

MORGAN C. FITZGERALD

(720) 352-6528 | mofitzgerald@ucsd.edu

EDUCATION

Ph.D., NEUROSCIENCE; GPA 3.98
UC, San Diego – San Diego, CA

Anticipated advancement: 2025

B.S., BIOPSYCHOLOGY; GPA: 4.00
UC, Santa Barbara – Santa Barbara, CA

June 2020

- Senior Thesis: “Cerebellar network organization across the human menstrual cycle”

RESEARCH EXPERIENCE

GRADUATE STUDENT RESEARCHER

June 2023—Present

UC, San Diego, Department of Cognitive Science, **Dr. Bradley Voytek**

- **Developed the PyHEARTS Toolbox**: Created an open-source tool for analyzing heart-related electrophysiological data, aiming to publish a tool introduction paper by October 2025.
- **Advanced ECG Signal Analysis**: Designed and implemented studies to explore the relationship between cardiac waveform features and cognitive aging, leveraging the PyHEARTS toolbox to extract and analyze beat-specific ECG features (e.g., waveform symmetry, amplitude, and duration) and investigate their association with EEG broadband shifts and memory performance.
- **Interdisciplinary Brain-Heart Dynamics Research**: Conducted innovative research on how cardiac artifacts influence neural EEG signals, utilizing advanced statistical models and machine learning techniques to disentangle cardiac and neural contributions to memory-related broadband activity, with implications for understanding age-related cognitive decline.

STAFF RESEARCH ASSOCIATE

September 2020—August 2022

UC, San Diego Health, Department of Psychiatry, **Dr. Matthew Panizzon**

- **Led Independent Research on Migraine Risk**: Investigated sex-specific factors contributing to migraine susceptibility, integrating clinical and neurobiological insights.
- **Supported NIH R01 Grant Development**: Drafted, reviewed, and edited a grant proposal, enhancing clarity and alignment with funding priorities.
- **Optimized Study Protocols**: Authored and revised IRB applications and amendments, ensuring compliance with ethical and regulatory standards.
- **Achieved High Participant Recruitment**: Recruited 39 clinical participants in 8 months, demonstrating strong organizational and interpersonal skills.
- **Administered Neuropsychological Assessments**: Conducted 19 batteries, providing critical cognitive and psychological evaluation data.
- **Operated Neuroimaging Equipment**: Ran 18 structural and functional MRI scans on a 3.0 T Siemens Prisma scanner, ensuring high-quality data collection.

RESEARCH ASSISTANT

March 2018—June 2020

UC, Santa Barbara, Department of Biopsychology, **Dr. Emily Goard-Jacobs**

- **Published First-Author Study on Hormonal Effects on Brain Connectivity**: Authored a peer-reviewed publication exploring how endogenous hormones influence functional connectivity in the human brain, showcasing expertise in neuroendocrinology and imaging analysis.
- **Processed and Analyzed Complex fMRI Data**: Utilized MATLAB and RStudio to preprocess and analyze functional MRI datasets, ensuring accuracy and reproducibility in data interpretation.
- **Managed Biological Sample Processing**: Prepared blood samples for specialized testing, maintaining rigorous standards for handling and documentation to ensure reliable results.
- **Supported Advanced Neuroimaging Protocols**: Assisted with MRI scanning procedures by loading participants, administering task protocols, and troubleshooting equipment to ensure seamless data collection.

RESEARCH ASSISTANT

September 2018—March 2019

UC, Santa Barbara, Department of Biopsychology, **Dr. Scott Grafton**

- **Evaluated Micro-Resonator Technology:** Assessed the efficacy of a novel device for detecting impedance cardiography (ICG) signals.
- **Monitored Cardiac Signals During MRI:** Oversaw ICG and ECG waveforms during MRI scans to ensure signal fidelity.
- **Conducted Cardiac Recordings:** Collected ICG and ECG data from study participants with precision and reliability.
- **Analyzed Data with MEAP:** Processed physiological data using the Moving Ensemble Analysis Pipeline for actionable insights.

PUBLICATIONS

- **In Preparation:** Manuscript detailing PyHEARTS Toolbox for journal submission (anticipated October 2025).
- **Fitzgerald, M., Kosik, E., & Voytek, B. (2024).** Unveiling hidden sources of noise. *eLife*, 13, e102878.
- **Fitzgerald, M., Saelzler, U. G., & Panizzon, M. S. (2021).** Sex Differences in Migraine: A Twin Study. *Frontiers in Pain Research*, 2, 113.
 - **Media:** Frontiers Science News ([link](#)), MD Edge ([link](#)), Physician's Weekly ([link](#)), Healthline ([link](#))
- **Fitzgerald, M., Pritschet, L., Santander, T., Grafton, S. T., & Jacobs, E. G. (2020).** Cerebellar network organization across the human menstrual cycle. *Scientific reports*, 10(1), 20732.

