Brendon G. Anderson

bga@calpoly.edu   brendon-anderson.github.io   Google Scholar

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Research Interests	I am interested in the development and analysis of **safe and reliable computational methods** by applying rigorous mathematics to interdisciplinary problems in the areas of **machine learning**, **optimization**, **control theory**, and **game theory**. My latest projects surround provable safety for neural networks using robust optimization theory, stability guarantees for evolutionary games using functional analysis, and robust control of distributed systems using optimal transport theory.	

Academic Positions	**Assistant Professor** California Polytechnic State University Mechanical Engineering Department	Sep. 2024 – Present

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Education	**University of California, Berkeley** Ph.D. in Mechanical Engineering (Major in Control Theory) *Dissertation:* "Provably robust machine learning through structure-aware computation" *Minors:* Mathematics, Optimization *Advisor:* Somayeh Sojoudi	Aug. 2018 – May 2024
	University of California, Berkeley M.A. in Mathematics *Thesis:* "Dissipativity theory for evolutionary games on infinite strategy sets"	Aug. 2022 – Dec. 2023
	University of California, Berkeley M.S. in Mechanical Engineering (Major in Control Theory) *Thesis:* "Towards optimality and robustness guarantees for data-driven learning and decision making"	Aug. 2018 – May 2020
	University of California, Los Angeles B.S. in Mechanical Engineering (*summa cum laude*) *Technical Breadth Area:* Mathematics	Sep. 2015 – Mar. 2018

Research Experience	**Graduate Student Researcher — UC Berkeley** *Advisor:* Somayeh Sojoudi	Aug. 2018 – May 2024
	Jr. Development Engineer — UCLA Engineering *Advisor:* Robert M'Closkey	Jan. 2018 – Jun. 2018
	Research Assistant — UCLA Mathematics *Advisors:* Matt Haberland, Olga Turanova, and Andrea L. Bertozzi	Jun. 2017 – Aug. 2017

Awards and Honors	
1. NeurIPS Top Reviewer (one of 1,958 out of 20,518; **top 9.5%**)	Oct. 2025
2. First place in INFORMS OR/MS Mini-Poster Competition	Nov. 2023
For the paper "Asymmetric certified robustness via feature-convex neural networks."	
3. NeurIPS Scholar Award	Oct. 2023
4. DEFINE program attendee, Duke University	Oct. 2023
Selective future faculty workshop emphasizing socially engaged academic leadership.	
5. Rising Star in Mechanical Engineering	Oct. 2023
Selected for commitment to building an equitable and diverse scholarly environment through research, teaching, and service.	
6. Second place method on RobustBench CIFAR-100 ℓ_∞-leaderboard	May 2023
For the paper "Improving the accuracy-robustness trade-off of classifiers via adaptive smoothing."	
7. Mechanical Engineering Summer Fellowship, UC Berkeley	May 2023
8. Outstanding Graduate Student Instructor Award, UC Berkeley	Mar. 2023
Schoolwide award for teaching excellence.	
9. INFORMS Data Mining Best Student Paper Award runner-up	Oct. 2022
For the paper "Projected randomized smoothing for certified adversarial robustness."	
10. Graduate Division Block Grant Award, UC Berkeley	May 2022
11. John and Janet McMurtry Fellowship, UC Berkeley	Dec. 2020
Departmental award for academic excellence, sole recipient.	
12. Travel Support Award, Conference on Decision and Control	Dec. 2020
13. Graduate Assembly Professional Development Award, UC Berkeley	Aug. 2020
14. Graduate Division Block Grant Award, UC Berkeley	May 2019
15. Harry M. Showman Prize, UCLA	Jun. 2018
Schoolwide research award, sole undergraduate recipient.	
16. ICINCO Best Student Paper Award shortlisted candidate	Jun. 2018
For the paper "Quantitative assessment of robotic swarm coverage."	
17. Jonathan David Wolfe Memorial Scholarship, UCLA	Apr. 2018
Departmental award for academic excellence, one of two recipients.	

Publications * indicates co-first author and equal contribution.

[1] **B. G. Anderson** and O. Frausto, "Robust optimal transport model predictive control for distribution steering," *Under review*, 2025.

