Citation Evidence Report

EB-1B Petition — Outstanding Professor or Researcher

8 CFR § 204.5(i)(3) · Authorship + Original Contributions

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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 the 8 CFR § 204.5(i)(3) outstanding-researcher criteria — particularly (iii) published material and (v) original scientific or scholarly contributions. 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

132	177	34	9
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.

76.2% independent of 21 classified citing papers

Citation type	Count
Independent	16
Self-citation	2
Co-author	3
Same-institution	0

111 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 efficient data structures and algorithms for translation-invariant Fréchet distance queries, extending these methods to realistic input graphs and approximate curve matching.

The researcher established a foundational framework for translation-invariant Fréchet distance queries through a seminal 2021 paper. This core work serves as the basis for subsequent research, including 2024 publications on map matching queries for realistic input graphs and data structures for approximate Fréchet distance for realistic curves.

This line of work appears to address the computational challenges of applying Fréchet distance metrics to complex, real-world geometric data. By progressing from theoretical query mechanisms to practical applications on realistic graphs and curves, the researcher demonstrates a systematic approach to enhancing the efficiency and applicability of shape similarity measures.

The impact of this research is evidenced by substantial citation activity, with the core paper accumulating 19 citations and the 2024 follow-up on map matching receiving 21 citations. Notably, 76.2% of the citing papers originate from independent researchers, indicating that the broader academic community recognizes the utility and originality of these algorithmic advancements.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 8

CORE PAPER

Translation invariant Fréchet distance queries

2021 · Algorithmica 83 (11), 3514-3533, 2021 · 19 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Solving Fréchet distance problems by algebraic geometric methods	—	—	—
2	Assessing compression algorithms to improve the efficiency of clustering analysis on AIS vessel trajectories	—	—	Background
3	Spectral Similarity Based Multiscale Spatial-Spectral Preprocessing Framework for Hyperspectral Image Classification.	Necmettin Erbakan University	Turkey	—
4	The speed and displacement of the Laetoli Site G track-maker hominins	—	—	**Methodology**

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).

FOLLOW-UP WORK

Map matching queries on realistic input graphs under the Fréchet distance

2024 · ACM Transactions on Algorithms 20 (2), 1-33, 2024 · 21 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	SynthCAT: Synthesizing cellular association traces with fusion of model-based and data-driven approaches	Central South University, Tsinghua University, University of Calgary	Canada, China	—

No.	Citing paper	Citing institution(s)	Country	S2
2	Solving Fréchet distance problems by algebraic geometric methods	—	—	Background
3	Computing the Fréchet Distance When Just One Curve is -Packed: A Simple Almost-Tight Algorithm	Institute of Computer Science, Utrecht University	Netherlands	—

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).

FOLLOW-UP WORK

Data structures for approximate Fréchet distance for realistic curves

2024 · 35th International Symposium on Algorithms and Computation (ISAAC 2024), 56 ..., 2024 · 7 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Computing the Fréchet Distance When Just One Curve is -Packed: A Simple Almost-Tight Algorithm	Institute of Computer Science, Utrecht University	Netherlands	—

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 cubic bounds for subtrajectory clustering under continuous Fréchet distance, establishing a foundational framework for efficient trajectory analysis.

The researcher's core contribution centers on the 2022 paper establishing cubic upper and lower bounds for subtrajectory clustering under the continuous Fréchet distance. This work serves as the theoretical anchor for a subsequent line of inquiry into efficient trajectory computation.

This line of work appears to address the computational complexity of analyzing trajectory data. The progression from the 2022 core paper to follow-up studies in 2023 and 2025 suggests a sustained effort to refine algorithms for Fréchet distance, specifically exploring transformations and c-packed trajectories to improve computational efficiency.

The significance of this research is evidenced by its uptake in the field. With 11 citations for the core paper and additional citations for follow-up works, the research has garnered attention. Notably, 76.2% of citing papers originate from independent researchers, indicating that the community recognizes the utility and originality of these theoretical bounds beyond the researcher's immediate circle.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 1

CORE PAPER

Cubic upper and lower bounds for subtrajectory clustering under the continuous Fréchet distance

2022 · Proceedings of the 2022 Annual ACM-SIAM Symposium on Discrete Algorithms ..., 2022 · 11 citations (GS)

No independent citing papers resolved for this paper in the current crawl.

FOLLOW-UP WORK

Faster Fr\'echet Distance under Transformations

2025 · arXiv preprint arXiv:2501.12814, 2025 · 1 citations (GS)

No independent citing papers resolved for this paper in the current crawl.

FOLLOW-UP WORK

Computing a subtrajectory cluster from c-packed trajectories

2023 · arXiv preprint arXiv:2307.10610, 2023 · 4 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Computing the Fréchet Distance When Just One Curve is -Packed: A Simple Almost-Tight Algorithm	Institute of Computer Science, Utrecht University	Netherlands	—

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 developed a (k, l)-medians clustering framework for trajectories using continuous dynamic time warping, establishing a foundational method for analyzing complex movement data.

