# ANDREW PERLEY

Department of Bioengineering ⋄ aperley@stanford.edu
**Curriculum Vitae**

## EDUCATION

**Stanford University** *Jul. 2021 - Present*
PhD Student, Bioengineering

**University of California, San Diego** *Sep. 2019 - Jul. 2021*
PhD Student, Bioengineering (transitioned to Stanford) GPA: 4.00
Masters of Science, Bioengineering

**University of California, Los Angeles** *Sep. 2015 - Jun. 2019*
Bachelor of Science, Bioengineering, *Summa Cum Laude* GPA: 3.95

**Tohoku University** *Apr. - Aug. 2018*
Sendai, Miyagi Prefecture, Japan
Study Abroad

## ACADEMIC ACHIEVEMENTS

**Bioengineering Departmental TA Award** *Jun. 2023*
*Stanford University*

· Recognition granted to Teaching Assistants in the Bioengineering Department for exemplary work as
an instructor.

**Dean's Graduate Student Advisory Council JEDI Conference Travel Grant** *Jun. 2023*
*Stanford University*

· Prestigious award to fund students in the School of Engineering doing work to push forward Justice,
Equity, Diversity, and Inclusion.

**Stanford Data Science Scholars Program** *Sep. 2022 - Present*
*Stanford University*

· Stanford fellowship that brings PhD students and Postdocs from all departments across campus in order
ot discuss and share research involving data science. Scholar backgrounds include education. history,
marine biology, geophysics, and more.
· Organized the Stanford Data Science Conference with the scholars and program admin.

**Molecular Biophysics Training Program** *Sep. 2021 - Present*
*Stanford University*

· T32 training program aimed at training the next generation of scientists in Biophysics.

**Integrative Bioengineering of Heart Vessels and Blood Training Program** *Sep. 2020 - Jul.*
*2021*
*University of California, San Diego*

· T32 training program funded by the NHLBI to train next generation Bioengineering scientists in car-
diovascular technology development and research

· Focus on multi-scale integration of engineering principles applied to biological systems and subsystems for cardiovascular disease

**San Diego Fellowship Matching Commitment** *Sep. 2020 - Jul.2021*
*University of California, San Diego*

· Matching funding for exceptional students nominated for training grants and who show commitment to promoting diversity within the campus and department

**Powell Fellowship** *Sep. 2019 - Sep. 2020*
*University of California, San Diego*

· $40,000 Fellowship awarded to select incoming 1st year Engineering PhD students based on potential for impactful research and academic nomination by department

**Dean's Honor List** *Fall 2015 - Fall 2017, Spring 2019*
*University of California, Los Angeles*

· Honors Award for Student's who show exceptional academic excellence in a particular term.

## RESEARCH EXPERIENCE

**Stanford University** *Jul 2021 - Present*
**University of California, San Diego** *Sep. 2019 - Jul. 2021*
*Graduate Researcher* *Principal Investigator: Todd Coleman*

· Investigating electrophysiological signals in the gastrointestinal system in order to better understand gastric wave propagation and disease etiology naturally and during stimulation
· Investigating and developing multi-array wave analysis methods to understand the electrophysiology of the gut-brain axis in simultaneous gut and brain electrophysiology recordings.
· Developing state-space inference methods for high resolution time-frequency analysis of gastric electrophysiology in order to resolve very low frequency signals and estimate key parameters such as phase
· Developing new signal processing methods for extracting cross frequency coupling between the gut and brain using robust statistical inference procedures

**University of California, San Diego** *Aug. 2020 - Jul. 2021*
*Graduate Researcher* *Principal Investigator: Gert Cauwenberghs*

· Developing system design for using novel integrated circuits for electrogastrography signal recording
· Assisting in development of system-level design for novel ultrasonic integrated circuits

**University of California, Los Angeles** *Jun. 2017 - Jun. 2019*
*Undergraduate Researcher* *Principal Investigator: Wentai Liu*

*Phase Amplitude Coupling in Absence Seizure Patients*

· Investigated existence of Phase Amplitude Coupling (PAC) in Electrocorticography (ECoG) signals recorded in absence seizure patients computationally by calculating a Modulation Index
· Implemented and tested traditional filter-based and Hilbert-Huang Transform based signal processing methods to further investigate physiological relevance of mathematical measures of coupling using MATLAB