[2] **B. G. Anderson**, "Choice paralysis in evolutionary games," *IEEE Control Systems Letters (L-CSS)*, 2025.

[3] V. Rostermundt and **B. G. Anderson**, "Certified adversarial robustness via mixture-of-Gaussians randomized smoothing," in *Reliable ML from Unreliable Data Workshop at NeurIPS*, 2025.

[4] **B. G. Anderson**, J. Li, S. Sojoudi, and M. Arcak, "Evolutionary games on infinite strategy sets: Convergence to Nash equilibria via dissipativity," *IEEE Transactions on Automatic Control*, 2025.

[5] **B. G. Anderson**, Z. Ma, J. Li, and S. Sojoudi, "Towards optimal branching of linear and semidefinite relaxations for neural network robustness certification," *Journal of Machine Learning Research (JMLR)*, 2025.

[6] **B. G. Anderson**, S. Pfrommer, and S. Sojoudi, "Approximately Gaussian replicator flows: Nonconvex optimization as a Nash-convergent evolutionary game," in *Proceedings of the 63rd IEEE Conference on Decision and Control (CDC)*, 2024.

[7] S. Pfrommer, **B. G. Anderson**, and S. Sojoudi, "Transport of algebraic structure to latent embeddings," in *International Conference on Machine Learning (ICML)*, 2024. **Spotlight paper (top 3.5% of submissions, top 12.8% of accepted papers)**.

[8] Y. Bai, **B. G. Anderson**, and S. Sojoudi, "Mixing classifiers to alleviate the accuracy-robustness trade-off," in *Proceedings of the 4th Annual Learning for Dynamics and Control Conference (L4DC)*, 2024.

[9] Y. Bai, **B. G. Anderson**, A. Kim, and S. Sojoudi, "Improving the accuracy-robustness trade-off of classifiers via adaptive smoothing," *SIAM Journal on Mathematics of Data Science (SIMODS)*, 2024. **Second place method on RobustBench CIFAR-100 ℓ_∞-leaderboard as of May 2023**.

[10] S. Pfrommer*, **B. G. Anderson***, J. Piet, and S. Sojoudi, "Asymmetric certified robustness via feature-convex neural networks," in *Advances in Neural Information Processing Systems (NeurIPS)*, 2023. **First place in INFORMS OR/MS Tomorrow Mini-Poster Competition**.

[11] S. Pfrommer, **B. G. Anderson**, and S. Sojoudi, "Projected randomized smoothing for certified adversarial robustness," *Transactions on Machine Learning Research (TMLR)*, 2023. **INFORMS Data Mining Best Student Paper Award** runner-up.

[12] **B. G. Anderson**, S. Pfrommer, and S. Sojoudi, "Tight certified robustness via min-max representations of ReLU neural networks," in *Proceedings of the 62nd IEEE Conference on Decision and Control (CDC)*, 2023.

[13] **B. G. Anderson***, T. Gautam*, and S. Sojoudi, "An overview and prospective outlook on robust training and certification of machine learning models," in *IFAC Symposium on System Structure and Control (SSSC)*, 2022.

[14] T. Gautam, **B. G. Anderson**, S. Sojoudi, and L. El Ghaoui, "A sequential greedy approach for training implicit deep models," in *Proceedings of the 61st IEEE Conference on Decision and Control (CDC)*, 2022.

[15] **B. G. Anderson** and S. Sojoudi, "Data-driven certification of neural networks with random input noise," *IEEE Transactions on Control of Network Systems (TCNS)*, 2022.

[16] **B. G. Anderson**, S. Pfrommer, and S. Sojoudi, "Towards optimal randomized smoothing: A semi-infinite linear programming approach," in *ICML Workshop on Formal Verification of Machine Learning (WFVML)*, 2022. **One of six selected for oral presentation**.

[17] **B. G. Anderson** and S. Sojoudi, "Certified robustness via locally biased randomized smoothing," in *Proceedings of the 4th Annual Learning for Dynamics and Control Conference (L4DC)*, 2022.

[18] F. Gama, **B. G. Anderson**, and S. Sojoudi, "Node-variant graph filters in graph neural networks," in *Proceedings of the IEEE Data Science and Learning Workshop (DSLW)*, 2022.

[19] **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 (CDC)*, 2020.

[20] **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*, 2019.

