

Tyler LaBonte

Undergraduate Researcher
University of Southern California
Department of Computer Science
Los Angeles, CA

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Research Interests

Mathematical Foundations of Machine Learning

Generalization Theory of Deep Learning
Convex and Non-Convex Optimization
Online Learning and Bandit Problems

Education

University of Southern California
Bachelor of Science, Applied and Computational Mathematics
Minor in Computer Science

2017–2021
GPA: 3.73/4.0
w/o PhD courses: 3.83/4.0

PhD courses (taken as an undergraduate):

CSCI 670: Advanced Analysis of Algorithms
CSCI 671: Randomized Algorithms
CSCI 672: Approximation Algorithms
CSCI 675: Convex and Combinatorial Optimization

Research Experience

University of Southern California
Convex Optimization Undergraduate Researcher
Advisor: Prof. Shaddin Dughmi
Investigated lower bounds on polytope information needed to efficiently solve linear programs.

Los Angeles, CA
2020–

Google X
Machine Learning Research Intern
Advisor: Daniel Ribeiro Silva
Invented novel deep learning architecture for temporal identity preservation in object tracking.

Mountain View, CA
2020

Sandia National Laboratories
Machine Learning Research Intern
Advisors: Carianne Martinez and Scott A. Roberts
Invented novel Bayesian deep learning architecture for credible geometric uncertainty.

Albuquerque, NM
2019–2020

University of Southern California
Machine Learning Undergraduate Researcher

Los Angeles, CA
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.

Air Force Research Laboratory

Kihei, HI

Machine Learning Research Intern

2018

Advisor: Capt. Justin Fletcher, USAF

Developed methodology for decoupling deep learning development and deployment.

Publications

PREPRINTS

1. **T. LaBonte** and D. R. Silva. Object Evolution: A Generalization of Multiple Object Tracking for Biological Domains. In preparation.
2. M. C. Krygier, C. Norris, **T. LaBonte**, C. Martinez, L. N. Collins, and S. A. Roberts. Impact of Geometric Uncertainty in 3D Image Data on Physical Properties. Under submission.
3. **T. LaBonte**, C. Martinez, and S. A. Roberts. We Know Where We Don't Know: 3D Bayesian CNNs for Credible Geometric Uncertainty. Under submission. <https://arxiv.org/abs/1910.10793>.

ACKNOWLEDGMENTS

1. A. Mistry, A. A. Franco, S. J. Cooper, S. A. Roberts, and V. Viswanathan. How Machine Learning Will Revolutionize Electrochemical Sciences. Under submission.
2. D. Kempe. Communication, Distortion, and Randomness in Metric Voting. In *Proceedings of AAAI 2020*. <https://arxiv.org/abs/1911.08129>.

Awards

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
USC Viterbi & USC Dornsife Dean's List (6-time awardee)	2017–2020
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

Open Source Software

1. BCNN: 3D Bayesian CNNs for credible geometric uncertainty 2019–2020
<https://github.com/sandialabs/bcnn> ★ 32 7
 Transitioned to a production environment by Sandia National Laboratories
 6th most starred Sandia repository (out of 69)
2. Tendies: Decoupling deep learning development and deployment 2018
<https://github.com/tmlabonte/tendies> ★ 33 9
 Transitioned to a production environment by the Air Force Research Laboratory

Invited Talks

1. USC Theory Group – LOS ANGELES, CA 2019
 3D Bayesian CNNs for Credible Geometric Uncertainty
2. USC Center for Artificial Intelligence in Society – LOS ANGELES, CA 2019
 3D Bayesian CNNs for Credible Geometric Uncertainty
3. USC Center for Artificial Intelligence in Society – LOS ANGELES, CA 2019
 Machine Learning Fairness in Word Embeddings
4. USC Center for Artificial Intelligence in Society – LOS ANGELES, CA 2018
 Beating Classical Game Algorithms with Reinforcement Learning

Teaching

1. Curriculum Lead | USC Center for Artificial Intelligence in Society 2019
 Introduction to Machine Learning
2. 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 2018–2020
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