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EDUCATION

Vanderbilt University   **Nashville, TN**
- B.S. in Honors Computer Science & Honors Mathematics   May 2022
- GPA: 3.88 / 4.0
- Honors & Awards: CRA Undergrad Researcher Honorable Mention, VUSE Fellowship, DSI-SRP Fellowship, Buchanan Librarian Fellowship, Robert Penn Warren Scholarship, Dean's List all semesters.
- Teaching: Teaching assistant for Intro to Programming with Python since Fall 2020.

SKILLS & COURSEWORK

- **Technical Skills:** Python, C++, JavaScript, D3.js, Vega-Lite, HTML, CSS, PyTorch, AWS, GCP.
- **Coursework**: Machine Learning, Data Visualization, Visual Analytics, Data Structures, Algorithms, Mathematical Statistics, Probability, Advanced Linear Algebra, Graph Theory, Real Analysis, Topology.

SELECTED PUBLICATIONS

Conference

[C1] **Lu, Y.**, Liu X, Kolouri, S. (2021), "Set Locality Sensitive Hashing via Sliced Wasserstein Embeddings." *IEEE Conference on Computer Vision and Pattern Recognition (CVPR) (submitted).*

[C2] Sahoo, S, **Lu, Y**., and Berger, M., "Neural Flow Map Reconstruction." (2021) *Computer Graphics Forum (EuroVis Proceedings) (submitted).*

[C3] **Lu, Y**., and Berger, M. (2021), "On Interpolation for Neural Field Representations." *(in revision)*

[C4] Liu, Q., Louis, P. C., **Lu, Y**., Jha, A., Zhao, M., Deng, R., ... and Huo, Y. (2021), "SimTriplet: Simple Triplet Representation Learning with a Single GPU." *International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI).*

[C5] **Lu, Y**., Jiang, K., Levine, J.A., and Berger, M. (2020), "Compressive Neural Representations of Volumetric Scalar Fields." *Computer Graphics Forum (EuroVis Proceedings).*

[C6] **Lu, Y**., Yang, H., Zhu, Z., Deng, R., Fogo, A.B. and Huo, Y. (2020), "Improve Global Glomerulosclerosis Classification with Unbalanced Data using CircleMix Augmentation". *Medical Imaging, International Society for Optics and Photonics (SPIE).*

[C7] Zhu, Z., **Lu, Y.**, Deng, R., Yang, H., Fogo, A. B., and Huo, Y. (2020), "EasierPath: An Open-source Tool for Human-in-the-loop Deep Learning of Renal Pathology." *Workshop in International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI).*

[C8] Yang, H., Deng, R., **Lu, Y**., Zhu, Z., Chen, Y., Roland, J.T., Lu, L., Landman, B.A., Fogo, A.B. and Huo, Y. (2020), "CircleNet: Anchor-Free Glomerulus Detection with Circle Representation." *International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI).*

Journal

[J1] **Lu, Y**., Yang, H., Asad, Z., Zhu, Z., ...and Huo, Y. (2021), "Holistic Fine-grained GGS Characterization: From Detection to Unbalanced Classification." *Journal of Medical Imaging (JMI) (to appear).*

In Preparation

[P1] **Lu, Y**., Perer, A. (2021), "NeuralMarker: Human-in-the-loop Neuron Labeling at Scale to support Customized Explanations."

[P2] **Lu, Y**., Kerley C., Landman, B.A. (2021), "Robust Optic Nerve Segmentation by Learning from Imperfect Labels."

