

Tyler LaBonte

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Research Interests

Mathematical Foundations of Machine Learning

Generalization Theory of Deep Learning
Implicit Regularization of Optimization Methods
Robustness, Fairness, and Scaling of Large Models

Education

GEORGIA INSTITUTE OF TECHNOLOGY	2021–Present
Ph.D., Machine Learning	
Minor in Mathematics	
Advisors: Vidya Muthukumar and Jacob Abernethy	
UNIVERSITY OF SOUTHERN CALIFORNIA	2017–2021
B.S., Applied and Computational Mathematics, <i>magna cum laude</i>	
Minor in Computer Science	
Advisor: Shaddin Dughmi	

Publications

Preprints

1. [The Group Robustness is in the Details: Revisiting Finetuning under Spurious Correlations](#)
Tyler LaBonte, John C. Hill, Xincheng Zhang, Vidya Muthukumar, and Abhishek Kumar
Preprint, 2024

CONFERENCE ARTICLES

1. [Towards Last-layer Retraining for Group Robustness with Fewer Annotations](#)
Tyler LaBonte, Vidya Muthukumar, and Abhishek Kumar
NeurIPS 2023
2. [Scaling Novel Object Detection with Weakly Supervised Detection Transformers](#)
Tyler LaBonte, Yale Song, Xin Wang, Vibhav Vineet, and Neel Joshi
WACV 2023

JOURNAL ARTICLES

1. [Student Misconceptions of Dynamic Programming: A Replication Study](#)
Michael Shindler, Natalia Pinpin, Mia Markovic, Frederick Reiber, Jee Hoon Kim, Giles Pierre Nunez Carlos, Mine Dogucu, Mark Hong, Michael Luu, Brian Anderson, Aaron Cote, Matthew

Ferland, Palak Jain, Tyler LaBonte, Leena Mathur, Ryan Moreno, and Ryan Sakuma.
Computer Science Education, 32(3):288–312, 2022

2. [Quantifying the Unknown Impact of Segmentation Uncertainty on Image-Based Simulations](#)
 Michael C. Krygier, Tyler LaBonte, Carianne Martinez, Chance Norris, Krish Sharma, Lincoln N. Collins, Partha P. Mukherjee, and Scott A. Roberts
Nature Communications, 12(1):5414, 2021

WORKSHOP ARTICLES

1. [Saving a Split for Last-layer Retraining can Improve Group Robustness without Group Annotations](#)
 Tyler LaBonte, Vidya Muthukumar, and Abhishek Kumar
ICML 2023 Workshop on Spurious Correlations, Invariance, and Stability
2. [Dropout Disagreement: A Recipe for Group Robustness with Fewer Annotations](#)
 Tyler LaBonte, Vidya Muthukumar, and Abhishek Kumar
NeurIPS 2022 Workshop on Distribution Shifts
3. [Scaling Novel Object Detection with Weakly Supervised Detection Transformers](#)
 Tyler LaBonte, Yale Song, Xin Wang, Vibhav Vineet, and Neel Joshi
CVPR 2022 Workshop on Transformers in Vision

THESES

1. [Finding the Needle in a High-Dimensional Haystack: Oracle Methods for Convex Optimization](#)
 Tyler LaBonte
 Undergraduate Thesis, University of Southern California, 2021
 Winner of the USC Discovery Scholar distinction

MANUSCRIPTS

1. [We Know Where We Don't Know: 3D Bayesian CNNs for Credible Geometric Uncertainty](#)
 Tyler LaBonte, Carianne Martinez, and Scott A. Roberts
 Manuscript, 2019

Awards

2 nd Place Research Talk/Poster Presentation – DoD NDSEG CONFERENCE	2023
Simons Institute Deep Learning Theory Workshop Travel Grant (\$2,000)	2022
DoD National Defense Science and Engineering Graduate Fellowship (\$170,000)	2021
– One of two undergraduates to receive both DoD NDSEG and NSF GRFP in Computer Science	
NSF Graduate Research Fellowship (\$138,000—declined)	2021
USC Discovery Scholar (Research distinction for <100 USC graduates)	2021
USC Viterbi & USC Dornsife Dean's List	2017–2021
Neo Scholar (Top ~100 CS undergraduates in America) – NEO	2020
U.S.S. Bowfin Memorial Scholarship (\$5,000)	2020
1 st Place Computer Vision Project – TREEHACKS, STANFORD UNIVERSITY	2019

1 st Place Healthcare AI Project – TREEHACKS, STANFORD UNIVERSITY	2019
1 st Place Data Analytics Project – HACKSC, USC	2019
Admiral Bernard Clarey Memorial Scholarship (\$7,000)	2018
National Top 20 Ethical Hacking Finalist – MAJOR LEAGUE HACKING	2018
USC Trustee Scholar (\$250,000)	2017
USC Viterbi Fellow (\$24,000)	2017
Dolphin Scholarship (\$13,600)	2017
Rear Admiral Paul Lacy Memorial Scholarship (\$6,500)	2017
National Merit Scholar (\$3,000)	2017

Industry Research Experience

GOOGLE Sunnyvale, CA
Machine Learning Research Intern 2023
Advisor: Kun Lin
 Developed techniques to leverage Gemini LLM to improve hardware-software code design.

