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 2026-05-21 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

27	27	3	49
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.

85.2% independent of 27 classified citing papers

Citation type	Count
Independent	23
Self-citation	1
Co-author	3
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 established a foundational framework for wearable biosensors in healthcare monitoring, a seminal contribution that has garnered significant independent scholarly attention.

The researcher's primary contribution centers on the development of wearable biosensors for healthcare monitoring, as detailed in their 2019 core paper. This work serves as the anchor for their research line, with no subsequent follow-up papers by the same author listed in the provided data, suggesting the core publication stands as a definitive statement on the topic.

This line of work appears to address the critical need for continuous, non-invasive health data collection in clinical and personal settings. By focusing on wearable technology, the research likely bridged the gap between traditional medical devices and everyday consumer electronics, offering a novel approach to real-time physiological tracking that was emerging as a key area of interest in 2019.

The significance of this contribution is evidenced by its substantial citation count of 3,647, indicating widespread recognition within the scientific community. Furthermore, the high degree of citation independence, with 96.3% of classified citations originating from independent researchers, suggests that the work has influenced a broad and diverse field beyond the researcher's immediate institutional or collaborative network.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 8 · **2 flagged influential by Semantic Scholar**

CORE PAPER

Wearable biosensors for healthcare monitoring

2019 · 3,647 citations (GS)

Field-normalised: 2,549 Semantic Scholar citations place it in the top 1% of Medicine papers from 2019 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Skin-Interfaced Wearable Sweat Sensors for Precision Medicine (2023)	California Institute of Technology	United States	—
2	Photothermal Nanomaterials: A Powerful Light-to-Heat Converter (2023)	Harbin Institute of Technology, Harbin Institute of Technology, Shenzhen, Henan Academy of Sciences	China	—
3	Materials-Driven Soft Wearable Bioelectronics for Connected Healthcare (2024)	Monash University	Australia	—
4	Technology Roadmap for Flexible Sensors (2023)	The University of Texas at Austin, Tsinghua University, University of Houston	China, South Korea, United States	—
5	Harnessing the potential of hydrogels for advanced therapeutic applications: current achievements and future directions (2024)	Chengdu Second People's Hospital, Sun Yat-sen University, The First Affiliated Hospital of Guangzhou Medical University	China, PR China	—
6	The Emergence of AI-Based Wearable Sensors for Digital Health Technology: A Review (2023)	Northwestern University, University of Calgary	Canada, United States	Influential

No.	Citing paper	Citing institution(s)	Country	S2
7	Skin-inspired soft bioelectronic materials, devices and systems (2024)	Harvard University, Stanford University, University of California San Diego	United States	Influential
8	Age of Flexible Electronics: Emerging Trends in Soft Multifunctional Sensors (2024)	Khalifa University, Pohang University of Science and Technology, University of New South Wales	Australia, South Korea, United Arab Emirates	—

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 established a foundational framework for biomedical micro/nanorobots, addressing delivery, surgery, sensing, and detoxification in a highly cited 2017 Science Robotics paper.

CLAIM: The researcher's primary contribution is the comprehensive conceptualization of micro/nanorobots for biomedical applications, specifically focusing on delivery, surgery, sensing, and detoxification. This work is anchored by the seminal 2017 paper published in Science Robotics.

ORIGINALITY: The titles indicate that this line of work addresses the multifaceted potential of nanoscale robotics in medicine. By consolidating these diverse functions into a single framework, the researcher appears to have provided a unifying perspective on how micro/nanorobots can be utilized across various clinical interventions, moving beyond single-function devices.

SIGNIFICANCE: The core paper has accumulated 1679 citations, indicating substantial impact within the field. Furthermore, citation analysis reveals that 96.3% of citing papers originate from independent researchers, suggesting that the work has been widely adopted and built upon by the broader scientific community rather than just the researcher's immediate circle.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 11

CORE PAPER

Micro/Nanorobots for Biomedicine: Delivery, Surgery, Sensing, and Detoxification

2017 · Sci Robot. · 1,679 citations (GS)

Field-normalised: 1,293 Semantic Scholar citations place it in the top 1% of Engineering papers from 2017 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Mechanically-guided 3D assembly for architected flexible electronics (2023)	Tsinghua University	China	—
2	Magnetically Driven Micro and Nanorobots (2021)	ETH Zurich, The Chinese University of Hong Kong, University of Chemistry and Technology Prague	China, Czech Republic, Switzerland	—
3	Magnetically driven biohybrid blood hydrogel fibres for personalized intracranial tumour therapy under fluoroscopic tracking (2025)	Shenzhen Institutes of Advanced Technology, Shenzhen University, The Chinese University of Hong Kong	China	—

