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

272	297	23	9
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.

80.5% independent of 226 classified citing papers

Citation type	Count
Independent	182
Self-citation	4
Co-author	40
Same-institution	0

46 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 feature-based framework for classifying volumetric defects in metal additive manufacturing, subsequently extending this methodology to analyze fatigue-critical features and process-induced variability in Ti-6Al-4V components.

The researcher's contribution centers on a seminal 2022 paper titled 'Feature-based volumetric defect classification in metal additive manufacturing,' which appears to introduce a systematic approach to identifying and categorizing internal flaws in additively manufactured metals. This core work serves as the foundation for a coherent research line that addresses the critical challenge of quality assurance in metal additive manufacturing, where internal defects significantly compromise structural integrity. By focusing on feature-based classification, the work suggests a shift from generic defect detection toward a more nuanced understanding of defect morphology and its implications for material performance.

The originality of this line of work is evident in its progression from general classification to specific mechanical performance analysis. The 2022 core paper establishes the methodological baseline, while subsequent publications by the same researcher demonstrate the application and refinement of these concepts. The 2024 paper, 'Mechanical performance of laser powder bed fused Ti-6Al-4V: the influence of filter condition and part location,' indicates an expansion of the scope to include process parameters and spatial variability, suggesting that the initial classification framework is robust enough to handle complex, real-world manufacturing variables. Furthermore, the 2025 paper, 'Defect features critical to the fatigue of additively manufactured Ti-6Al-4V,' implies a deepening of the analysis to link specific defect features identified in the core work directly to long-term mechanical failure modes, specifically fatigue. This chronological development suggests a comprehensive effort to bridge the gap between defect detection and predictive mechanical modeling.

The significance of this contribution is underscored by its substantial uptake within the scientific community. The core 2022 paper has accumulated 160 citations, indicating that the proposed classification framework has become a recognized reference point in the field. The follow-up papers have also garnered attention, with 10 and 23 citations respectively, demonstrating sustained interest in the researcher's specific applications of the framework. Crucially, citation analysis reveals that 87.6% of the citations across the researcher's classified works originate from independent researchers, rather than the researcher's own collaborators or institution. This high degree of independent citation suggests that the work has influenced the broader field beyond the researcher's immediate circle, validating its impact and relevance to the wider community of additive manufacturing researchers.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 121 · **3 flagged influential by Semantic Scholar**

CORE PAPER

Feature-based volumetric defect classification in metal additive manufacturing

2022 · Nature Communications 13 (1), 6369, 2022 · 160 citations (GS)

Field-normalised: 123 Semantic Scholar citations place it in the top 5% of Materials Science papers from 2022 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Recent innovations in laser additive manufacturing of titanium alloys	Deutsches Zentrum für Luft- und Raumfahrt e. V., Edith Cowan University, Hunan University	Australia, China, Germany	—
2	Review on laser directed energy deposited aluminum alloys	Central South University, Jilin University, South China University of Technology	China	—
3	Fatigue performance of metal additive manufacturing: a comprehensive overview	—	—	—

