Gregory I. Holste

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EDUCATION

Kenyon College, Gambier, OH — Aug. 2016-May 2020
B.A. in Mathematics & Statistics

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

RESEARCH EXPERIENCE

Michigan State University, East Lansing, MI — Aug. 2019-present
Medical Imaging & Data Integration Lab — *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 submission to *Radiology: Artificial Intelligence*

Michigan State University, East Lansing, MI — Summer 2019
ACRES Research Experience for Undergraduates (REU) — *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 — Jan. 2017-May 2019
Kerkhoff Macroecology Lab — *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 — Summer 2018
Neurologoical Research Institute | Liu Lab — *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 May 2020-present
Elected to the Kenyon College chapter of the national academic honor society

Sigma Xi Feb. 2020-present
Inducted into the Kenyon-Denison chapter of the science research honor society

Pi Mu Epsilon Apr. 2018-present
Elected to the Ohio Pi chapter of the national mathematics society

Wendell D. Lindstrom Memorial Prize Apr. 2018
One of 12 students given prize for outstanding mathematics students at Kenyon College

Kenyon College Merit List (8x) every semester

ORAL PRESENTATIONS

Multi-class semantic segmentation of pediatric chest radiographs
SPIE Medical Imaging: Image Processing, Houston, TX Feb. 2020

SCIENTIFIC ABSTRACTS

Automatic Segmentation of Chest Radiographs with Deep Learning
G. Holste, R. Sullivan, N. Nagy, M. Bindschadler, A. Alessio
Mid-SURE Symposium, East Lansing, MI July 2019

Deep Learning Methods for Automatic Evaluation of Lines in Chest Radiographs
R. Sullivan, **G. Holste**, A. Alessio
Mid-SURE Symposium, East Lansing, MI July 2019

TECHNICAL SKILLS

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

Technologies: Git, Linux/Unix, LaTeX

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