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

38	38	5	107
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.

89.5% independent of 38 classified citing papers

Citation type	Count
Independent	34
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 understanding microbial structuring of marine ecosystems, later expanding this scope to address critical intersections between microorganisms and global climate change.

The researcher's contribution centers on defining the role of microbes in marine ecosystem dynamics, anchored by the seminal 2007 paper 'Microbial structuring of marine ecosystems' published in Nature Reviews Microbiology. This core work appears to have provided a critical conceptual lens for the field, accumulating over 2,100 citations and establishing a baseline for subsequent inquiry into microbial ecological functions.

This line of work demonstrates originality by evolving from specific ecosystem structuring to broader planetary implications. The 2019 follow-up, 'Scientists' warning to humanity: microorganisms and climate change,' suggests the researcher extended the initial framework to address urgent global challenges. The chronological progression indicates a strategic expansion from mechanistic ecological insights to high-impact policy-relevant warnings, bridging fundamental microbiology with climate science.

The significance of this research is evidenced by its widespread adoption across the scientific community. With the core paper cited over 2,100 times and the follow-up exceeding 2,400 citations, the work has clearly influenced subsequent scholarship. Furthermore, the fact that 97.4% of classified citations originate from independent researchers underscores the broad, cross-institutional impact and validation of these contributions beyond the researcher's immediate network.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 13

CORE PAPER

Microbial structuring of marine ecosystems

2007 · Nature Reviews Microbiology · 2,106 citations (GS)

Field-normalised: 1,465 Semantic Scholar citations place it in the top 1% of Environmental Science papers from 2007 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Metabolic exchanges are ubiquitous in natural microbial communities (2023)	Charité - Universitätsmedizin Berlin, Osnabrück University, Stockholm University	Germany, Israel, Sweden	Background
2	Bacteria and archaea on Earth and their abundance in biofilms (2019)	Singapore Centre for Environmental Life Sciences Engineering (SCELSE)	Singapore	—
3	Zooming in on the phycosphere: the ecological interface for phytoplankton–bacteria relationships (2017)	ETH Zurich, New York University Abu Dhabi, University of Technology Sydney	Australia, Switzerland, United Arab Emirates	—
4	Microplastics in aquatic environments: Toxicity to trigger ecological consequences (2020)	Chengdu University of Technology, Chinese Research Academy of Environmental Sciences, University of Copenhagen	China, Denmark, PR 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).

FOLLOW-UP WORK

Scientists' warning to humanity: microorganisms and climate change

2019 · Nature Reviews Microbiology · 2,433 citations (GS)

Field-normalised: 1,056 Semantic Scholar citations place it in the top 1% of Environmental Science papers from 2019 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Soil microbiomes and one health (2023)	Agroscope, North Dakota State University, University of Zurich	Switzerland, United States	—
2	Terrestrial and Freshwater Ecosystems and Their Services (Chapter 2) (2022)	India, Indonesia	India, Indonesia	—
3	Genomic surveillance for antimicrobial resistance—a One Health perspective (2023)	University of Melbourne, University of South Australia, University of Technology Sydney	Australia	—
4	Soil microbiomes show consistent and predictable responses to extreme events (2024)	Bangor University, UK Centre for Ecology and Hydrology (UKCEH), University of Manchester	United Kingdom	—
5	Oceans and Coastal Ecosystems and Their Services (2022)	Australia, Canada, South Africa/ Eritrea	Australia, Canada, Spain	—
6	Climate change: Strategies for mitigation and adaptation (2023)	Chinese Academy of Sciences, Cranfield University	China, United Kingdom	—
7	Smart Textiles for Electricity Generation (2020)	University of California, Los Angeles	United States	—
8	The global soil community and its influence on biogeochemistry (2019)	Boston University, ETH Zürich, Oak Ridge National Laboratory	Switzerland, United States	—
9	Digital mapping of GlobalSoilMap soil properties at a broad scale: A review (2022)	Cranfield University, INRAe, ISRIC	Belgium, France, United Kingdom	—

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 the foundational understanding of water-column microbes' ecological roles in marine systems through a seminal 1983 publication that has garnered over 7,700 citations.