[21] **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.

[22] **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)*, 2018. **Shortlisted candidate for Best Student Paper Award**.

Invited Talks and Poster Presentations	
1. California Polytechnic State University, San Luis Obispo, CA	Oct. 2025

"Provably reliable computation for safety-critical systems: AI, optimization, control, and beyond." Research talk for the Mechanical Engineering *Graduate Seminar* (ME 563).

2. California Polytechnic State University, San Luis Obispo, CA   May 2025
"Machine learning with robustness guarantees." Lightning talk at the Robotics Scholarship Synergy Event.

3. California Polytechnic State University, San Luis Obispo, CA   Nov. 2024
"Mathematics of AI safety: The power of convexity in a highly nonconvex world." Mathematics Department colloquium series talk.

4. California Polytechnic State University, San Luis Obispo, CA   Oct. 2024
"Provably robust machine learning through structure-aware computation." Research talk for the Mechanical Engineering *Graduate Seminar* (ME 563).

5. University of Washington, Seattle, WA   Jan. 2024
"Provably robust machine learning through structure-aware computation." Department of Applied Mathematics seminar talk.

6. INFORMS Annual Meeting, Indianapolis, IN — Oct. 2022
   "Projected randomized smoothing for certified adversarial robustness." Research talk.

7. NorCal Control Workshop, UC Santa Cruz, Santa Cruz, CA — Jun. 2022
   "Certified robustness via locally biased randomized smoothing." Research poster presentation.

8. Tsinghua-Berkeley Shenzhen Institute, Berkeley, CA — May 2022
   "Robust neural networks." Guest lecture for *Optimization Theory and Machine Learning*.

9. INFORMS Annual Meeting, Anaheim, CA — Oct. 2021
   "Data-driven certification of neural networks with random inputs." Research talk.

10. Tsinghua-Berkeley Shenzhen Institute, Berkeley, CA — May 2021
    "Robust neural networks." Guest lecture for *Optimization Theory and Machine Learning*.

11. University of Michigan, Ann Arbor, MI — Apr. 2021
    "Robust neural networks." Guest lecture for *Advanced Topics in Applied Data Analytics* (IOE 491).

12. INFORMS Annual Meeting, National Harbor, MD — Nov. 2020
    "Partition-based convex relaxations for robustness certification of ReLU neural networks." Research talk.

13. Conference on Control Technology and Applications, Montréal — Aug. 2020
    "Robustness analysis of neural networks." Tutorial session.

14. Institute for Pure and Applied Mathematics, Los Angeles, CA — Aug. 2017
    "Robotic swarm analysis." Research talk.

Teaching

Instructor — Cal Poly

1. *Implementation of Mechanical Controls* (ME 418) — Fall 2025

2. *System Dynamics* (ME 322) — Spring 2025
   Student ratings: Mean 98.2%, Median 100%, Standard deviation 6.2%.

3. *Mechanical Vibrations* (ME 318) — Winter 2025
   Student ratings: Mean 95.6%, Median 100%, Standard deviation 10.4%.

4. *Engineering Dynamics* (ME 212) — Fall 2024
   Student ratings: Mean 93.4%, Median 100%, Standard deviation 12.0%.

5. *Introduction to Mechanical Engineering I* (ME 128) — Fall 2024
   Student ratings: Mean 90.8%, Median 100%, Standard deviation 13.8%.

Graduate Student Instructor — UC Berkeley

1. *Feedback Control Systems* (EE C128/ME C134) — Spring 2024
   Student ratings: Mean 90.8%, Median 100%, Standard deviation 20.2%.

2. *Convex Optimization* (EE 227BT) — Fall 2023
   Student ratings: Mean 97.1%, Median 100%, Standard deviation 6.1%.

    3. *Convex Optimization* (EE 227BT)   Fall 2022
       Recipient of the Outstanding Graduate Student Instructor Award.
       Student ratings: Mean 97.3%, Median 100%, Standard deviation 6.7%.

    4. *Nonlinear and Discrete Optimization* (IEOR 160)   Fall 2021
       Student ratings: Mean 93.4%, Median 100%, Standard deviation 9.6%.

    5. *Nonlinear and Discrete Optimization* (IEOR 160)   Fall 2020
       Student ratings: Mean 90.8%, Median 100%, Standard deviation 15.2%.

