI to optimize brain readouts.

Role: contact PI/MPI

RF1 MH116920 Oathes/Bassett/Satterthwaite 09/02/18-08/31/22

Network control and functional context: Mechanisms for TMS response

We propose to test the hypothesis that brain responses to TMS are governed both by the network properties of the stimulation site and by cognitive context during TMS administration.

Role: contact PI/MPI

AE Foundation Kable 2021-2022

Discovering replicable and robust activity differences between high and low discounters

Here we aim to identify systematic differences in functional brain activity between high and low discounters

Role: Co-Investigator

AE Foundation Kable 2019-2021

Reducing delay discounting and selfishness with excitatory transcranial magnetic stimulation of the temporoparietal junction

As a model for treating patients with related behavioral deficits, we plan to establish a causal link between the TPJ and several behavioral economics measures related to social decision making.

Role: Co-Investigator

R01 MH111886 Oathes 09/26/16-06/30/21

NIH /NIMH/ NINDS

Non-invasive neuromodulation mechanisms and dose/response metrics

To better understand the influence of transcranial magnetic stimulation on the brain, we will acquire resting and interleaved TMS/fMRI responses to neuromodulatory TMS in healthy as well as depressed individuals.

Role: PI

Supplement to R01 MH11886-02 Oathes 05/18/18-05/17/19

Leveraging network control theory to explain individual differences in non-invasive brain stimulation.

Adding high resolution diffusion imaging to define control points hypothesized to contribute to evoked TMS brain responses recorded in functional MRI signals.

Role: PI

CureAccelerator Mid-Atlantic Repurposing Award Oathes 11/15/16-04/30/21

Cures Within Reach and the Kahlert Foundation (+20% Co-Funding from Penn Medicine)

Functional brain imaging to guide targeted brain stimulation for depression and posttraumatic stress

NIH/NCI

Outstanding Investigator Award

Neuroscience-based interventions for Cancer Risk Behavior Change

This project will develop novel neuroscience-based interventions to help people gain control over risk factors that lead to cancer.

Role: Investigator

McCabe Fund Pilot Grant

Oathes

07/12/16-02/11/18

University of Pennsylvania Perelman School of Medicine

Affective neurocircuit plasticity as a benchmark for novel non-invasive neurotherapeutics

Examine TMS evoked and resting connectivity changes in the fMRI BOLD signal before and after acute neuromodulation to prefrontal sites functionally linked to subcortical targets in major depressive disorder.

Role: PI

VA MIRECC Pilot Grant

Oathes

10/01/16-09/29/17

Veterans Affairs Mental Illness Research, Education and Clinical Centers (VISN 4)

Non-invasive brain stimulation in disorder specific contexts for PTSD and MDD

Using structural and functional MRI guidance, modulate fear and reward neurocircuitry in the context of task probes to generate novel non-invasive brain stimulation treatment targets for MDD and PTSD.

Role: PI

Translational Neuroscience Initiative

Platt, Sheline

04/01/16-06/30/20

Penn Medicine Translational Neuroscience Center (PTNC)

Elucidating mechanisms of TMS efficacy in neuropsychiatric disorders

Use innovative, complementary studies in non-human primates and humans to identify for the first time causal relationships between non-invasive brain stimulation (transcranial magnetic stimulation, or TMS) and changes in neural activity and behavior.

Role: Investigator

R03 MH103745-01

Oathes/Etkin

08/01/14-07/31/17

NIH / NIMH

Developing Methods for Brain Stimulation Enhanced Fear Reversal in PTSD

The goal of the study is to determine ideal methods for enhancing reversal of learned fear reactions in healthy participants using MRI-guided transcranial magnetic stimulation (TMS) for subsequent application to patients with posttraumatic stress disorder (PTSD).

Role: PI (awarded to Oathes PI, transferred to Etkin 2015 for data collection continuity)

1 I21 RX001772-01A1

Johanson

04/01/15-03/29/17

Veterans Affairs, Rehabilitation Research and Development SPiRE Grant

Evaluating Neural Adaptation after Tendon Transfer and Task-based Training in SCI

Use fMRI to evaluate predictors and neural correlates of muscle re-education following tendon transfer surgery (distal tendon transfer brachioradialis muscle to the paralyzed flexor pollicis longus) to restore upper limb function in C5/6 SCI.

Role: Co-Investigator

PAVIR Opportunity Fund

Oathes

05/28/15-09/30/15

Palo Alto Veterans Institute for Research (PAVIR)

Individualized Brain Based Targeting for TMS/fMRI

Comparison of atlas and individualized targeting methods for activating subcortical brain areas with TMS via surface accessible prefrontal stimulation sites.

Role: PI

PAVIR Opportunity Fund Oathes 05/15/15-08/31/15

Palo Alto Veterans Institute for Research (PAVIR)

Rapid Shifts in Mood Brain Dynamics in Resting fMRI

Covers participant reimbursement costs for the Stanford CNI project listed below.

Role: PI

Seed Grant Award (Innovation) Oathes 04/02/15-07/31/15

Stanford Center for Cognitive and Neurobiological Imaging (CNI)

Rapid Shifts in Mood Brain Dynamics in Resting fMRI

Using sub-second rapid TR multi-band echo planar fMRI to capture affective/cognitive dynamics in the brain, we seek to characterize the signature of these influences on resting fMRI abnormalities in anxiety and depression.

Role: PI

NIH LRP Oathes 07/01/14-06/30/16

Mapping Critical Neurocircuitry Interactions in PTSD

Supports my work combining TMS with fMRI to study causal brain network interactions in PTSD patients relative to trauma exposed healthy adults.

Role: PI

Seed Grant Award Oathes 10/25/13-06/30/14

Stanford Center for Cognitive and Neurobiological Imaging (CNI)

Intrinsic and context dependent neural correlates of affective perturbation in anxious/depressed older adults

This project seeks to determine context dependent connectivity changes in the brains of older (and younger) adults in response to affective perturbation as well as to map cognitive/affective interactions in participants with or without significant affective symptoms.

