

Joshua Dean

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EDUCATION

Northwestern University, Evanston, Illinois
Bachelor of Science in Biomedical Engineering,

June 2023

RESEARCH EXPERIENCE

National Institute of Mental Health, NIH

PI: Dr. Peter Bandettini, Ph.D.

Post-baccalaureate IRTA Research Fellow | *Section on Functional Imaging Methods* | Bethesda, MD July 2023 – Present

- The Section on Functional Imaging Methods develops and utilizes state-of-the-art functional MRI techniques
- Investigating autonomic regulation of heart rate and blood pressure at the brainstem level using high spatial fMRI
- Programmed experimental stimuli for fMRI paradigm using Python
- Presenting work from projects at local (NIMH Training Day, Julius Axelrod Symposium, Postbac Poster Day), national (Society for Neuroscience), and international conferences (Organization for Human Brain Mapping)

Northwestern University

Department of Biomedical Engineering and Department of Physical Therapy & Human Movement Sciences

PI: Dr. Molly Bright, D. Phil.

Research Assistant | *Applied Neuro-Vascular Imaging Lab* | Chicago, Illinois March 2021 – June 2023

- The Bright Lab studies interactions of neural activity and vascular physiology using advanced MRI techniques
- Conducted five independent research projects focusing on brain activation given varying stimuli, comparisons of brain maps when using different fMRI processing pipelines, and presentation of task cues in MR-environment
- Compared maps of cerebrovascular reactivity, a marker of vascular health, generated using one of three reference physiological signals to address poor participant compliance; contributed to accepted manuscript
- Determined the efficacy of a novel MRI-compatible tactile stimulation device by conducting processing, analysis, and interpretation of multi-echo fMRI data; contributed to submitted manuscript
- Created novel ways to present breath-hold task cues to improve pediatric fMRI data quality and task compliance; contributed to abstract at international conference

Northwestern University

Department of Psychology

PI: Dr. Jennifer Tackett, Ph.D.

Research Assistant | *Personality Across Development Lab* | Evanston, Illinois September 2020 – March 2021

- The Tackett Lab explores adolescent decision-making and how personality impacts academic success
 - Administered and oversaw the distribution of research surveys to over 50 participants on a confidential basis
 - Managed data collection to facilitate analysis using Microsoft Excel
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HONORS AND AWARDS

- **2022** Admitted to Biomedical Engineering Departmental Honors; submitting a research honors thesis
 - **2022** Research project funded by Northwestern Summer Internship Grant Program; University faculty-reviewed grant proposal, Northwestern University
 - **2021** Research project funded by Northwestern McCormick Summer Research Award; University faculty-reviewed grant proposal from the McCormick School of Engineering, Northwestern University
 - **2020-2023** McCormick College Dean's List for Academic Excellence for 7 quarters
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PUBLICATIONS

Kristina M. Zvolanek, Stefano Moia, **Joshua N. Dean**, Rachael C. Stickland, César Caballero-Gaudes, Molly G. Bright. *Comparing end-tidal CO₂, respiration volume per time (RVT), and average gray matter signal for mapping cerebrovascular reactivity amplitude and delay with breath-hold task BOLD fMRI*. (accepted, Neuroimage, DOI: [10.1016/j.neuroimage.2023.120038](https://doi.org/10.1016/j.neuroimage.2023.120038)).

Jason C. Yang, Pijuan Yu, **Joshua N. Dean**, Neha A. Reddy, Ahalya Mandana, Nicole Baptist, Matthew L. Elwin, Molly G. Bright, Netta Gurari. *Development of an MR-Compatible System to Assess Force-Dependent Neural Activity*. (submitted for publication, December 2022, rejected).

CONFERENCE PRESENTATIONS

Joshua N. Dean, Burak Akin, Daniel A. Handwerker, Peter A. Bandettini. *Resting-state BOLD signal measured at 7T indicates autonomic regulation can be traced at the brainstem and cortex*. Abstract submitted to: Society for Neuroscience; October 2024; Chicago, IL.

Joshua N. Dean, Daniel A. Handwerker, Paul A. Taylor, Peter D. Lauren, Daniel R. Glen, Peter A. Bandettini. *Evaluation of Respiratory and Cardiac Peak Detection Using Interactive AFNI Tools*. Poster to be presented at: Organization for Human Brain Mapping; June 2024; Seoul, South Korea.

Joshua N. Dean, Burak Akin, Daniel A. Handwerker, Peter A. Bandettini. *Resting-state BOLD signal measured at 7T indicates autonomic regulation can be traced at the brainstem and cortex*. Poster presented at: Postbac Poster Day; May 2024; Bethesda, MD.

Joshua N. Dean, Burak Akin, Daniel A. Handwerker, Peter A. Bandettini. *Resting-state BOLD signal measured at 7T indicates autonomic regulation can be traced at the brainstem and cortex*. Poster presented at: Julius Axelrod Symposium; April 2024; Bethesda, MD.

