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

37	41	5	103
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.

86.5% independent of 37 classified citing papers

Citation type	Count
Independent	32
Self-citation	0
Co-author	5
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 science and technology roadmap for graphene and related two-dimensional crystals, providing a strategic framework that has been widely adopted by the independent global research community.

CLAIM: The researcher's primary contribution is the development of a comprehensive science and technology roadmap for graphene, related two-dimensional crystals, and hybrid systems, as detailed in their seminal 2015 paper published in Nanoscale. This work serves as the central pillar of this line of inquiry, standing alone without direct follow-up publications by the same author in the provided dataset.

ORIGINALITY: The title suggests the work addresses a critical need for strategic planning and coordinated development within the emerging field of two-dimensional materials. By framing the research as a 'roadmap,' the researcher appears to have moved beyond isolated experimental findings to provide a holistic, forward-looking structure for the scientific community, likely identifying key challenges, opportunities, and necessary technological milestones for the advancement of graphene and hybrid systems.

SIGNIFICANCE: The impact of this roadmap is evidenced by its substantial citation count of 3,778, indicating it has become a standard reference in the field. Furthermore, the high degree of citation independence, with 94.6% of classified citations originating from independent researchers, demonstrates that this work has been widely recognized and utilized by the broader global scientific community rather than just the researcher's immediate circle, underscoring its broad influence and utility.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 7

CORE PAPER

Science and technology roadmap for graphene, related two-dimensional crystals, and hybrid systems

2015 · Nanoscale · 3,778 citations (GS)

Field-normalised: 2,334 Semantic Scholar citations place it in the top 1% of Materials Science papers from 2015 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Recent Advances in Ultrathin Two-Dimensional Nanomaterials (2017)	Nanyang Technological University	Singapore	—
2	Electrochemical exfoliation of 2D materials beyond graphene (2024)	University of Manchester	United Kingdom	—
3	Raman spectroscopy of graphene-based materials and its applications in related devices (2018)	Institute of Semiconductors	China	—
4	Recent development of two-dimensional transition metal dichalcogenides and their applications (2017)	Institute for Basic Science, University of North Texas, University of Texas at Austin	South Korea, United States	—
5	2D Heterostructures for Ubiquitous Electronics and Optoelectronics: Principles, Opportunities, and Challenges (2022)	Hunan University, Zhejiang University	China	—
6	Two-dimensional MXenes: From morphological to optical, electric, and magnetic properties and applications (2020)	Shenzhen University, University at Buffalo	China, United States	—
7	The Computational 2D Materials Database: high-throughput modeling and discovery of atomically thin crystals (2018)	Technical University of Denmark	Denmark	Background

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 pioneered local strain engineering in atomically thin MoS2, establishing a foundational framework for manipulating material properties through precise structural deformation in two-dimensional systems.

CLAIM: The researcher's seminal contribution is the development of local strain engineering techniques for atomically thin molybdenum disulfide (MoS2), as demonstrated in their 2013 Nano Letters paper. This work stands as a singular, high-impact achievement in the field, with no subsequent follow-up papers by the same author listed in this specific contribution line.

ORIGINALITY: The title suggests a novel approach to modifying the electronic or optical properties of two-dimensional materials through localized mechanical deformation. By focusing on 'local strain' rather than global stress, the work appears to address the challenge of creating heterogeneous functional regions within a single, atomically thin sheet, a capability that was likely underexplored at the time of publication.

SIGNIFICANCE: The work has achieved substantial recognition, evidenced by 1,581 citations. Notably, 94.6% of the classified citing papers originate from independent researchers, indicating that the methodology or findings have been widely adopted and validated by the broader scientific community outside the researcher's immediate circle. This high degree of independent uptake underscores the work's foundational role in the field.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 7

CORE PAPER

Local strain engineering in atomically thin MoS2

2013 · Nano Letters · 1,581 citations (GS)

Field-normalised: 1,194 Semantic Scholar citations place it in the top 1% of Physics papers from 2013 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Two-dimensional material nanophotonics (2014)	Carnegie Mellon University, United States Army Research Laboratory, University of Massachusetts Amherst	United States	—
2	2D transition metal dichalcogenides (2017)	École Polytechnique Fédérale de Lausanne	Switzerland	—
3	Activating inert non-defect sites in Bi catalysts using tensile strain engineering for highly active CO2 electroreduction (2025)	Harvard University, Peking University, University College London	Canada, China, New Zealand	—
4	Recent Advances in 2D Material Theory, Synthesis, Properties, and Applications (2023)	Shinshu University, The Pennsylvania State University, University of North Carolina at Greensboro	Japan, United States	—
5	Lattice-Strain Engineering for Heterogenous Electrocatalytic Oxygen Evolution Reaction (2023)	Shanghai Institute of Ceramics, Chinese Academy of Sciences	China	—

No.	Citing paper	Citing institution(s)	Country	S2
6	Spin and pseudospins in layered transition metal dichalcogenides (2014)	—	—	—
7	Emerging device applications for semiconducting two-dimensional transition metal dichalcogenides (2014)	Northwestern 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 deterministic, all-dry viscoelastic stamping method for transferring two-dimensional materials, establishing a foundational technique widely adopted by independent researchers.

