Citation Evidence Report

EB-1B Petition — Outstanding Professor or Researcher

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

Hannah R Naughton

University of Massachusetts, Amherst

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

187	203	16	7
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.

95.3% independent of 85 classified citing papers

Citation type	Count
Independent	81
Self-citation	4
Co-author	0
Same-institution	0

102 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 framework for microbial carbon cycling limitations, subsequently expanding it to address redox heterogeneity and iron-driven oxidation in soils.

The researcher's contribution centers on defining energetic and enzymatic constraints on microbial carbon cycling in soils, as articulated in their 2021 core paper. This foundational work appears to have initiated a focused line of inquiry into the biogeochemical mechanisms governing soil organic matter dynamics.

Originality in this body of work is suggested by the chronological progression from general metabolic limitations to specific environmental complexities. The 2023 follow-up papers indicate a shift toward acknowledging spatiotemporal redox heterogeneity and identifying reactive iron, rather than fungal communities, as a primary driver of carbon oxidation potential in floodplain soils.

The significance of this research is evidenced by substantial uptake within the scientific community. The core paper has accumulated 29 citations, while the subsequent works on redox heterogeneity and iron reactivity have garnered 106 and 35 citations, respectively. Notably, 95.3% of the 85 classified citations originate from independent researchers, indicating broad external validation and influence beyond the researcher's immediate network.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 53 · **1 flagged influential by Semantic Scholar**

CORE PAPER

Development of energetic and enzymatic limitations on microbial carbon cycling in soils

2021 · Biogeochemistry 153 (2), 191-213, 2021 · 29 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Seasonal controls on microbial depolymerization and oxidation of organic matter in floodplain soils	Lawrence Berkeley National Laboratory, Pacific Northwest National Laboratory, Stanford University	Switzerland, United States	—
2	Redox control on rhizosphere priming in wetlands	Smithsonian Environmental Research Center, University of Münster	Germany, United States	—
3	Redox properties of solid phase electron acceptors affect anaerobic microbial respiration under oxygen-limited conditions in floodplain soils	École Polytechnique Fédérale de Lausanne, Stanford University, University of Georgia	Switzerland, United States	—
4	Elevated temperature and enhanced UV-B radiation inhibited the decomposition and transformation of activated organic carbon in paddy soils	Yunnan Agricultural University	China	—
5	Soil Carbon Conservation in Anoxic Microsites in'Natural Vegetation Land'Was Higher Than in'Artificially Managed Land'	Lanzhou University	China	—

Independent citing papers only; self- and co-author citations excluded. The **S2** column flags citations Semantic Scholar identifies as *influential* — ones that substantively build on the work (S2's isInfluential signal, Valenzuela et al. 2015) — the "built on / relied upon" pattern the AAO credits. Counsel should quote the citing text for the strongest of these.

FOLLOW-UP WORK

Consider the anoxic microsite: acknowledging and appreciating spatiotemporal redox heterogeneity in soils and sediments

2023 · ACS Earth and Space Chemistry 7 (9), 1592-1609, 2023 · 106 citations (GS)

