OMB No. 0925-0001 and 0925-0002 (Rev. 09/17 Approved Through 03/31/2020)

BIOGRAPHICAL SKETCH

**Provide the following information for the Senior/key personnel and other significant contributors.**

**Follow this format for each person. DO NOT EXCEED FIVE PAGES**.

NAME: Trapp, Nicholas Thomas MD MS

eRA COMMONS USER NAME (credential, e.g., agency login): ntrapp

POSITION TITLE: Assistant Professor of Psychiatry

EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)

| INSTITUTION AND LOCATION | DEGREE  (if applicable) | Completion Date  MM/YYYY | FIELD OF STUDY |
| --- | --- | --- | --- |
| University of Notre Dame, Notre Dame, IN | B.A. | 05/2009 | Sociology  Preprofessional Studies |
| University of Nebraska College of Medicine,  Omaha, NE | M.D. | 05/2013 | Medicine |
| Barnes-Jewish Hospital, Washington University in Saint Louis School of Medicine, St. Louis, MO  University of Iowa Hospitals and Clinics,  Iowa City, IA  University of Iowa Hospitals and Clinics,  Iowa City, IA | Residency  Postdoctoral Fellowship  M.S. | 06/2017  06/2019  05/2019 | Psychiatry  Neuromodulation and Neuropsychiatry  Translational Biomedicine |
|  |  |  |  |

# A. Personal Statement

My research is focused on the application and optimization of neuromodulation therapies for the treatment of neuropsychiatric conditions. Since residency, I have focused on using innovative methods of applying brain stimulation treatment to address difficult-to-treat conditions, employing the use of structural MRI, resting-state functional connectivity MRI, and neuronavigation. In residency, my co-resident and I conducted a clinical trial using functional connectivity MRI (fcMRI) to guide repetitive transcranial magnetic stimulation (rTMS) therapy for the treatment of depression in patients following traumatic brain injury. I believe that brain stimulation holds tremendous promise as a novel treatment approach to illnesses that have failed to respond to traditional pharmacologic and psychotherapeutic efforts. I continue to work on research endeavors aimed at improving the current applications of neuromodulation, better understanding the physiologic effects of the procedure, and exploring the potential for these therapies in new patient populations. I am currently engaged in research focused on better understanding the physiologic effects of rTMS in the human brain (using electrocorticography); research focused on discovering biomarkers of rTMS treatment response in patients receiving clinical treatment for major depressive disorder (using heart rate variability and electroencephalography), and research focused on applying these therapies in clinical trials for various conditions (as I am leading ongoing clinical trials with applications for schizophrenia, bipolar disorder, and autism spectrum disorder). As such I am uniquely positioned to translate research findings to improve clinical treatments, and this remains the main focus of my research and my clinical efforts as a member of the neuromodulation team and medical director of the emerging interventional psychiatry service at the University of Iowa. As part of my desire to expand my areas of expertise, my immediate goal is to pursue additional clinical and research training in the fields of neuropsychiatry and behavioral neurology while continuing to seek career development award funding to nurture my growth as a physician scientist focused on neuromodulation.

# B. Positions and Honors

## Positions and Employment

2015-2017 Emergency Room Psychiatric Consultant (Moonlighting)

Washington University School of Medicine & Barnes-Jewish Hospital,

St. Louis, MO

2015-2017 Repetitive Transcranial Magnetic Stimulation Technician and Research

Assistant (Moonlighting), Washington University School of Medicine,

St. Louis, MO

2016-2017 Chief Resident (Assistant in Psychiatry), Washington University in Saint

Louis School of Medicine, St. Louis, MO

2017-2019 Neuromodulation & Neuropsychiatry Fellow, INSPIRE Neuroscience

T32 Scholar, University of Iowa, Iowa City, IA

2017-2019 Associate of Psychiatry, University of Iowa, Iowa City, IA

2017- Attending Physician, Psychiatry, University of Iowa Hospitals and Clinics,

Iowa City, IA

2018- Fee-Basis Physician, Iowa City VA Medical Center, Iowa City, IA

2018- Neuromodulation Service Psychiatry Resident Rotation Director and Medical Student Clerkship Director, University of Iowa, Iowa City, IA

2019- Interventional Psychiatry and Psychiatric Neuromodulation Medical

Director, University of Iowa, Iowa City, IA

2019- Assistant Professor of Psychiatry, University of Iowa Carver College of Medicine and Iowa Neuroscience Institute, Iowa City, IA

2019- Faculty Member, Iowa Neuroscience Interdisciplinary Graduate Program, Iowa City, IA

## Other Experience and Professional Memberships

2012- Member, American Psychiatric Association

2015- Alumni Board Member, Phi Chi Medical Fraternity, Upsilon Nu Chapter

2016- Member, International Society for ECT and Neurostimulation

2017- Member, American Neuropsychiatric Association

2017- Member of Education Committee, Research Committee, and Outreach Committee, Clinical TMS Society