PROFESSIONAL EXPERIENCE

CMU HCI Institute | Interpretable Machine Learning   Pittsburgh, PA
Research Intern, advisor: Dr. Adam Perer   June 2021 – Aug 2021
- Performed exploratory analysis on a mammogram dataset of 81,149 DICOM images and built a patch generation pipeline using image processing techniques to extract human annotations.
- Developed deep neural networks to detect breast cancer, built a visual analytics interface for domain experts to interactively explore and label human-interpretable units to generate customized explanations. [P1]

Data Science Institute | Machine Learning   Nashville, TN
Data Science Intern, advisor: Dr. Yuankai Huo   May 2020 - Aug 2020
- Adapted convolutional neural networks for supervised multi-class glomeruli classification using PyTorch, implemented focal loss and a batch sampler to combat the imbalanced data distribution
- Designed CircleMix, a novel data augmentation optimized for ball-shaped biomedical objects that improves balanced accuracy by 3% on cross-validation [C6].

RESEARCH & PERSONAL PROJECTS

Computational Optimal Transport | Advised by Dr. Soheil Kolouri
- Working on releasing a PyTorch package on Sliced-Wasserstein Distance with tutorials on its scalability and sample complexity as well as its application to k-means clustering and generative modeling algorithms.
- Researched Sliced-Wasserstein Embedding to enable non-parametric learning on set data, achieved state-of-the-art (SOTA) performance on three benchmark datasets. [C1]

Neural Volume Visualization | Advised by Dr. Matthew Berger
- Designed a novel coordinate-based multi-layer perceptron for compressing both 3D and time-varying volumetric scalar fields that provides new SOTA compression performance. [C2] [C5]
- Investigated the impact of higher-order interpolants when treating neural representations of volumetric scalar fields as derivations from interpolating a coarse grid of learned vector representations. [C3]
- Researched using attention mechanism in Transformers to model interpolation schemes.

Computational Renal Pathology | Advised by Dr. Yuankai Huo
- Developed the user interface of EasierPath, an open-source renal pathology annotation toolkit in Python [C7].
- Contributed to CircleNet [C8], an object detection algorithm optimized for glomeruli, by preparing training and test data; contributed to SimTriplet [C4] by adapting SimSiam architecture to work on multi-view medical images and exploring mixed-precision training to address memory constraints.
- Integrated a glomerular sclerosis characterization pipeline that leverages hard negative mining and large-scale transfer learning to generate fine-grained characterization results directly from whole slide images [J1].

CT Window Adjustment | Advised by Dr. Bennett Landman
- Designed a multi-head neural network to learn optimal window adjustment for brain CTs.

Optic Nerve Segmentation | Advised by Dr. Bennett Landman
- Trained a 2D U-Net using MONAI to segment optic nerves in brain MRIs, implemented histogram matching to standardize contrast, implemented a postprocessing step by finding the largest connected components. The model serves as a robust translation of the previous multi-atlas method but is 20 times faster. [P2]

Gaokaopedia | Education Equality
- A project promoting educational equality and future path awareness among high school students in China.
- Co-developed a WeChat mini program that connects high school and college students based on alumni relations that attracts over 2.2k users. Won second place in Tencent Global mini program competition.

LEADERSHIP & SERVICE EXPERIENCE

The Wond'ry Center for Innovation and Design | Design Thinking   Nashville, TN
Founder at Vanderbilt Innovation and Entrepreneurship Society   Jan 2019 – May 2021
- Won the 1st place among thirty teams in 48 Hour Launch Competition pitching an online spoken English teaching platform that links American college students and overseas English test takers.

Student Advisory Committee Member at Coffee Equity Lab
- Surveyed the third wave coffee industry and learned human-centered design, led the development of a suite of interactive visualizations using D3.js aiming to help customers demystify third wave coffee and a Nashville Coffee Atlas using Google My Maps API.

iLEAD | Mentorship   Nashville, TN
PR Chair / Orientation Leader   Aug 2019 – Aug 2020
- Helped new international students adapt to college life by organizing orientation events and bonding activities.
- Designed recruitment and marketing plans, managed social media accounts, and interviewed candidates.

Vanderbilt Student Government | Service   Nashville, TN
Student Service Committee Co-chair   Aug 2019 – May 2020
- Led the committee to promote public transportation usage in the student body and push school administration for adopting digital student cards on campus.