

Brian A. Erickson, Ph.D.

Research Assistant Professor

Applied Cognitive & Brain Sciences
Drexel University, Department of Psychology
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Education & Research Positions

- Research Assistant Professor** 2019 - Present
Cognitive Neuroengineering and Wellbeing Laboratory, John Medaglia PI
Drexel University, Philadelphia, Pennsylvania
Major foci: Closed-loop EEG Neurostimulation and Attention
- Postdoctoral Researcher** 2017 - 2019
Cognitive Neuroengineering and Wellbeing Laboratory
Drexel University, Philadelphia, Pennsylvania
Major foci: EEG & f/MRI biomarkers & predictors of responses to TMS
- Ph.D., Psychology: Applied Cognitive & Brain Sciences** 2012 - 2017
Creativity Laboratory, John Kounios PI
Drexel University, Philadelphia, Pennsylvania
Thesis: Trait-like Resting-State Brain Oscillations Predict Subsequent Problem-Solving Strategies
- M.S., Bioengineering; Specialization in Neural Engineering** 2010 - 2012
Drexel University, Philadelphia, Pennsylvania
Thesis: Application Development and Investigation of a Cognitive Training Protocol
Advisors: Joshua Jacobs, Ph.D., John Kounios, Ph.D.
- B.S., Mechanical Engineering** 2005 - 2008
Drexel University, Philadelphia, Pennsylvania
Thesis: Modification of FAA's "FASTER" Facility to Enable Compression Loading
Advisors: Tein-Min Tan, Ph.D., Jonathan Awerbuch, Ph.D.
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Journal Publications

- [1] Erickson, B. A., Kim, B., Deck, B. L., Pustina, D., DeMarco, A. T., Dickens, J. V., ... & Medaglia, J. D. (2022). Preserved anatomical bypasses predict variance in language functions after stroke. *Cortex*, 155, 46-61.
- [2] Medaglia, J. D., Erickson, B. A., Pustina, D., Kelkar, A. S., DeMarco, A. T., Dickens, J. V., & Turkeltaub, P. E. (2022). Simulated attack reveals how lesions affect network properties in post-stroke aphasia. *Journal of Neuroscience*.
- [3] Cember, A. T., Deck, B. L., Kelkar, A., Faseyitan, O., Zimmerman, J. P., Erickson, B., ... & Medaglia, J. D. (2022). Glutamate-Weighted Magnetic Resonance Imaging (GluCEST) Detects Effects of Transcranial Magnetic Stimulation to the Motor Cortex. *NeuroImage*, 256, 119191.
- [5] Driscoll, N., Erickson, B., Murphy, B. B., Richardson, A. G., Robbins, G., Apollo, N. V., ... & Vitale, F. (2021). MXene-infused bioelectronic interfaces for multiscale electrophysiology and stimulation. *Science Translational Medicine*, 13(612), eabf8629.

- [6] Oh, Y., Chesebrough, C., **Erickson, B.**, Zhang, F., & Kounios, J. (2020). An insight-related neural reward signal. *NeuroImage*, 214, 116757.
- [7] Rosen, D. S., Oh, Y., **Erickson, B.**, Zhang, F. Z., Kim, Y. E., & Kounios, J. (2020). Dual-process contributions to creativity in jazz improvisations: An SPM-EEG study. *NeuroImage*, 213, 116632.
- [8] Medaglia, J., Kelkar, A., Zimmerman, J., & **Erickson, B.** (2019). Personalizing Neuromodulation. *International Journal of Psychophysiology*.
- [9] Cember, A. T., **Erickson, B.**, Faseyitan, O., Kelkar, A., Wilson, N., Nanga, R. P. R., ... & Medaglia, J. D. (2019). Using Glutamate-Weighted Imaging (GluCEST) to Detect Effects of Transcranial Magnetic Stimulation to the Motor Cortex. In *Proc. Intl. Soc. Mag. Reson. Med (Vol. 27, p. 3094)*.
- [10] **Erickson, B.**, Truelove-Hill, M., Oh, Y., Anderson, J., Zhang, F. Z., & Kounios, J. (2018). Resting-state brain oscillations predict trait-like cognitive styles. *Neuropsychologia*, 120, 1-8.
- [11] Truelove-Hill, M., **Erickson, B. A.**, Anderson, J., Kossoyan, M., & Kounios, J. (2018). A Growth-Curve Analysis of the Effects of Future-Thought Priming on Insight and Analytical Problem-Solving. *Frontiers in Psychology*, 9.
- [12] **Erickson, B.**, Rosen, D., Mirman, D., Hamilton, R. H., Kim, Y. E., & Kounios, J. (2017). tDCS of the Right DLPFC Increases Semantic Distance of Responses on the Verb Generation Task. *Brain Stimulation: Basic, Translational, and Clinical Research in Neuromodulation*, 10(1), e10.
- [13] Feig, E. H., Winter, S. R., Kounios, J., **Erickson, B.**, Berkowitz, S. A., & Lowe, M. R. (2017). The role of hunger state and dieting history in neural response to food cues: An event-related potential study. *Physiology & Behavior*, 179, 126-134.
- [14] Rosen, D. S., **Erickson, B.**, Kim, Y. E., Mirman, D., Hamilton, R. H., & Kounios, J. (2016). Anodal tDCS to right dorsolateral prefrontal cortex facilitates performance for novice jazz improvisers but hinders experts. *Frontiers in Human Neuroscience*, 10.
- [15] Winter, S. R., Feig, E. H., Kounios, J., **Erickson, B.**, Berkowitz, S., & Lowe, M. R. (2016). The relation of hedonic hunger and restrained eating to lateralized frontal activation. *Physiology & Behavior*, 163.
- [16] **Erickson, B.**, & Kounios, J. (2013). Insight. *Emerging Trends in the Social and Behavioral Sciences: An Interdisciplinary, Searchable, and Linkable Resource*.

