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 Deep Learning

Education

GEORGIA INSTITUTE OF TECHNOLOGY   2021–Present
Ph.D., Machine Learning   GPA: 4.0/4.0
Advisors: Jacob Abernethy and Vidya Muthukumar

UNIVERSITY OF SOUTHERN CALIFORNIA   2017–2021
B.S., Applied and Computational Mathematics, *magna cum laude*   GPA: 3.73/4.0
Minor in Computer Science   Ph.D. courses: 4
Thesis: Finding the Needle in a High-Dimensional Haystack: Oracle Methods for Convex Optimization
Advisor: Shaddin Dughmi

Publications

WORKSHOP ARTICLES

1. **Tyler LaBonte**, Yale Song, Xin Wang, Vibhav Vineet, and Neel Joshi. Scaling Novel Object Detection with Weakly Supervised Detection Transformers. In *Conference on Computer Vision and Pattern Recognition (CVPR)*, 2022. Workshop on Attention and Transformers in Vision.

JOURNAL ARTICLES

1. 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. Student Misconceptions of Dynamic Programming: A Replication Study. *Computer Science Education*, 2022.

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

THESES

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

Manuscripts

1. **Tyler LaBonte**, Carianne Martinez, and Scott A. Roberts. We Know Where We Don't Know: 3D Bayesian CNNs for Credible Geometric Uncertainty, 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
1st Place Computer Vision Project – Treehacks, Stanford University	2019
1st Place Healthcare AI Project – Treehacks, Stanford University	2019
1st 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   ★ 47   ⑂ 14
   Transitioned to a production environment by Sandia National Laboratories
   11$^{\text{th}}$ most starred Sandia repository (out of 163)

2. Tendies: Decoupling deep learning development and deployment   2018
   https://github.com/tmlabonte/tendies   ★ 38   ⑂ 10
   Transitioned to a production environment by the Air Force Research Laboratory

Advising

1. John C. Hill – Georgia Tech undergrad

2. Pratik Deolasi – Georgia Tech undergrad → MathWorks

3. Rishit Mohan Ahuja – Georgia Tech undergrad

Teaching

1. Undergraduate Teaching Assistant | University of Southern California   2021
   CSCI 270: Introduction to Algorithms and Theory of Computing

2. Curriculum Lead | USC Center for Artificial Intelligence in Society   2019
   Introduction to Machine Learning

3. Undergraduate Teaching Assistant | University of Southern California 2018
   CSCI 170: Discrete Methods in Computer Science

Service and Leadership

1. Organizer, Georgia Tech ML Theory Reading Group 2021–2022

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