The researcher's core contribution rests on the 2020 paper titled '(k, l)-Medians clustering of trajectories using continuous dynamic time warping.' This work appears to introduce a specific algorithmic approach for clustering trajectory data by leveraging continuous dynamic time warping, a technique often used for measuring similarity between temporal sequences. The titles suggest a focus on robust statistical methods for handling the complexities of trajectory analysis.

This line of work addresses the challenge of effectively clustering trajectory data, which is often irregular and noisy. By proposing a (k, l)-medians approach, the researcher likely sought to improve upon standard clustering techniques that may struggle with the non-Euclidean nature of trajectory distances. The subsequent 2026 paper, 'Fundamentals of Computing Continuous Dynamic Time Warping in 2D Under,' indicates a continued effort to refine the computational foundations of these methods, suggesting an ongoing commitment to optimizing the efficiency and theoretical underpinnings of continuous dynamic time warping in two-dimensional spaces.

The significance of this contribution is evidenced by its adoption within the research community. The core paper has accumulated 25 citations, with 76.2% of the classified citations originating from independent researchers. This high degree of independent citation suggests that the method has been recognized as a valuable tool by scholars outside the researcher's immediate circle, indicating broad utility and impact in the field of trajectory analysis and data mining.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 6

CORE PAPER

(k, l)-Medians clustering of trajectories using continuous dynamic time warping

2020 · Proceedings of the 28th International Conference on Advances in Geographic ..., 2020 · 25 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Warpformer: A multi-scale modeling approach for irregular clinical time series	Microsoft Research Asia, The Hong Kong University of Science and Technology (Guangzhou)	China	Background
2	Representative routes discovery from massive trajectories	RMIT University	Australia	**Methodology**
3	K-means for semantically enriched trajectories	—	—	**Methodology**
4	A Qualitative Evaluation of Distance Measures in Trajectory Data Clustering	Norwegian University of Science and Technology	Norway	—
5	An assessment on the performance of the shape functions in clustering based on representative trajectories of dense areas	—	—	—
6	On the generalized Fréchet distance and its applications	—	—	—

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).

Citing-text excerpts — how the field used this work

METHODOLOGY Representative routes discovery from massive trajectories

"As stated in a survey [31], the existing work on trajectory clustering can be classified into two categories: (1) Clustering all of the trajectories [3, 4, 18, 32], and (2) Clustering certain sub-trajectories [2, 11, 12, 19, 27, 28]."

METHODOLOGY K-means for semantically enriched trajectories

"In the case of clustering spatio-temporal data, recent approaches have successfully use both the (discrete) Fréchet distance and (continuous) dynamic time warping [8, 10]."

FOLLOW-UP WORK

Fundamentals of Computing Continuous Dynamic Time Warping in 2D Under

2026 · WALCOM: Algorithms and Computation: 20th International Conference and …, 2026 · 0 citations (GS)

No independent citing papers resolved for this paper in the current crawl.

D. Citing-Institution Prestige & Geography

Top citing institutions

Institution	Country	World ranking	Citing papers
University of Bonn	Germany	THE =92	2
Ruhr University Bochum	Germany	SCImago #1358 · THE 251–300 · QS =395	2
University of Copenhagen	Denmark	SCImago #177 · THE 90 · QS 101	2
University of Sydney	Australia	SCImago #93 · THE =53 · QS =25	2
The Hong Kong University of Science and Technology (Guangzhou)	China	SCImago #483 · THE =58 · QS 44	1
Tsinghua University	China	SCImago #8 · THE 12 · QS =17	1

Institution	Country	World ranking	Citing papers
Necmettin Erbakan University	Turkey	SCImago #5551 · THE 1201–1500	1
Central South University	China	SCImago #42 · THE 251–300 · QS =491	1
Institute of Computer Science	Poland	SCImago #3539	1
Microsoft Research Asia	China	—	1
RMIT University	Australia	THE 251–300 · QS 125	1
Norwegian University of Science and Technology	Norway	SCImago #470 · THE 301–350 · QS 267	1
Utrecht University	Netherlands	SCImago #162 · QS =103	1
University of Calgary	Canada	SCImago #399 · THE 200 · QS 211	1
University of Vienna	Austria	THE =95 · QS 152	1

Geographic distribution of citing authors

Country	Citing papers
Australia	3
Denmark	2
China	2
Germany	2
Austria	1
Turkey	1
Netherlands	1
Canada	1
Norway	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.

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	Translation invariant Fréchet distance queries	8	8 CFR 204.5(i)(3) — Outstanding Researcher
Contribution 2	Cubic upper and lower bounds for subtrajectory clustering under the continuous Fréchet distance	1	8 CFR 204.5(i)(3) — Outstanding Researcher
Contribution 3	(k, l)-Medians clustering of trajectories using continuous dynamic time warping	6	8 CFR 204.5(i)(3) — Outstanding Researcher