Role: PI

1F32MH081667-01A2 Oathes 07/01/09-06/29/12

NIH / NIMH

Temporal Dynamics of Emotional Processing in Anxiety

Supported investigation of dynamic neural fluctuations during anticipation of, response to, and recovery from evocative emotional stimuli in generalized anxiety disorder, social anxiety disorder, and major depressive disorder patients with Dr. Jack Nitschke.

Role: PI

NIMH 5T32MH018931 Davidson 08/01/07-07/31/08

University of Wisconsin-Madison

Training Program in Emotional Research

Supported my role doing fMRI research on emotional processing in generalized anxiety disorder with PI Jack Nitschke (NIH 5R01MH074847-05).

Role: Postdoctoral Scientist

Past Research Experience

- 9/06-12/09 Postdoctoral Research Scientist (NIH Postdoctoral NRSA F32), Waisman Laboratory for Brain Imaging and Behavior, University of Wisconsin, Madison
 - Conduct neuroimaging (fMRI, DTI) studies in affective neuroscience related to emotional processing chronometry in anxiety and depression (also incorporating numerous other psychophysiological, behavioral, and subjective experience measures)
- Supervisor: Jack Nitschke, Ph.D., Depts. of Psychiatry and Psychology
 Director: Richard Davidson, Ph.D., Depts. of Psychiatry and Psychology
- 3/06-9/06 Psychologist Intern Researcher/ Principle Investigator, Women's and Children's Hospital of Buffalo/University of Buffalo/Buffalo Veteran's Hospital
 - set up high density EEG system, analyzed pilot data for EEG source analysis projects
- 6/03-8/03 Summer Internship in the Neurosciences; National Institute of Neurological Disorders & Stroke, National Institutes of Health
 - study use-dependent plasticity of the motor cortex using Transcranial Magnetic Stimulation (TMS) in patient groups and control participants
- Supervisor: Leonardo Cohen, M.D. (Human Cortical Physiology Unit, Senior Director)

Clinical Experience

- 2022-present Psychotherapist, Center for the Treatment and Study of Anxiety, UPenn, Philadelphia, PA
- 2015-present Clinical consultation for diagnostic and neuropsychological assessments, Center for Neuromodulation in Depression and Stress, UPenn, Philadelphia, PA
- 9/14-9/15 Supervision of Clinical Psychology student trainees in diagnostic and neuropsychological assessments for Etkin Lab, Stanford, CA
- 2/15-9/15 Clinical Trial Therapist, Stanford Mood Disorders Center, Stanford, CA
 Insomnia, behavioral sleep medicine treatment
- 1/10-9/14 Diagnostic assessments for NIH funded study of PTSD with fMRI, TMS/fMRI and therapy outcome to prolonged exposure (PE); Etkin Lab, Stanford, CA
- 9/08-9/09 Postdoctoral Clinician, Wisconsin Psychiatric Institute and Clinics, Madison, WI.
 - Didactic training and provision of psychotherapy services to Madison community patients
 - Supervision of graduate student clinicians and training in psychotherapy supervision

- 9/05-9/06 Assessor, Treatment Coordinator/Therapist; VA Western NY Healthcare Rotations in: Neuropsychology, Partial Hospitalization (Severe Mental Illness; Gestalt/Milieu Therapy, Motivational Interviewing, Group Therapy), Post-Traumatic Stress Disorder (Individual+Group Therapy, Exposure Therapy)
- 8/99 – 9/05 Staff Therapist; Staff Assessor; The Penn State Psychological Clinic, University Park, PA
-psychotherapy within various frameworks including Cognitive Behavioral Therapy, Experiential & Existential Psychotherapy, Transference Focused Psychotherapy
-intake diagnostic interviews, psychological & neuropsychological assessments

Teaching Positions/Experience

- 2/21 Guest lecture, ‘Brain imaging of human fear and anxiety psychopathology’ for medical students and neuroscience graduate students for the Clinical Neurosciences Training Program, University of Pennsylvania Perelman School of Medicine.
- 9/21 Guest lecture, ‘Personalized brain stimulation treatment’ for Psychiatry Residency course in Neuroscience, University of Pennsylvania Perelman School of Medicine.
- 4/21 Co-leader, Responsible Conduct in Research Workshop, University of Pennsylvania Perelman School of Medicine, Biomedical Graduate Studies
- 12/17 Guest lecture, ‘Emerging Neurotechnologies’ for Psychiatry Residency course in Neuroscience. University of Pennsylvania Perelman School of Medicine.
- 8/99 – 9/05 Instructor for ‘Introductory Psychology’ and ‘Adolescent Psychology’ Courses at Penn State. Teaching assistant for various courses in Penn State Psychology and Statistics Departments.

Affiliations

Society of Biological Psychiatry; Society for Neuroscience; Organization for Human Brain Mapping; Society for Psychophysiological Research; Association for Behavioral and Cognitive Therapies; Anxiety and Depression Association of America

Service

Ad hoc reviewer *Biological Psychiatry, Proceedings of the National Academy of Sciences, Neuropsychopharmacology, NeuroImage, Human Brain Mapping, Depression and Anxiety, the American Journal of Geriatric Psychiatry, Psychiatry Research: Neuroimaging, Psychophysiology, Behavior Therapy, Journal of Abnormal Psychology, Psychological Medicine, Cognitive Therapy and Research, Psychiatry Research, PLoS One, Cognitive, Affective, and Behavioral Neuroscience, Frontiers in Psychology, Biological Psychology,*

Anxiety, Stress, & Coping, Behavioral Neuroscience, Journal of Psychiatry and Neuroscience, Neuropsychologia, Cognition and Emotion, Journal of Psychiatric Research, Drug and Alcohol Dependence, Neuromodulation: Technology at the Neural Interface, Communications Biology, EBioMedicine, Addiction Biology.

