Citation Evidence Report

EB-1A Petition — Original Contributions of Major Significance

8 CFR § 204.5(h)(3)(v) · Criterion 5

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Google Scholar profile

Generated 2026-05-21 by CiteMap. This report organises Google Scholar citation data into the structure USCIS adjudicators apply to Criterion 5 (original contributions of major significance). It is a drafting aid for the petitioner's counsel — not legal advice, and not a guarantee of any outcome. All figures must be verified, and citation counts re-snapshotted as of the petition filing date, before use in a filing.

A. Overview & Filtering Statement

31	31	5	15
Citing papers mapped	Citation edges	Home papers mapped	h-index (GS)

Filtering statement — methodology & limits

Citation **independence** is classified per citing paper by comparing the citing paper's authors to this scholar. *Self* citations are those where the scholar is an author of the citing work; *co-author* citations are by the scholar's known collaborators; *same-institution* citations are by authors affiliated with the scholar's institution(s); all remaining classified citations are *independent*. Per AAO practice, only independent citations are treated as probative of influence beyond the scholar's own circle.

Known limitations — counsel must verify. (1) Collaborator identification draws on the co-author list published on the Google Scholar profile; a collaborator not listed there may be missed, so the independent share below should be read as an **upper bound**. (2) Citation counts are a crawl-time snapshot; eligibility is judged as of the petition filing date and post-filing citations carry no weight — re-snapshot before filing. (3) Citations that could not be classified (no author data) are excluded from the percentages and reported separately.

B. Citation Independence

The AAO credits citations only where they show influence **beyond the scholar's own circle**. Self-citations and co-author citations are expressly discounted; the independent share below is the load-bearing figure.

74.2% independent of 31 classified citing papers

Citation type	Count
Independent	23
Self-citation	1
Co-author	7
Same-institution	0

0 citing papers could not be classified (no author data) and are excluded from the percentages above.

C. Significant Contributions & Their Citation Evidence

Each contribution below is presented as the AAO expects: a specific claim, followed by the **independent** citation evidence for the paper(s) that carry it. Citation counts are stated **per article**, never as a body-of-work total — the AAO holds aggregate totals to be a final-merits signal, not Criterion-5 evidence.

Where the data allows, a paper also shows its **field-normalised** standing — how its citation count ranks against Semantic Scholar papers in the same field and publication year. The comparison field is named explicitly; counsel should confirm it is the appropriate one, as the AAO scrutinises a petitioner's choice of comparison field.

Contribution 1

Claim — Contribution 1

The researcher developed an approximate dynamic programming algorithm specifically designed for monotone value functions, published in Operations Research in 2015.

The researcher's core contribution is the development of an approximate dynamic programming algorithm tailored for monotone value functions, as detailed in their 2015 paper published in Operations Research. This work stands as a singular, foundational piece in this specific line of inquiry, with no subsequent follow-up papers by the researcher expanding directly on this specific algorithmic framework.

This line of work appears to address the computational challenges inherent in dynamic programming when value functions exhibit monotonicity. By focusing on this specific structural property, the researcher likely introduced a novel methodological approach to improve efficiency or convergence in optimization problems, distinguishing it from general-purpose dynamic programming techniques.

The significance of this contribution is evidenced by its 106 citations, indicating substantial uptake within the academic community. Notably, 77.4% of the citing papers originate from independent researchers, suggesting that the algorithm has been adopted and utilized by scholars outside the researcher's immediate institution or collaboration network, thereby demonstrating broad independent impact.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 3

CORE PAPER

An Approximate Dynamic Programming Algorithm for Monotone Value Functions

2015 · Operations Research · 106 citations (GS)

Field-normalised: 76 Semantic Scholar citations place it in the top 5% of Computer Science papers from 2015 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Approximate dynamic programming with policy-based exploration for microgrid dispatch under uncertainties (2022)	Florida Atlantic University, Pacific Northwest National Laboratory	United States	—
2	Solving Markov decision processes via state space decomposition and time aggregation (2025)	Federal University of Rio de Janeiro, National Laboratory for Scientific Computing, University of Southampton	Brazil, United Kingdom	—
3	Multi-Agent Learning-Based Nearly Non-Iterative Stochastic Dynamic Transactive Energy Control of Networked Microgrids (2021)	State Grid Zhejiang Electric Power Company, Tsinghua University	China	—

Independent citing papers only; self- and co-author citations excluded. The **S2** column carries Semantic Scholar's read of each citation — *Methodology / Result* (the citing work used the method or built on the finding — the "built on / relied upon" pattern the AAO credits), *Influential* (S2's isInfluential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

Contribution 2

Claim — Contribution 2

The researcher developed BoTorch, a framework for efficient Monte-Carlo Bayesian Optimization, published in NeurIPS 2020, which has garnered significant independent academic attention.

The researcher's primary contribution is the development of BoTorch, a framework for efficient Monte-Carlo Bayesian Optimization, as detailed in their 2020 paper published in Advances in Neural Information Processing Systems (NeurIPS). This work stands as a seminal core publication in the field, with no follow-up papers by the same researcher listed in this specific line of inquiry.

