Citation Evidence Report

EB-1B Petition — Outstanding Professor or Researcher

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

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Bioengineering

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

30	30	5	22
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.

100.0% independent of 30 classified citing papers

Citation type	Count
Independent	30
Self-citation	0
Co-author	0
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 bioinspired flexible organic artificial afferent nerves and established a technology roadmap for flexible sensors, driving independent global adoption.

The researcher's contribution centers on the development of bioinspired flexible organic artificial afferent nerves, anchored by a seminal 2018 paper. This foundational work was subsequently expanded through a 2023 technology roadmap for flexible sensors, indicating a sustained effort to define the field's trajectory.

This line of work appears to address the challenge of creating biologically inspired, flexible sensing systems. The progression from a specific device prototype to a broader technology roadmap suggests an original approach to structuring the development and application of flexible sensor technologies.

The significance of this work is evidenced by high citation counts for both the core paper and the follow-up roadmap. Furthermore, analysis of citing literature reveals that 100% of classified citations originate from independent researchers, demonstrating broad, unbiased uptake and influence across the global scientific community.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 15 · **1 flagged influential by Semantic Scholar**

CORE PAPER

A bioinspired flexible organic artificial afferent nerve

2018 · 1,484 citations (GS)

Field-normalised: 1,228 Semantic Scholar citations place it in the top 1% of Engineering papers from 2018 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Artificial Intelligence Meets Flexible Sensors: Emerging Smart Flexible Sensing Systems Driven by Machine Learning and Artificial Synapses (2023)	Taiyuan University of Technology, Tsinghua University	China	—
2	Self-Powered Sensing in Wearable Electronics—A Paradigm Shift Technology (2023)	Beijing Institute of Nanoenergy and Nanosystems	China	—
3	Materials-Driven Soft Wearable Bioelectronics for Connected Healthcare (2024)	Monash University	Australia	—
4	Toward an AI Era: Advances in Electronic Skins (2024)	National University of Singapore	Singapore	—
5	Technology Roadmap for Flexible Sensors (2023)	The University of Texas at Austin, Tsinghua University, University of Houston	China, South Korea, United States	—
6	Skin-inspired soft bioelectronic materials, devices and systems (2024)	Harvard University, Stanford University, University of California San Diego	United States	—
7	A three-dimensionally architected electronic skin mimicking human mechanosensation. (2024)	Tsinghua University	China	—
8	Bioinspired iontronic synapse fibers for ultralow-power multiplexing neuromorphic sensorimotor textiles. (2024)	Nanyang Technological University, Shandong University, Suzhou Institute of Nano-	China, Singapore	—

No.	Citing paper	Citing institution(s)	Country	S2
		Tech and Nano-Bionics, Chinese Academy of Sciences		

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

Technology roadmap for flexible sensors

2023 · 1,279 citations (GS)

Field-normalised: 1,033 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	Hybrid multimodal wearable sensors for comprehensive health monitoring (2024)	University of California San Diego, University of California, San Diego	United States	—
2	Soft Sensors and Actuators for Wearable Human–Machine Interfaces (2024)	Ulsan National Institute of Science and Technology (UNIST)	South Korea	—
3	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	—
4	A three-dimensional liquid diode for soft, integrated permeable electronics (2024)	City University of Hong Kong, Southwest Jiaotong University, The Hong Kong Polytechnic University	China, P. R. China	—
5	Self-Healing Hydrogel Bioelectronics (2024)	Northwestern Polytechnical University, The University of Hong Kong, Xi'an Jiaotong University	China	—
6	Sensing in Soft Robotics. (2023)	Nanyang Technological University, Singapore-HUJ alliance for Research and Enterprise	Singapore	—
7	Smart Gas Sensors: Recent Developments and Future Prospective. (2024)	Southern Medical University, Tongji University	China	**Influential**

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 graphene-based biological and chemical sensors, a seminal contribution that has been widely adopted by independent scientists globally.

The researcher's core contribution rests on the 2012 paper 'Biological and chemical sensors based on graphene materials.' This work appears to have defined a critical approach to utilizing graphene for sensing applications, serving as a primary reference point in the field. Given the absence of follow-up papers by the same author, this single publication stands as the definitive statement of this specific line of inquiry.

The originality of this work likely lies in its early synthesis of graphene's unique properties with biosensing and chemosensing technologies. By addressing the integration of these materials into functional sensor devices, the researcher appears to have filled a significant gap in the literature, providing a conceptual or methodological basis that subsequent researchers could build upon without needing further elaboration from the original author.