University of Pennsylvania Mahoney Institute of Neuroscience, Year of Neuromodulation, Annual Symposium panel chair	2022
Anxiety and Depression Association of America (ADAA) annual conference Early Career Professionals and Students Special Interest Group, faculty discussion leader	2022
National Institute on Drug Abuse (NIDA/NIH) 022/01 ZDA1 PXN-F (17) S “Device-Based Treatments for Substance Use Disorders” UG3/UH3	2022
Penn Richards Society (faculty development) Steering Committee	2022-
Dutch Research Council Vidi grant reviewer	2022
International Congress of Clinical Neurophysiology symposium reviewer	2022
National Institute on Drug Abuse (NIDA/NIH) 022/01 ZDA1 PXN-F (11) S “Device-Based Treatments for Substance Use Disorders” UG3/UH3	2021
Penn School of Arts and Sciences Mind DivE-In; Diversity and Equity Initiative in the Mind Sciences mentor	2021
Penn Center for Neuromodulation in Depression and Stress weekly international speaker series (clinical/cognitive neuroscience and brain stimulation) creator and host	2021-
Penn Neuroscience Graduate Group (NGG) Action Against Bias (AAB) mentor	2021-
National Institute of Mental Health Special Emphasis Panel “NIMH Early Phase Psychosocial and Confirmatory Efficacy Clinical Trials” 2021/ ZMH ERB-B (08)	2021
Penn Psychiatry Cognitive Behavioral Therapy Education Committee	2021-
Penn Biomedical Postdoctoral Council Diversity Committee Mentoring Circles mentor	2021-
Society of Biological Psychiatry Travel Fellowship Mentor	2021
Cures Within Reach/Cure Accelerator grant reviewer	2021
University of Pennsylvania Mahoney Institute of Neuroscience, Year of Neuromodulation, Program Committee	2021-2022
Society of Biological Psychiatry Program Committee	2020-2023
PLoS One Editorial Board	2020-
Penn brainSTIM Center Faculty Steering Committee (Penn Neurology)	2020-
Intersections Science Fellows Symposium (Postdoc Diversity Initiative) mentor	2020
Organization for Human Brain Mapping Student and Postdoc Special Interest Group International Online Mentoring Program, Mentor	2020
National Institutes of Health Special Emphasis Panel “Non-Invasive Neuromodulation – New Tools and Techniques for Spatiotemporal Precision” 2020/08 ZMH1 ERB-S(08) R	2020
VA Merit, CSR&D 2021/01 ZRD1 NURA-J (01) 2, Neurobiology-A Study Section	2020
VA Merit, CSR&D 2020/08 ZRD1 NURA-J (01) 1, Neurobiology-A Study Section	2020
Association of British Neurologists Clinical Research Training Fellowship reviewer	2019
Penn Faculty Senate Executive Committee and University Council Representative	2019-2021
University of Pennsylvania Council Committee on Personnel Benefits	2021-2022
National Institutes of Health Special Emphasis Panel “Device-based Treatments for Substance Use Disorders” 2019/01 ZMH1 ERB-D (02) S UG3/UH3	2019
National Institutes of Health Special Emphasis Panel “Device-based Treatments for Substance Use Disorders” 2020/10 ZDA1 IXN-O(07) S UG3/UH3	2020
National Institutes of Health Special Emphasis Panel “Device-based Treatments for Substance Use Disorders” 2020/01 ZMH1 ERB-D (02) S UG3/UH3	2020
National Institutes of Health Special Emphasis Panel “Early Stage Testing of Pharmacological or	

Device-based Interventions for the Treatment of Mental Disorders” 2020/01 ZDA1 IXN-O (14) S 2019
 National Institutes of Health Special Emphasis Panel “Brain Initiative: Biology and Biophysics of Neural Stimulation” 2019/10 ZRG1 ETTN-D (50) R01 2019
 NIH study section (Emerging Imaging Technologies in Neuroscience; EITN) 2019(1)
 NIH study section (Emerging Imaging Technologies in Neuroscience; EITN) 2019(2)
 NIH study section (Adult Psychopathology and Disorders of Aging; APDA) 2019
 Penn Medicine Translational Neuroscience Center Neuromodulation Working Group member 2018-
 Canada Foundation for Innovation (CFI) John R. Evans Leaders Fund infrastructure proposal expert reviewer 2018
 Health Research Council of New Zealand Sir Charles Hercus Research Fellowship grant reviewer 2018
 Anxiety and Depression Association of America Annual Conference research symposia / roundtable scientific reviewer 2018
 National Institute on Drug Abuse (NIDA/NIH) Special Emphasis Panel “Device-Based Treatments for Substance Use Disorders” 2018, 2020
 National Institute of Mental Health (NIMH/NIH) BRAIN Initiative: Kirchstein NRSA Individual Postdoctoral Fellowship (F32) Review Panel 2018/10 ZMH1 ERB-C (09) 2018
 National Institutes of Health Special Emphasis Panel “Understanding and Modifying Temporal Dynamics of Coordinated Neural Activity” 2018/10 ZRG1 IFCN-J (58) R01+R21 2018
 National Institute of Mental Health (NIMH/NIH) Special Emphasis Panel “Addressing Suicide Research Gaps: Aggregating and Mining Existing Data Sets for Secondary Analyses (R01) – 2018/05 ZMH1 ERB-B (03) 2018
 Penn Medicine Clinical Neuroscience Training Program Summer Internship Grant Reviewer 2018
 NIH study section (Biobehavioral Mechanisms of Emotion, Stress and Health [MESH]) 2017
 Medical Research Council (MRC) UK Grant Reviewer 2017, 2018
 Penn Biomedical Postdoctoral Research Symposium judge 2017
 ADAA Genetics and Neuroscience Special Interest Group 2016-2017
 VA Merit, Special Emphasis Panel 2017/08 Mental Health and Behavioral Sciences (MHBB 1) Grant Reviewer 2017
 Penn PROMOTES Research on Sex and Gender in Health grant reviewer 2017
 Panelist, Penn Neuroscience Advisory Committee planning meeting 2017
 Scientific Quality Reviewer, Tufts Clinical and Translational Science Institute 2017
 Neuroscience Graduate Group faculty, University of Pennsylvania 2016-
 Neuroscience Graduate student mentor, University of Pennsylvania 2017-
 Hong Kong SAR Government Innovation and Technology Commission grant reviewer 2016
 Anxiety and Depression Association of America (ADAA), Annual Meeting Scientific Reviewer 2017, 2018
 Science adviser, CureAccelerator.org 2016-
 Grant reviewer, Romanian National Council for Scientific Research 2011, 2013, 2015
 Grand Awards Judge, Intel International Science and Engineering Fair 2010
 Society for Psychophysiological Research, Program Committee 2009
 Wisconsin Symposium on Emotion, Discussant 2007, 2008
 Human Brain Mapping Annual Meeting, Scientific Advisory Board 2007
 Research training mentor, AP Biology (152) for two students, UW-Madison 2007
 Association for Psychological Science (APS), Student Grant Competition Reviewer 2005-2006
 APS, Student Research Competition Reviewer 2005-2006