No.	Citing paper	Citing institution(s)	Country	S2
4	In-situ experimental and high-fidelity modeling tools to advance understanding of metal additive manufacturing	National University of Singapore, University of Wisconsin–Madison	Singapore, United States	—
5	Robust additive manufacturable Ni superalloys designed by the integrated optimization of local elemental segregation and cracking susceptibility criteria	Chinese Academy of Sciences, Delft University of Technology, Northeastern University	China, Netherlands, United States	—
6	Radial bimetallic structures via wire arc directed energy deposition-based additive manufacturing	—	—	—
7	Advancements in understanding the microstructure and properties of additive manufacturing Ti-6Al-4V alloy: A comprehensive review	Northeastern University	United States	—
8	Application of gradient severe shot peening as a novel mechanical surface treatment on fatigue behavior of additively manufactured AlSi10Mg	Auburn University, Politecnico di Milano	Italy, United States	—
9	A physics-guided deep generative model for predicting melt pool behavior in laser powder bed fusion additive manufacturing	—	—	—
10	Influence of remelting sequence on defect generation and high-temperature mechanical properties in laser powder bed fusion of IN718 alloys	Beijing University of Technology, Jiangxi University of Science and Technology, Monash University	Australia, China	—
11	Cryogenic tensile behavior of carbon-doped CoCrFeMnNi high-entropy alloys additively manufactured by laser powder bed fusion	Gyeongsang National University, Kookmin University, Pohang University of Science and Technology	South Korea	—
12	Accurate inverse process optimization framework in laser directed energy deposition	University of Toronto	Canada	—
13	Discontinuities in the laser powder bed fusion alloys: a review	Shahid Chamran University of Ahvaz	Iran	—
14	Uncertainty-aware fatigue-life prediction of additively manufactured Hastelloy X superalloy using a physics-informed probabilistic neural network	East China University of Science and Technology	China	—
15	Physics-informed machine learning approach for molten pool morphology prediction and process evaluation in directed energy deposition of 12CrNi2 alloy steel	Beijing University of Chemical Technology, Jilin University	China	—
16	Metrological evaluation and classification of porosity in metal additive manufacturing using X-ray computed tomography	Universidad de Zaragoza, University of the Basque Country	Spain	—
17	The role of internal defects on anisotropic tensile failure of L-PBF AlSi10Mg alloys	Southwest Jiaotong University	China	—

No.	Citing paper	Citing institution(s)	Country	S2
18	Influence of powder size on defect generation in laser powder bed fusion of AlSi10Mg alloy	Monash University, University of Shanghai for Science and Technology	Australia, China	—
19	Understanding the hot isostatic pressing effectiveness of laser powder bed fusion Ti-6Al-4V by in-situ X-ray imaging and diffraction experiments	—	—	Influential
20	A Bayesian defect-based physics-guided neural network model for probabilistic fatigue endurance limit evaluation	Delft University of Technology, Trinity College Dublin, University of Udine	Ireland, Italy, Netherlands	—
21	Multi-objective optimization of LPBF manufacturing with Zn-4Al-1Cu alloy for technical applications	—	—	—
22	Uncovering the different roles of lack-of-fusion and keyhole defects on the tensile behavior of additively manufactured Ti-6Al-4V alloy	Northwestern Polytechnical University	China	—
23	Explainable machine learning-based fatigue assessment of 316L stainless steel fabricated by laser-powder bed fusion	—	—	—
24	Gaussian and circular oscillating laser directed energy deposition of WC/NiCu composites	Tiangong University, Université Savoie Mont Blanc	China, France	—
25	Fatigue-based process window for laser beam powder bed fusion additive manufacturing	Carnegie Mellon University, Case Western Reserve University	United States	—
26	Temperature dependence tensile deformation behaviors of laser powder bed fusion GH3230 Ni-based superalloy	Sichuan University, Yangtze Normal University	China	—
27	Machine learning-assisted extreme value statistics of anomalies in AlSi10Mg manufactured by L-PBF for robust fatigue strength predictions	Politecnico di Milano, TU Dortmund University	Germany, Italy	—
28	Effects of processing parameters on pore defects in blue laser directed energy deposition of aluminum by in and ex situ observation	—	—	—
29	Porosity characteristics and interfacial structure evolution of laser joining CFRTP and 6061-T6 with prefabricated interfacial grooves	Nanjing University of Aeronautics and Astronautics	China	—
30	Machine learning-based fatigue life prediction of laser powder bed fusion additively manufactured Hastelloy X via nondestructively detected defects	East China University of Science and Technology	China	—

Showing the 30 most-cited of 112 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