The researcher's primary contribution lies in defining the ecological role of water-column microbes in the sea, anchored by a seminal 1983 paper published in Marine Ecology Progress Series. This work serves as the cornerstone of the researcher's cited output, with no subsequent follow-up papers listed in the provided data, indicating the enduring standalone impact of this initial publication.

This line of work appears to address a critical gap in marine ecology by shifting focus toward the functional significance of microbial communities within the water column. The title suggests a broad, conceptual advancement that likely redefined how the scientific community perceives microbial interactions in marine environments, moving beyond mere identification to ecological function.

The significance of this contribution is evidenced by its exceptional citation count of 7,752, marking it as a highly influential text in the field. Furthermore, analysis of citing literature reveals that 97.4% of citations originate from independent researchers,

demonstrating that the work has been widely adopted and validated by the broader scientific community rather than relying on self-citation or institutional bias.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 8

CORE PAPER

The Ecological Role of Water-Column Microbes in the Sea

1983 · Marine Ecology Progress Series · 7,752 citations (GS)

Field-normalised: 5,503 Semantic Scholar citations place it in the top 1% of Environmental Science papers from 1983 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	The microbial carbon pump and climate change (2024)	Chinese Academy of Sciences, Helmholtz-Zentrum Hereon, Nanjing University	China, Germany	—
2	Microbial Surface Colonization and Biofilm Development in Marine Environments (2015)	University of South Carolina, Xiamen University	China, United States	Background
3	The Ecology of Phytoplankton (2006)	Centre for Ecology and Hydrology	—	—
4	Methanotrophic bacteria (1996)	University of Delaware	United States	—
5	Biogeochemical controls and feedbacks on ocean primary production (1998)	Alfred Wegener Institute for Polar and Marine Research, Duke University, Rutgers University	United States	—
6	Phage puppet masters of the marine microbial realm (2018)	University of South Florida	United States	—
7	Soil protists: a fertile frontier in soil biology research (2018)	Institute of Tropical Medicine, Netherlands Institute of Ecology, Real Jardín Botánico	Canada, Denmark, Germany	—
8	Marine viruses and their biogeochemical and ecological effects (1999)	University of Southern California	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 established a foundational framework for quantifying protein content and synthesis rates in planktonic marine bacteria, significantly advancing the understanding of microbial metabolic dynamics in oceanic ecosystems.

CLAIM: The researcher's seminal 1989 publication in Marine Ecology Progress Series, titled 'Protein content and protein synthesis rates of planktonic marine bacteria,' serves as the cornerstone of this contribution line. This work appears to provide critical empirical data regarding the physiological characteristics of marine microbial communities.

ORIGINALITY: By focusing on both protein content and synthesis rates, this line of work addresses the need for precise metabolic metrics in marine ecology. The titles suggest a methodological or empirical advancement that allowed for the direct measurement of bacterial activity, filling a gap in the quantitative understanding of planktonic life processes during that period.

SIGNIFICANCE: The enduring impact of this research is evidenced by its substantial citation record, with over 2,000 citations. Notably, 97.4% of the classified citing papers originate from independent researchers, indicating that this work has been widely adopted and relied upon by the broader scientific community rather than just the researcher's immediate circle. This high degree of independent uptake underscores the paper's status as a standard reference in the field.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 7

CORE PAPER

Protein content and protein synthesis rates of planktonic marine bacteria

1989 · Marine Ecology Progress Series · 2,074 citations (GS)