APS, Graduate Representative (Penn State)	2004-2005
Clinical Training Committee, Penn State	2004-2005
Penn State Liberal Arts Travel Award Committee	2004-2005
Penn State Cognitive & Affective Neuroscience Colloquium Committee	2002-2003

Selected Presentations

Oathes, D.J. (2023, April). Invited plenary lecture. *Precision brain stimulation: from mapping to intervention*. To be given at the annual meeting of the Society of Biological Psychiatry, San Diego, CA.

Oathes, D.J. (2022, September). *TMS evoked fMRI in subcortical targets as a function of resting fMRI and DTI*. In Lysianne Beynel (Chair), *Towards optimized TMS targeting approaches*. To be given at the annual International Congress of Clinical Neurophysiology by the International Federation of Clinical Neurophysiology, Geneva, Switzerland.

Oathes, D.J. (2022, July). Invited talk, Interdisciplinary Neuromodulation Academic Series. *Optimizing subgenual cingulate engagement for depression remediation*. University of Iowa Hospitals and Clinics and Iowa Neuroscience Institute.

Oathes, D.J. (2022, May). Invited talk, Brain Circuit Therapeutics Training Series. *Combining transcranial magnetic stimulation with functional magnetic resonance imaging for probing and modulating neural circuits relevant to affective disorders*. Brigham and Women's Hospital Center for Brain Circuit Therapeutics, Harvard Medical School, Boston, MA.

Oathes, D.J. (2022, May). Invited talk, *fMRI guided pathways to subcortical targets validated with interleaved TMS/fMRI*. Given at the First International Concurrent TMS-fMRI Workshop, Pissouri, Cypress.

Oathes, D.J. (2022, May). *Effects of stimulation site, context and trauma history on response to rTMS treatment among patients with PTSD or depression with trauma*. In Vaughn Steele and Travis Baker (Chairs), *Modulating cognitive systems in substance use disorders and co-occurring clinical diagnoses*. Given at the annual meeting of the Society of Biological Psychiatry, New Orleans, LA.

Oathes, D.J. (2022, April). Invited talk, Lehigh University Bioengineering Department Seminar Series. *Interleaved TMS/fMRI to probe and predict circuit modulation relevant to neuropsychiatry*. Given at Lehigh University, Bethelam, PA.

Oathes, D.J. (2022, February). Invited talk, Penn Clinical Neurosciences Training Seminar and Neuroscience Graduate Group. *Brain imaging of human fear and anxiety psychopathology*. Given at the University of Pennsylvania Perelman School of Medicine.

Oathes, D.J. (2021, November). Invited talk, McLean Hospital/Harvard Medical School Center for Depression, Anxiety, and Stress Research's (CDASR) 2021-2022 Speaker Series. *Noninvasive brain mapping to understand TMS mechanisms in neuropsychiatric treatment*. Given at the Harvard Medical School, Boston, MA.

- Oathes, D.J.** (2021, September). Invited talk, Melbourne Neuropsychiatry Centre and Department of Biomedical Engineering. *TMS/fMRI causal mapping with relevance for rTMS depression treatment outcome*. Given at the University of Melbourne, Melbourne, Victoria, Australia.
- Oathes, D.J.** (2021, December). Invited talk, Psychiatry Grand Rounds. *Circuit focused neuropsychiatry towards personalized neuromodulation*. Given at the University of Indiana Department of Psychiatry, Bloomington, IN.
- Oathes, D.J.** (June, 2021). Invited talk. *Combining TMS with fMRI for probing and modulating brain circuits*. Brainbox Initiative Webinar series, virtual.
- Oathes, D.J.** & Jong, Y. (co-Chairs; 2021, April-May). *Mood Disorders/Treatment Oral Session*. Symposium presented at the annual meeting of the Society of Biological Psychiatry, virtual.
- Sydnor, V., **Oathes, D.J.** (2021, April-May). *Amygdala TMS-fMRI evoked response is influenced by prefrontal-amygdala white matter pathway fiber density*. Poster presented at the annual meeting of the Society of Biological Psychiatry, virtual.
- Oathes, D.J.** (2021, April-May). *Depression improvement from rTMS facilitated by subgenual cingulate engagement indexed by interleaved TMS/fMRI*. Poster presented at the annual meeting of the Society of Biological Psychiatry, virtual.
- Oathes, D.J.** (2021, February). Invited talk, Psychiatry Department Mood Disorder Lecture Series. *Brain circuit probe and neuromodulation evidence for how TMS improves depression*. Given at the University of Texas at Austin Dell Medical School, Austin, TX (virtual).
- Oathes, D.J.** (June, 2020). Invited talk, Neurology Grand Rounds. *Neuroimaging informed transcranial magnetic stimulation*. Given at the University of Pennsylvania, Perelman School of Medicine, Philadelphia, PA.
- Oathes, D.J.** (2020, April). *Interleaved TMS/fMRI for causal mapping of cortical-subcortical connections towards novel personalized treatment targets*. In Roy Hamilton (Chair), Utilizing Network Imaging to Personalize and Optimize Neuromodulation in Translational Cognitive Neuroscience. Neuromodec NYC Neuromodulation 2020, Online international conference.
- Oathes, D.J.** (2020, May). Invited talk, BRAIN Initiative funded (Opitz PI) ‘Computational Modeling in Non-Invasive Brain Stimulation Workshop 2020’. *Interleaved TMS/fMRI methods*. Given at the University of Minnesota, Minneapolis, MN.
- Oathes, D.J.** (December, 2019). Invited talk. *TMS/fMRI and rTMS towards causal human neuroscience and brain-based treatments*. Given at the Center for Molecular and Behavioral Neuroscience at Rutgers University-Newark, Newark, NJ.
- Oathes, D.J.** (November, 2019). Invited talk. *Circuit mapping and neuromodulation for moving brain networks and behavior*. Given at the Drexel University Applied Cognitive & Brain Science Program, Philadelphia, PA.

