

IDO HABER

PhD Candidate · Neuroengineering · Signal Processing & Machine Learning

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PROFESSIONAL SUMMARY

PhD candidate in Neuroengineering specializing in large-scale neural data systems, signal processing, and scientific computing. I develop scalable pipelines for high-dimensional physiological data, bridging research and engineering across machine learning, software infrastructure, and computational neuroscience. My work spans end-to-end system design — from algorithm development and optimization to UI/UX. I enjoy open-source development for real-world scientific applications. I bring a lifelong learning mindset and genuine enthusiasm for pushing the boundaries of neuroscience through technology.

Time-Series Analysis • DevOps • Containerization • Data Pipelines • Statistical Modeling

RESEARCH EXPERIENCE

Graduate Researcher

Center of Sleep and Consciousness — Dept. of Psychiatry, UW–Madison
Sep 2023 – Present • Madison, WI

- End-to-end sleep HD-EEG signal analysis in Python and MATLAB — preprocessing, artifact removal, feature extraction, and source reconstruction
- Designed head models and stimulation protocols for DARPA-funded clinical studies under the STRENGTHEN program
- Designed a 3D-printed apparatus for accurate placement of stimulation electrodes from individual MR images ↗
- Built a machine-learning classifier to predict patient outcomes in response to intervention protocols

Graduate Researcher

Hai Lab — Dept. of Biological Engineering, UW–Madison
Jan 2021 – Present • Madison, WI

- Investigate the effects of 5HT_{2A} receptor manipulation via pharmacological agents on the behavior of neural cultures on MEA ↗
- Simulated magnetolectric nanoparticles in COMSOL Multiphysics ↗

Undergraduate Researcher

Barnes Lab — Dept. of Kinesiology, UW–Madison
May 2018 – May 2019 • Madison, WI

- Researched the effect of aging and lifestyle on cerebral blood flow regulation and its association with age-related diseases
- Analyzed changes in cerebral blood flow in response to chemical and metabolic stressors pre- and post-administration of cyclooxygenase inhibitors

FEATURED OPEN-SOURCE PROJECTS

TI-Toolbox — Simulation of Non-invasive Temporal Interference Stimulation ↗

May 2025 – Present • Lead Developer & Maintainer

- Founder & Lead developer — designed the full-stack architecture, UI/UX, CI/CD, and core algorithms. Supporting a global community of researchers

SimNIBS — Simulation of Non-invasive Brain Stimulation ↗

Jan 2024 – Present • Contributor

- Developed a feature to ease clinical translation of electrode placement
- Assist researchers with the codebase and offer solutions based on individual research needs

NVIM — Vim-fork Focused on Extensibility

Jan 2024 – Present • Developer & Maintainer

- Developed a framework for MATLAB development from the terminal ↗

EDUCATION

PhD in Neuroengineering

University of Wisconsin – Madison • Sep 2023 – Present

Focus: Sleep EEG signal processing, Transcranial Temporal Interference Stimulation, FEM modeling

MSc in Biomedical Engineering

University of Wisconsin – Madison • Dec 2023

Focus: electrophysiology, psychoplastogen neuropharmacology, graph-theory

BSc in Neurobiology & Psychology

University of Wisconsin – Madison • Dec 2021

TECHNICAL SKILLS

ML & Data Science: Python (NumPy, pandas, SciPy, scikit-learn) • Jupyter • SQL

Agentic Dev Tools: Claude/Codex CLI • Pi • Cursor • Skills & MCP integrations

Engineering: Bash • MATLAB • SSH • TMUX • Vim • Unix Architecture

DevOps: Git • GitHub Actions • Docker • CircleCI

Data & Analytics: Google Analytics • BigQuery • Grafana • Looker Studio • Streamlit

Neural Signal Processing: EEGLAB • MNE • YASA • Brainstorm • Nilearn • NiBabel • BIDS Apps • Freesurfer • FSL • MRtrix3

