Benjamin E. Shanahan

Class of 2017, Sc. B. in Neuroscience with Honors, Magna Cum Laude, Brown University
Class of 2013, Boston Latin School
Curriculum Vitae February 2021

Contact Information

Email	**benshanahan1 (at) gmail**
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Web	**benshanahan.dev** ***(projects & code)***

Technical Skills

Languages	Python, JavaScript, Matlab, C, HTML5, CSS, SQL, Bash
Concepts	Object-oriented programming, RESTful API architecture/implementation/consumption
Frameworks	Flask
Libraries	ReactJS
Databases	PostgreSQL, Oracle, MongoDB
OS	Linux, Windows
Doc. Tools	Doxygen, Sphinx
Embedded	Raspberry Pi, Zedboard, Arduino

Work Experience

2020 - Present | **Software Engineer** | SpaceX, Greater Los Angeles Area, CA
Develop and maintain a vast array of software applications and systems with a small team, focusing on manufacturing and telemetry systems.
Manager: Steve Sepanloo

2018 - Present | **Research Software Engineer** | NeuroPace, Mountain View, CA
Full-stack development of internal web-based tools for research and field teams. Focus on interfaces for analysis and visualization of large neural data sets. Linux server and Oracle database administration and monitoring.
Manager: Tom Tcheng, Ph.D.

2017 - 2018 | **Computer Programmer** | BrainGate, Brown University, Providence, RI
Reverse-engineered and re-implemented software interface to neural recording software in C, allowing arbitrary data to be sent. Co-led architecture and implementation in C of BrainGate calibration/decoder pipeline on embedded Linux system. Wrote and ran testbenches in Vivado HLS to debug HLS signal processing code; wrote bash scripts to automate Xilinx system-on-chip build process. Led architecture and implementation of websocket-based message-passing system in Python for web-based real-time monitoring application; designed back-end database in MongoDB to store system status reports. Redesigned internal web portal application that is used to train newcomers to the lab. Supervised a high school intern in creation of JavaScript-based calibration game for the BrainGate system.
Supervisors: Dr. John Simeral & Dr. Leigh Hochberg

2016 - 2017 | **Research Assistant** | BrainGate, Brown University, Providence, RI
Implemented steady state Kalman filter in closed-loop auto-updating brain-computer interface (BCI) calibration system. Honors thesis research in idle state detection in BCIs in human motor and premotor cortex.
Supervisors: Dr. Leigh Hochberg & Dr. David Brandman

2015 - Present	**Research Assistant**	Omarlab, Brown University, Providence, RI
	Analyzed shape of brain rhythms in running rats to evaluate their usefulness as an analytical metric. Work on figures and logic for first-author journal article. Developed Matlab toolbox for brain rhythm shape analysis. Shadowed epileptologist at Rhode Island Hospital. Supervisor: Dr. Omar Ahmed	
2014 - Present	**Matlab Consultant**	Burwell Lab, Brown University, Providence, RI
	Develop and maintain Matlab code for colleagues' requested analyses and data processing. Tutor and assist colleagues in Matlab programming. Attend weekly lab meetings. Supervisor: Dr. Rebecca Burwell	
Summer 2014, 2013	**Research Assistant**	Cashlab, Massachusetts General Hosp., Boston, MA
	Developed affordable OpBox rat operant conditioning chamber with Dr. Eyal Kimchi. Developed Semiology Diagnostic Tool to objectively diagnose region of seizure onset and settle conflicts during surgical meetings. Developed Matlab toolbox to detect high-frequency oscillations in epilepsy data. Supervisors: Dr. Sydney Cash & Dr. Brandon Westover	
Summer 2012	**Tech Apprentice**	State Street Corp., Quincy, MA
	Summer intern in the Flexible Work Department. Documented, troubleshooted, maintained, & analyzed data from internal FlexTrax website. Designed and programmed time-saving macro for pulling reports in Visual Basic. Helped solve user issues, fix bugs, & document FlexTrax web tool. Manager: Chris Siclari	