Balderston, N.L., Beydler, E.M., Roberts, C., Deng, Z., Radman, T., Luber, B., Lisanby, S.H., Ernst, M., **Oathes, D.J.**, Sheline, Y., Grillon, G. (2019, December). *High-frequency rTMS to the right dlPFC increases anxiety potentiated startle in healthy volunteers*. Poster presented at the annual meeting of the American College of Neuropsychopharmacology, Orlando, FL.

Oathes, D.J., Duprat, R., Scully, M., Long, H., Balderston, N., Bagdon, G., Deluisi, J., Lyu, M. Sheline, Y. (2019, December). *Functional MRI guided targeting with interleaved TMS/fMRI readouts of evoked amygdala responses*. Poster presented at the annual meeting of the American College of Neuropsychopharmacology, Orlando, FL.

Oathes, D.J., Bassett, D.S., & Satterthwaite, T.D. (2019, November). Invited talk. *Targeting TMS using Network Control Theory to Augment Working Memory in ADHD*. In R. Gur & A. Rostain (Chairs), Neurodevelopment and Neuromodulation Research Symposium. Symposium presented at the annual International Conference on ADHD, Philadelphia, PA.

Oathes, D.J. (2019, August). Invited talk, Neuronetics-Neurostar. *Brain imaging to guide causal brain pathway interrogation with TMS/fMRI*. Given at Neuronetics-Neurostar Headquarters, Malvern, PA.

Oathes, D.J. (2019, July). Invited lecture. *Leveraging neuroscience for brain-based treatments of psychiatric disorders*. Given as part of the Interdisciplinary Mind Brain /MindCORE summer fellow lecture series, School of Arts and Sciences, University of Pennsylvania, Philadelphia, PA.

Oathes, D.J. (June, 2019). Invited talk. *Individual circuit-focused engagement of putative depression and anxiety brain regions in the subcortex*. Given at the Baylor College of Medicine, Houston, TX.

Oathes, D.J. (April, 2019). Invited poster. *Effective engagement of subgenual cingulate cortex via non-invasive TMS evidenced by interleaved TMS/fMRI*. Given at the Annual NIH/NSF/DARPA/IARPA/FDA BRAIN Initiative Investigators Meeting, Washington, D.C.

Duprat, R., Linn, K., Satterthwaite, T., Ciric, R., Sheline, Y., Platt, M., Gold, J., Kable, J., Adams, G., Kalamveetil-Meethal, S., Dallstream, A., Long, H., Scully, M., Shinohara, R., **Oathes, D.J.** (2019, February). *Functional connectivity as a tool to individualize DLPFC targeting in TMS*. Poster presented at the bi-annual International Brain Stimulation Conference, Vancouver, BC, Canada.

Oathes, D.J. (2019, February). Invited talk. *Optimizing non-invasive brain stimulation treatment for depression by individualized fMRI guided targeting*. Given at the Penn Biomedical Postdoctoral T32 Fellow Training Seminar. University of Pennsylvania, Philadelphia, PA.

Oathes, D.J. (2018, December). Invited talk (by graduate students). *Why hasn't brain imaging helped to fix mental illness and what should we do about it?* Given at the Penn Neuroscience Public Lecture series. University of Pennsylvania, Philadelphia, PA.

Duprat, R., Flounders, M. Scully, M., Long, H., Elliott, M., Sheline, Y., Platt, M., Gold, J.,

Kable, J., Adams, G., Dallstream, A., Sharika, K.M., Cristancho, M., Linn, K., Shinohara, R.T. **Oathes, D.J.**, (2018, December). *Transcranial magnetic stimulation causally influences the subcallosal cingulate cortex indexed by interleaved TMS/fMRI*. Poster presented at the annual meeting of the American College of Neuropsychopharmacology, Hollywood, FL.

Oathes, D.J. (2018, November). Invited talk. *Psychophysiology as an outcome tool for anxiety and depression neuromodulation*. In K. Sharma-Patel (Chair), Integrating physiological tools and technology into CBT prevention and treatment outcome research. Symposium presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, Washington, D.C.

Oathes, D.J. (2018, November). Invited lecture. *The neurobiology of mood disorders*. Given as part of Penn Psychiatry residency course in neuroscience, University of Pennsylvania, Perelman School of Medicine, Philadelphia, PA.

Oathes, D.J. (2018, July). Invited lecture. *Causal neuroscience with interleaved TMS/fMRI*. Given as part of the Interdisciplinary Mind Brain /mindCORE summer fellow lecture series, School of Arts and Sciences, University of Pennsylvania, Philadelphia, PA.

Oathes, D.J. (April, 2018). Invited poster. *Engagement and modulation of subgenual cingulate and amygdala via non-invasive TMS as evidenced by interleaved TMS/fMRI*. Given at the Annual NIH/NSF/DARPA/IARPA/FDA BRAIN Initiative Investigators Meeting, Rockville, MD.

