

# 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

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

- Scaling Novel Object Detection with Weakly Supervised Detection Transformers  
**Tyler LaBonte**, Yale Song, Xin Wang, Vibhav Vineet, and Neel Joshi  
WACV 2023

### JOURNAL ARTICLES

- 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 <sup>st</sup> Place Computer Vision Project – TREEHACKS, STANFORD UNIVERSITY	2019
1 <sup>st</sup> Place Healthcare AI Project – TREEHACKS, STANFORD UNIVERSITY	2019
1 <sup>st</sup> 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 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 and Presentations

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

## Open Source Software

1. BCNN: 3D Bayesian CNNs for credible geometric uncertainty 2019–2020  
<https://github.com/sandialabs/bcnn> ★ 53   📄 17  
 Transitioned to a production environment by Sandia National Laboratories  
 14<sup>th</sup> most starred Sandia repository (out of 197)
2. Tendies: Decoupling deep learning development and deployment 2018  
<https://github.com/tmlabonte/tendies> ★ 37   📄 11  
 Transitioned to a production environment by the Air Force Research Laboratory

## Advising

1. John C. Hill – Georgia Tech BS/MS 2022–
2. Pratik Deolasi – Georgia Tech BS → MathWorks 2021–2022
3. Rishit Mohan Ahuja – Georgia Tech BS 2021–2022

## Teaching

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

## Service and Leadership

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

## 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