

# IDO HABER

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[Portfolio Website](https://idossha.github.io): [idossha.github.io](https://idossha.github.io); [LinkedIn Profile](https://www.linkedin.com/in/idohaber): [www.linkedin.com/in/idohaber](https://www.linkedin.com/in/idohaber)

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## PROFESSIONAL SUMMARY

I am a neuroengineering PhD candidate with expertise in neuromodulation, EEG signal analysis, and FEM modeling. I develop open-source software and stimulation protocols that support clinical and translational neuroscience research, with a focus on temporal interference stimulation and sleep EEG studies. My work takes inspiration from both academia and industry best practices, emphasizing reproducible tools, clinical feasibility, and real-world impact. I bring a lifelong learning mindset and genuine enthusiasm for pushing the boundaries of neuroscience through technology.

## EDUCATION

**University of Wisconsin - Madison; Madison, WI**

**PhD in Neuroengineering**

September 2023 - Present

Focus: Sleep EEG Signal Processing, Transcranial Temporal Interference Stimulation, FEM Modeling

**MSc in Biomedical Engineering**

December 2023

Focus: Neural Plasticity, Electrophysiology

**BSc in Neurobiology & Psychology**

December 2021

## ACADEMIC EXPERIENCE

**University of Wisconsin - Madison; Madison, WI**

**Researcher, Center of Sleep and Consciousness – Department of Psychiatry**

September 2023 - Present

- Conceptualized and published TI-Toolbox. An open-source software used throughout the world for clinical research
- Developed a 3D printed apparatus for accurate placement of stimulation electrodes from individual MR images
- Built machine learning classifier to predict patient outcomes in response to intervention protocols via scikit-learn
- Design head models and stimulation protocols for DARPA-funded clinical studies under the STRENGTHEN program
- Perform end-to-end sleep HD-EEG signal analysis in MATLAB and Python, from raw input through preprocessing, artifact removal, feature extraction, and source reconstruction
- Deliver transcranial electrical stimulation to human subjects using kHz frequencies in clinical settings

**Researcher, Hai's Lab - Department of Biological Engineering**

January 2021 - Present

- Investigate the effects of 5HT<sub>2A</sub> receptor agonists on the behavior of neural cultures
- Simulated behavior of magnetoelectric nanoparticles in COMSOL Multiphysics
- Plated neuronal cultures for calcium imaging, MEA recordings, protein labeling, and protocol optimization

**Graduate Teaching Assistant – Psych 225, Research Methods - Department of Psychology**

August 2022 - May 2023

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

**Undergraduate Research Assistant, Barnes Lab - Department of Kinesiology**

May 2018 - May 2019

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

## PUBLICATIONS

1. **Haber, I.**, Jackson, A., Thielscher, A., Hai, A., & Tononi, G. TI-Toolbox: An Open-Source Software for Temporal Interference Stimulation Research. *Brain Stimulation: Basic, Translational, and Clinical Research in Neuromodulation*. <https://doi.org/10.1016/j.brs.2025.103016>
2. E. L. Schaeffer, **I. Haber**, *et al.*, "Enhancement of Sleep Slow Wave Activity using Transcranial Electrical Stimulation with Temporal Interference", doi: <https://doi.org/10.1101/2025.08.11.25333452>.
3. I. Bok, **I. Haber**, X. Qu, and A. Hai, "In silico assessment of electrophysiological neuronal recordings mediated by magnetoelectric nanoparticles," *Sci Rep*, vol. 12, no. 1, p. 8386, May 2022, doi: [10.1038/s41598-022-12303-4](https://doi.org/10.1038/s41598-022-12303-4).

## INDUSTRY EXPERIENCE

### Collaborator – Z43 & ITIS Foundation; Zurich, Switzerland

June 2024

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

### Business Consultant, Video Editor, Content Creator - Effectivate; Tel Aviv, Israel

May 2020 - July 2022

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

### Project Manager & National Member - TAMID Group; Madison, WI

September 2019 - December 2020

- Advised top universities across the United States during their beta process on a student national team
- Led teams of business-oriented UW students in pro bono consulting cases for innovative Israeli startups
- Utilized strong communication and leadership skills by facilitating instructions from company executives to team members (Effectivate, Phytor)

## SKILLS & TECH STACK

- Modeling: SimNIBS, Gmsh, Blender, LTspice, Sim4Life, Bambu Studio, COMSOL Multiphysics, Altium Designer
- Programming: Python, MATLAB, Bash, Lua, JavaScript, HTML, CSS, C++
- Tech: Git, Docker, CircleCI, Electron, SSH, TMUX, VIM, Unix, Windows, Google Analytics, Looker Studio
- Neuroscience: BIDS, Freesurfer, FSL, MRtrix3, EEGLAB, Brainstorm, MNE, YASA, Nilearn, NiBabel, scikit-learn
- *in vitro*: Micro Electrode Array Recording, Calcium Imaging, Protein Labeling
- Other: Inkscape, GIMP, 3D printing, TouchDesigner, Ableton Live, Final Cut Pro, OverLeaf, LaTeX
- Languages: Fluent in English & Hebrew

## OPEN-SOURCE PROJECTS

### TI-Toolbox – Simulation of Non-invasive Temporal Interference Stimulation

May 2025 - Present

- Main developer - Developed the software's architecture, CI/CD, deployment, and key algorithms
- Active maintainer - Support researchers and clinicians worldwide in adopting and using TI-Toolbox

### SimNIBS – Simulation of Non-invasive Brain Stimulation

January 2024 - Present

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

### NVIM – Hyperextensible Vim-based test editor

March 2025 - Present

- Developed a complete MATLAB scripting and debugging approach from the terminal that can be executed from headless servers
- Built a Python plugin for convenient environment control and direct execution of scripts

## LEADERSHIP EXPERIENCE

### University of Wisconsin - Madison; Madison, WI

Member, Varsity Swim Team - middle-distance freestyle

August 2017 - October 2019

### Wingate Institute for Sports Excellence; Netanya, Israel

National Athlete, Israeli National Swimming Team

April 2010 - October 2019

*Israeli record holder in 400m free and 800m free relay*

### Israeli Defense Force; Haifa, Israel

October 2014 - August 2017

Air Force Sergeant

## INTERESTS

Brazilian Jiu Jitsu, still photography, music & vinyl collecting, surfing