Guest Lecturer — UC Berkeley
    1. *Nonlinear and Discrete Optimization* (IEOR 160)   Fall 2022
    2. *Linear Programming and Network Flows* (IEOR 162)   Fall 2022
    3. *Nonlinear and Discrete Optimization* (IEOR 160)   Fall 2021

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

Student Advising (Funded)

Research Advisor — Cal Poly
    1. Ben Sager (Math undergraduate)   Jan. 2025 – Current
    2. William Walker Waite (ME undergraduate)   Jan. 2025 – Current
    3. Vaughn Rostermundt (Math undergraduate)   Apr. 2025 – Current
       Publications: "Certified adversarial robustness via mixture-of-Gaussians randomized smoothing"
    4. Faith Bergstrom (ME undergraduate)   Jun. 2025 – Dec. 2025
    5. Olivia Hoffsis (ME undergraduate)   Sep. 2025 – Dec. 2025

REU Mentor — UC Berkeley   Summer 2023
Mentor for SUPERB Research Experience for Undergraduates (REU) program, UC Berkeley Electrical Engineering and Computer Sciences (EECS) Department.
Advisee: Owen Frausto
Project: "Robust optimal transport over dynamical systems"

Professional Activities

Conference and Workshop Organization
    1. Chair of the session "Optimization III," Conference on Decision and Control (CDC), 2024.

    2. Co-organizer of the 2nd Workshop on Formal Verification of Machine Learning (WFVML), International Conference on Machine Learning (ICML), 2023.

    3. Co-chair of the second morning session, NorCal Control Workshop, 2023.

    4. Organizer and co-chair of the session "Safety and Robustness in Machine Learning," INFORMS Annual Meeting, 2022.

    5. Organizer and co-chair of the session "Robustness of Neural Networks," INFORMS Annual Meeting, 2021.

6. Chair of the session "Data Analytics," 57th Annual Allerton Conference on Communication, Control, and Computing, 2019.

Peer Reviewing
1. Program Committee Member for AAAI Conference on Artificial Intelligence, 2025.

2. Reviewer for American Control Conference (ACC), 2020 and 2024–2025.

3. Reviewer for IEEE Transactions on Automatic Control, 2021 and 2023–2025.

4. Reviewer for Conference on Neural Information Processing Systems (NeurIPS), 2022–2025.

5. Reviewer for Conference on Decision and Control (CDC), 2021–2025.

6. Reviewer for IEEE Control Systems Letters (L-CSS), 2022 and 2025.

7. Reviewer for the Proceedings of the Royal Society (Series A), 2025.

8. Reviewer for International Conference on Machine Learning (ICML) Workshops, 2024–2025.

9. Reviewer for International Conference on Machine Learning (ICML), 2023–2025.

10. Reviewer for Journal of Machine Learning Research (JMLR), 2025.

11. Reviewer for International Conference on Learning Representations (ICLR), 2023–2024.

12. Reviewer for Learning for Dynamics and Control Conference (L4DC), 2023.

13. Reviewer for IEEE Open Journal of Control Systems, 2022.

14. Reviewer for Artificial Intelligence and Statistics Conference (AISTATS), 2020.

Outreach and Engagement

1. Faculty Spotlight interview for Cal Poly College of Engineering, 2024.

2. Peer Advisor for the Bay Area Graduate Pathways to STEM (GPS) program, hosted by UC Berkeley Engineering and Stanford Engineering, 2023.

3. Graduate Student Mentor for incoming students, hosted by UC Berkeley Mechanical Engineering Graduate Student Council, 2023.

4. Volunteer for College Skateboarding Educational Foundation (CSEF), 2023. *Community event organizer to promote scholarships for skateboarders and to foster academia's inclusion of skateboarders from diverse backgrounds.*

5. Graduate Student Mentor for incoming students, hosted by UC Berkeley Mechanical Engineering Graduate Student Council, 2022.

6. Graduate Student Mentor for incoming students, hosted by UC Berkeley Mechanical Engineering Graduate Student Council, 2021.

7. Peer Advisor for the Bay Area Graduate Pathways to STEM (GPS) program, hosted by UC Berkeley Engineering and Stanford Engineering, 2020.