Modeling: SimNIBS • Gmsh • COMSOL Multiphysics • Sim4Life • LTspice • Altium Designer • Blender • Bambu Studio

Wet Lab (in Vitro): MEA Recording • Calcium Imaging • Protein Labeling

Creative & Productivity: Inkscape • GIMP • TouchDesigner • Ableton Live • Final Cut Pro • 3D Printing • LaTeX / Overleaf • Jira • Obsidian

LANGUAGES

English ●●●● (fluent)

Hebrew ●●●● (fluent)

SELECTED PUBLICATIONS

1. **Haber, I.**, Jackson, A., Thielscher, A., Hai, A., & Tononi, G. (2026) TI-Toolbox: An Open-Source Software for Temporal Interference Stimulation Research. *Brain Stimulation*. ↗
2. **Haber, I.** et. al., Shortened Anterior Fast Spindles Link Hypopnea Burden to Attentional Vulnerability in Children. *In prep.*
3. **Haber, I.**, Tononi, G. Do Agents Need Sleep? *Submitted.*
4. **Haber, I.**, et al. Acute DOI exposure drives cortical hyperexcitability and functional network remodeling. *In Review.* ↗
5. Schaeffer, E. L., **Haber, I.**, et al. (2025) Enhancement of Sleep Slow Wave Activity using Transcranial Electrical Stimulation with Temporal Interference. *In Review.* ↗
6. Bruno, S., Mat, B., Schaeffer, E. L., **Haber, I.**, et. al. (2026). Thalamic transcranial electrical stimulation with temporal interference enhances sleep spindle activity during a daytime nap. *In Review.* ↗
7. Bok, I., **Haber, I.**, Qu, X., & Hai, A. (2022). In silico assessment of electrophysiological neuronal recordings mediated by magnetoelectric nanoparticles. *Scientific Reports*. ↗

INVITED TALKS

- In Silico Simulation of Temporal Interference Stimulation — BU Computational Cognitive Neuroscience Lab. March 2026

TEACHING & PROFESSIONAL EXPERIENCE

Research Collaborator

Z43 & ITIS Foundation

Jun 2024 • Zurich, Switzerland

- Collaborated on hardware and software solutions for advanced temporal interference stimulation.
- Contributed to hardware discussions on inter-modulation artifacts due to system non-linearities.
- Provided clinical insights to the software team on EEG nets and electric-vector orientation with respect to cortical tissue.

Graduate Teaching Assistant

Psych 225, Research Methods — Dept. of Psychology, UW–Madison

Aug 2022 – May 2023 • Madison, WI

- Taught two labs weekly, held office hours, and proctored exams.
- Facilitated hands-on learning while optimizing student outcomes as part of Communication-B coursework.

Business Consultant, Video Editor & Content Creator

Effectivate

May 2020 – Jul 2022 • Tel Aviv, Israel

- Conducted literature research and UX testing for the R&D team.
- Created marketing content; increased sales and lowered cost-per-lead for an early-stage startup.

Project Manager & National Member

TAMID Group

Sep 2019 – Dec 2020 • Madison, WI

- Advised top U.S. universities during their beta process as part of a national student team.
- Led teams of business-oriented UW students in pro-bono consulting cases for innovative Israeli startups.
- Facilitated communication between company executives and team members (Effectivate, Phytor).

LEADERSHIP & ATHLETICS

Varsity Swim Team — Middle-Distance Freestyle

University of Wisconsin – Madison

Aug 2017 – Oct 2019 • Madison, WI

National Athlete, Israeli National Swimming Team

Wingate Institute for Sports Excellence

Apr 2010 – Oct 2019 • Netanya, Israel

Israeli record holder — 400 m freestyle and 800 m freestyle relay.

Air Force Sergeant

Israeli Defense Force

Oct 2014 – Aug 2017 • Haifa, Israel

INTERESTS

Brazilian Jiu-Jitsu • Still Photography • Music & Vinyl Collecting • Surfing