Zachary **Stoebner**

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Overview

*My research spans **deep learning**, **sensing & imaging**, and **computer vision**, with general interests in AI/ML & neuroscience, optimization & control, and intelligent systems & robotics.*

Education

University of Texas at Austin — *Austin, TX*

PhD in Electrical & Computer Engineering — *August 2022-Present*

- Advisor: Prof. Jon Tamir
- Focus: Computational sensing and imaging
- Coursework: Convex Optimization, Probabilistic & Stochastic Processes

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
- Masters Thesis: A deep learning-enabled automatic segmentation system for surgical endoscopy
- Bachelors Research: ML for brain MRI: (1) GAN-based harmonization and (2) cortical shape analysis using linear-mixed models
- Coursework: Statistical ML, Visual Analytics for ML, Systems Theory, Computational Game Theory, Automated Verification

Skills

Deep Learning • Image & Signal Processing • Compressed Sensing | ML Workflows • Design Patterns • Visualization

Programming: Python (PyTorch, OpenCV, SigPy, CVXPY), C++ & C (ITK, VTK, OpenCV, LLVM), MATLAB (ML, Signal Processing), JavaScript (d3.js), R (LME4), LaTeX
Verbal: English (native), Portuguese (fluent), Spanish (advanced), French (basic)
Other: kū & tanka poet, photographer, lifter & runner

Select Publications

Zachary A. Stoebner, Daiwei Lu, Seok Hee Hong, Nicholas L. Kavoussi, and Ipek Oguz, "Segmentation of kidney stones in endoscopic video feeds", Proc. SPIE 12032, *Medical Imaging 2022: Image Processing* (2022).
[SPIE][arXiv]

- Built and annotated a novel dataset of endoscopic nephrolithotomy videos
- Optimized a high-performing (>0.9 Dice, 0.8 Kappa) U-Net++ video segmentation model
- Wrote the paper and collaborated closely with a leading surgeon

Zachary A. Stoebner, Kilian Hett, Ilwoo Lyu, Hans Johnson, Jane S. Paulsen, Jeffrey Long, Ipek Oguz, "Comprehensive shape analysis of the cortex in Huntington's disease", *Human Brain Mapping* (2022). [Accepted, In Production]
[GitHub]

- Formulated a linear-mixed model to describe cortical measurements in terms of demographic and clinical information
- Coordinated with senior researchers across time zones to incorporate their work into our methods and leverage their expertise into insights on our findings
- Wrote the paper

Ahmadi, Mohsen, Kevin Leach, Ryan Dougherty, **Zachary A. Stoebner**, Michael Sandborn, Stephanie Forrest, and Westley Weimer. "Mimosa: Reducing malware analysis overhead with coverings." *Submitting to IEEE-TDSC* (2022).
Contribution: deep multilabel classification of malware binaries + simulating scalability based on classifier performance
[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 **Cockrell Engineering Fellowship**, University of Texas at Austin

Select Presentations

Posters

** presenting author*

Zachary A. Stoebner*, Daiwei Lu, Seok Hee Hong, Nicholas L. Kavoussi, and Ipek Oguz. "Segmentation of kidney stones in endoscopic video feeds". *Vanderbilt Institute of Surgery & Engineering*. 2021. Nashville, TN.

Nicholas L. Kavoussi*, **Zachary A. Stoebner**, Daiwei Lu, Ipek Oguz. "Automated Method of Tracking and Segmenting Kidney Stones During Ureteroscopy Using Computer Vision Techniques". *Engineering & Urology Society*. 2021. Las Vegas, NV.

Talks

Fall 2021 **ML for Course and Research Projects**, CS 4262 - Foundations of ML *Vanderbilt*

Teaching Experience

Assistant

Spring 2022 **Projects in ML**, CS 3892 *Vanderbilt*
Fall 2021 **Artificial Intelligence**, CS 4260 *Vanderbilt*
Spring 2021 **Deep Learning**, CS 3891 *Vanderbilt*
Fall 2020 **Operating Systems**, CS 3281 *Vanderbilt*
Spring 2020 **Discrete Structures**, CS 2212 *Vanderbilt*
Fall 2019 **Discrete Structures**, CS 2212 *Vanderbilt*

Service & Outreach

2021-2022 **Community Outreach Chair**, Out in Engineering *Vanderbilt*
2021-2022 **Peer Reviewer, Section Leader, & Graduate Mentor**, Undergraduate Research Journal *Vanderbilt*
2019-2021 **Mentor & VP of Communications**, Engineering Design Studio *Vanderbilt*