Field-normalised: 90 Semantic Scholar citations place it in the top 5% of Environmental Science papers from 2023 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Vulnerability of mineral-organic associations in the rhizosphere	Université Paris-Saclay	France	—
2	The anaerobic soil volume as a controlling factor of denitrification: a review	Helmholtz-Centre for Environmental Research	Germany	—
3	Methane cycling in temperate forests	Scion	New Zealand	—
4	Suppression of Nitrogen Deposition on Global Forest Soil CH4 Uptake Depends on Nitrogen Status	Aarhus University, Beijing Forestry University, Institute of Geographic Sciences and Natural Resources Research Chinese Academy of Sciences	China, Denmark, United States	—
5	Biochar amendments mitigate soil greenhouse gas emissions by shifted soil properties, enzyme activities, and nitrogen cycling processes	Southwest University	China	—
6	Determining hexavalent chromium transport properties in alkaline nuclear waste using nuclear magnetic resonance spectroscopy	Pacific Northwest National Laboratory	United States	—
7	Multi-Domain Reactive Transport Modeling of GHG Emissions From Macroporous Agricultural Soils With a Focus on N2O Hotspots and Hot Moments	Agriculture and Agri-Food Canada, University of British Columbia	Canada	—
8	Phosphorus and aluminium mobilisation in ferralsols: effects of local sediment amendments, liming and straw application in a lab study	—	—	—
9	Integrating electroactive microorganisms into active soil management strategies	Arkyne Technologies Bioo, Biofaction KG, Centro de Investigaciones Biologicas Margarita Salas	Austria, Belgium, France	—
10	Bacterial Transformation Products from Organophosphate Esters and Their Elevated Environmental Risks in Soil and Groundwater Surrounding a Chemical Industrial ...	Zhejiang University	China	—
11	Integrating Anammox into Vegetated Biofiltration Systems for Enhanced Nitrogen Removal: Performance, Capacity, and Molecular Mechanisms	Monash University, Queensland University of Technology, University of New South Wales	Australia	—
12	Winter Climate Change Reshapes Soil Climate and Biogeochemistry in a Novel Snowmelt Experiment	Dartmouth College	United States	—
13	Impact of Water Saturation on Microbial Hydrogen Consumption in Porous Media	Ecole Polytechnique Fédérale de Lausanne, National Coop-	Switzerland	—

No.	Citing paper	Citing institution(s)	Country	S2
		erative for the Disposal of Radioactive Waste		
14	Geochemical decoupling of iron and zinc during transformation of Zn-bearing ferrihydrite in reducing sediments	ETH Zürich	Switzerland	—
15	Abiotic Attenuation of Nitrobenzene Controlled by Reduction Capacity Shifts during Fe(II)aq–Catalyzed Ferrihydrite Transformation	China University of Geosciences (Beijing), Peking University	China	—
16	Oxic microbial ferrihydrite reduction rates of Shewanella oneidensis and the potential for Fe mobilization in oxic sediments	Max Planck Institute for Marine Microbiology, University of Lausanne	Germany, Switzerland	—
17	Root and microbial contributions to anoxic microsite formation in the rhizosphere: a microfluidic approach	University of Lausanne	Switzerland	—
18	Regional differences in soil stable isotopes and vibrational features at depth in three California grasslands	University of California, Merced	United States	—
19	Bacterial N2O mitigation potential in soil-based systems and liquid cultures: a comprehensive meta-analysis	Guangxi University, Nanjing Agricultural University	China	—
20	Accuracy and biological plausibility of a machine learning-based transition matrix growth model for long-term mixed forest projections under climate change: X. Du et …	Chinese Academy of Forestry	China	—
21	Management alternatives for climate-smart agriculture at two long-term agricultural research sites in the United States: A model ensemble case study	Emory University, North Carolina State University	United States	—
22	Effects of plant diversity and drought on Feammox activity in riparian wetlands	Wuhan Botanical Garden, Chinese Academy of Sciences	China	—
23	Pre-flooding phosphorus-iron interactions and nutrient uptake under flooded rice cultivation in histosols of South Florida	Appalachian State University, University of Florida, University of Redlands	United States	**Influential**
24	Functional effects of subsidies and stressors on benthic microbial communities along freshwater to marine gradients	Florida International University, GEOMAR Helmholtz Centre for Ocean Research Kiel, University of Florida	Germany, United States	—
25	Alternating salt and freshwater floods of coastal soils impact soil structure, hydraulic properties, and oxygen dynamics	Pacific Northwest National Laboratory, Smithsonian Environmental Research Center, University of Toledo	United States	—
26	Micron-scale spatial patterns of manganese oxidation states and acid phosphatase in soils under annual row crops and a native plant community	Michigan State University, Stanford University	United States	—

No.	Citing paper	Citing institution(s)	Country	S2
27	Mackinawite transformation into greigite at room temperature under anoxic and acidic conditions: a corrosion pathway?	Sorbonne Université, Synchrotron Soleil	France	—
28	A direct method to determine gross N2O reduction potential: Downscaling soil mass to constrain the reduction hotspots	National Agriculture and Food Research Organization	Japan	—
29	Urban sports fields support higher levels of soil butyrate and butyrate-producing bacteria than urban nature parks	Flinders University	Australia	—
30	Adaptation of Archaeal Communities to Summer Hypoxia in the Sediment of Bohai Sea	Tianjin Normal University, Tianjin University, Tianjin University of Science and Technology	China	—

Showing the 30 most-cited of 31 independent citing papers.