2017- Participated in Resident Selection Committee, Psychiatry Residency

Program, University of Iowa Hospitals and Clinics

2018- Member, Society for Biological Psychiatry

2018- Peer reviewer for *Psychiatry Research*

2018 Participant, NRMN Entering Mentoring Research and Clinical and

Translational Research Mentor Training

2010-13 Member, American Academy of Neurology

2013-17 Member, Missouri Psychiatric Association

2013 Teaching Assistant & Tutor, Neuroanatomy Course, University of

Nebraska College of Medicine

2016 Clinical Observorship & Research Rotation, Brain Stimulation Lab, Department of Psychiatry, Medical University of South Carolina

2016 Clinical Observorship, Deep Brain Stimulation & Movement Disorders Service, Departments of Neurology and Neurosurgery, Washington University School of Medicine

2017 Course Certificate, Transcranial Magnetic Stimulation Intensive Courses:

Beth Israel Deaconess Medical Center & Harvard Medical School

(October 23-27);

Medical University of South Carolina (October 2-6);

University of Toronto (November 9-10)

2017 Functional MRI Visiting Fellowship Completion, October 16-20

Massachusetts General Hospital & Martinos Center for Biomedical Imaging, Boston, MA

2019 Visiting Fellow, Neurosurgery Clinical Service, University of Iowa, Iowa City, IA

## Honors

## 2019 Research Scientist Travel Award, North American Neuromodulation

Society Annual Meeting, Las Vegas, NV

2018 Research Travel Award & Top 10Poster Abstract, Oral Presentation, Minnesota Neuromodulation Symposium, Minneapolis, MN

2017 MindGames Finalist, American Psychiatric Association Annual Meeting,

San Diego, CA

2012 Phi Chi Medical Fraternity Leadership Award

2010 Resident Assistant Mentor of the Year, Summer Medical and Dental

Education Program, University of Nebraska College of Medicine

2009-2013 Scholarship Award Recipient: University of Nebraska Medical Center Regents’ Scholarship; Dr. August Frederick Jonas Sr. Scholarship; Davis Family Scholarship; College of Medicine Class of 1963 District Scholarship

# C. Contribution to Science

1. **The use of transcranial electrical stimulation for neuropsychiatric illnesses**

Some of my early research has focused on the use of different methods of transcranial electrical stimulation, including transcranial direct current stimulation (tDCS) and transcranial pulsed current stimulation (tPCS), to modulate brain circuitry and alter cognition and behavior. This work has helped to better understand the electroencephalographic effects of electrical stimulation in the brain, and to organize and review this literature for clinicians who are often unfamiliar with these novel treatment approaches.

a. Singh A\*\*, **Trapp NT\*\***, De Corte B, Cao S, Kingyon J, Boes A, Parker KL. Cerebellar Theta-Frequency Transcranial Pulsed Stimulation Increases Frontal Theta Oscillations in Patients with Schizophrenia. *Cerebellum.* 2019 Mar 1. doi: 10.1007/s12311-019-01013-9. [Epub ahead of print]. \*\* *Indicates authors contributed equally*

\*\* *Indicates authors contributed equally*

b. Siddiqi SH, **Trapp NT.** Transcranial Direct Current Stimulation: Theory, Treatment of Major Depressive Disorder, and Other Neuropsychiatric Applications. *American Journal of Psychiatry Residents’ Journal.* 10(10): 2-4, October 2015.

c. **Trapp NT**, Xiong W, Gott BM, Espejo GD, Bikson M, Conway CR. 4 mA Adaptive Transcranial Direct Current Stimulation for Treatment-Resistant Depression: Early Demonstration of Feasibility with a 20-Session Course. *Brain Stimulation.* 2019 Mar-Apr; 12(2): e124-125.

Cristancho P, Trapp NT, Siddiqi SH, Dixon D, Lenze EJ. "rTMS for Major Depression: Treatment Outcomes at an Academic Medical Center." Presented at Clinical TMS Society, May 2017.

1. **The use of deep brain stimulation for neuropsychiatric illnesses**

Some of my more recent research has focused on reviewing our deep brain stimulation program at the University of Iowa, aimed primarily at 1) investigating methods for improving the treatment for future patients and 2) presenting a guide for other academic centers planning to start a deep brain stimulation program, with the goal of improving access to novel treatments and improving upon the techniques as they currently exist in practice. a. Holland MT\*\*, **Trapp NT\*\***, McCormick LM, Zanaty M, Close LN, Jareczek FJ, Beeghly J, Greenlee JD. Deep Brain Stimulation for Obsessive Compulsive Disorder: Long Term Follow Up in a Single Institution. [Submitted – *Frontiers in Psychiatry – Neuroimaging and Stimulation*]. \*\* *Indicates authors contributed equally*

b. Gourisankar A, Eisenstein SA, **Trapp NT**, Koller JM, Campbell MC, Ushe M, Perlmutter JS, Hershey T, Black KJ. Mapping Movement, Mood, Motivation, and Mentation in the Subthalamic Nucleus. *R Soc Open Sci*, 5(7): 171177, 2018.

