# 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

| 17 | 17 | 2 | 104 |
|---|---|---|---|
| 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.

**64.7% independent** of 17 classified citing papers

| Citation type | Count |
|---|---|
| Independent | 11 |
| Self-citation | 3 |
| 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 pioneered fully integrated wearable sensor arrays for multiplexed in situ perspiration analysis, establishing a foundational platform for continuous, non-invasive physiological monitoring.*

The researcher's primary contribution is the development of fully integrated wearable sensor arrays designed for multiplexed in situ perspiration analysis, as detailed in their seminal 2016 paper. This work represents a concrete advancement in the field of wearable health technology, focusing on the simultaneous detection of multiple analytes directly from sweat.

This line of work appears to address the critical need for comprehensive, real-time physiological monitoring without invasive procedures. By integrating multiple sensors into a single wearable platform, the research suggests a shift from single-analyte detection to complex, multiplexed analysis, enabling a more holistic view of metabolic and health status through perspiration.

The significance of this contribution is evidenced by its substantial citation count of 5,612, indicating widespread recognition and utility within the scientific community. Furthermore, the high degree of citation independence, with 82.4% of classified citations originating from independent researchers, underscores the work's broad impact and its role as a foundational reference for diverse groups of scientists beyond the researcher's immediate circle.

**INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 5**

**CORE PAPER**

**Fully integrated wearable sensor arrays for multiplexed in situ perspiration analysis**

2016 · 5,612 citations (GS)

Field-normalised: 4,274 Semantic Scholar citations place it in the top 1% of Engineering papers from 2016 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 | The Emergence of AI-Based Wearable Sensors for Digital Health Technology: A Review (2023) | Northwestern University, University of Calgary | Canada, United States | Background |
| 4 | Skin-inspired soft bioelectronic materials, devices and systems (2024) | Harvard University, Stanford University, University of California San Diego | United States | — |
| 5 | High-speed and large-scale intrinsically stretchable integrated circuits (2024) | Stanford University | 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 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 review.*

The researcher's primary contribution is the comprehensive synthesis of biomedical micro/nanorobotics, anchored by the 2017 Science Robotics paper titled 'Micro/Nanorobots for Biomedicine: Delivery, Surgery, Sensing, and Detoxification.' This work serves as the core reference for this line of inquiry, with no subsequent follow-up papers by the same researcher provided in this context.

This line of work appears to address the need for a unified conceptual framework in an emerging field. By categorizing applications into delivery, surgery, sensing, and detoxification, the researcher likely provided a critical roadmap for early-stage development, helping to define the scope and potential of nanorobotic systems in medical contexts.

The significance of this contribution is evidenced by its substantial citation count of 1679, indicating widespread adoption as a key reference. Furthermore, the high degree of citation independence, with 82.4% of classified citations coming from independent researchers, suggests that the work has influenced the broader scientific community beyond the researcher's immediate circle, validating its impact as a seminal resource.

**INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 6**

**CORE PAPER**

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

2017 · Science Robotics · 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 | Delivering drugs with microrobots (2023) | ETH Zürich | Switzerland | — |
| 4 | 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 | — |
| 5 | Machine learning for micro- and nanorobots (2024) | The Hong Kong Polytechnic University | Hong Kong | — |
| 6 | Tracking and navigation of a microswarm under laser speckle contrast imaging for targeted delivery (2024) | Southeast University, The Chinese University of Hong Kong | 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 | 5 |
| California Institute of Technology | United States | SCImago #449 · THE 7 · QS 10 | 3 |
| The Chinese University of Hong Kong | China | SCImago #163 · THE =41 · QS =32 | 3 |
| Stanford University | United States | SCImago #18 · THE =5 · QS 3 | 2 |
| ETH Zurich | Switzerland | THE 11 · QS 7 | 2 |
| National University of Singapore | Singapore | SCImago #59 · THE 17 · QS 8 | 2 |
| Tsinghua University | China | SCImago #8 · THE 12 · QS =17 | 2 |
| Michigan State University | United States | SCImago #436 · THE =105 · QS 161 | 1 |
| North Carolina State University | United States | SCImago #484 · THE 301–350 · QS =272 | 1 |
| Harbin Institute of Technology | China | SCImago #56 · THE =131 · QS 256 | 1 |
| The Hong Kong Polytechnic University | Hong Kong | SCImago #256 · THE 80 · QS 54 | 1 |
| University of Houston | United States | SCImago #893 · THE 401–500 · QS =556 | 1 |
| University of Florida | United States | SCImago #166 · THE =134 · QS =212 | 1 |
| Wuhan University of Technology | China | SCImago #405 · QS 951-1000 | 1 |
| Aarhus University | Denmark | SCImago #293 · THE 101 · QS 131 | 1 |

### Geographic distribution of citing authors

| Country | Citing papers |
|---|---|
| United States | 11 |
| China | 6 |
| Switzerland | 3 |
| Singapore | 2 |
| Czech Republic | 2 |
| Canada | 2 |
| South Korea | 2 |
| Netherlands | 1 |
| Spain | 1 |
| Turkey | 1 |
| United Kingdom | 1 |
| Italy | 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 | Fully integrated wearable sensor arrays for multiplexed in situ perspiration analysis | 5 | 8 CFR 204.5(h)(3)(v) — Criterion 5 |
| Contribution 2 | Micro/Nanorobots for Biomedicine: Delivery, Surgery, Sensing, and Detoxification | 6 | 8 CFR 204.5(h)(3)(v) — Criterion 5 |