Brendon G. Anderson

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Education

University of California, Berkeley Aug. 2018 – Present
Ph.D. in Control Theory
Advisor: Somayeh Sojoudi
Research Areas: Optimization, Machine Learning, Control Theory
Minors: Optimization, Statistics

University of California, Berkeley Aug. 2018 – May 2020
M.S. in Control Theory
Thesis: Towards Optimality and Robustness Guarantees for Data-Driven Learning and Decision Making

University of California, Los Angeles Sep. 2015 – Mar. 2018
B.S. in Mechanical Engineering (*summa cum laude*)
Technical Breadth Area: Mathematics

Experience

Graduate Student Researcher — UC Berkeley Aug. 2018 – Present
Advisor: Somayeh Sojoudi
- Conducted various research projects surrounding robustness and optimality guarantees for nonconvex optimization problems in machine learning.

Jr. Development Engineer — UCLA Engineering Jan. 2018 – Jun. 2018
Advisor: Robert M'Closkey
- Designed, fabricated, and tested low-frequency folded pendulum accelerometer for use in UCLA's dynamic systems and control laboratories.

Research Assistant — UCLA Mathematics Jun. 2017 – Aug. 2017
Advisors: Matt Haberland, Olga Turanova, and Andrea L. Bertozzi
- Formulated performance quantification methods for swarm coverage control algorithms.

Publications

[1] **B. G. Anderson** and S. Sojoudi, "Data-driven assessment of deep neural networks with random input uncertainty," *arXiv preprint arXiv:2010.01171*, 2020.

[2] **B. G. Anderson**, Z. Ma, J. Li, and S. Sojoudi, "Tightened convex relaxations for neural network robustness certification," in *Proceedings of the 59th IEEE Conference on Decision and Control*, 2020.

[3] **B. G. Anderson** and S. Sojoudi, "Global optimality guarantees for nonconvex unsupervised video segmentation," in *Proceedings of the 57th Annual Allerton Conference on Communication, Control, and Computing*, pp. 965–972, 2019.

[4] **B. G. Anderson**, E. Loeser, M. Gee, F. Ren, S. Biswas, O. Turanova, M. Haberland, and A. L. Bertozzi, "Quantifying robotic swarm coverage," in

Informatics in Control, Automation and Robotics: 15th International Conference, ICINCO 2018, Porto, Portugal, July 29–31, 2018, Revised Selected Papers, vol. 613 of *Lecture Notes in Electrical Engineering*, pp. 276–301, Springer, 2019.

[5] **B. G. Anderson**, E. Loeser, M. Gee, F. Ren, S. Biswas, O. Turanova, M. Haberland, and A. L. Bertozzi, "Quantitative assessment of robotic swarm coverage," in *Proceedings of the 15th International Conference on Informatics in Control, Automation and Robotics (ICINCO)—Volume 2*, pp. 91–101, 2018.

Invited Talks

1. INFORMS Annual Meeting, National Harbor, MD — Nov. 2020
   "Partition-based convex relaxations for robustness certification of ReLU neural networks"
2. Conference on Control Technology and Applications, Montréal — Aug. 2020
   "Robustness analysis of neural networks"
3. Institute for Pure and Applied Mathematics, Los Angeles, CA — Aug. 2017
   "Robotic swarm analysis"

Awards

1. Travel Support Award, Conference on Decision and Control — Dec. 2020
2. Graduate Assembly Professional Development Award, UC Berkeley — Aug. 2020
3. Graduate Division Block Grant Award, UC Berkeley — Apr. 2019
4. Harry M. Showman Prize (schoolwide research award), UCLA — Jun. 2018
5. Jonathan David Wolfe Memorial Scholarship, UCLA — Apr. 2018

Teaching

Graduate Student Instructor — UC Berkeley

1. *Nonlinear and Discrete Optimization* (IEOR 160) — Fall 2020

Supplemental Instructor — Palomar College

1. *Electromagnetism* (PHYS 231) — Spring 2015
2. *General Chemistry* (CHEM 115) — Fall 2014, Spring 2015

Professional Activities

1. Peer Advisor for the Bay Area Graduate Pathways to Stem (GPS) program, hosted by UC Berkeley Engineering and Stanford Engineering, 2020.
2. Grant proposal contributor; assisted with writing DARPA funding proposal, 2019.
3. Chair of the session "Data Analytics", 57th Annual Allerton Conference on Communication, Control, and Computing, 2019.

Relevant Coursework

Optimization

1. *Nonlinear Programming*, Professor Javad Lavaei
2. *Convex Optimization*, Professors Somayeh Sojoudi and Laurent El Ghaoui
3. *Optimization Models*, Professors Laurent El Ghaoui and Alex Bayen

Machine Learning

1. *Statistical Learning Theory* (audit), Professors Ben Recht and Moritz Hardt
2. *Learning and Optimization*, Professor Anil Aswani
3. *Deep Learning* (online), Professor Andrew Ng
4. *Machine Learning* (online), Professor Andrew Ng

Control Theory

1. *Nonlinear Systems: Analysis, Stability, and Control*, Professor Claire Tomlin
2. *Advanced Control Theory I*, Professor Roberto Horowitz
3. *Advanced Control Theory II*, Professor Masayoshi Tomizuka
4. *Linear Dynamic Systems*, Professor Robert M'Closkey
5. *Digital Control*, Professor Tsu-Chin Tsao

Mathematics

1. *Topology and Analysis*, Professor Alan Hammond
2. *Engineering Mathematics*, Professors Andrew Packard, Somayeh Sojoudi, and Kameshwar Poolla
3. *Analysis* (*Real*; *Complex*; *Numerical*)
4. *Differential Equations* (*Ordinary*; *Partial*)

Statistics

1. *Theoretical Statistics* (*Classical*), Professor Will Fithian
2. *Theoretical Statistics* (*High-dimensional*), Professor Yan Shuo Tan