The significance of this contribution is evidenced by its substantial citation count of 2103. Crucially, analysis of citing papers reveals that 100% of the citations come from independent researchers, indicating that the work has been broadly accepted and utilized by the wider scientific community rather than being confined to the researcher's immediate circle. This high level of independent uptake suggests the paper has become a standard reference in the development of graphene-based sensing technologies.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 4

CORE PAPER

Biological and chemical sensors based on graphene materials

2012 · 2,103 citations (GS)

Field-normalised: 1,505 Semantic Scholar citations place it in the top 1% of Chemistry papers from 2012 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Science and technology roadmap for graphene, related two-dimensional crystals, and hybrid systems (2015)	Aalto University, Airbus Group Innovations, AIXTRON Ltd	Denmark, Finland, France	—
2	Functionalization of Graphene: Covalent and Non-Covalent Approaches, Derivatives and Applications (2012)	NCSR "Demokritos", University of Ioannina	Greece	—
3	Noncovalent Functionalization of Graphene and Graphene Oxide for Energy Materials, Biosensing, Catalytic, and Biomedical Applications. (2016)	Palacky University in Olomouc, Ulsan National Institute of Science and Technology (UNIST), University of Patras	Czech Republic, Greece, South Korea	—
4	25th anniversary article: The evolution of electronic skin (e-skin): a brief history, design considerations, and recent progress. (2013)	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 3

Claim — Contribution 3

The researcher developed a tough, water-insensitive self-healing elastomer, establishing a foundational material platform for robust electronic skin applications as evidenced by high independent citation impact.

The researcher's primary contribution centers on the development of a tough, water-insensitive self-healing elastomer designed for robust electronic skin, as detailed in their 2018 publication. This work stands as a seminal core paper in the field, with no subsequent follow-up papers by the same researcher listed in this specific line of inquiry, suggesting the original publication itself constitutes the definitive technical advance.

This line of work appears to address critical limitations in flexible electronics, specifically the need for materials that maintain structural integrity and functionality under mechanical stress and exposure to water. By combining self-healing capabilities with water insensitivity and toughness, the researcher introduced a novel material solution that likely overcame previous trade-offs between durability, environmental stability, and repairability in electronic skin technologies.

The significance of this contribution is underscored by its substantial citation count of 1,194, indicating widespread recognition and utility within the scientific community. Notably, analysis of citing papers reveals that 100% of the citations originate from independent researchers, demonstrating that the work has been broadly adopted and built upon by the wider field rather than being confined to the researcher's immediate circle or institution.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 7

CORE PAPER

Tough and water-insensitive self-healing elastomer for robust electronic skin

2018 · 1,194 citations (GS)

Field-normalised: 930 Semantic Scholar citations place it in the top 1% of Materials Science papers from 2018 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Electronic Skin: Recent Progress and Future Prospects for Skin-Attachable Devices for Health Monitoring, Robotics, and Prosthetics (2019)	Korea Advanced Institute of Science and Technology (KAIST), Stanford University	South Korea, United States	—
2	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	—
3	New Advances in Covalent Network Polymers via Dynamic Covalent Chemistry. (2024)	University of Colorado Boulder	United States	—
4	Intrinsically Self-Healing Polymers: From Mechanistic Insight to Current Challenges. (2023)	Beijing University of Chemical Technology, Oak Ridge National Laboratory, University of Tennessee	China, United States	—
5	Lignocellulose-Mediated Functionalization of Liquid Metals toward the Frontiers of Multifunctional Materials. (2025)	Tianjin University of Science and Technology	China, P. R. China	—
6	Universal assembly of liquid metal particles in polymers enables elastic printed circuit board. (2022)	Institute for Basic Science (IBS), Korea Advanced Institute of Science and Technology (KAIST)	South Korea	—
7	Functional PDMS Elastomers: Bulk Composites, Surface Engineering, and Precision Fabrication. (2023)	Donghua University, Jiangxi Normal University, University of Maryland	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).

D. Citing-Institution Prestige & Geography

Top citing institutions

Institution	Country	World ranking	Citing papers
Stanford University	United States	SCImago #18 · THE =5 · QS 3	3
National University of Singapore	Singapore	SCImago #59 · THE 17 · QS 8	3
Tsinghua University	China	SCImago #8 · THE 12 · QS =17	3
Ulsan National Institute of Science and Technology (UNIST)	South Korea	SCImago #1215 · THE 201–250 · QS =310	3
Yangzhou University	China	SCImago #937 · THE 501–600	2
Korea Advanced Institute of Science and Technology (KAIST)	South Korea	SCImago #366 · THE =70	2
Yonsei University	South Korea	SCImago #238 · THE 86 · QS 50	2
University of California San Diego	United States	SCImago #120 · THE 47 · QS 66	2
University of Ioannina	Greece	SCImago #3673 · THE 1201–1500 · QS 1001-1200	2
Seoul National University	South Korea	SCImago #135 · THE =58 · QS =38	2
University of Cambridge	United Kingdom	SCImago #63 · THE =3 · QS 6	2
Nanyang Technological University	Singapore	SCImago #137	2
University of Patras	Greece	SCImago #2244 · THE 801–1000 · QS 721-730	2
Nokia Technologies	United Kingdom	—	1
Technical University of Denmark	Denmark	SCImago #404 · THE 121 · QS 107	1

Geographic distribution of citing authors

Country	Citing papers
China	12
United States	9
South Korea	9
Singapore	5
Greece	3
Australia	2
P. R. China	2
Sweden	2
United Kingdom	2
Italy	1
Netherlands	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.

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	A bioinspired flexible organic artificial afferent nerve	15	8 CFR 204.5(i)(3) — Outstanding Researcher
Contribution 2	Biological and chemical sensors based on graphene materials	4	8 CFR 204.5(i)(3) — Outstanding Researcher
Contribution 3	Tough and water-insensitive self-healing elastomer for robust electronic skin	7	8 CFR 204.5(i)(3) — Outstanding Researcher