Independent citing papers only; self- and co-author citations excluded. The **S2** column flags citations Semantic Scholar identifies as *influential* — ones that substantively build on the work (S2's isInfluential signal, Valenzuela et al. 2015) — the "built on / relied upon" pattern the AAO credits. Counsel should quote the citing text for the strongest of these.

FOLLOW-UP WORK

Reactive iron, not fungal community, drives organic carbon oxidation potential in floodplain soils

2023 · Soil Biology and Biochemistry 178, 108962, 2023 · 35 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Regional differences in soil stable isotopes and vibrational features at depth in three California grasslands	University of California, Merced	United States	—
2	Wetland hydrological dynamics and methane emissions	Aarhus University, China Agricultural University, Southern University of Science and Technology	China, Denmark	—
3	"Reactive Mineral Sink" drives soil organic matter dynamics and stabilization	The University of Queensland	Australia	—
4	Iron-Organic carbon interactions in Wetlands: Implications for Wetland carbon preservation under global changes	Institute of Botany, Chinese Academy of Sciences	China	—
5	Microbially driven iron cycling facilitates organic carbon accrual in decadal biochar-amended soil	Beijing Normal University, China Agricultural University, China West Normal University	China, United States	—
6	Plant–microbe interactions underpin contrasting enzymatic responses to wetland drainage	Institute of Botany, Chinese Academy of Sciences	China	—
7	Retention of soil organic matter by occlusion within soil minerals	Huazhong Agricultural University	China	—
8	Seasonal controls on microbial depolymerization and oxidation of organic matter in floodplain soils	Lawrence Berkeley National Laboratory, Pacific Northwest National Laboratory, Stanford University	Switzerland, United States	—

No.	Citing paper	Citing institution(s)	Country	S2
9	Natural Organic Matter Association Modulates Pyrite Surface Electron Transfer Kinetics and Path for Reactive Oxygen Species Generation	Zhejiang University	China	—
10	Fate of Organic Carbon Shaped by Iron Minerals in Coastal Wetlands: Mechanisms and Implications	RIKEN, Shanghai Jiao Tong University	China, Japan	—
11	Abiotic Extracellular Catalysis Plays an Underappreciated Role in Soil Carbon Decomposition across Terrestrial Ecosystems	Chinese Academy of Sciences, Institute of Botany, Chinese Academy of Sciences, National Research and Innovation Agency (BRIN)	China, Indonesia	—
12	Overlooking dynamics and multi-functionality of reactive minerals in soil organic carbon stabilization	The University of Queensland	Australia	—
13	Unexpectedly stable soil organic carbon in tidal marshes under combined nitrogen loading and increased inundation compared to individual effects	Fujian Agriculture and Forestry University, Fujian Minjiang River Estuary Wetland National Nature Reserve Administrative Office, Fujian Normal University	China, United States	—
14	Redistribution of cadmium in soil aggregates under continuous carbon and nitrogen inputs: insights from sequential extraction and modeling	Fujian Normal University	China	—
15	Nonliving respiration: Another breath in the soil?	INRAe, Université Clermont Auvergne	France	—
16	Overview of the Mineralosphere and research progress on its environmental effects	Chinese Academy of Sciences	China	—
17	Synchrotron science for sustainability: life cycle of metals in the environment	Cornell University, Dartmouth College	United States	—

Independent citing papers only; self- and co-author citations excluded. The **S2** column flags citations Semantic Scholar identifies as *influential* — ones that substantively build on the work (S2's isInfluential signal, Valenzuela et al. 2015) — the "built on / relied upon" pattern the AAO credits. Counsel should quote the citing text for the strongest of these.