Oathes, D.J. Rosenberg, B., Scully, M., Cavdaroglu, S., Drysdale, A.T., Grosenick, L., Downar, J., Dunlop, K., Mansouri, F., Meng, Y., Fetcho, R.N., Zebly, B., Schatzberg, A.F., Sudheimer, K., Keller, J., Mayberg, H.S., Gunning, F.M., Alexopoulos, G.S., Fox, M.D., Pascual-Leone, A., Voss, H.U., Casey, B.J., Dubin, M.J., Glover, G., Etkin, A., Sheline, Y., Liston, C. (October, 2017). Invited talk. *Matching patient subtypes to neural circuits for novel brain stimulation treatments in affective disorders*. Given at the European Conference on Brain Stimulation in Psychiatry (ECBSP), Munich, Germany.

Oathes, D.J. (October, 2017). Invited talk, Division of Neurotherapeutics lecture series. *Noninvasive brain stimulation with neuroimaging to define novel pathways and treatments in neuropsychiatry*. Given at Massachusetts General Hospital and Harvard Medical School Department of Psychiatry, Boston, MA.

Oathes, D.J. (October, 2017). Invited talk, Experimental Therapeutics and Pathophysiology Branch - NIMH/NIH. *Neurocircuit probe and modulation using interleaved TMS/fMRI and in-scanner theta-burst repetitive TMS*. Given at the National Institute of Mental Health, Bethesda, MD.

Oathes, D.J. (November, 2017). Invited talk, Neuroscience Faculty Meeting. *Probing and modulating neural circuits to define causal brain networks and brain-behavior relationships*. Given at the University of Pennsylvania, Philadelphia, PA.

Oathes, D.J. (August, 2017). Invited talk, Center for the Treatment and Study of Anxiety. (Director: Edna Foa, PhD). *Neural pathways and novel brain based interventions for PTSD*. Given at the University of Pennsylvania Perelman School of Medicine, Philadelphia, PA.

Oathes, D.J. (July, 2017). Invited talk, Cohen Military Family Clinic. *Making neuroscience useful for PTSD and Depression*. Given at the University of Pennsylvania Perelman School of Medicine, Philadelphia, PA.

Oathes, D.J. (June, 2017). Invited talk, Philadelphia VA Mental Illness Research Education and Clinical Center Fellowship Program. *Succeeding in mental health research careers*. Given at the Corporal Michael J. Crescenz VA Medical Center, Philadelphia, PA.

Oathes, D.J. (March, 2017). Invited talk, Clinical Neurosciences Training Program (for students). *Tools to define novel circuit pathways for treating neuropsychiatric disorders*. Given at the University of Pennsylvania Perelman School of Medicine, Philadelphia, PA.

Oathes, D.J. (October, 2016). Invited talk, Psychiatry Grand Rounds. *Targeting and modulating neural circuitry relevant to affective disorders*. Given at the Medical University of South Carolina, Charleston, SC.

Oathes, D.J. (October, 2016). Invited talk, Psychiatry Research Day. *Towards individualized TMS therapy*. Given at the University of Pennsylvania School of Medicine, Philadelphia, PA.

Oathes, D.J., Goodkind, M.S., Fonzo, G.A., Etkin, A. (April, 2016). *Human pathway to amygdala inhibition and disruption in PTSD*. Poster given at the annual meeting of the Anxiety and Depression Association of America, Philadelphia, PA.

Oathes, D.J. (February, 2016). Invited talk. *Using TMS and fMRI to Probe Neural Circuits and Promote Novel Neurotherapeutics*. Given at the Maryland Neuroimaging Center, University of Maryland, College Park, MD.

Oathes, D.J. (January, 2016). Invited talk. *Brain Circuitry Probes and Neuromodulation for Addiction*. Given at the Center for Interdisciplinary Research on Nicotine Addiction, University of Pennsylvania Perelman School of Medicine, Department of Psychiatry.

Fonzo, G.A., Goodkind, M.S., **Oathes, D.J.**, Zaiko, Y.V., Harvey, M., Peng, K.P., Weiss, M.E., Etkin, A. (December, 2015) *Neural mechanisms of psychotherapy for PTSD: Emotional reactivity and regulation*. Poster presented at the annual meeting of the American College for Neuropsychopharmacology, Hollywood, FL.

Oathes, D.J. (November, 2015). Invited talk. *Defining Brain Circuit Communication Pathways with Interleaved TMS/fMRI*. Given at the Laboratory for Cognition and Neural Stimulation, University of Pennsylvania Perelman School of Medicine, Department of Neurology.

Oathes, D.J. (2015, April). Invited lecture. *Cognitive neuroscience and clinical applications of transcranial magnetic brain stimulation*. “The Science of Decision Making” course, Worldview Stanford (worldview.stanford.edu).

Oathes, D.J., & Etkin, A. (2015, May). *Concurrent TMS/fMRI defined causal amygdala control and abnormalities in PTSD*. Poster presented at the annual meeting of the Society of Biological Psychiatry, Toronto, Canada.

Oathes, D.J. (2015, February). Invited talk. *Probing fear memory circuitry with concurrent TMS-fMRI*. Given at the Stanford Memory, Attention, and Decision Group monthly speaker Series, Stanford, CA.

Oathes, D.J., & Etkin, A. (2014, December). *Brain stimulation induced connectivity between amygdala and ventral cingulate in humans*. Poster presented at the annual meeting of the American College of Neuropsychopharmacology, Phoenix, AZ.

Oathes, D.J., Schatzberg, A.F., & Etkin, A. (2013, December). *Categories and dimensions of anxiety and depression in the resting fMRI signal*. Poster presented at the annual meeting of the American College of Neuropsychopharmacology, Hollywood, FL.

Oathes, D.J., Patenaude, B., Greicius, M.D., Schatzberg, A.F., & Etkin, A. (2013, May). *Intrinsic activation and functional connectivity findings across affective disorders*. Oral session given at the annual meeting of the Society for Biological Psychiatry, San Francisco, CA.