Grants

R01-NS-121219-01 (MPIs Vitale and Medaglia) June 2021 - May 2026 NINDS **Total Costs: \$2,870,000**
 Validating MXene Electrodes for Next-Generation Electroencephalography
 Role (Erickson): Co-Investigator

Seed Project Research Grant August 2013 ExCITE Center, Drexel University **Amount Awarded: \$5,000**
 Investigation of noninvasive brain stimulation (tDCS) and creative cognition.

Manuscripts in Submission or Preparation

- [1] (In Revision at Neuroimage) Deck, B., Kelkar, A., **Erickson, B.A.**, Erani, F., McConathey, E., Sacchetti, D., Faseyitan, O., Hamilton, R., & Medaglia, J. D. Individual-level Functional Connectivity Predicts Cognitive Control Efficiency
- [2] (In Preparation) **Erickson, B.A.**, Kim, B., Rich, R.R., Ferandez-Nunez, L., Hatcher, A. & Medaglia, J. D. TMS Phase Resetting of EEG is Parametric with TMS Power and Endogenous Phase.

[3] (In Preparation) **Erickson, B.A.**, Rich, R.R., Shankar, S., Driscoll, N., Vitale, F. & Medaglia, J. D. Signal Quality of Dry, Passive, MXene-Based "MXtrode" EEG Electrodes compared to Gelled Ag/AgCl Electrodes.

[4] (In Preparation) Mentzelopoulos, G., **Erickson, B.**, Driscoll, N., Rich, R., Kim, B., Shankar, S., Fernandez-Nunez, L., Stoll, H., Medaglia, J., & Vitale, F. Investigating the rhythmicity of alerting attention using dry MXene EEG arrays.

Peer Reviewed Conference Papers, Presentations, and Abstracts

[1] **Erickson, B.A.**, Nelson, B., Kim, B., Sabes, P., Rich, R. R., & Medaglia, J.D. Parametric Evaluation of TMS EEG Phase Resetting as a function of TMS Amplitude and Endogenous EEG Phase. Joint meeting of Neuroergonomics & NYC Neuromodulation Conference. NYC, July 2022 [Blitz Talk & Poster; B. Erickson, speaker]

[2] **Erickson, B.A.**, Kim, B., Deck, B., Pustina, D., DeMarco, A.T., Dickens, J.V., Kelkar, A.S., Turkeltaub, P.E., Medaglia, J.D. Anatomical Connectome Bypasses Predict Variance in Aphasia Severity After Stroke. Society for the Neurobiology of Language Annual Conference. Held virtually, October 2020. [Poster]

[3] Parchure, S., Wurzman, R., **Erickson, B.**, Harvey, D., Sacchetti, D., Deloretta, L., ... & Hamilton, R. (2019). Abstract# 16: Input-Output Slope Predicts Effects of cTBS on Motor Evoked Potentials. Brain Stimulation: Basic, Translational, and Clinical Research in Neuromodulation, 12(2), e6.

[4] Medaglia, J.D., Cember, A., Nanga, R.P., Hariharan, H., **Erickson, B.**, Kelkar, A., McConathey, E., Faseyitan, O., Hamilton, R.H., Coslett, H.B., Elliott, M., Reddy, R. Glutamate-weighted CEST (GluCEST) MRI contrast at the site of transcranial magnetic stimulation is related to changes in motor evoked potentials. American Academy of Neurology Conference. Philadelphia, PA. [Poster]

[5] **Erickson, B.** & Medaglia, J. Lost in Space and Time: A Systematic Framework for Developing Individualized Brain-Stimulation. Cognitive Neuroscience Society Annual Meeting. New York, NY, August 2018. [Poster]