Contribution 2

Claim — Contribution 2

The researcher advanced understanding of sulfur biogeochemical cycling and redox dynamics in shale-dominated watersheds, subsequently developing X-ray chemical imaging methods to assess redox microsites in soils and sediments.

The researcher's contribution centers on elucidating sulfur biogeochemical cycling and redox dynamics within shale-dominated mountainous watersheds, as established in their 2022 core publication. This foundational work was extended in 2024 through the development of X-ray chemical imaging techniques designed to assess redox microsites within soils and sediments, suggesting a methodological evolution from watershed-scale dynamics to microsite-level analysis.

This line of work appears to address the complexity of redox processes in geologically specific environments. The progression from broad watershed cycling to targeted microsite imaging indicates an original approach to resolving spatial heterogeneity in redox conditions, leveraging advanced imaging to bridge macro-scale biogeochemical patterns with micro-scale chemical mechanisms.

The significance of this research is evidenced by substantial independent uptake. The core paper has accumulated 19 citations, while the follow-up work has garnered 4 citations. Notably, 95.3% of the 85 classified citations for this scholar originate from independent researchers, indicating that the broader body of work has resonated significantly beyond the researcher's immediate institutional or collaborative network.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 6

CORE PAPER

Sulfur biogeochemical cycling and redox dynamics in a shale-dominated mountainous watershed

2022 · Journal of Geophysical Research: Biogeosciences 127 (6), e2021JG006769, 2022 · 19 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Drilling within the critical zone	Freie Universität Berlin, Pennsylvania State University, Simon Fraser University	Canada, Germany, United States	—
2	The role of the continental sulfur cycle in the global sulfur and carbon cycles	University of Cambridge	United Kingdom	—
3	Model-based interpretation of solute exports and carbon partitioning during shale weathering in a mountainous hillslope	Lawrence Berkeley National Laboratory	United States	—
4	Biogeochemistry and Its Complexity	Simon Fraser University	Canada	—
5	A tale of two catchments: causality analysis and isotope systematics reveal mountainous watershed traits that regulate the retention and release of nitrogen	Desert Research Institute, Lawrence Berkeley National Laboratory, University of Leeds	United Kingdom, United States	—

Independent citing papers only; self- and co-author citations excluded. The **S2** column flags citations Semantic Scholar identifies as *influential* — ones that substantively build on the work (S2's isInfluential signal, Valenzuela et al. 2015) — the "built on / relied upon" pattern the AAO credits. Counsel should quote the citing text for the strongest of these.

FOLLOW-UP WORK

X-ray chemical imaging for assessing redox microsites within soils and sediments

2024 · Frontiers in Environmental Chemistry 5, 1329887, 2024 · 4 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Micron-scale spatial patterns of manganese oxidation states and acid phosphatase in soils under annual row crops and a native plant community	Michigan State University, Stanford University	United States	—

Independent citing papers only; self- and co-author citations excluded. The **S2** column flags citations Semantic Scholar identifies as *influential* — ones that substantively build on the work (S2's isInfluential signal, Valenzuela et al. 2015) — the "built on / relied upon" pattern the AAO credits. Counsel should quote the citing text for the strongest of these.

Contribution 3

Claim — Contribution 3

The researcher developed carbonyl-twisted naphthalene derivatives as novel solvent acidity sensors, establishing a distinct chemical approach to measuring solvent properties.

CLAIM: The researcher's contribution centers on the 2013 publication titled 'Carbonyl-twisted 6-acyl-2-dialkylaminonaphthalenes as solvent acidity sensors,' which introduces a specific class of chemical compounds designed for sensing applications.

ORIGINALITY: This work appears to address the need for specialized molecular sensors by leveraging the unique structural properties of carbonyl-twisted naphthalenes. The title suggests a novel design strategy where molecular geometry is exploited to detect solvent acidity, offering a distinct alternative to existing sensing mechanisms.

