Citation Evidence Report

EB-2 NIW Petition — National Interest Waiver

Matter of Dhanasar · Prong 2 (well-positioned)

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Google Scholar profile

Generated 2026-05-22 by CiteMap. This report organises Google Scholar citation data into the structure USCIS adjudicators apply to Prong 2 of Matter of Dhanasar (the petitioner is well positioned to advance the proposed endeavor) — the prong where past citation evidence is most probative. 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

20	28	3	40
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.

70.0% independent of 20 classified citing papers

Citation type	Count
Independent	14
Self-citation	2
Co-author	4
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 pioneered wearable epidermal patches for simultaneous hemodynamic and metabolic monitoring, subsequently advancing the field with a wearable cardiac ultrasound imager.

The researcher established a foundational contribution in wearable biomedical sensing through a 2021 paper in Nature Biomedical Engineering on epidermal patches for simultaneous biomarker monitoring. This core work was extended by a 2023 publication in Nature describing a wearable cardiac ultrasound imager, indicating a sustained focus on miniaturized, non-invasive diagnostic technologies.

This line of work appears to address the challenge of integrating multiple physiological monitoring capabilities into comfortable, wearable form factors. The progression from multiparameter epidermal patches to specialized cardiac imaging suggests an original approach to expanding the scope of wearable diagnostics beyond simple sensing to include structural imaging.

The significance of this research is evidenced by substantial citation counts, with the core paper cited 629 times and the follow-up work cited 636 times. Furthermore, analysis of citing literature reveals that 80% of citations originate from independent researchers, demonstrating broad adoption and impact across the wider scientific community rather than limited internal recognition.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 10

CORE PAPER

An epidermal patch for the simultaneous monitoring of haemodynamic and metabolic biomarkers

2021 · Nature Biomedical Engineering · 629 citations (GS)

Field-normalised: 490 Semantic Scholar citations place it in the top 1% of Medicine papers from 2021 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Materials-Driven Soft Wearable Bioelectronics for Connected Healthcare (2024)	Monash University	Australia	—
2	Technology Roadmap for Flexible Sensors (2023)	The University of Texas at Austin, Tsinghua University, University of Houston	China, South Korea, United States	—
3	Wearable and flexible electrochemical sensors for sweat analysis: a review (2022)	Chinese Academy of Sciences	China	—
4	A wearable electrochemical biosensor for the monitoring of metabolites and nutrients (2022)	Beckman Research Institute at City of Hope, California Institute of Technology, University of California, Los Angeles	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).

FOLLOW-UP WORK

A wearable cardiac ultrasound imager

2023 · Nature · 636 citations (GS)

Field-normalised: 505 Semantic Scholar citations place it in the top 1% of Engineering papers from 2023 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Materials-Driven Soft Wearable Bioelectronics for Connected Healthcare (2024)	Monash University	Australia	—
2	Ultrasound-Based Micro-/Nanosystems for Biomedical Applications (2024)	Shanghai General Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai Jiao Tong University School of Medicine, Shanghai University	China	—
3	Porous Conductive Textiles for Wearable Electronics (2024)	The Hong Kong Polytechnic University	China, P. R. China	—
4	Transforming Healthcare: Intelligent Wearable Sensors Empowered by Smart Materials and Artificial Intelligence (2025)	Huazhong University of Science and Technology, National University of Singapore, Oslo Metropolitan University	Norway, Singapore, Sweden	—
5	Artificial Intelligence-Powered Electronic Skin (2023)	California Institute of Technology	United States	—
6	From machine learning to deep learning: Advances of the recent data-driven paradigm shift in medicine and healthcare (2024)	Adamas University, Fakir Mohan University	India	—

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 an integrated wearable microneedle array enabling continuous, multi-biomarker monitoring in interstitial fluid, establishing a foundational platform for non-invasive physiological sensing.

The researcher's primary contribution centers on the development of an integrated wearable microneedle array designed for the continuous monitoring of multiple biomarkers in interstitial fluid. This work, published in 2022, serves as the cornerstone of this specific line of inquiry, with no subsequent follow-up papers by the same researcher currently listed in this dataset.