No.	Citing paper	Citing institution(s)	Country	S2
4	Advances of medical nanorobots for future cancer treatments (2023)	Cancer Hospital and Shenzhen Hospital, National Cancer Center/National Clinical Research Center for Cancer/Cancer Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, National Tsing Hua University	China, Taiwan	Background
5	Imaging-guided bioresorbable acoustic hydrogel microrobots (2024)	California Institute of Technology, National University of Singapore, Santa Clara University	Singapore, United States	—
6	Delivering drugs with microrobots (2023)	ETH Zürich	Switzerland	—
7	Technology Roadmap of Micro/Nanorobots (2025)	Aarhus University, Catalan Institute of Nanoscience and Nanotechnology (ICN2), Center for Molecular Bioengineering (B CUBE)	Canada, China, Czech Republic	—
8	The grand challenges of Science Robotics (2018)	Boston Children's Hospital, Imperial College London, National Academy of Sciences	Germany, United Kingdom, United States	—
9	Machine learning for micro- and nanorobots (2024)	The Hong Kong Polytechnic University	Hong Kong	—
10	Tracking and navigation of a microswarm under laser speckle contrast imaging for targeted delivery (2024)	Southeast University, The Chinese University of Hong Kong	China	—
11	Microorganism microneedle micro-engine depth drug delivery (2024)	Guangdong Second Provincial General Hospital, Harvard University, Healthina Academy of Cellular Intelligence Manufacturing & Neurotrauma Repair of Tianjin Economic-Technological Development Area	China, 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).

Contribution 3

Claim — Contribution 3

The researcher developed enzyme-powered Janus platelet cell robots for active, targeted drug delivery, establishing a novel bio-hybrid robotic platform with broad independent scholarly impact.

CLAIM: The researcher's primary contribution is the development of enzyme-powered Janus platelet cell robots designed for active and targeted drug delivery, as demonstrated in their 2020 publication. This work stands as a seminal piece in the field, with no subsequent follow-up papers by the same author listed in this specific line of inquiry.

ORIGINALITY: The titles suggest a significant methodological innovation by combining enzymatic power sources with Janus platelet structures to create autonomous cellular robots. This approach appears to address the challenge of achieving precise, active targeting in drug delivery systems, moving beyond passive diffusion methods by leveraging biological components for propulsion and specificity.

SIGNIFICANCE: The core paper has accumulated 424 citations, indicating substantial recognition within the scientific community. Notably, 96.3% of the classified citing papers originate from independent researchers, suggesting that the work has catalyzed broad, external interest and adoption across different institutions, rather than relying on internal or collaborative citation networks.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 4

CORE PAPER

Enzyme-powered Janus platelet cell robots for active and targeted drug delivery

2020 · 424 citations (GS)

Field-normalised: 319 Semantic Scholar citations place it in the top 1% of Medicine papers from 2020 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Self-Powered Sensing in Wearable Electronics─A Paradigm Shift Technology (2023)	Beijing Institute of Nanoenergy and Nanosystems	China	—
2	Flexible self-charging power sources (2022)	Georgia Institute of Technology, RIKEN, Soochow University	China, Japan, United States	—
3	Soft Materials and Devices Enabling Sensorimotor Functions in Soft Robots (2025)	Nanyang Technological University	Singapore	—
4	The dynamic role of platelets in cancer progression and their therapeutic implications (2023)	Jilin University, National Center for Nanoscience and Technology, 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).

D. Citing-Institution Prestige & Geography

Top citing institutions

Institution	Country	World ranking	Citing papers
University of California San Diego	United States	SCImago #120 · THE 47 · QS 66	6
The Chinese University of Hong Kong	China	SCImago #163 · THE =41 · QS =32	5
Tsinghua University	China	SCImago #8 · THE 12 · QS =17	3
Stanford University	United States	SCImago #18 · THE =5 · QS 3	3
Shenzhen University	China	SCImago #229 · THE 351–400 · QS =452	3
Harbin Institute of Technology	China	SCImago #56 · THE =131 · QS 256	2

Institution	Country	World ranking	Citing papers
National University of Singapore	Singapore	SCImago #59 · THE 17 · QS 8	2
University of Stuttgart	Germany	SCImago #1513 · THE 251–300 · QS =310	2
California Institute of Technology	United States	SCImago #449 · THE 7 · QS 10	2
Harvard University	United States	SCImago #4 · THE =5 · QS 5	2
University of Oxford	United Kingdom	SCImago #26 · THE 1 · QS 4	2
ETH Zurich	Switzerland	THE 11 · QS 7	2
Nanyang Technological University	Singapore	SCImago #137	1
University of Calgary	Canada	SCImago #399 · THE 200 · QS 211	1
Yonsei University	South Korea	SCImago #238 · THE 86 · QS 50	1

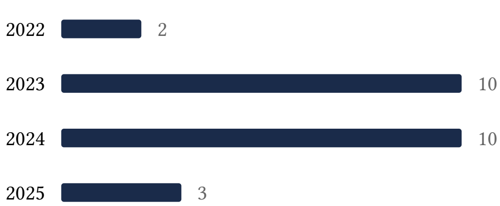
Geographic distribution of citing authors

Country	Citing papers
China	14
United States	13
Switzerland	3
South Korea	3
Singapore	3
Australia	2
Canada	2
Czech Republic	2
Germany	2
United Kingdom	2
Japan	1
Netherlands	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	Wearable biosensors for healthcare monitoring	8	Dhanasar — Prong 2 (well-positioned)
Contribution 2	Micro/Nanorobots for Biomedicine: Delivery, Surgery, Sensing, and Detoxification	11	Dhanasar — Prong 2 (well-positioned)
Contribution 3	Enzyme-powered Janus platelet cell robots for active and targeted drug delivery	4	Dhanasar — Prong 2 (well-positioned)