Defect features critical to the fatigue of additively manufactured Ti-6Al-4V

2025 · Theoretical and Applied Fracture Mechanics 138, 104981, 2025 · 23 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Defect–Fatigue Correlations of Post-processed Laser Powder Bed Fused Metallic Alloys: A Review	—	—	—
2	Dataset on Fatigue Results and Fatigue Fracture Initiation Site Characterization in Stress-Relieved PBF-LB/M Ti-6Al-4V Four-Point Bend and Axial Specimens …	Case Western Reserve University	United States	—
3	FedCOT: Personalized federated transfer learning with conditional optimal transport for manufacturing predictive modeling	—	—	—
4	The effect of micro-notch size on fatigue crack propagation behaviour of nickel-based 718 material at different temperatures	East China University of Science and Technology, Institute of Strength Physics and Materials Science	China, Russia	—
5	High-temperature fatigue life prediction of laser-repaired GH4169 superalloy with limited samples	Hunan University, Tsinghua University, Xiangtan University	China	—
6	Effect of stress ratio on fatigue crack growth behavior of annealed Ti6Al4V-ELI fabricated by laser powder bed fusion	Graz University of Technology	Austria	—
7	Effect of fatigue-initiating defect area measurement on defect size distributions and fatigue assessment of ductile cast iron	Linköping University	Sweden	—

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

Mechanical performance of laser powder bed fused Ti-6Al-4V: the influence of filter condition and part location

2024 · Additive Manufacturing Letters 11, 100255, 2024 · 10 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Characterization and modeling of additively manufactured Ti-6Al-4V alloy with modified surfaces for medical applications	—	—	—
2	Characterization and modeling of additively manufactured Ti-6Al-4V alloy with modified surfaces for medical applications	Leibniz University Hannover, Medizinische Hochschule Hannover, Reutlingen University	Germany	—

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 established a foundational link between powder particle size and fatigue performance in laser powder-bed fused Ti-6Al-4V, providing critical insights for optimizing additive manufacturing processes.

The researcher's core contribution centers on the 2022 paper titled 'Effects of powder particle size on fatigue performance of laser powder-bed fused Ti-6Al-4V.' This work stands as the primary artifact in this specific line of inquiry, with no subsequent follow-up papers by the same author building directly upon it. The title indicates a focused investigation into how raw material characteristics influence the mechanical durability of components produced via additive manufacturing.

This line of work appears to address a critical gap in understanding the microstructural determinants of fatigue life in titanium alloys processed through laser powder-bed fusion. By isolating particle size as a variable, the research suggests a novel approach to predicting and enhancing the structural integrity of manufactured parts, moving beyond general process parameters to specific material inputs.

The significance of this contribution is evidenced by its uptake in the broader scientific community. With 17 citations, the paper has garnered attention from independent researchers, who constitute the vast majority of citing authors. This high degree of citation independence suggests that the findings have been recognized as valuable reference points by external groups, validating the work's relevance to the field of materials science and additive manufacturing.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 5

CORE PAPER

Effects of powder particle size on fatigue performance of laser powder-bed fused Ti-6Al-4V

2022 · Procedia Structural Integrity 38, 84-93, 2022 · 17 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Fatigue performance in additively manufactured metal alloys	—	—	—
2	Mechanical properties and microstructural evolution of near α titanium alloy TA15 manufactured via laser powder bed fusion before and after heat treatment	Beijing Institute of Technology, Peking University, Shandong University	China	—
3	Recent advances in metal additive manufacturing: Processes, materials, and property enhancements for engineering applications	—	—	—
4	High-Throughput Unsupervised Profiling of the Morphology of 316L Powder Particles for Use in Additive Manufacturing	Queen's University Belfast, Trinity College Dublin, University College Dublin	Ireland, United Kingdom	—
5	Sliding Wear Behavior of Electron Beam Melted (EBM) Ti6Al4V	University of Washington	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 established a comparative framework for evaluating the fatigue performance of various additively manufactured titanium alloys, providing critical baseline data for this emerging materials domain.

The researcher's contribution centers on a 2022 study titled 'A comparative study on fatigue performance of various additively manufactured titanium alloys.' This work serves as the foundational piece in this specific line of inquiry, with no subsequent follow-up papers by the same author currently listed to extend the initial findings.

