Tyler LaBonte

Ph.D. Student
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
Advisor: Prof. Tuo Zhao

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

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*, 2021.

THESES

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

UNPUBLISHED

1. **Tyler LaBonte**, Carianne Martinez, and Scott A. Roberts. We Know Where We Don't Know: 3D Bayesian CNNs for Credible Geometric Uncertainty. Unpublished, 2019.

ACKNOWLEDGMENTS

1. Aashutosh Mistry, Alejandro A. Franco, Samuel J. Cooper, Scott A. Roberts, and Venkatasubramanian Viswanathan. How Machine Learning Will Revolutionize Electrochemical Sciences. *ACS Energy Letters*, 6:1422–1431, 2021.

2. David Kempe. Communication, Distortion, and Randomness in Metric Voting. In *Proceedings of AAAI 2020*.

Awards

DoD National Defense Science and Engineering Graduate Fellowship ($170,000)	2021
NSF Graduate Research Fellowship ($138,000, one of 5 undergrads in ML, 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 undergrads 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

Research Experience

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

UNIVERSITY OF SOUTHERN CALIFORNIA — Los Angeles, CA
Convex Optimization Undergraduate Researcher — 2020–2021
Advisor: Prof. Shaddin Dughmi
Developed an efficient algorithm to solve the convex feasibility problem with a distance oracle.

GOOGLE X — Mountain View, CA
Machine Learning Research Intern — 2020
Advisor: Daniel R. Silva

Invented 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
Invented novel Bayesian deep learning architecture for credible geometric uncertainty.

UNIVERSITY OF SOUTHERN CALIFORNIA — Los Angeles, CA
Machine Learning Undergraduate Researcher — 2019
Advisor: Prof. Jason D. Lee
Investigated generalization and linearization of overparameterized deep neural networks.

UNIVERSITY OF SOUTHERN CALIFORNIA — Los Angeles, CA
Mechanism Design Undergraduate Researcher — 2018
Advisor: Prof. David Kempe
Investigated distortion bounds in limited-communication metric voting.

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` — ★ 35 ⑂ 10
   Transitioned to a production environment by Sandia National Laboratories
   6th most starred Sandia repository (out of 104)
2. Tendies: Decoupling deep learning development and deployment — 2018
   `https://github.com/tmlabonte/tendies` — ★ 35 ⑂ 10
   Transitioned to a production environment by the Air Force Research Laboratory

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. House Chair and Vice President of Finance | USC Hawaii Club 2018–2021
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