This line of work appears to address the challenge of obtaining continuous, multi-analyte data from interstitial fluid through a single, integrated wearable device. The title suggests a novel engineering approach that combines microneedle technology with multi-biomarker sensing capabilities, potentially overcoming limitations of single-analyte or invasive monitoring methods prevalent at the time.

The significance of this contribution is evidenced by its substantial citation count of 601, indicating strong uptake within the scientific community. Furthermore, citation analysis reveals that 80% of citing papers originate from independent researchers, suggesting that the work has influenced a broad and diverse range of scholars beyond the researcher's immediate institutional or collaborative network.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 7 · **1 flagged influential by Semantic Scholar**

CORE PAPER

An integrated wearable microneedle array for the continuous monitoring of multiple biomarkers in interstitial fluid

2022 · 601 citations (GS)

Field-normalised: 463 Semantic Scholar citations place it in the top 1% of Medicine papers from 2022 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Technology Roadmap for Flexible Sensors (2023)	The University of Texas at Austin, Tsinghua University, University of Houston	China, South Korea, United States	—
2	Microneedle biomedical devices (2024)	City University of Hong Kong, Zhejiang University	China	**Influential**
3	The Emergence of AI-Based Wearable Sensors for Digital Health Technology: A Review (2023)	Northwestern University, University of Calgary	Canada, United States	—
4	Transforming Healthcare: Intelligent Wearable Sensors Empowered by Smart Materials and Artificial Intelligence (2025)	Huazhong University of Science and Technology, National University of Singapore, Oslo Metropolitan University	Norway, Singapore, Sweden	—
5	Advances in Wearable Biosensors for Healthcare: Current Trends, Applications, and Future Perspectives (2024)	Gachon University	South Korea	—
6	A stretchable wireless wearable bioelectronic system for multiplexed monitoring and combination treatment of infected chronic wounds (2023)	California Institute of Technology, University of Southern California	United States	—
7	A review on flexible wearables–Recent developments in non-invasive continuous health monitoring (2024)	Image Processing Systems Institute of RAS, Warsaw University of Technology	Poland, Russia	—

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
California Institute of Technology	United States	SCImago #449 · THE 7 · QS 10	5
University of California San Diego	United States	SCImago #120 · THE 47 · QS 66	5
Northwestern University	United States	THE 30 · QS =42	2
Huazhong University of Science and Technology	China	SCImago #25 · THE =176 · QS 319	1
Gachon University	South Korea	SCImago #1349 · THE 501–600	1
University of Cambridge	United Kingdom	SCImago #63 · THE =3 · QS 6	1
City University of Hong Kong	China	SCImago #342 · THE 73 · QS =63	1
University of Calgary	Canada	SCImago #399 · THE 200 · QS 211	1
Chinese Academy of Sciences	China	SCImago #2	1
University of California, San Diego	United States	SCImago #120 · THE 47 · QS 66	1

Institution	Country	World ranking	Citing papers
University of Gothenburg	Sweden	SCImago #573 · THE 201–250 · QS 202	1
The Hong Kong Polytechnic University	P. R. China	SCImago #256 · THE 80 · QS 54	1
University of Freiburg	Germany	THE =138	1
University of Houston	United States	SCImago #893 · THE 401–500 · QS =556	1
Mayo Clinic	United States	SCImago #88	1

Geographic distribution of citing authors

Country	Citing papers
United States	11
China	6
Canada	2
South Korea	2
United Kingdom	2
Poland	1
Australia	1
Russia	1
Singapore	1
Sweden	1
Switzerland	1
Tanzania	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).

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 epidermal patch for the simultaneous monitoring of haemodynamic and metabolic biomarkers	10	Dhanasar — Prong 2 (well-positioned)
Contribution 2	An integrated wearable microneedle array for the continuous monitoring of multiple biomarkers in interstitial fluid	7	Dhanasar — Prong 2 (well-positioned)