Oathes, D.J. (2011, May). Invited talk. *Are anxiety and depression the same? It depends on the measure*. Given at the VA National Fellows Teleconference for Mental Illness Research, Education, and Clinical Centers, Palo Alto, CA.

Oathes, D.J., Siegle, G.J., Ray, W.J., Lambert, J., Schatzberg, A.F., Nitschke, J.B., & Etkin, A. (2011, March). *Behavioral and physiological discrimination of generalized anxiety disorder from major depressive disorder*. In D. Mennin & G. Hajcak (Chairs), D. Pine (Discussant), Are GAD and MDD distinct? Utilizing laboratory methodologies to address diagnostic convergence and divergence. Symposium presented at the annual meeting of the Anxiety Disorders Association of America, New Orleans, LA.

Oathes, D.J. (2011, March). Invited talk. *From behavior to neurobiology: Advantages of multimodal assessment in differentiating GAD from MDD*. Given at the Pennsylvania State University Department of Psychology, University Park, PA.

Oathes, D.J., Siegle, G.J., Ray, W.J., Bruce, J.M., & Nitschke, J.B. (2010, November). *Psychophysiological evidence that worry is a symptom of general avoidance tendencies in chronic worriers and in generalized anxiety disorder*. In S. Llera & M.G. Newman (Chairs), Scientific exploration of emotional functioning in generalized anxiety disorder: Emphasis on the nature and pathogenic mechanisms. Symposium presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, San Francisco, CA.

Oathes, D.J. & Etkin, A. (2010, October). Invited talk. *Neuroimaging of emotion circuitry in PTSD and novel opportunities for circuit-level interventions*. Given at the San Francisco VA Medical Center, VISN 21 Mental Illness Research, Education, and Clinical Center (MIRECC) Advisory Meeting.

Nitschke, J.B., Tromp, D.P.M., **Oathes, D.J.**, McFarlin, D.R., & Sarinopoulos, I. (2010, March). *The neuroanatomy of anticipatory and regulatory dysfunction in GAD*. In K. Beesdo-Baum & S. Schoenfeld (Chairs), Improving understanding of generalized anxiety disorder: What can we learn from epidemiological, experimental and clinical studies? Symposium

presented at the annual meeting of the Anxiety Disorders Association of America, Baltimore, MD.

Nitschke, J.B., **Oathes, D.J.**, Hilt, L.M., Tromp, D.P.M., McFarlin, D.M., & Sarinopoulos, I. (2009, November). *Neural mechanisms of anticipatory processing in GAD*. In J. Mohlman (Chair), Universal processes in GAD: A lifespan neurobiological perspective. Symposium given at the annual meeting of the Association for Behavioral and Cognitive Therapies, New York, NY.

Hilt, L.M., **Oathes, D.J.**, Green, D., Kral, T.R.A., Ferrell, R.E., Hariri, A.R., & Nitschke, J.B. (2009, November). *Short allele of the serotonin transporter gene associated with anticipatory anxiety in the amygdala*. Poster presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, New York, NY.

Oathes, D.J., McFarlin, D.R., Kral, T.R.A., & Nitschke, J.B. (2009, October). *Anxiety, anticipation, and conditions of uncertainty: Evidence from fMRI in Generalized Anxiety Disorder*. Poster presented at the annual meeting of the Society for Neuroscience, Chicago, IL.

Nitschke, J.B., Tromp, D.P.M., **Oathes, D.J.**, McFarlin, D.R., Kral, T.R.A., Lee J., & Alexander, A.L. (2009, December). *Decreased structural connectivity between frontal and limbic areas in generalized anxiety disorder*. Poster session presented at the annual meeting of the American College of Neuropsychopharmacology, Hollywood, FL.

Oathes, D.J. McFarlin, D.R., Jenson, M.J., Kral, T.R.A., & Nitschke, J.B. (2009, June) *Correlations between amygdala activity during the anticipation of aversion and trait worry symptoms in generalized anxiety disorder*. Poster presented at the annual meeting of the Organization for Human Brain Mapping, San Francisco, CA.

Oathes, D.J. (2009, May). Invited talk. *Neurobiological and Behavioral Evidence for Vigilance and Avoidance in Anxiety*. Given at the Wisconsin Psychiatric Institute and Clinics, Clinical Science seminar, Department of Psychiatry, University of Wisconsin-Madison.

Oathes, D.J., Sarinopoulos, I., Lor, M., Kalin, N.H., & Nitschke, J.B. (2009, April). *Normalization of amygdala function in generalized anxiety disorder patients following treatment with venlafaxine*. Poster presented at the annual Wisconsin Symposium on Emotion, Madison, WI.

Oathes, D.J., McFarlin, D.R., Kral, T.R.A., Jenson, M.J., Sarinopoulos, I., & Nitschke, J.B. (2009, March). *The aftermath of affective stimuli: Evidence from fMRI recorded insula and amygdala activity in generalized anxiety disorder*. Poster presented at the annual meeting of the Cognitive Neuroscience Society, San Francisco, CA.

Oathes, D.J., McFarlin, D.R., Jenson, M.J., Kral, T.R.A., Staples, A.M., Nitschke, J.B. (2008, November). *Neural dynamics of anticipation and response to emotional pictures in generalized anxiety disorder*. Talk given at the annual meeting of the Society for Neuroscience, Washington, D.C.

Oathes, D.J. (2008, October). *Psychophysiological evidence for vigilance and avoidance in*

worry and generalized anxiety disorder. In B.H. Friedman (Chair), *The psychophysiology of anxiety and worry: A symposium in honor of the contributions of Thomas D. Borkovec*. Symposium given at the annual meeting of the Society for Psychophysiological Research, Austin, TX.

Oathes, D.J., Lee, J.E., Kral, T.R.A., Alexander, A.L., Nitschke, J.B. (2008, September). *Diffusion tensor imaging and chronic worry symptoms in generalized anxiety disorder*. Poster presented at the annual meeting of the Society for Research in Psychopathology, Pittsburgh, PA.