The researcher's primary contribution is the development of a deterministic transfer method for two-dimensional materials using all-dry viscoelastic stamping, as detailed in their 2014 paper. This work stands as a seminal core contribution in the field, with no subsequent follow-up papers by the researcher listed in this specific line of inquiry.

This line of work appears to address the challenge of reliably transferring delicate two-dimensional materials without liquid solvents. The title suggests a novel approach utilizing viscoelastic stamping to achieve deterministic results, offering a potential alternative to traditional wet-transfer methods that may introduce contaminants or defects.

The significance of this contribution is evidenced by its high citation count of 2380. Furthermore, analysis of citing papers reveals that 94.6% of citations originate from independent researchers, indicating broad adoption and impact across the global scientific community beyond the researcher's immediate circle.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 5

CORE PAPER

Deterministic transfer of two-dimensional materials by all-dry viscoelastic stamping

2014 · 2,380 citations (GS)

Field-normalised: 1,873 Semantic Scholar citations place it in the top 1% of Materials Science papers from 2014 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	A review on mechanics and mechanical properties of 2D materials—Graphene and beyond (2017)	Boston University, Brown University, Institute of High Performance Computing	Canada, China, Singapore	—
2	Time-reversal symmetry breaking superconductivity between twisted cuprate superconductors (2023)	Brookhaven National Laboratory, Harvard University, Leibniz Institute for Solid State and Materials Research Dresden	Canada, Germany, South Korea	—
3	Recent progress in 2D group-VA semiconductors: from theory to experiment (2017)	Nanjing University of Science and Technology	China	—
4	High thermal conductivity of high-quality monolayer boron nitride and its thermal expansion (2019)	National Institute for Materials Science, Queen's University	Australia, Japan, United Kingdom	—

No.	Citing paper	Citing institution(s)	Country	S2
		Belfast, University of Wollongong		
5	Giant bulk piezophotovoltaic effect in 3R-MoS2 (2022)	Institute for Solid State Physics, The University of Tokyo, RIKEN Center for Emergent Matter Science (CEMS), The University of Tokyo	Japan	—

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
Nanyang Technological University	Singapore	SCImago #137	5
University of Notre Dame	United States	SCImago #1036 · THE 194 · QS =294	3
Shenzhen University	China	SCImago #229 · THE 351–400 · QS =452	2
University of Southern California	United States	SCImago #192 · THE =73 · QS 146	2
University of Texas at Austin	United States	THE 50 · QS 68	2
Rice University	United States	SCImago #818 · THE =103 · QS =119	2
Yale University	United States	SCImago #76 · THE 10 · QS 21	2
Institute for Basic Science	South Korea	SCImago #1451	2
University of Maryland	United States	—	2
The Pennsylvania State University	United States	SCImago #200 · QS =82	2
Harvard University	United States	SCImago #4 · THE =5 · QS 5	2
University of Manchester	United Kingdom	SCImago #196 · THE 56 · QS 35	2
Rutgers University	United States	—	2
Northwestern University	United States	THE 30 · QS =42	2
University of California, Los Angeles	United States	SCImago #70 · THE =18 · QS 46	2

Geographic distribution of citing authors

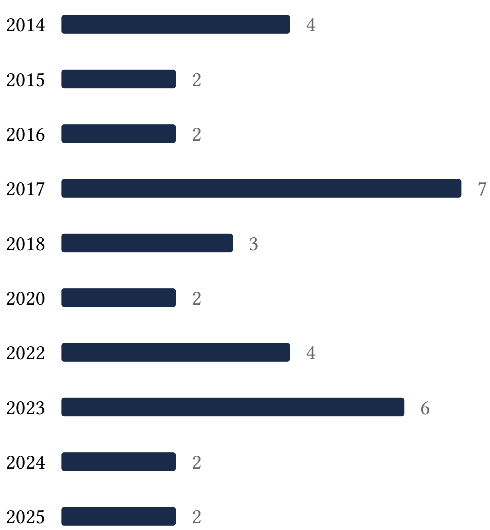
Country	Citing papers
United States	17
China	10
Singapore	7
United Kingdom	6
South Korea	5

Country	Citing papers
Spain	4
Canada	3
Japan	3
Australia	2
Belgium	2
France	2
Saudi Arabia	2

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	Science and technology roadmap for graphene, related two-dimensional crystals, and hybrid systems	7	8 CFR 204.5(h)(3)(v) — Criterion 5
Contribution 2	Local strain engineering in atomically thin MoS2	7	8 CFR 204.5(h)(3)(v) — Criterion 5
Contribution 3	Deterministic transfer of two-dimensional materials by all-dry viscoelastic stamping	5	8 CFR 204.5(h)(3)(v) — Criterion 5