

Tyler LaBonte

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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*, 12(5414), 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.

MANUSCRIPTS

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

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|--|-------------------|
| MICROSOFT RESEARCH | Redmond, WA |
| <i>Machine Learning Research Intern</i> | 2021 |
| <i>Advisor: Neel Joshi</i> | |
| Developed Vision Transformer for weakly supervised object detection with multiple instance learning. | |
| UNIVERSITY OF SOUTHERN CALIFORNIA | Los Angeles, CA |
| <i>Convex Optimization Undergraduate Researcher</i> | 2020–2021 |
| <i>Advisor: Prof. Shaddin Dughmi</i> | |
| Developed an efficient algorithm to solve the convex feasibility problem with a distance oracle. | |
| GOOGLE X | Mountain View, CA |
| <i>Machine Learning Research Intern</i> | 2020 |
| <i>Advisor: Daniel R. Silva</i> | |

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

Advising

1. Pratik Deolasi – Georgia Tech undergrad (2021)
2. Rishit Mohan Ahuja – Georgia Tech undergrad (2021)

Teaching

1. Undergraduate Teaching Assistant | University of Southern California
CSCI 270: Introduction to Algorithms and Theory of Computing 2021
2. Curriculum Lead | USC Center for Artificial Intelligence in Society
Introduction to Machine Learning 2019
3. Undergraduate Teaching Assistant | University of Southern California
CSCI 170: Discrete Methods in Computer Science 2018

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