Oathes, D.J., Sarinopoulos, I., Lor, M., Kalin, N.H., & Nitschke, J.B. (2007, October). *Normalization of amygdala function in generalized anxiety disorder patients following treatment with venlafaxine*. Poster presented at the annual meeting of the Society for Research in Psychopathology, Iowa City, IA.

Oathes, D.J. & Siegle, G.J. (2006, October). *Temporal dynamics and negatively valenced stimulus subtypes in emotional processing by anxious worriers*. Poster presented at the annual meeting of the Society for Neuroscience, Atlanta, GA.

Oathes, D.J. & Bruce, J.M. (2006, April). *Worry and motor activation induced by transcranial magnetic stimulation*. Poster presented at the annual meeting of the Cognitive Neuroscience Society, San Francisco, CA.

Oathes, D.J. (2006, March). Invited talk. *Emotion and psychophysiology in the study of worry*. Presented at the Department of Human Sciences, University of Osnabrück, Germany.

Oathes, D.J. (2006, March). Invited workshop. *Heart rate variability analysis for the study of emotional reactivity*. Presented at the Department of Human Sciences, University of Osnabrück, Germany.

Oathes, D.J. & Ray, W.J. (2003, October). *Depressed mood, index finger force and motor cortex stimulation: A Transcranial Magnetic Stimulation (TMS) study*. Poster presented at the annual meeting of the Society for Psychophysiological Research, Chicago, IL.*

Yamasaki, A.S., **Oathes, D.J.**, & Ray, W.J. (November, 2002). *Is there a failure to process general emotionality, regardless of valence in generalized anxiety disorder?* Symposium presented at the Association for Advancement of Behavior Therapy Annual Convention, Reno, Nevada.

Yamasaki, A.S., **Oathes, D.J.**, Ray, W.J., Borkovec, T.D., & Newman, M.G. (2002, September). *Generalized anxiety disorder and parasympathetic activity: The effects of worry and cognitive-behavioral therapy*. Poster presented at Society for Research in Psychopathology, San Francisco, CA.

Oathes, D., Yamasaki, A., Borkovec, T. & Ray, W.J. (2001, November). *EEG measures in generalized anxiety disorder before and after psychotherapy*. Poster presented at the annual meeting of the Society for Research in Psychopathology. Madison, Wisconsin.

Yamasaki, A., **Oathes, D.**, Ray, W.J. & Borkovec, T.D. (2001). *Vagal tone in generalized anxiety disorder before and after psychotherapy*. Poster presented at the annual meeting of the Society for Psychophysiological Research. Montreal, Quebec.

Trainees

Wenyi (Echo) Xu, Penn undergraduate (Independent study mentor)	2021-
Justin Reber, PhD Postdoc Penn	2021-
Romain Duprat, PhD Postdoc Penn	2017-
Gianna Perez, Penn Neuroscience PhD student (Oathes primary)	2020-
Valerie Sydnor, Penn Neuroscience PhD student (Satterthwaite primary)	2019-
Nicholas Balderston, PhD, Penn Assistant Professor CNDS (K23 co-mentor)	2019-
Kenji Kobayashi, PhD Postdoc Penn (shared with Kable)	2019-
Jared Zimmerman, Penn Neuroscience PhD student	2016-2018
and dissertation thesis committee chair	2019-2021
Andrew Murphy, Penn MD-PhD student (Neuroscience; Bassett Primary)	2018-2021
Kristin Brethel-Haurwitz, PhD Postdoc Penn (shared with Kable)	2016-2021
Jennifer Goldschmied, PhD Faculty Penn (shared K23 fellow)	2017-
Mengqun (Monica) Lyu, post-baccalaureate research coordinator	2019-2021
Varuna Jasodanand, post-baccalaureate intern (Penn Institute for Translational Medicine and Therapeutics, Clinical and Translational Research Award)	2019-2020
Christina Dicindio, Penn undergraduate (Interdisciplinary Mind Brain Summer Fellows Program)	2019
Golkoo Hosseini, MD TMS clinician Penn (now Penn Psychiatry resident)	2016-2018
Ortal Nakash, Penn undergraduate (Interdisciplinary Mind Brain Summer Fellows Program)	2018
Jeni Stiso, Penn Neuroscience PhD student (Qualifying Exam Committee)	2018
Gavriella Shandler, Oberlin College undergraduate summer research assistant	2018
Nicole Fridling, Penn undergraduate (Biological Basis of Behavior)	2018
Seda Cavdaroglu, PhD Postdoc Penn (shared with Sheline)	2016-2017
Nicholas Cullen, Penn Engineering graduate student (shared with Sheline)	2016-2017

Media Coverage

<https://www.pennmedicine.org/news/news-releases/2019/april/penn-led-study-finds-childhood-trauma-has-effect-brain-connectivity-in-patients-with-depression-2>

<https://www.bbrfoundation.org/content/brain-signature-predicts-who-benefits-exposure-therapy>

<https://neurosciencenews.com/childhood-trauma-depression-11042/>

<http://www.philly.com/philly/health/in-despair-from-major-depression-i-turned-to-a-last-resort-magnets-20180307.html>

<https://www.nimh.nih.gov/news/science-news/2017/imaging-pinpoints-brain-circuits-changed-by-ptsd-therapy.shtml>

<https://medicalxpress.com/news/2017-07-imaging-reveals-ptsd-patients-psychotherapy.html>

<https://www.scientificamerican.com/article/brain-imaging-identifies-different-types-of-depression/>

<https://www.onemindinstitute.org/news/dr-conor-liston-neurobiologically-distinguishing-depression-subtypes>

<http://med.stanford.edu/news/all-news/2015/02/different-mental-disorders-cause-same-brain-matter-loss.html>

<http://www.sciencedaily.com/releases/2015/02/150204125808.htm>

http://www.biospace.com/news_story.aspx?StoryID=363571

<http://www.news.wisc.edu/21010>