[6] **Erickson, B.**, Truelove-Hill, M., Anderson, J., Kounios, J. Trait-like resting-state brain oscillations predict subsequent problem-solving strategies. Society for the Neuroscience of Creativity Annual Meeting. San Francisco, CA, March 2017. [Poster]

[7] **Erickson, B.**, Truelove-Hill, M., Kounios, J. The Aha! experience: insight solutions produce delta-band ERN-like reward signals. Cognitive Neuroscience Society Annual Meeting. New York, NY, April 2016. [Poster]

[8] Rosen, D., **Erickson, B.**, Mirman, D., Kounios, J., Hamilton, R., Kim, Y.E. Electrical Brain Stimulation Improves Performance on a Test of Creativity. Association for Psychological Science 27th Annual Convention. New York, NY, May 2015. [Poster]

[9] Truelove-Hill, M., **Erickson, B.**, Anderson, J., Kossoyan, M., Rosen, D., Kounios, J. Does Thinking about the Future Enhance Creative Insight? Association for Psychological Science 27th Annual Convention. New York, NY, May 2015. [Poster]

[10] **Erickson, B.**, Rosen, D., Mirman, D., Hamilton, R., Kim, Y.E., Kounios, J. tDCS of the Right dlPFC Increases Semantic Distance of Responses on the Verb Generation Task. Neuromodulation Conference 2015. The City College of New York, New York, NY, January 2015. [Poster]

[11] Rosen, D., **Erickson, B.**, Hamilton, R., Kim, Y.E. & Kounios, J. tDCS Investigations of the Neural Basis of Improvisational Cognition: A Brain Stimulation Study of Jazz Musicians. Proceedings of the BKN25: Milestones in Music Cognition Conference. McGill University. Montreal, Canada, June 2014. [Poster]

Popular Presentations & Media

- [1] Invited Talk: Closed-loop EEG Neuromodulation. BrainSTIM Center bimonthly meeting. 2021, University of Pennsylvania
- [2] Invited Talk: The Cognitive Neuroscience of Insight. 2nd International Neuroergonomics Conference. 2018, Drexel University
- [3] Kluger, J. (2018, August). This Is Your Brain on Creativity. TIME Special Issue, The Science of Creativity, pp. 11-17.
- [4] Kadaba, L. S., (2015). Tracking the Eureka Factor. Haverford Alumni Magazine, Winter 2015, pp. 44-48.
- [5] Campus Talk: Lebow Business School: Neuroeconomics and EEG, September 2016
- [6] Campus Talk: ExCITE T3 Flash Talk: tDCS and Creativity, April 2014
- [7] Campus Talk: Presentation for Tri-Beta Sorority Bimonthly Meeting, February 2016

Awards and Honors

Neuromodulation for Rehabilitation (NM4R) Travel Award

Society for the Neuroscience of Creativity Travel Award (2017). To attend and present at the SfNC annual meeting. San Francisco, CA. March. (\$1000)

NIH fMRI Graduate Student Trainee (2014). fMRI Training Course at the University of Michigan. Ann Arbor, MI. (Travel and attendance fully funded)

Domestic Travel Award (2013,2016). Drexel University, Office of Graduate Studies (\$400).

International Travel Award (2014). Drexel University, Office of Graduate Studies. (\$500).

Office of Graduate Studies Fellowship (2013; 2014). COAS, Drexel University. (\$2000/AY)

Teaching Experience

- [1] Invited Guest Lecturer, "Brain|Technology Convergence" class. Drexel University Global Innovation Partnership Program, June 2021
- [2] Primary Mentor, "Independent Study in EEG" class. Drexel University College of Arts and Sciences, Spring 2018
- [3] Department funded course development, "xEEG" (experiential hands-on EEG brain-computer interface course for undergraduates). Drexel University, winter-fall AY2015
- [4] Primary mentor, Biomedical Engineering EEG brain-computer interface senior design team (1st place award). Drexel University, spring-winter AY2015
- [5] Primary mentor, independent studies in tDCS and MATLAB programming for ACBS colleagues. Drexel University, spring & winter AY2014
- [6] Teaching assistant, Research Methods (PSY360), Drexel University, fall AY2012 & spring AY2015
- [7] Teaching assistant, Cognitive Psych (PSY330), Drexel University, winter AY2012

[8] Teaching assistant, Sensation & Perception (PSY213), Drexel University, spring AY2012

Peer Review

Nature Scientific Reports, Neuroimage, Journal of Neuroscience, Nutrients

Technical Proficiencies

Languages: MATLAB, R, Unix, Javascript, Python

Packages: LSL, SPM, EEGLAB/ERPLAB, PsychoPy, EMSE, Eprime, SPSS, OpenVIBE, Brainstorm

Equipment: Intan RHD, BVActiCHamp, MagStim TMS, NeuroConn Stim+ tDCS, OpenBCI, LabView