

Hannah Kempfert

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EDUCATION

University of California, Berkeley

Aug. 2023 – Present

PhD Student in Electrical Engineering

Major: Medical Imaging, Minor: Control & Optimization

Advisor: Prof. Chunlei Liu

Cumulative GPA: 3.88/4.00, Major GPA: 4.00/4.00

University of Florida

Aug. 2019 – May 2023

Bachelor of Science in Electrical Engineering

Minor in Mathematics

Cumulative GPA: 3.99/4.00, Major GPA: 4.00/4.00

RESEARCH POSITIONS

Graduate Student Researcher, Liu Lab

Aug. 2023 – Present

University of California, Berkeley – Prof. Chunlei Liu

I. Multiphoton MRI for Simultaneous Transmission and Reception Jan. 2024 - Present

- Designing and implementing a custom hardware system and pulse sequences for simultaneous transmission and reception imaging by using the recently developed multiphoton MRI method

II. MRI Image Reconstruction for 96-channel Coil at 7T Aug. 2023 - Present

- Developed an effective magnitude and phase image reconstruction pipeline for high density receive arrays (arrays of 32 and 96 surface coils for brain imaging) with extraordinary imaging acceleration and high spatial resolution; in particular, an acceleration rate of $\times 10$ below the Nyquist sampling condition with sub-millimeter resolution *in vivo*, allowing for a tenfold reduction in scan time

Undergraduate Researcher, SmartData Lab

Aug. 2021 – May 2023

University of Florida – Prof. Joel B. Harley, Dr. Harsha Tetali

I. Physics-informed Machine Learning Aug. 2022 – May 2023

- Developed unsupervised algorithm for moving object detection, implementing a novel matrix factorization technique for the optical flow partial differential equation
- Implemented physics-guided matrix factorization to decompose homogenous and non-homogeneous spatiotemporal vibrational data into linear components satisfying Helmholtz wave equation constraints

II. Modal Analysis with Event-based Imaging Aug. 2021 – Jun. 2022

- Implemented a phase-based motion algorithm in Python to perform blind source separation and extract modal coordinates from local phase values of a wine glass in resonance

- Designed and performed an experiment to capture wine glass resonance using an event-based, neuromorphic camera

NNCI & NSF REU Program, Kunze Neuroengineering Lab

Jun. 2022 – Aug. 2022

Montana State University – Prof. Anja Kunze, Dr. Mackenna Landis

- Determined high-impact geometric parameters of micromagnets for optimizing nanomagnetic force maps with the greater goal of stimulating localized and precise magnetically-actuated mechanical forces on internalized nanoparticles in cells
- Used COMSOL Multiphysics software to design permalloy micromagnets and simulate the resulting nanomagnetic force maps; experimentally validated results using Leica DMI8 fluorescent microscope

CONFERENCES & SYMPOSIUMS

ISMRM & ISMRT Annual Meeting & Exhibition

May 2025

Presenting Author, *Optimized z-Direction RF Coil for Multiphoton Excitation with Improved Homogeneity*

ISMRM & ISMRT Annual Meeting & Exhibition

May 2024

Presenting Author, *Coil Sensitivity Estimation and Complex Image Combination for 96-channel Coil at 7T*

BMES Annual Meeting

Oct. 2022

Presenting Author, *Optimizing Nanomagnetic Force Field Patterns for Cellular Growth and Signaling Assays*

Annual NNCI Nano+Additive Manufacturing Summit

Aug. 2022

Presenting Author, *Optimizing Nanomagnetic Force Modulation through Geometric Shaping*

**ASME 2022 QNDE – 49th Annual Review of Progress in Quantitative
Nondestructive Evaluation**

Jul. 2022

Co-Author, *Learning Wave Modes from Neuromorphic Cameras: A Feasibility Study*

University of Florida 2022 Spring Undergraduate Research Symposium

Apr. 2022

Co-Author, *Radial Modal Analysis with Neuromorphic Event-based Imaging*

TEACHING EXPERIENCE

Undergraduate Teaching Assistant, Circuits 2

Jan. 2023 – May 2023

University of Florida – Prof. Mark Sheplak

- Held weekly recitation sessions to review course content; held weekly office hours to assist students with course content, such as first- and second-order analog filters, complex circuit analysis, and continuous time transforms
- Graded lab assignments and exams

University of Florida – Prof. Eric M. Schwartz

- Held weekly office hours and lab sessions to assist students with course content, such as AVR Assembly, C programming, external memory interfacing, DMA, implementation of communication protocols, CPU interrupts, timer/counter systems, and ADC/DAC systems
- Graded lab assignments, student demonstrations, and exams

AWARDS

Chancellor's Fellowship

2023

University of California, Berkeley

- Full-funding for first year of PhD eligible to qualified applicants who enhance the diversity of Berkeley's graduate programs

EECS Excellence Award

2023

University of California, Berkeley

- Granted in first year of PhD for outstanding undergraduate academic record; this award consists of a one-time payment with no employment expectations

Electrical Engineering Student Award

2023

University of Florida

- Granted to graduating electrical engineering students with a minimum upper division GPA of 3.90 in all course work as well as a 3.90 or higher GPA in all ECE courses; most prestigious award offered by the Department of Electrical and Computer Engineering at the University of Florida

Florida Academic Scholarship

2019

- Full-tuition scholarship awarded to high school students in the state of Florida based on GPA, test scores, and volunteer work

PRACTICAL SKILLS

- Operation of 3T GE MRI scanner and associated software
- Python, C, C++, Java, JavaScript, ARM and AVR assembly, VHDL, MATLAB
- COMSOL Multiphysics, ImageJ, Quartus, LTSpice, Modelsim, ADS, KiCad