POSTERS & PRESENTATIONS

- **Fitzgerald, M., Kosik, E. & Voytek, B., (October 2024),** 'Assessing electrocardiogram waveform interference in simulated electroencephalogram signals' [Poster], Society for Neuroscience, Chicago, IL.
- **Fitzgerald, M. & Voytek, B., (September 2024),** 'Assessing cardiac signal interference in simulated electroencephalogram signals' [Presentation], Body-Brain Waves Conference, Salerno, IT.
- **Fitzgerald, M. & Panizzon, M., (June 2022),** 'Mechanisms of Sex Differences in Migraine: A Twin Study – The need to consider sex as a variable of interest' [Presentation], American Headache Society, Denver, CO
- **Fitzgerald, M., Saelzler, U., & Panizzon, M., (May 2022),** 'Hormonal Mechanisms of Sex Differences in Migraine' [Poster], Organization for the Study of Sex Differences, Marina Del Rey, CA.
- **Fitzgerald, M. & Jacobs, E., (May 2020),** 'Cerebellar network organization across the human menstrual cycle' [Poster], Undergraduate Research and Creative Activities Conference, University of California, Santa Barbara.

GRANTS & AWARDS

UC, San Diego

- Neuroscience Graduate Program NIH training grant (T32; 2023-2024)

UC, Santa Barbara

- **The Morgan Award for Research Promise (2020)**
 - Awarded to seniors who demonstrate promise in research, as selected by the faculty
- **University Award of Distinction (2020)**
 - Awarded to seniors who demonstrate in-depth involvement and significant achievement on campus
- **Exceptional Academic Performance (2020)**
 - Awarded to seniors with a 3.9 or higher GPA in their upper division major coursework
- **Distinction in the Major (2020)**
 - Awarded to seniors who successfully complete their senior thesis
- **Exceptional Student (2019, 2020)**
 - Awarded to students with a GPA of 3.75 or higher

MORGAN C. FITZGERALD

- **Undergraduate Research and Creative Activities Grant** (2019)
 - Funding awarded to undergraduates to pursue an independent research project
- **Dean's Honors, College of Letters and Science** (2018, 2019, 2020)
 - Awarded to students with a GPA of 3.75 or higher

WORK EXPERIENCE

SCIENCE AND ENGINEERING LAB INTERN

June–September 2015, 2016, 2017

Genentech – Oceanside, CA

- Planned and executed independent study for qualification of disposable spinners
- Maintained working cell lines for laboratory studies
- Monitored cell culture performance: gases, nutrients, metabolites, viable cell density, and pH
- Developed and introduced a stage-gate model for qualification of engineering and qualification runs
- Performed daily maintenance on Cedex BioHT and larger annual/biannual maintenance tasks
- Assisted with BioHT AOP development and documentation
- Prepared media per SOP for cell culture process
- Performed DO and pH calibrations for bioreactors
- Analyzed cell culture performance data using Delta-V and PI interface
- Developed a document database on TouchPoint
- Conducted root cause analysis of contamination

LEADERSHIP & ACTIVITIES

- **Student Representative/Policy Strategist**, Office of Student Affairs, UC San Diego May 2023 – Present
- **Lead Mentor/Advisory Committee**, Colors of the Brain, UC, San Diego September 2022 – Present
- **Co-Executive Director**, Miles for Migraine, San Diego December 2022 – Present
- **Patient Advocate**, Patients Rising, San Diego June 2021 – Present
- **Patient Advocate**, Global Healthy Living Foundation, San Diego, CA December 2020 – Present
- **Mentor**, Girls Inc. March 2019 – June 2021
- **Patient Companion**, Hospice of North Coast, San Diego, CA June 2016 – September 2016
- **Coach**, Special Olympics, San Diego, CA September 2011 – August 2014

TECHNICAL SKILLS

Programming and Software Development

- Expertise in Python, including proficiency with libraries such as NumPy, SciPy, Pandas, and Matplotlib for data analysis and visualization.
- Experience developing open-source software, including the PyHEARTS Toolbox for ECG signal analysis and reproducibility in neuroscience research.
- Skilled in version control and collaboration using GitHub, including creating and managing repositories, issue tracking, and documentation.
- Proficient in MATLAB for neuroimaging and statistical modeling, and RStudio for data preprocessing and advanced statistical analysis.

Data Analysis and Research Tools

- Advanced knowledge of signal processing techniques for ECG and EEG, including filtering, feature extraction, and artifact correction.
- Familiarity with machine learning models (e.g., Random Forest) for analyzing physiological data.
- Proficient in statistical modeling and hypothesis testing using tools like Python (statsmodels) and R.
- Skilled in developing automated workflows for data processing to ensure scalability and reproducibility.

Languages

- Programming: Python, MATLAB, R, Bash scripting.
- Spoken/Written: Conversational Spanish.