

Gregory I. Holste

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EDUCATION

The University of Texas at Austin, Austin, TX
M.S., Ph.D. in Electrical Engineering

Aug. 2021-present
Advisor: Zhangyang (Atlas) Wang

Kenyon College, Gambier, OH
B.A. in Mathematics & Statistics

Aug. 2016-May 2020

- GPA: 3.91 / 4.00 (*summa cum laude*)
- Concentration in Scientific Computing; Minor in Biology

RESEARCH EXPERIENCE

Michigan State University, East Lansing, MI
Medical Imaging & Data Integration Lab

Aug. 2019-present
Advisor: Adam Alessio

- Pediatric rib fracture detection and breast cancer classification with **PyTorch**
 - Invited to submit our “top” solution to MICCAI 2020 RibFrac Challenge for publication
- Developing fusion architectures that combine breast imaging with patient metadata (age, reason for visit, *etc.*) to improve breast cancer detection
 - Preparing manuscript for journal publication

Michigan State University, East Lansing, MI
ACRES Research Experience for Undergraduates (REU)

Summer 2019
Advisor: Adam Alessio

- Semantic segmentation of pediatric chest radiographs in **Python** [1-2]
- Trained fully convolutional neural networks to automatically segment regions of the chest in pediatric radiographs with 10^5 -fold imbalance between classes [1]
- Implemented custom pixel-weighted loss functions in **Keras**

Kenyon College, Gambier, OH
Kerkhoff Macroecology Lab

Jan. 2017-May 2019
Advisor: Andrew Kerkhoff

- Used **R** to uncover distribution patterns of crop wild relatives (CWRs) in the Americas
- Compared spatial patterns of CWR diversity and range size to those of all plants using millions of species occurrence records from the Botanical Information & Ecology Network (BIEN)
- Discovered regions significantly more CWR-rich than would be expected by chance via Monte Carlo simulation

Baylor College of Medicine, Houston, TX
Neurological Research Institute | Liu Lab

Summer 2018
Advisor: Zhangdong Liu

- Graph-theoretic analysis of protein-protein interaction networks with Python and Cytoscape
- Identified and ranked genes as candidates for causing neurodegenerative disease by node centrality (“importance”) measures and a heat diffusion approach
- Compared community detection algorithms to find meaningful clusters of genes and diseases

PUBLICATIONS

- [1] **G. Holste**, R. Sullivan, M. Bindschadler, N. Nagy, A. Alessio. “Multi-class semantic segmentation of pediatric chest radiographs” in *Proc. SPIE Medical Imaging 2020: Image Processing*. 10 March 2020.
- [2] R. Sullivan, **G. Holste**, J. Burkow, A. Alessio. “Deep learning methods for segmentation of lines in pediatric chest radiographs” in *Proc. SPIE Medical Imaging 2020: Computer-Aided Diagnosis*. 16 March 2020.

HONORS & AWARDS

Phi Beta Kappa Elected to the Kenyon College chapter of the national academic honor society	May 2020-present
Sigma Xi Inducted into the Kenyon-Denison chapter of the science research honor society	Feb. 2020-present
Pi Mu Epsilon Elected to the Ohio Pi chapter of the national mathematics society	Apr. 2018-present
Wendell D. Lindstrom Memorial Prize One of 12 students given prize for outstanding mathematics students at Kenyon College	Apr. 2018
Kenyon College Merit List (8x)	every semester

ORAL PRESENTATIONS

Multi-class semantic segmentation of pediatric chest radiographs <i>SPIE Medical Imaging: Image Processing, Houston, TX, USA</i>	Feb. 2020
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INVITED TALKS

Fusing imaging and clinical information for improved automatic breast cancer detection <i>MSU Virtual Imaging Research Symposium, East Lansing, MI, USA</i>	Feb. 2021
Automatic segmentation of pediatric chest radiographs <i>Kenyon College Math Monday, Gambier, OH, USA</i>	Nov. 2019

SCIENTIFIC ABSTRACTS

Rib fracture detection in pediatric radiographs via deep convolutional neural networks J. Burkow, G. Holste , F. Perez, J. Junewick, A. Zbojnowicz, J. Frost, E. Romberg, S. Menashe, J. Otjen, A. Alessio <i>International Pediatric Radiology Congress, Milan, Italy</i>	October 2021
Automatic segmentation of chest radiographs with deep learning G. Holste , R. Sullivan, N. Nagy, M. Bindschadler, A. Alessio <i>Mid-SURE Symposium, East Lansing, MI, USA</i>	July 2019
Deep learning methods for automatic evaluation of lines in chest radiographs R. Sullivan, G. Holste , A. Alessio <i>Mid-SURE Symposium, East Lansing, MI, USA</i>	July 2019

TECHNICAL SKILLS

Languages: Python (PyTorch, Keras), R, C++

Technologies: Git, Linux/Unix, L^AT_EX

Mathematics background: Calculus, Probability, Linear Algebra, Statistical Modeling (Regression, CART), Machine Learning (Random Forests, Convolutional Neural Networks)