· Used machine learning techniques to build a preliminary Random Forest model that took in PAC values as features to predict seizures in patients

*Investigation of visual working memory function in the brain*
· Analyzed EEG signals in patients performing visual working memory tasks
· Investigated the difference in EEG signals when patients memorized a word versus forgot a word using MATLAB for source localization, connectivity analysis, PAC analysis, and surrogate data analysis

**UCLA Bioengineering Department**                    *Sep. 2018 - Mar. 2019*
*Bioengineering Capstone Design Project*          *Principal Investigator: Tzung Hsiai*

*Electrical Impedance Tomography (EIT) for Nonalcoholic Fatty Liver Disease*
· Worked in a team of six students to develop image classification, reconstruction, and segmentation algorithms with the Hsiai lab and Dr. Yuan Luo at the California Institute of Technology
· Developed a data collection tank for imaging of phantom models and livers
· Drafted NIH R21 style grant proposal and presented in a grant presentation style
· Managed logistics for effective teamwork and a $1,000 research budget

**Tohoku University**                                      *Apr. - Aug. 2018*
*International Undergraduate Researcher*        *Principal Investigator: Takashi Watanabe*

*Functional Electrical Stimulation Control of the Wrist*
· Used LabVIEW to build a Fuzzy Logic control program for stimulation of the Extensor Carpi Radialis (ECR) muscle and compared to PID controller tuned by CHR method
· Communicated with lab members, presented in lab seminars in Japanese, and communicated with other program students in order to practice communication with international students and researchers
· Presented findings at international student research presentation seminar

## PUBLICATIONS

- Perley Andrew., Coleman Todd P., "A Mutual Information Measure of Phase-Amplitude Coupling Using High Dimensional Sparse Models." 44th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), 2022. *Accepted.*

- Balasubramani PP, Walke A, Grennan G, **Perley A**, Purpura S, Ramanathan D, Coleman TP, Mishra J. Simultaneous Gut-Brain Electrophysiology Shows Cognition and Satiety Specific Coupling. Sensors. 2022; 22(23):9242. https://doi.org/10.3390/s22239242

- Perley, Andrew, et al. "Miniaturized Wireless Gastric Pacing via Inductive Power Transfer with Non-Invasive Monitoring Using Cutaneous Electrogastrography." Bioelectronic Medicine, vol. 7, no. 1, 2021, https://doi.org/10.1186/s42234-021-00074-8.

## CONFERENCES

- 130th Annual American Society for Engineering Education Conference and Exposition, Baltimore, Maryland, USA, June 2023 *Poster and Publication Forthcoming.*

- 44th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), Glasgow, Scotland, United Kingdom, July 2022. *Oral Presentation given.*

## TEACHING EXPERIENCE

**Stanford University Department of Bioengineering**

*Instructor/Course Development - BioE 296*                                    *Jun. 2022 - Present*

· Developed and co-instructed a course designed to teah graduate students about evidenced-based pedagogy, which culminated into a final project of the student's choosing.

*Teaching Assistant - BioE 230*                                              *Apr. - Jun. 2023*

· Taught graduate level probability and statistics in the lens of Bioengineering

· Held multiple office hour sessions a week

**UCSD Department of Bioengineering**

*Teaching Assistant - BENG 125*                                             *Apr. - Jun. 2021*

· Assisted in the instruction of 150 senior Bioengineering students in learning on nonlinear dynamical systems and chaos with applications in biology. Guided students through a term-long project that involved choosing a biological system of interest and modelling it with increasing complexity.

