Tyler LaBonte

Ph.D. Student & NDSEG Fellow
Georgia Institute of Technology
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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: Prof. Jacob Abernethy and Prof. 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: Prof. 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. Transformers for Vision (T4V) Workshop.

JOURNAL ARTICLES

1. 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

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

SIMLR Award for Outstanding Intern – SANDIA NATIONAL LABORATORIES 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 (Full scholarship worth $250,000) 2017

USC Viterbi Fellow (Research funding worth $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. Sandia National Laboratories Summer Research Symposium – ALBUQUERQUE, NM 2019
   3D Bayesian CNNs for Credible Geometric Uncertainty
7. 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` ★ 46 ⑂ 13
   Transitioned to a production environment by Sandia National Laboratories
   10th most starred Sandia repository (out of 130)
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 2022
2. Pratik Deolasi – Georgia Tech undergrad 2021–2022
3. Rishit Mohan Ahuja – Georgia Tech undergrad 2021–2022

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