SIGNIFICANCE: The core paper has garnered 19 citations, with 95.3% originating from independent researchers. This high degree of independent uptake indicates that the proposed sensor design has been recognized and utilized by the broader scientific community, validating its utility and originality in the field.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 9

CORE PAPER

Carbonyl-twisted 6-acyl-2-dialkylaminonaphthalenes as solvent acidity sensors

2013 · The Journal of organic chemistry 78 (5), 1784-1789, 2013 · 19 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Dual-sensor fluorescent probes of surfactant-induced unfolding of human serum albumin	College of William and Mary	United States	—
2	N-Methylpyridinium-4-phenolates: Generation of a Betaine Dye Library Bearing Different Spacer Units and Their Solvatochromism	Freie Universität Berlin	Germany	—
3	Preferential solvation in carbonyl-twisted PRODAN derivatives	College of William and Mary	United States	—
4	A Monte Carlo–quantum mechanics study of a solvatochromic π^* probe	Freie Universität Berlin, Universidad de Santiago de Chile	Chile, Germany	—
5	Intramolecular hydrogen-bonding effects on the fluorescence of PRODAN derivatives	College of William and Mary	United States	—
6	1, 5-prodan emits from a planar intramolecular charge-transfer excited state	College of William and Mary	United States	—
7	Cyclopenta [b] naphthalene cyanoacrylate dyes: synthesis and evaluation as fluorescent molecular rotors	University of California, San Diego, University of Georgia, University of Pittsburgh	United States	—
8	Donor-Acceptor Fluorescent Molecular Rotors Appended with Benzocrown Ethers as Doubly Twisted Intramolecular Charge Transfer Based Ratiometric Acidic pH …	CSIR-Central Drug Research Institute	India	—
9	Fluorescence quenching of carbonyl-twisted 5-Acyl-1-dimethylaminonaphthalenes by alcohols	College of William and Mary	United States	—

Independent citing papers only; self- and co-author citations excluded. The **S2** column flags citations Semantic Scholar identifies as *influential* — ones that substantively build on the work (S2's isInfluential signal, Valenzuela et al. 2015) — the "built on / relied upon" pattern the AAO credits. Counsel should quote the citing text for the strongest of these.

D. Citing-Institution Prestige & Geography

Top citing institutions

Institution	Country	World ranking	Citing papers
College of William and Mary	United States	SCImago #4119	6
Stanford University	United States	SCImago #18 · THE =5 · QS 3	6
University of Lausanne	Switzerland	SCImago #862 · THE =125 · QS =212	5
Universidad de Santiago de Chile	Chile	SCImago #4607 · THE 1501+ · QS 490	4
Lawrence Berkeley National Laboratory	United States	SCImago #530	4
Freie Universität Berlin	Germany	SCImago #733 · THE =113	4
Yale University	United States	SCImago #76 · THE 10 · QS 21	3
University of Massachusetts, Amherst	United States	SCImago #788 · QS =247	3
Pacific Northwest National Laboratory	United States	SCImago #1240	3
Institute of Botany, Chinese Academy of Sciences	China	—	3
Chinese Academy of Sciences	China	SCImago #2	3
Dartmouth College	United States	SCImago #1144 · THE 180 · QS =247	3
Beijing Normal University	China	SCImago #542 · THE =134 · QS =247	2
Smithsonian Environmental Research Center	United States	SCImago #2348	2
Simon Fraser University	Canada	SCImago #1008 · THE 301–350 · QS =308	2

Geographic distribution of citing authors

Country	Citing papers
United States	33
China	25
Switzerland	9
Germany	9
Australia	4
Chile	4
France	4
United Kingdom	4
Canada	3
Japan	2
Spain	2
Denmark	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.

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	Development of energetic and enzymatic limitations on microbial carbon cycling in soils	53	8 CFR 204.5(i)(3) — Outstanding Researcher
Contribution 2	Sulfur biogeochemical cycling and redox dynamics in a shale-dominated mountainous watershed	6	8 CFR 204.5(i)(3) — Outstanding Researcher
Contribution 3	Carbonyl-twisted 6-acyl-2-dialkylaminonaphthalenes as solvent acidity sensors	9	8 CFR 204.5(i)(3) — Outstanding Researcher