

Zachary Stoebner

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Overview

My research interests lie in **computational imaging**, **computer vision**, and **signal processing**. My current work is on representing **neural implicit**s in **inverse problems** to improve **image reconstruction** in Fourier imaging.

Education

University of Texas at Austin

PHD IN ELECTRICAL & COMPUTER ENGINEERING

Austin, TX

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

Vanderbilt University

BS WITH HONORS IN COMPUTER SCIENCE & NEUROSCIENCE, MINOR IN APPLIED MATHEMATICS

Nashville, TN

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 the implicit neural representation of the B_0 field 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. *In review at IEEE-TDSC* (2023).
[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: Neural Implicit, Inverse Problems, Fourier Analysis, Score-Based Diffusion, 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, kō & tanka poetry, photography