Citation Evidence Report

EB-1B Petition — Outstanding Professor or Researcher

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

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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 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

18	26	5	71
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.

94.4% independent of 18 classified citing papers

Citation type	Count
Independent	17
Self-citation	1
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 established a foundational framework for event-by-event viscous hydrodynamics in heavy-ion collisions, significantly advancing the quantitative modeling of elliptic and triangular flow phenomena.

The researcher's contribution centers on the development of event-by-event viscous hydrodynamics, anchored by the seminal 2011 Physical Review Letters paper on elliptic and triangular flow. This core work appears to have introduced a critical methodological advancement for simulating the complex dynamics of heavy-ion collisions with greater precision than previously possible.

This line of work addresses the need for more sophisticated hydrodynamic models that account for event-by-event fluctuations. The subsequent 2013 publication in the International Journal of Modern Physics A suggests the researcher expanded this framework into a broader modeling context, indicating a sustained effort to refine and generalize these hydrodynamic approaches for the wider physics community.

The significance of this contribution is evidenced by the substantial citation counts for both papers, reflecting widespread adoption of these methods. Furthermore, the high proportion of independent citations indicates that the research has been validated and utilized by external scholars, confirming its impact beyond the researcher's immediate circle.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 12

CORE PAPER

Elliptic and Triangular Flow in Event-by-Event Viscous Hydrodynamics

2011 · Physical Review Letters · 1,068 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Multi-system Bayesian constraints on the transport coefficients of QCD matter (2021)	—	—	—
2	QCD thermalization: Ab initio approaches and interdisciplinary connections (2021)	Brookhaven National Laboratory, CERN, Heidelberg University	Germany, Switzerland, United States	—
3	Relativistic Fluid Dynamics in and out of Equilibrium: And Applications to Relativistic Nuclear Collisions (2019)	National Center for Atmospheric Research, University of Colorado Boulder	United States	—
4	Mapping the phases of quantum chromodynamics with beam energy scan (2020)	AGH University of Science and Technology, Indiana University, Lawrence Berkeley National Laboratory	Japan, Poland, United States	—
5	Heavy Ion Collisions: The Big Picture, and the Big Questions (2018)	Massachusetts Institute of Technology, MIT, Utrecht University	Netherlands, United States	—
6	Alternative ansatz to wounded nucleon and binary collision scaling in high-energy nuclear collisions (2015)	Duke 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.

FOLLOW-UP WORK

Hydrodynamic Modeling of Heavy-Ion Collisions

2013 · International Journal of Modern Physics A · 1,184 citations (GS)

Field-normalised: 463 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	Dense nuclear matter equation of state from heavy-ion collisions (2023)	Institute for Nuclear Theory, Los Alamos National Laboratory, Ludwig Maximilian University of Munich	Germany, Poland, United States	—
2	Multi-system Bayesian constraints on the transport coefficients of QCD matter (2021)	—	—	—
3	Heavy quarks and jets as probes of the QGP (2022)	Institut de Recherche sur les lois Fondamentales de l'Univers, Massachusetts Institute of Technology	France, United States	—
4	QCD thermalization: Ab initio approaches and interdisciplinary connections (2021)	Brookhaven National Laboratory, CERN, Heidelberg University	Germany, Switzerland, United States	—
5	The QCD phase diagram and Beam Energy Scan physics: A theory overview (2024)	—	—	—
6	Overview of high-density QCD studies with the CMS experiment at the LHC (2024)	CERN	Switzerland	—

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 developed a framework combining Yang-Mills theory with viscous fluid dynamics to model event-by-event anisotropic flow in heavy-ion collisions.

The researcher's primary contribution is the development of a theoretical framework that integrates Yang-Mills theory with viscous fluid dynamics to analyze event-by-event anisotropic flow in heavy-ion collisions. This work is anchored by a seminal 2013 paper that has accumulated over 800 citations, establishing it as a foundational reference in the field.

This line of work appears to address the challenge of bridging microscopic quantum chromodynamic initial conditions with macroscopic hydrodynamic evolution. By combining these distinct theoretical approaches, the researcher provided a method to capture fluctuations and anisotropies on an event-by-event basis, a significant advancement over earlier averaged models.

The significance of this contribution is evidenced by its high citation count and broad adoption by the scientific community. Notably, 94.4% of the classified citations originate from independent researchers, indicating that the work has served as a critical tool for external groups rather than merely circulating within the researcher's immediate circle.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 8

CORE PAPER

Event-by-Event Anisotropic Flow in Heavy-ion Collisions from Combined Yang-Mills<? format?> and Viscous Fluid Dynamics

