# 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** 2017–2021
B.S., Applied and Computational Mathematics, *magna cum laude* GPA: 3.72/4.0
Minor in Computer Science w/o PhD Courses: 3.84/4.0

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 Los Angeles, CA
*Convex Optimization Undergraduate Researcher* 2020–2021
*Advisor: Prof. Shaddin Dughmi*
Investigated lower bounds on oracle information needed to efficiently solve linear programs.

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.

Air Force Research Laboratory — Kihei, HI
*Machine Learning Research Intern* — 2018
*Advisor: Capt. Justin Fletcher, USAF*
Developed framework for decoupling deep learning development and deployment on classified servers.

## Publications

PREPRINTS

1. M. C. Krygier, **T. LaBonte**, C. Martinez, C. Norris, K. Sharma, L. N. Collins, P. P. Mukherjee, and S. A. Roberts. Quantifying the Unknown: Impact of Segmentation Uncertainty on Image-Based Simulations. Under submission to Nature Communications, 2020. `https://arxiv.org/abs/2012.09913`.
2. **T. LaBonte**, C. Martinez, and S. A. Roberts. We Know Where We Don't Know: 3D Bayesian CNNs for Credible Geometric Uncertainty. Preprint, 2020. `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 to ACS Energy Letters, 2020.
2. D. Kempe. Communication, Distortion, and Randomness in Metric Voting. In *Proceedings of AAAI 2020*. `https://arxiv.org/abs/1911.08129`.

## Awards

USC Viterbi & USC Dornsife Dean's List (7-time awardee) — 2017–2020

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 ($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` ★ 35 ⑂ 9
   Transitioned to a production environment by Sandia National Laboratories
   6th most starred Sandia repository (out of 73)
2. Tendies: Decoupling deep learning development and deployment 2018
   `https://github.com/tmlabonte/tendies` ★ 34 ⑂ 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. Sandia National Laboratories Summer Research Symposium – Albuquerque, NM 2019
   3D Bayesian CNNs for Credible Geometric Uncertainty
4. USC Center for Artificial Intelligence in Society – Los Angeles, CA 2019
   Machine Learning Fairness in Word Embeddings

## 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