Megan deBettencourt

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Megan-deBettencourt | debetten

About Me

I am a scientist with over a decade of experience at the intersection of neurotechnology, health AI, and cognitive science. With expertise in study design, statistical modeling, and both quantitative and qualitative data analysis, I excel at leading projects and collaborations from start to finish to deliver meaningful, data-driven outcomes. Specializing in brain-computer interfaces, multimodal physiological data, and advanced machine learning, I am excited to build cutting-edge technologies that augment human experience and behavior.

Education

Princeton University, Princeton Neuroscience Institute
PhD, Neuroscience — Sept. 2016
MA, Neuroscience — May 2016

Columbia University, Departments of Biomedical & Electrical Engineering
BS Applied Mathematics *magna cum laude* — May 2010

Experience

Ruby Neuroetch, Senior Research Scientist — Redwood City, CA
Early preclinical stage start-up with non-dilutive funding from Wellcome Leap — Feb 2023 – Present — 2 years 3 months — full-time

- Led end-to-end program management for a digital mental health study, integrating AI and neurotechnology to deliver scalable, personalized treatment solutions
- Utilized large language models (LLMs) to implement an automated data quality scoring system, achieving near human-level accuracy and enhancing operational efficiency
- Discovered key PTSD treatment biomarker, by analyzing symptoms from qualitative data of remote diaries and quantitative data from time-resolved physiological recordings, and applying advanced statistical models to gain deeper insights
- Developed full-stack web application featuring an AI-driven chat interface using OpenAI API, Node.js, React.js, and WebSockets, optimizing for scalability
- Supervised data collection from 200+ participants onsite, leveraging eye-tracking (Tobii), heart rate (PPG), and face tracking (MediaPipe), to ensure high-quality, accurate data capture while maintaining adherence to study protocol
- **Skills:** Python (PyTorch, scikit-learn, statsmodels, OpenCV), JavaScript (Node.js, React, jsPsych), AI Large Language Models (OpenAI API, LangChain), Version control (git), Data visualization (dashboards, Adobe, Canva)

Stanford University, Wu Tsai Human Performance Alliance, Consultant — Palo Alto, CA
2023 – 2024 — Ad-hoc, as needed

- Provided expert guidance on real-time pupillometry for a project aimed at improving human memory retrieval, optimizing experimental design and data interpretation
- Supplied code for a closed-loop pupil system, ensuring its real-time functionality
- **Skills:** Python, eye-tracking (Tobii, EyeLink), mentorship, data visualization, statistics

University of Chicago, Institute for Mind and Biology, Post-doctoral fellow (K99 & F32) — Chicago, IL
Oct 2016 – Feb 2023

- Built closed-loop brain-computer interfaces to predict attention lapses in real time by leveraging EEG, pupillometry, and behavior to support more effective interventions
- Developed hardware and software for collecting and analyzing attention and memory neural dynamics, working directly with clinicians and patients in neurosurgical operating suites and epilepsy patients during inpatient monitoring
- Advised and mentored 10 PhD and undergraduate researchers through all project phases,

from concept development to data analysis and publication, fostering skill development and successful outcomes

- **Skills:** Python (machine learning classificatin and regression, scikit-learn and statsmodels), R, MatLab, EEG, eye-tracking (EyeLink), experimental design & data collection (psychopy, psychtoolbox, MTurk, prolific), scientific and grant writing

Princeton University, Princeton Neuroscience Institute, PhD student (NSF GRFP) — Princeton, NJ, Oct 2016 – Feb 2023

- Launched parternship with **Intel Labs** (Brain-Inspired Computing Lab), to build cloud platform for real-time fMRI analysis and drive industry-academic collaboration
- Pioneered brain-computer interfaces to train & improve human visual attention with closed-loop fMRI neurofeedback, leading to 4 publications with 500+ citations
- **Skills:** Python, MatLab, fMRI, experimental design, data collection, scientific writing

Columbia University, Biomedical & Electrical Engineering Depts., Undergraduate Researcher — New York, NY, Oct 2016 – Feb 2023

- Developed signal processing tools and support vector machines (SVMs) to decode single-trial EEG and fMRI data, for research in brain-computer interface technologies

Selected Publications

Over 1000 citations, for a full list of publications, see Google Scholar or Pubmed

- MT deBettencourt, JD Cohen, RF Lee, KA Norman, NB Turk-Browne (2015) Closed-loop training of attention with real-time brain imaging. ***Nature Neuroscience***
- MT deBettencourt, PA Keene, E Awh, EK Vogel (2019) Real-time triggering reveals concurrent lapses of attention and working memory. ***Nature Human Behaviour***
- CD Wakeland-Hart, SA Cao, MT deBettencourt*, WA Bainbridge*, MD Rosenberg* (2022) Predicting visual memory across images and within individuals. ***Cognition***
- PA Keene*, MT deBettencourt*, E Awh, EK Vogel (2022) Pupillometry signatures of sustained attention and working memory. ***Attention, Perception, & Psychophysics***

Scientific contributions & presentations

- Invited speaker and panelist at Neuroethics and the Future of Reality June 2023
- Invited panelist at **NeurIPS 2022** for All Things Attention: Bridging Different Perspectives on Attention workshop
- Reviewer for **NeurIPS 2022** Gaze meets ML workshop, along with many high-impact scientific journals
- 20+ invited and external talks and seminars for academic and industry audiences, including at Brown, CMU, FSU, JHU, Intel, Microsoft, MIT, NIH, Stanford, UCLA, UCSB, UCSD, UCSF, UT Austin, UToronto, Va Tech
- 30+ conference talks and poster presentations for US and international audiences
- **Awarded $1,000,000+** in federal research grant funding (NIH Brain initiative K99R00, NIMH F32NRSA & NSF GRFP)

Skills

Programming Languages: Python, JavaScript, R, HTML, Bash, MatLab

Physiology & neuroscience: fMRI, EEG, fNIRS, EOG, PPG, Pupillometry, Eye-tracking

Cognitive Science: Attention, Learning, Memory

Languages

English native

French fluent

Hobbies

Pottery (wheel-thrown functional ceramics), trail running, NYTimes crossword puzzles, birding