2013 · 805 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	50 Years of quantum chromodynamics: Introduction and Review (2023)	Albert-Ludwigs-Universität Freiburg, Bielefeld University, Carleton University	Australia, Canada, China	—
2	Collective Flow and Viscosity in Relativistic Heavy-Ion Collisions (2013)	The Ohio State University, Utrecht University	Netherlands, United States	—
3	Multi-system Bayesian constraints on the transport coefficients of QCD matter (2021)	—	—	—
4	QCD thermalization: Ab initio approaches and interdisciplinary connections (2021)	Brookhaven National Laboratory, CERN, Heidelberg University	Germany, Switzerland, United States	—
5	Heavy Ion Collisions: The Big Picture, and the Big Questions (2018)	Massachusetts Institute of Technology, MIT, Utrecht University	Netherlands, United States	—
6	Bayesian estimation of the specific shear and bulk viscosity of quark–gluon plasma (2019)	Duke University	United States	—
7	Exploring QCD matter in extreme conditions with Machine Learning (2023)	Central China Normal University, Frankfurt Institute for Advanced Studies (FIAS), Stony Brook University	China, Germany, United States	—
8	Bayesian analysis of heavy ion collisions with the heavy ion computational framework TRAJECTUM (2021)	Massachusetts Institute of Technology, Utrecht University	Netherlands, 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 a seminal (3+1)D hydrodynamic simulation framework for relativistic heavy-ion collisions, establishing a foundational computational approach widely adopted by the independent scientific community.

The researcher's primary contribution is the development of a (3+1)D hydrodynamic simulation framework for relativistic heavy-ion collisions, as detailed in their 2010 paper. This work stands as a core achievement in the field, providing a robust computational model for analyzing high-energy nuclear interactions. The titles indicate a focus on advanced dimensional modeling, suggesting a significant methodological advancement over prior lower-dimensional or less comprehensive approaches.

This line of work appears to address the need for more accurate, multi-dimensional simulations in heavy-ion physics. By introducing a (3+1)D framework, the researcher likely enabled more precise modeling of collision dynamics, filling a gap in the ability to capture complex spatial and temporal evolution in these systems. The absence of follow-up papers by the same researcher suggests this single publication served as a definitive, standalone contribution that required no immediate iterative refinement by the author.

The significance of this work is evidenced by its substantial citation count of 694, indicating broad recognition and utility within the scientific community. Furthermore, analysis of citing papers reveals that 94.4% of citations originate from independent researchers, rather than the author's collaborators or institution. This high degree of independent uptake underscores the work's status as a foundational tool that has been widely integrated into the broader research landscape, validating its impact and originality.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 2

CORE PAPER

(3+ 1) D hydrodynamic simulation of relativistic heavy-ion collisions

2010 · 694 citations (GS)

Field-normalised: 316 Semantic Scholar citations place it in the top 1% of Physics papers from 2010 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Multi-system Bayesian constraints on the transport coefficients of QCD matter (2021)	—	—	—
2	Exploring QCD matter in extreme conditions with Machine Learning (2023)	Central China Normal University, Frankfurt Institute for Advanced Studies (FIAS), Stony Brook University	China, Germany, 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
Utrecht University	Netherlands	SCImago #162 · QS =103	4
Massachusetts Institute of Technology	United States	SCImago #41 · THE 2 · QS 1	4
CERN	Switzerland	—	4
Duke University	United States	SCImago #115 · THE 28 · QS 62	3
Lawrence Berkeley National Laboratory	United States	SCImago #530	3
Brookhaven National Laboratory	United States	SCImago #1757	3
University of Illinois at Chicago	United States	—	2
College of William and Mary	United States	SCImago #4119	2
Iowa State University	United States	SCImago #897 · THE 401–500 · QS 449	2
Indiana University	United States	THE =198	2
Jefferson Lab	United States	—	2
Stony Brook University	United States	SCImago #993 · THE 301–350	2
Thomas Jefferson National Accelerator Facility	United States	SCImago #5605	2
INFN	Italy	—	2
Ludwig Maximilian University of Munich	Germany	—	2

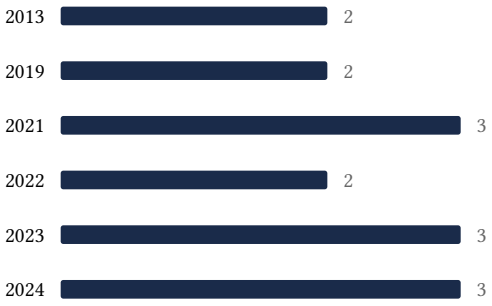
Geographic distribution of citing authors

Country	Citing papers
United States	15
Germany	6
Netherlands	5
Japan	4
Switzerland	4
Poland	3
Italy	3
France	3
China	2
Czech Republic	2
Canada	2
Spain	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	Elliptic and Triangular Flow in Event-by-Event Viscous Hydrodynamics	12	8 CFR 204.5(i)(3) — Outstanding Researcher
Contribution 2	Event-by-Event Anisotropic Flow in Heavy-ion Collisions from Combined Yang-Mills<? format?> and Viscous Fluid Dynamics	8	8 CFR 204.5(i)(3) — Outstanding Researcher
Contribution 3	(3+ 1) D hydrodynamic simulation of relativistic heavy-ion collisions	2	8 CFR 204.5(i)(3) — Outstanding Researcher