Honors, Awards, & Grants

2018	**RISG Space Grant (*$1,000*) with team**	NASA Rhode Island Space Grant Consortium
2017	**Brown Design Workshop Maker Grant (*$500*) with team**	Brown University
2017	**Prize4Life ALS Hackathon winner (*$1,000 prize*)**	Prize4Life, Inc.
2017	**Sc. B. in Neuroscience with Honors, Magna Cum Laude**	Brown University
2015	**Matthew Siravo Undergraduate Award in Epilepsy**	Brown University
2013	**Campbell Medal**	Boston Latin School
2013	**T. Vincent Learson Scholarship**	Boston Latin School
2013	**Horace M. Chadsley '14 Scholarship**	Boston Latin School
2012	**National Honor Society**	Boston Latin School
2010-12	**Francis Gardner Prize for Excellence in Modern Studies**	Boston Latin School

Peer-Reviewed Publications

2020	EY Kimchi, BF Coughlin, **BE Shanahan**, G Piantoni, J Pezaris, SS Cash. *OpBox: Open source tools for simultaneous EEG and EMG acquisition from multiple subjects.* eNeuro.
2020	M Ghosh*, **BE Shanahan***, SC Furtak, GA Mashour, RD Burwell, OJ Ahmed. *Instantaneous amplitude and shape of postrhinal theta oscillations differentially encode running speed.* Behavioral Neuroscience.
2018	DM Brandman, T Hosman, J Saab, MC Burkhart, **BE Shanahan**, JG Ciancibello, AA Sarma, DJ Milstein, CE Vargas-Irwin, B Franco, J Kelemen, C Blabe, BA Murphy, DR Young, FR Willett, C Pandarinath, SD Stavisky, RF Kirsch, BL Walter, AB Ajiboye, SS Cash, EN Eskandar, JP Miller, JA Sweet, KV Shenoy, JM Henderson, B Jarosiewicz, MT Harrison, JD Simeral, and LR Hochberg. *Rapid calibration of an intracortical braincomputer interface for people with tetraplegia.* Journal of Neural Engineering.

Abstracts

2018	**Neural Interfaces Conference** Minneapolis, MN *A Mobile High-Performance Neural Processing Platform for Next-Generation High Channel-Count iBCIs.* C Heelan, **BE Shanahan**, DM Brandman, AN Dusang, JD Simeral, and AV Nurmikko.
2015	**Society for Neuroscience** Chicago *OpBox: Open-source development of customized and cost-effective hardware and software for behavioral neurophysiology.* BF Coughlin, **BE Shanahan**, G Piantoni, SS Cash, EY Kimchi.
2014	**American Epilepsy Society** Washington, DC *Human Single Neuron Correlates Of High Frequency Oscillations During Seizures.* OJ Ahmed, MA Kramer, JS Naftulin, **BE Shanahan**, EN Eskandar, R Cosgrove, NS Potter, A Blum, L Hochberg, SS Cash.

Presentations & Talks

2018	**NASA Rhode Island Space Grant Symposium** Providence, RI Gave brief talk with team at Rhode Island Space Grant Symposium about rocket flight computer development and motor-testing (side project). Presentation can be found **here**.

Skills & Interests

Research	Organization and analysis of massive multi-day, multi-subject data sets.
Projects	Developed rocket flight computer with logging and rotational sensors to deploy a parachute at apogee. Developed an autonomous drone delivery service with integrated web-app. Developed real-time audio LED visualizer for making parties more exciting. Programmed web application for crowd-sourcing Spotify playlists among friends using Spotify Web API. Co-founded an ran an art-centric club at University for 2.5 years. More information and details on my website, **benshanahan.dev**.
Graphics	Proficient in Adobe Illustrator, Photoshop.
Language	Fluent in English; French conversational, reading, and writing skills; Spanish reading and writing skills; study of Latin
Personal	Highly organized, motivated, responsible, and resourceful. Team leader and collaborator. Perseverant and committed to projects. Creative and efficient problem solver. Not afraid to ask for help when necessary. Able to self-teach new concepts quickly and effectively.