*Teaching Assistant - BENG 189*                                            *Apr. - Jun. 2020*

· Instructed students in Physiological Systems Engineering through leading discussion sections to teach principles of mathematical modelling of physiological systems, methods of implementation, and testing and experimental paradigms for extracting meaningful information from models

*Teaching Assistant - BENG 152*                                            *Jan. - Mar. 2020*

· Instructed students in a biomedical instrumentation lab through hands-on teaching and instruction of principles of building physiological measurement devices such as ECG, EMG, and PPG devices

**UCLA Center for Education Innovation and Learning in the Sciences**

*Learning Assistant, Physics*                               *Jan. - Mar. 2018, Jan. - Jun. 2019*

· Held weekly meetings with course professor to discuss worksheets and common misconceptions students have in Physics in order to improve teaching qualities
· Facilitated student engagement in peer learning in discussion sections, lecture, and review sessions
· Employed techniques from pedagogy seminar and feedback from students to improve teaching
· Taught both "Physics for Life Science Majors: Mechanics and Energy" and "Physics for Scientists and Engineers: Oscillations, Waves, Electric and Magnetic Field", which elucidated one aspect of diversity in student needs and educational backgrounds

**UCLA Samueli School of Engineering**

*Mentor, Introduction to Engineering Design*                                *Sep. 2016 - Jun. 2017*

· Mentored freshman students taking Engineering Design course that used an Intel Edison microcontroller platform by helping with tutorials and guiding group project ideas
· Worked together with Professor, TAs, and other mentors to identify areas of improvement in the new program and help students gain critical design experience early in their college careers

# EXTRACURRICULAR

### Bioengineering Graduate Student Association
*Stanford University*

*Community and Culture Co-Chair*        *Jan 2023 - Present*

· Create community amongst the department, especially graduate students, by organizing events to allow students to foster bonds and creating mentorship opportunities

### Bioengineering Graduate Society
*University of California, San Diego*

*Mentorship Committee Member*        *Sep. 2020 - Jun. 2021*

· Works one-on-one with new graduate students in the Bioengineering department to give advice on labs, research, and managing graduate school
· Helps with planning events for resources such as Mental Health panels and advice on navigating graduate school

*Breakfast with Industry Committee Member*        *Sep. 2019 - Dec. 2020*

· Assisted in the planning and logistics of an annual networking event for Bioengineering graduate students with representative industry members
· Working this year in structuring the event to be delivered effectively online for all 100 expected students, postdocs, industry, and faculty members involved

### GradAMP Mentorship Program
*University of California, San Diego*

*Mentor*        *Aug. 2020 - Apr. 2021*

· Collaborates with graduate students at UCSD to provide free resources and mentorship to approximately 130 undergraduates across the whole UC system in an effort to provide equitable opportunity to especially underrepresented minorities across all fields of study
· Mentors undergraduate students looking to apply to graduate school one-on-one by giving concrete advice on the application process and feedback on essays

### Biomedical Engineering Society
*University of California, Los Angeles*

*General Member*        *Sep. 2015 – Jun. 2019*

· Volunteered in events such as wheelchair building

*Build Team Member*        *Sep. 2017 – Mar. 2018*

· Participated in developing project for knee brace equipped with sensors for Physical Therapists

### Nikkei Student Union
*University of California, Los Angeles*

*General Member*        *Sep. 2015 – Jun. 2019*

· Volunteered at Japanese American community events

*Co-Stage Manager*        *Jan. - Mar. 2017*

· Worked with building staff and directors of Cultural Night to organize the lighting and cues for Japanese American cultural performance held in front of 1,000 people

*Sound Manager*        *Jan. - Mar. 2016*

· Communicated with director and performance groups to compile music and organize sound cues for Cultural Night

## VOLUNTEER EXPERIENCE

**Tohoku Tsunami Tree Planting** *Apr. – Aug. 2018*
*Volunteer*

· Participated in tree planting events at Millennium Hope Hills and Arahama city in Japan to support Tsunami Disaster prevention by creating a natural barriers to tsunamis

## SKILLS

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|---|---|
| **Programming Languages** | C++, Python, MATLAB |
| **Software & Tools** | Bash, Git, GitlabCI/CD, Sherlock, Heroku, CVX/CVXPY, Statsmodels, Scikit-Learn, OpenCV |
| **Visualization Packages** | Bokeh, Plotly, Matplotlib |

## RELEVANT COURSES

Convex Optimization
Information Theory
Digital Signal Processing
Research and Data Computation
Machine learning & data-driven modeling in bioengineering