

Tyler LaBonte

Ph.D. Student & NDSEG Fellow
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Research Interests

Mathematical Foundations of Machine Learning

Generalization Theory of Deep Learning
Convex and Non-Convex Optimization
Robustness and Scalability of Large Models

Education

GEORGIA INSTITUTE OF TECHNOLOGY

Ph.D., Machine Learning

Minor in Mathematics

Advisors: Jacob Abernethy and Vidya Muthukumar

2021–Present

GPA: 4.0/4.0

UNIVERSITY OF SOUTHERN CALIFORNIA

B.S., Applied and Computational Mathematics, *magna cum laude*

Minor in Computer Science

Advisor: Shaddin Dughmi

2017–2021

GPA: 3.73/4.0

Publications

WORKSHOP ARTICLES

1. Dropout Disagreement: A Recipe for Group Robustness with Fewer Annotations
Tyler LaBonte, Vidya Muthukumar, and Abhishek Kumar
NeurIPS 2022 Workshop on Distribution Shifts
2. 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

CONFERENCE ARTICLES

1. 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

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

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

MICROSOFT RESEARCH <i>Machine Learning Research Intern</i> <i>Advisor: Neel Joshi</i> Developed Transformer model for weakly supervised object detection with multiple instance learning.	Redmond, WA 2021–2022
GOOGLE X <i>Machine Learning Research Intern</i> <i>Advisor: Daniel R. Silva</i> Developed novel deep learning architecture for temporal identity preservation in object tracking.	Mountain View, CA 2020
SANDIA NATIONAL LABORATORIES <i>Machine Learning Research Intern</i> <i>Advisors: Carianne Martinez and Scott A. Roberts</i> Developed Bayesian deep learning model for geometric uncertainty in engineering applications.	Albuquerque, NM 2019–2020

Talks and Presentations

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

Open Source Software

1. BCNN: 3D Bayesian CNNs for credible geometric uncertainty https://github.com/sandialabs/bcnn Transitioned to a production environment by Sandia National Laboratories 12 th most starred Sandia repository (out of 193)	2019–2020 ★ 52 📄 17
2. Tendies: Decoupling deep learning development and deployment https://github.com/tmlabonte/tendies Transitioned to a production environment by the Air Force Research Laboratory	2018 ★ 38 📄 11

Advising

1. John C. Hill – Georgia Tech BS/MS
2. Pratik Deolasi – Georgia Tech BS → MathWorks
3. Rishit Mohan Ahuja – Georgia Tech BS

Teaching

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|---|------|
| 1. Lecturer and Teaching Assistant Georgia Institute of Technology
CS 7545: Machine Learning Theory | 2023 |
| 2. Undergraduate Teaching Assistant University of Southern California
CSCI 270: Introduction to Algorithms and Theory of Computing | 2021 |
| 3. Curriculum Lead USC Center for Artificial Intelligence in Society
Introduction to Machine Learning | 2019 |
| 4. Undergraduate Teaching Assistant University of Southern California
CSCI 170: Discrete Methods in Computer Science | 2018 |

Service and Leadership

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| 1. Organizer, Georgia Tech ML Theory Reading Group | 2021–2023 |
| 2. Projects Lead USC Center for Artificial Intelligence in Society | 2019 |
| 3. Associate Director of Robotics Outreach USC Viterbi K-12 STEM Outreach | 2018 |
| 4. Volunteer VEX Robotics Mentor USC Viterbi K-12 STEM Outreach | 2017–2018 |