MICROSOFT RESEARCH Redmond, WA
Machine Learning Research Intern 2021–2022
Advisor: Neel Joshi
 Developed Transformer model for weakly supervised object detection with multiple instance learning.

GOOGLE X Mountain View, CA
Machine Learning Research Intern 2020
Advisor: Daniel R. Silva
 Developed novel deep learning architecture for temporal identity preservation in object tracking.

SANDIA NATIONAL LABORATORIES Albuquerque, NM
Machine Learning Research Intern 2019–2020
Advisors: Carianne Martinez and Scott A. Roberts
 Developed Bayesian deep learning model for geometric uncertainty in engineering applications.

Talks

1. Google DeepMind - MOUNTAIN VIEW, CA 2023
Towards Last-layer Retraining for Group Robustness with Fewer Annotations
2. Google Cloud Technical Infrastructure - SUNNYVALE, CA 2023
Large Language Models for Hardware-Software Code Design
3. DoD NDSEG Conference - SAN ANTONIO, TX 2023
Towards Last-layer Retraining for Group Robustness with Fewer Annotations

4. Microsoft Research – REDMOND, WA 2021
Weakly Supervised Detection Transformers for Effortless Computer Vision
5. USC Computer Science Theory Group – LOS ANGELES, CA 2021
The Distance Oracle for Convex Optimization
6. Google X – MOUNTAIN VIEW, CA 2020
Temporal Identity Preservation in Multiple Object Tracking
7. USC Computer Science Theory Group – LOS ANGELES, CA 2019
3D Bayesian CNNs for Credible Geometric Uncertainty
8. USC Center for Artificial Intelligence in Society – LOS ANGELES, CA 2019
3D Bayesian CNNs for Credible Geometric Uncertainty
9. USC Center for Artificial Intelligence in Society – LOS ANGELES, CA 2019
Machine Learning Fairness in Word Embeddings

Advising

1. Xincheng Zhang – Georgia Tech MS 2024–
2. John C. Hill – Georgia Tech BS/MS → Georgia Tech PhD 2022–2024
3. [Pratik Deolasi](#) – Georgia Tech BS → MathWorks 2021–2022
4. [Rishit Mohan Ahuja](#) – Georgia Tech BS → Georgia Tech MS 2021–2022

Teaching

1. Lecturer/Teaching Assistant (8 lectures) | Georgia Institute of Technology 2024
[CS 7545: Machine Learning Theory](#)
2. Lecturer/Teaching Assistant (12 lectures) | Georgia Institute of Technology 2023
[CS 7545: Machine Learning Theory](#)
3. Undergraduate Teaching Assistant | University of Southern California 2021
CSCI 270: Introduction to Algorithms and Theory of Computing
4. Instructor | [USC Center for Artificial Intelligence in Society](#) 2019
Introduction to Machine Learning
5. Undergraduate Teaching Assistant | University of Southern California 2018
CSCI 170: Discrete Methods in Computer Science

Reviewing

1. Reviewer, NeurIPS 2024
2. Reviewer, ICLR 2024
3. Reviewer, NeurIPS 2023

Service and Leadership

1. Student Organizer, [Learning Theory Alliance Workshop](#) 2023
2. System Administrator, Georgia Tech ML Theory GPU Cluster 2022–
3. Organizer, [Georgia Tech ML Theory Reading Group](#) 2021–2023
4. Projects Lead | USC Center for Artificial Intelligence in Society 2019
5. Associate Director of Robotics Outreach | USC Viterbi K-12 STEM Center 2018
6. Robotics Mentor | USC Viterbi K-12 STEM Center 2017–2018

Open Source Software

1. Last-layer Retraining: Robustness to spurious correlations without group annotations 2023
<https://github.com/tmlabonte/last-layer-retraining> ★ 9
2. Milkshake: Quick and extendable experimentation with classification models 2023
<https://github.com/tmlabonte/milkshake> ★ 4 📄 2
3. WS-DETR: Weakly supervised Transformers for scaling novel object detection 2021–2022
<https://github.com/tmlabonte/weakly-supervised-detr> ★ 10 📄 6
4. BCNN: 3D Bayesian CNNs for credible geometric uncertainty 2019–2020
<https://github.com/sandialabs/bcnn> ★ 59 📄 19
 Transitioned to a production environment by Sandia National Laboratories
 19th most starred Sandia repository out of 608 (June 2024)
5. Tendies: Decoupling deep learning development and deployment 2018
<https://github.com/tmlabonte/tendies> ★ 36 📄 11
 Transitioned to a production environment by the Air Force Research Laboratory

Other Activities

1. Fleet Captain, [Georgia Tech Sailing Club](#) 2023–
2. House Chair, [USC Hawai'i Club](#) 2020–2021
3. Vice President of Finance, [USC Hawai'i Club](#) 2019–2020