Zachary Stoebner

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Overview

*My research interests are in **computational imaging** and **computer vision**. Currently, I am working on methods for **image reconstruction** and **system identification** for Fourier imaging systems.*

Education

University of Texas at Austin *Austin, TX*
PHD IN ELECTRICAL & COMPUTER ENGINEERING *August 2022-Present*

- Advisor: Prof. Jon Tamir
- Graduate Coursework: Convex Optimization, Probability & Stochastic Processes, Computational MRI, Real Analysis, Advanced Computer Vision, Fourier Optics, Digital Signal Processing, Large-Scale Optimization

Vanderbilt University *Nashville, TN*
BS WITH HONORS IN COMPUTER SCIENCE & NEUROSCIENCE, MINOR IN APPLIED MATHEMATICS *May 2021*
MS IN COMPUTER SCIENCE *August 2022*

- Advisor: Prof. Ipek Oguz
- Thesis: A deep learning-enabled automatic segmentation system for surgical endoscopy
- Graduate Coursework: Statistical ML, Systems Theory, Computational Game Theory, Intelligent Systems & Robotics

Publications

IN PROGRESS

"Learning a neural implicit to jointly estimate B_0 field map estimation and image reconstruction in low-field MRI", **Zachary A. Stoebner**, Jonathan I. Tamir.

CONFERENCE

"Segmentation of kidney stones in endoscopic video feeds", **Zachary A. Stoebner**, Daiwei Lu, Seok Hee Hong, Nicholas L. Kavoussi, and Ipek Oguz. *SPIE Medical Imaging 2022: Image Processing* (2022).
[DOI][arXiv]

- Optimized a high-performing (>0.9 Dice, 0.8 Kappa) U-Net video segmentation model and deployed in live surgeries
- Built and annotated a novel dataset of endoscopic nephrolithotomy videos

JOURNAL

"Comprehensive shape analysis of the cortex in Huntington's disease", **Zachary A. Stoebner**, Kilian Hett, Ilwoo Lyu, Hans Johnson, Jane S. Paulsen, Jeffrey Long, Ipek Oguz. *Human Brain Mapping* (2023).
[DOI][GitHub]

- Formulated a linear-mixed model to describe the cortex from the longitudinal PREDICT-HD dataset, using a novel index for gyrification, sulcal depth, and cortical thickness
- Discovered new areas of change associated with Huntington's disease and corroborated the degree of change associated with known areas

"Reducing malware analysis overhead with coverings", Michael Sandborn, **Zachary A. Stoebner**, Westley Weimer, Stephanie Forrest, Ryan Dougherty, Jules White, Kevin Leach. *IEEE-TDSC* (2023).
[DOI][GitHub]

- Developed a high-performing (>90% hit rate) deep multilabel classifier that predicts which sandboxes will run a stealthy malware sample using its binary image
- Implemented scheduling algorithms to simulate the analysis framework's scalability given the classifier's predictions

Select Honors

2022-Present	**Cockrell Engineering Fellowship,** University of Texas at Austin
2017-2021	**Dean's List**, Vanderbilt University

Skills

Theory: Inverse Problems, Fourier Analysis, Optimization, Deep Learning (Score-Based Diffusion, Neural Implicits, GANs)
Practice: Python (PyTorch, OpenCV), C++ & C (ITK / VTK, OpenCV, LLVM), ML Optimization & Workflow (Lightning, Comet), Visualization (PyPlot, Seaborn), MATLAB, R

Verbal: English (native), Portuguese (fluent), Spanish (advanced), French (basic)

Other: tennis (USTA 4.5), trail running, backpacking, kū & tanka poetry, photography