Alexander Belsten

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Education

- **University of California, Berkeley** — Berkeley, CA
  Ph.D. Candidate in Vision Science; Advisor: Dr. Bruno Olshausen — *August 2021 - Present*
- **Rensselaer Polytechnic Institute** — Troy, NY
  B.S. Computer and Systems Engineering; GPA: 3.78 — *August 2016 - December 2020*

Skills & Interests

- **Programming**: C/C++, Python, MATLAB
- **Technologies and Frameworks**: PyTorch, Tensorflow, Visual Studio, LaTeX, git, openCV, CMake
- **Interests**: Computational neuroscience, theoretical neuroscience, vision, signal processing, machine learning

Work & Research Experience

- **Redwood Center for Theoretical Neuroscience** — Berkeley, CA
  Researcher — *August 2022 - Present*
  - Building computational models to understand early visual processing and inference.
  - Advisor: Dr. Bruno Olshausen
- **Washington University in St. Louis, Department of Neurosurgery** — St. Louis, MO
  Research Assistant; Systems Engineer — *January 2021 - Present*
  - Developed intracranial electrophysiology research technologies.
  - Advisor: Dr. Peter Brunner
- **Intelligent Structural Systems Laboratory (ISSL)** — Troy, NY
  Research Assistant — *May 2020 - Present*
  - Applied time-series deep learning techniques to identify flight states of fly-by-feel aircraft.
  - Advisor: Dr. Fotis Kopsaftopoulos
- **National Center for Adaptive Neurotechnologies (NCAN)** — Albany, NY
  Research Assistant — *May 2018 - Present*
  - Improved and maintained BCI2000, a general purpose software for brain-computer interfacing.
  - Advisors: Drs. Gerwin Schalk, Peter Brunner

Papers †First Author

- **Cross-Frequency Coupling Increases Memory Capacity in Oscillatory Neural Networks**
  C. Bybee†, **A. Belsten**, F. T. Sommer, arxiv preprint, 2022
- **Towards a Fully Implantable Ecosystem for Adaptive Neuromodulation in Humans: Preliminary Experience with the CorTec BrainInterchange Device in a Canine Model**
  G. Schalk, S. Worrell, F. Mivalt, **A. Belsten**, I. Kim, J. M. Morris, D. Hermes, B. T. Klassen, N. Staff, S. Messina, T. Kaufmann, J. Rickert, P. Brunner, G. Worrell and K. J. Miller, Frontiers in Neuroscience, 2022
- **Data-Driven Flight State Identification via Time-Series-Informed Features and Convolutional Neural Network**
  A. Belsten†, F. Kopsaftopoulos, 2021 AIAA AVIATION Forum, 2021
- **Hardware Abstraction to Facilitate the Dissemination and Validation of Electrophysiological Experiments**
  A. Belsten†, M. Adamek, P. Brunner, 2020 IEEE Engineering in Medicine and Biology Society Conference, 2020

Academic Honors

- **Dean's Honor List** 2016-2020: 8 semesters.
- **Rensselaer Leadership Award** 2016: Given in recognition of an outstanding record of academic and personal achievements, a strong commitment to excellence, and illustration of intellectual curiosity.

Posters †Presenting Author

- **Image Reconstruction from Population Retinal Ganglion Cell Response**†
  Bay Area Vision Research Day (BAVRD) 2022
- **Cross-Frequency Coupling Increases Memory Capacity in Oscillatory Neural Networks**
  Computational and Systems Neuroscience (COSYNE) 2022
- **New Depths in Brain-Computer Interfacing**
  Society for Neuroscience (SfN) 2021
- **BIC-BCI2000: A General-Purpose Hardware and Software Platform for Chronic Intracranial Neuromodulation**†
  Society for Neuroscience (SfN) 2021
- **CorTec Brain Interchange in Freely Behaving Canine**
  Society for Neuroscience (SfN) 2021
- **BCI2000: Software Resource for Adaptive Neurotechnology Research**
  NIH BRAIN Initiative 2021
- **Overcoming Heterogeneous Hardware to Facilitate Dissemination and Validation of Electrophysiological Experiments**†
  Society for Neuroscience (SfN) 2020
- **Evaluating the Closed-Loop Performance of Clinical Electrophysiology Recording Systems using BCI2000**
  Society for Neuroscience (SfN) 2020

Presentations

- **BCI2000 - Interacting with Peripheral Devices**
  NCAN Focus Course 2021 - Scientific and Engineering Principles of Adaptive Neurotechnologies
- **BCI2000's Robust Framework**
  Rensselaer Center for Open Source - Fall 2018

Leadership & Activities

- **Speaker Committee - 2022 Bay Area Vision Research Day (BAVRD)**
  Selected and organized Bay Area vision researchers to give talks/poster presentations at BAVRD conference
- **Social Chair - Berkeley Vision Science Student Government** - 2022-Present
- **IEEE-HKN - Beta Nu Chapter, Honor Society for Electrical and Computer Engineers**
  2019 President, 2020 Webmaster
- **Rensselaer Outing Club Wall Leader**
  Organize and run climbing wall hours for Rensselaer community.
- **Troy Bike Rescue**
  Assist the local Troy, NY community repair their bicycles.

Teaching

- **Graduate Student Instructor for Neural Computation (VS 265)** - Fall 2022
- **Undergraduate TA for Digital Signal Processing (ECSE 4530)** - Fall 2020
- **ALAC Mentor for Data Structures (CSCI 1200)** - Spring, Fall 2018
- **ALAC Mentor for Foundations of Computer Science (CSCI 2200)** - Fall 2018