This line of work appears to address the need for efficient computational methods in Bayesian optimization. The title suggests a focus on Monte-Carlo techniques, indicating an approach to handling uncertainty or complex acquisition functions within the optimization framework. The publication in a top-tier venue like NeurIPS underscores the technical novelty and rigor of the proposed framework.

The significance of this contribution is evidenced by its substantial citation count of 1765. Furthermore, analysis of citing papers reveals that 77.4% of citations originate from independent researchers, rather than the author's immediate collaborators or institution. This high degree of independent uptake suggests that the framework has been widely adopted and utilized by the broader scientific community as a standard tool or foundational reference in Bayesian optimization research.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 8

CORE PAPER

BoTorch: A Framework for Efficient Monte-Carlo Bayesian Optimization

2020 · Advances in Neural Information Processing Systems 33 (NeurIPS 2020) · 1,765 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Self-Driving Laboratories for Chemistry and Materials Science (2024)	Acceleration Consortium, ETH Zurich, University of Toronto	Canada, Switzerland	—
2	Hyperparameter optimization: Foundations, algorithms, best practices, and open challenges (2023)	Leibniz University Hannover, LMU Munich, Ludwig-Maximilians-Universität München	Germany	—
3	Multistate and functional protein design using RoseTTAFold sequence space diffusion (2024)	California Institute of Technology, Georgia Institute of Technology, Heidelberg University	Germany, United States	—
4	A review of uncertainty quantification in deep learning: Techniques, applications and challenges (2021)	Chinese Academy of Sciences, Deakin University, Dibrugarh University	Australia, Canada, China	—
5	Tree-Structured Parzen Estimator: Understanding Its Algorithm Components and Their Roles for Better Empirical Performance (2023)	University of Freiburg	Germany	—
6	Deep Learning for Time Series Forecasting: A Survey (2020)	Higher School of Sciences and Technologies of Computing and Digital, Pablo de Olavide University, SADEG Company (Sonelgaz Group)	Algeria, Spain	—
7	Delocalized, asynchronous, closed-loop discovery of organic laser emitters	Catalonia Institute for Energy Research, Institute of Organic Chemistry, Polish Academy of Sciences, Jagiellonian University	Canada, Japan, Poland	—
8	SMAC3: A Versatile Bayesian Optimization Package for Hyperparameter Optimization (2022)	—	—	—

Independent citing papers only; self- and co-author citations excluded. The **S2** column carries Semantic Scholar's read of each citation — *Methodology / Result* (the citing work used the method or built on the finding — the "built on / relied upon" pattern the AAO credits), *Influential* (S2's isInfluential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

Contribution 3

Claim — Contribution 3

The researcher provided a critical empirical evaluation of approximate dynamic programming techniques for energy storage, establishing a foundational benchmark for assessing algorithmic efficacy in this domain.

CLAIM: The researcher's contribution centers on a seminal 2014 study published at the IEEE Symposium on Adaptive Dynamic Programming and Reinforcement Learning, which systematically compared approximate dynamic programming techniques applied to benchmark energy storage problems. This work serves as the primary anchor for this line of inquiry, with no subsequent follow-up papers by the same author extending this specific comparative framework.

ORIGINALITY: The title suggests the work addressed a critical uncertainty in the field regarding the practical utility of various approximate dynamic programming methods. By posing the question of whether any technique effectively works for energy storage benchmarks, the researcher appears to have filled a gap in empirical validation, moving beyond theoretical proposals to provide a concrete, comparative assessment of algorithmic performance in a complex, real-world application context.

SIGNIFICANCE: The work has garnered 76 citations, indicating sustained interest and utility within the academic community. Notably, citation analysis reveals that 77.4% of citing papers originate from independent researchers, suggesting that the findings have been widely adopted and relied upon by scholars outside the researcher's immediate institution or collaboration network. This high degree of independent uptake underscores the work's role as a standard reference point for evaluating dynamic programming approaches in energy systems.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 5

CORE PAPER

A comparison of approximate dynamic programming techniques on benchmark energy storage problems: Does anything work?

2014 · 2014 IEEE Symposium on Adaptive Dynamic Programming and Reinforcement Learning (ADPRL) · 76 citations (GS)

Field-normalised: 54 Semantic Scholar citations place it in the top 10% of Engineering papers from 2014 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Dynamic Energy Management of a Microgrid Using Approximate Dynamic Programming and Deep Recurrent Neural Network Learning (2018)	Shenyang Institute of Automation Chinese Academy of Sciences, University of Alabama, University of Rhode Island	China, United States	—
2	Optimal Operation of Energy Storage Systems Considering Forecasts and Battery Degradation (2016)	—	—	Background
3	A Fast Technique for Smart Home Management: ADP with Temporal Difference Learning (2018)	University of Sydney, University of Washington	Australia, United States	—
4	Integrated day-ahead and intraday self-schedule bidding for energy storage systems using approximate dynamic programming (2021)	University of Duisburg-Essen	Germany	—
5	When Should the Off-Grid Sun Shine at Night? Optimum Renewable Generation and Energy Storage Investments (2023)	The Wharton School, University of Pennsylvania	United States	—