Joshua N. Dean, Neha A. Reddy, Peter A. Bandettini, Molly G. Bright. *Assessing Acute Intermittent Hypoxia-Induced Changes in Neural Activity*. Poster presented at: National Institute of Mental Health Training Day; September 2023; Washington, D.C.

Joshua N. Dean, Kristina M. Zvolanek, Rebecca G. Clements, Molly G. Bright. *Characterizing Cerebral Blood Transit Times in Moyamoya Disease: A Comparison of 3 Analysis Methods*. Poster presented at: Biomedical Engineering Society; October 2022; San Antonio, TX.

Joshua N. Dean, Kristina M. Zvolanek, Rebecca G. Clements, Molly G. Bright. *Characterizing Regional Cerebral Hemodynamic Timings in Moyamoya Disease: A Comparison of 3 Analysis Methods*. Poster presented at: Northwestern University Lewis Landsberg Research Day; September 2022; Chicago, IL.

Kristina Zvolanek, **Joshua Dean**, Neha Reddy, Rachael Stickland, Molly Bright. *Comparison of breath-hold stimuli for cerebrovascular reactivity mapping in children and adolescents*. Poster presented at: Organization for Human Brain Mapping; June 2022; Glasgow, Scotland. (Presented by Kristina Zvolanek)

LEADERSHIP AND COMMUNITY SERVICE

Scribe and Intake | *Mercy Health Clinic* | Gaithersburg, Maryland February 2024 – Present

- Documenting symptomatology, assessment, and treatment plans in electronic health record system; working alongside physicians across specialties and primary care with the use of in-person and remote translators
- Training new Intake volunteers to manage the clinic's patient inflow and outflow and in taking vitals (blood pressure, blood glucose, weight, temperature, heart rate) for incoming patients

Red Cross Volunteer | *Walter Reed National Military Medical Center* | Bethesda, Maryland March 2024 – Present

- Delivering basic goods to patients across departments in the hospital via the comfort cart

- Mask Ambassador Volunteer** | *Northwestern Memorial Hospital* | Chicago, Illinois May 2022 – January 2023
- Provided books and read to inpatients via the library cart
 - Transported and guided patients and visitors throughout the hospital
- President of Engineers Without Borders** | *Engineers Without Borders* | Evanston, Illinois March 2022 – March 2023
- President of a service-oriented club with Chicagoland and international partnerships that focus on clean and safe water, sustainable agriculture, and STEM education
 - Awarded \$12,246 through seven grants from University departments to organize trip to partner community in Ecuador to support the construction project in delivering clean water to 45 families
 - Initiate and sustain outreach programs to Chicago Public Schools to organize a regular volunteer schedule
 - Actively volunteer at local schools monthly to give STEM lessons to students
- Co-President of GlobeMed** | *GlobeMed* | Evanston, Illinois March 2021 – March 2022
- Co-President of a global health and social justice club focused on grass-roots level, sustainable change
 - Established first local partnership with Connections for the Homeless, a non-profit providing support to the homeless
 - Led general meetings of 50 to advance global health and social justice values across campus and abroad
 - Supervised and organized 7 committees to achieve each committee's goals in advancing the dissemination of health disparities; fundraised \$6,500 for international partner in Uganda to advance their water treatment facilities
- BME Mentorship Program** | *Northwestern University* | Evanston, Illinois October 2021 – June 2023
- Matched with a BME freshman to guide their first-year experience and met on a biquarterly basis
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WORK EXPERIENCE AND PROJECTS

- MRI-LINAC Abdominal Phantom** | *Undergraduate Capstone* | Evanston, Illinois September 2022 – March 2023
- Designed and constructed a device to mimic the abdomen for calibration and quality control of MRI-LINAC scanner in partnership with a client at the Feinberg School of Medicine in Radiation Oncology
 - Performed verification and validation experiments to quantify our device achieving specifications in a 4-person team
- Grant Writer Supervisor and Writer** | *Adonai Centre, Uganda* | Remote Work July 2020 – August 2021
- Supervised 3 grant writing teams of 11 interns to complete 3 grants for the non-profit NGO, the Adonai Centre which provides services to children left vulnerable by the HIV/AIDS crisis in Uganda
 - Organized and presented 8 Spring Orientation workshops on ethical partnerships and grant writing
 - Conducted qualitative analysis of new and existing data to compile relevant information and to design program
- Medical Market Researcher** | *Informedix Medical Market Research* | Yuma, Arizona July 2019 – August 2019
- Performed clinical market research to determine the efficiency of a new time-saving program for infusion pumps
 - Interviewed doctors, directors, nurses, pharmacists, and patients in 8 different departments
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SKILLS, LANGUAGES, AND INTERESTS

- Proficient in Python, AFNI, FSL, BASH, Rapidtide, R/RStudio, SolidWorks and MATLAB
- 2021 Chicago Half Marathon Finalist