PMC Journal – In Process. DOI: 10.1098/rsos.171177.

1. **Optimizing and expanding the application of noninvasive brain stimulation**

Noninvasive brain stimulation is a burgeoning field with rapidly expanding applications and therapeutic modalities. The majority of my research has focused on trying to harness the exciting potential of these treatments, by 1) combining brain stimulation therapies with neuroimaging, 2) applying brain stimulation techniques to new difficult-to-treat conditions, and 3) investigating ways for more efficacious and personalized use of existing techniques. Our pilot data showed that transcranial magnetic stimulation (TMS) was demonstrated to have similar to superior efficacy in treatment-resistant depression secondary to traumatic brain injury as has been demonstrated in clinical use for major depressive disorder. Additionally, our research team developed and successfully applied a novel strategy for using individualized resting state functional connectivity to target TMS treatments.

a. Siddiqi SH, **Trapp NT**, Shahim P, Hacker CD, Laumann TO, Kandala S, Carter AR, Brody DL. Efficacy and Neural Network Changes with fMRI-targeted rTMS for Neuropsychiatric Sequelae of Repetitive Traumatic Brain Injury in a Retired NFL Player. *J Neuropsychiatry Clin Neurosci* 2019 Apr 3. doi: 10.1176/appi.neuropsych.18110280. [Epub ahead of print].

b. Siddiqi SH, **Trapp NT**, Hacker CD, Laumann TO, Kandala S, Hong X, Trillo L, Shahim PP, Leuthardt E, Carter AR, Brody DL. Repetitive Transcranial Magnetic Stimulation with Resting State Network Targeting for Treatment-Resistant Depression in Traumatic Brain Injury: A Randomized, Controlled, Double Blinded Pilot Study. *J Neurotrauma*. 2019 Apr 15; 36(8):1361-1374. doi: 10.1089/neu.2018.5889. Epub 2019 Jan 7.

c. Cristancho P, **Trapp NT**, Siddiqi SH, Dixon D, Miller JP, Lenze EJ. Crossover to bilateral rTMS: A potential strategy when patients are not responding to unilateral left-sided high-frequency rTMS. *J ECT*. 2019 Mar; 35(1): 3-5. DOI: 10.1097/YCT.0000000000000500.

d. Boes A, Kelly M, **Trapp NT**, Stern A, Press D, Pascual-Leone A. Noninvasive Brain Stimulation: Challenges and Opportunities for a New Clinical Specialty. *J Neuropsychiatry Clin Neurosci* 2018 Apr 24; 30(3):173-79. DOI: 10.1176/appi.neuropsych.17110262.

e. **Trapp NT,** Uitermarkt B, King Johnson M, Koscik TR, Garrett L, Heinzerling A, Zanaty M, Holland MT, Howard M\*, Boes AD\*. A New Device to Improve Target Localization for Transcranial Magnetic Stimulation Therapy. *Brain Stimulation,* <http://doi.org/10.1016/j.brs.2019.07.028>. [Epub ahead of print]. \* Indicates shared senior authorship.

**Complete List of Published Work in MyBibliography:** <https://www.ncbi.nlm.nih.gov/sites/myncbi/nicholas.trapp.1/bibliography/54992776/public/?sort=date&direction=ascending>

# D. Additional Information: Research Support and/or Scholastic Performance

## Ongoing Research Support

Roy J. Carver Charitable Trust Wemmie (PI) 2017-2022

Iowa Neuroscience Institute Research Program of Excellence in Bipolar Disorder

Role: Trainee (Mentor is Aaron Boes, co-investigator; no direct funding)

Roy J. Carver Charitable Trust Narayanan (PI) 2017-2022

Iowa Neuroscience Institute Research Program of Excellence in Neuromodulation

Role: Trainee (Mentor is Aaron Boes, co-investigator; no direct funding)

University of Iowa Department of Psychiatry Pilot Grant

Competitive Departmental Pilot Funding Trapp (PI) 2018-2019

“Predicting depression treatment response with functional MRI: Personalized engagement of the central autonomic network with transcranial magnetic stimulation to treat major depressive disorder.”

Role: PI

## Completed Research Support

Iowa Neuroscience Specialty Program in Research Education

(INSPIRE) Fellowship Nopoulos (Director) 2017-2019

“Cerebellar neuromodulation and cognitive control.” Two-year fellowship with research support.

Role: Trainee & T32 Awardee