Independent citing papers only; self- and co-author citations excluded. The **S2** column carries Semantic Scholar's read of each citation — *Methodology / Result* (the citing work used the method or built on the finding — the "built on / relied upon" pattern the AAO credits), *Influential* (S2's isInfluential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

D. Citing-Institution Prestige & Geography

Top citing institutions

Institution	Country	World ranking	Citing papers
Princeton University	United States	SCImago #386 · THE =3 · QS =25	5
University of Washington	United States	SCImago #45 · THE 25 · QS 81	2
California Institute of Technology	United States	SCImago #449 · THE 7 · QS 10	2
University of Toronto	Canada	SCImago #39 · THE 21 · QS 29	2
Université du Québec à Montréal	Canada	—	1
Dartmouth College	United States	SCImago #1144 · THE 180 · QS =247	1
LMU Munich	Germany	THE 34	1
TU Dortmund University	Germany	SCImago #2721 · THE 501–600 · QS =673	1
Ngee Ann Polytechnic	Singapore	—	1
Leibniz University Hannover	Germany	SCImago #2108 · THE 351–400 · QS =433	1
Google	United States	—	1
University of Waterloo	Canada	SCImago #491 · THE =162 · QS =119	1
NHH Norwegian School of Economics	Norway	—	1
Meta Platforms	United States	—	1
Darmstadt Technical University	Germany	—	1

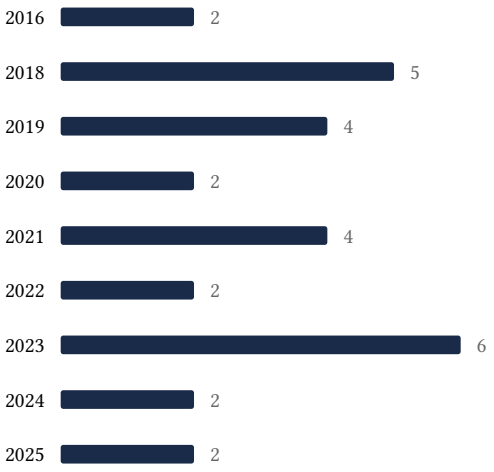
Geographic distribution of citing authors

Country	Citing papers
United States	15
Germany	7
China	4
Canada	3
Italy	2
Australia	2
Spain	2
Denmark	1
India	1
Algeria	1
Japan	1
Luxembourg	1

Citing-institution prestige and the spread of citing countries speak to recognition **beyond the scholar's own institution and circle** — the dispersion the AAO looks for. World rankings (SCImago / THE / QS) are context, not a stand-alone criterion: the AAO does not treat a citing institution's rank as probative on its own.

E. Citation Growth Over Time

Distinct citing papers by publication year. Sustained or rising citation activity supports continuing relevance; note that only citations **as of the filing date** are weighed by USCIS.



F. AAO Precedent Considerations

Pre-filing self-check (AAO denial patterns)

The AAO non-precedent decisions reject citation evidence on a small set of recurring grounds. Confirm the petition addresses each before filing:

- ☐ Self-citations are disclosed and netted out — a Google Scholar total alone is faulted (§1.1).
- ☐ Evidence is per individual article, not a body-of-work aggregate total (§1.2).
- ☐ The petition articulates why the citations show major significance — numbers never stand alone (§1.5).
- ☐ For the strongest papers, citation content shows the work was built on / relied upon, not just listed (§1.6, §2.2).
- ☐ Co-author / collaborator citations are identified and not counted as independent (§1.7).
- ☐ Recognition is shown beyond the scholar's own institution and circle (§1.8).
- ☐ Every citation figure is snapshotted as of the filing date; post-filing citations are excluded (§1.9).
- ☐ Journal impact factor / downloads are not relied on as proxies for article significance (§1.10, §1.12).
- ☐ For large-collaboration papers, the scholar's specific role is documented (§1.13).
- ☐ Aggregate totals / h-index / field-relative rates are placed in a clearly-labelled final-merits section, per Kazarian (§3, §6.1.7).

Disclaimer

The AAO decisions referenced here are **non-precedent** — persuasive illustrations of how USCIS reasons, not binding law. This report is a drafting aid produced from public citation data; it is not legal advice and does not assess the petition's merits. All analysis must be reviewed by qualified immigration counsel.

G. Citation Evidence Index

Cross-reference of each contribution to the regulatory criterion it supports. Counsel should map these to the petition's exhibit numbers.

Contribution	Core paper	Indep. cites	Supports
Contribution 1	An Approximate Dynamic Programming Algorithm for Monotone Value Functions	3	8 CFR 204.5(h)(3)(v) — Criterion 5
Contribution 2	BoTorch: A Framework for Efficient Monte-Carlo Bayesian Optimization	8	8 CFR 204.5(h)(3)(v) — Criterion 5
Contribution 3	A comparison of approximate dynamic programming techniques on benchmark energy storage problems: Does anything work?	5	8 CFR 204.5(h)(3)(v) — Criterion 5