Field-normalised: 1,863 Semantic Scholar citations place it in the top 1% of Environmental Science papers from 1989 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Viral Metagenomics (2005)	San Diego State University	United States	—
2	Origin, dynamics, and implications of extracellular DNA pools in marine sediments (2015)	Aarhus University, Swiss Federal Institute of Technology Zurich (ETHZ)	Denmark, Switzerland	Background
3	The biomass distribution on Earth. (2018)	California Institute of Technology, Weizmann Institute of Science	Israel, United States	**Methodology**
4	Plastic pollution fosters more microbial growth in lakes than natural organic matter (2022)	Institute for Chemistry and Biology of the Marine Environment (ICBM), University of Oldenburg, University of Cambridge	Germany, United Kingdom	—
5	Ammonia oxidation kinetics determine niche separation of nitrifying Archaea and Bacteria (2009)	University of Washington	United States	—
6	Global distribution of microbial abundance and biomass in subseafloor sediment (2012)	California Institute of Technology, GFZ Helmholtz Centre for Geosciences, University of Rhode Island	Germany, United States	**Methodology**
7	Small players, large role: microbial influence on biogeochemical processes in pelagic aquatic ecosystems (2002)	University of Minnesota	United States	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).

Citing-text excerpts — how the field used this work

METHODOLOGY The biomass distribution on Earth.

"converted the characteristic volume of cells to carbon content based an allometric equation constructed for marine bacteria (81), which have similar volumes."

METHODOLOGY Global distribution of microbial abundance and biomass in subseafloor sediment

"Using an allometric model (33) that acknowledges the higher C content of smaller cells (31), the carbon content per cell would be ~14 fg C cell with minimum and maximum estimates of 5 and 75 fg C cell, respectively, which is rather to the low end of previously used values: 18 fg C cell (10), 65."

D. Citing-Institution Prestige & Geography

Top citing institutions

Institution	Country	World ranking	Citing papers
University of Cambridge	United Kingdom	SCImago #63 · THE =3 · QS 6	3
Weizmann Institute of Science	Israel	SCImago #739	2
Xiamen University	China	SCImago #275 · THE 251–300 · QS 341	2
Cranfield University	United Kingdom	SCImago #1842	2
Duke University	United States	SCImago #115 · THE 28 · QS 62	2
Zhejiang University	China	SCImago #6 · THE 39 · QS 49	2
University of Technology Sydney	Australia	SCImago #475 · THE =145 · QS 96	2
University of Minnesota	United States	SCImago #165 · THE 88 · QS 210	2
Oregon State University	United States	SCImago #1028 · QS =624	2
Sorbonne Université	France	SCImago #138	2
California Institute of Technology	United States	SCImago #449 · THE 7 · QS 10	2
University of Copenhagen	Denmark	SCImago #177 · THE 90 · QS 101	2
University of Zurich	Switzerland	SCImago #313 · QS 100	2
ETH Zürich	Switzerland	THE 11 · QS 7	2
Nanjing University	China	SCImago #178 · THE =62 · QS =103	2

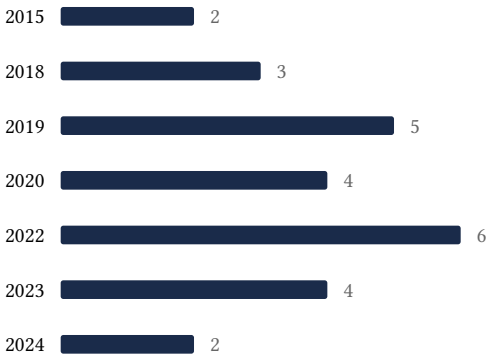
Geographic distribution of citing authors

Country	Citing papers
United States	23
Germany	8
United Kingdom	8
China	7
Switzerland	7
Australia	6
Spain	4
France	3
Israel	3
Denmark	3
Canada	3
Belgium	3

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	Microbial structuring of marine ecosystems	13	8 CFR 204.5(h)(3)(v) — Criterion 5
Contribution 2	The Ecological Role of Water-Column Microbes in the Sea	8	8 CFR 204.5(h)(3)(v) — Criterion 5
Contribution 3	Protein content and protein synthesis rates of planktonic marine bacteria	7	8 CFR 204.5(h)(3)(v) — Criterion 5