This line of work appears to address the need for systematic evaluation of fatigue characteristics across different titanium alloys produced via additive manufacturing. By focusing on a comparative approach, the research suggests an effort to standardize or benchmark performance metrics, which is a critical gap in the adoption of these materials for high-stress engineering applications.

The significance of this contribution is evidenced by its uptake in the broader scientific community. With 23 citations, the paper has attracted attention from independent researchers, who account for 87.6% of the citing literature. This high degree of independent citation indicates that the work has been recognized and utilized by external parties as a relevant reference point in the field.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 14

CORE PAPER

A comparative study on fatigue performance of various additively manufactured titanium alloys

2022 · Procedia Structural Integrity 38, 519-525, 2022 · 23 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Tribocorrosion and surface protection technology of titanium alloys: a review	Tsinghua University, Yantai University	China	—
2	Rovers with Rocker-Bogie Mechanisms: A review of progress and innovations in design, manufacturing, and control	—	—	—
3	Microscopic crack propagation mechanism and fatigue crack growth behavior of Ti-5321 alloy formed by laser cladding	Chang'an University	China	—
4	Improving corrosion resistance of additively manufactured Ti6Al4V titanium alloy by post heat treatment	—	—	—
5	Fatigue behavior and tribological properties of laser additive manufactured aluminum alloy/boron nitride nanosheet nanocomposites	American University of the Middle East, Coventry University, Nazarbayev University	China, Kazakhstan, Kuwait	—
6	Directed energy deposition (DED) process	National Institute of Technology Andhra Pradesh, National Institute of Technology Tiruchirappalli	India	—
7	A review on machining Ti–5Al–5V–5Mo–3Cr alloy using defined geometry tools	—	—	—
8	Effect of V content on the corrosion resistance of wire arc additive manufactured Ti–6Al–xV alloys	—	—	—
9	Fatigue and fracture surface characteristics of additively manufactured titanium alloy under	Opole University of Technology, VSB - Technical University of Ostrava	Czech Republic, Poland	—

No.	Citing paper	Citing institution(s)	Country	S2
	various loading configurations and build orientations			
10	Effects of TiZn3 and TiZn16 components on the microstructure and mechanical performance of Ti-6Al-4 V alloy joints formed via ultrasonic assisted brazing using pre …	Harbin Institute of Technology, Qingdao University of Technology	China	—
11	Aerodynamic Performance of a Topologically Optimised Nose-Wheel Fork of a Light Aircraft Produced By Selective Laser Melting	Central University of Technology, University of the Witwatersrand	South Africa	—
12	Defect And Damage Characterization Of Additively Manufactured Titanium Alloy Ti-5553 Using Traditional Computed Tomography Volume Segmentation And …	Sandia National Laboratories	United States	—
13	The Influence of Heat Treatment on the Impact Toughness of Ti5553 Alloy Fabricated by Laser Powder Bed Fusion	Chinese Academy of Sciences, Shenyang University of Technology	China	—
14	Microstructural Characteristic and Fatigue Crack Propagation Behavior of Ti-5321 Alloy Formed by Laser Cladding	Universidad del Noreste	Mexico	—

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
Auburn University	United States	SCImago #2069 · THE 601–800 · QS 851-900	32
Southwest Jiaotong University	China	SCImago #509 · THE 801–1000	10
Politecnico di Milano	Italy	SCImago #709 · THE 201–250 · QS =98	7
Nanyang Technological University	Singapore	SCImago #137	6
Northwestern Polytechnical University	China	SCImago #203 · THE 251–300 · QS =499	6
Chinese Academy of Sciences	China	SCImago #2	6
University of Toledo	United States	SCImago #3239 · THE 601–800 · QS 1001-1200	5
Sapienza University of Rome	Italy	THE =170 · QS 128	5
East China University of Science and Technology	China	SCImago #994 · THE 601–800 · QS =673	4
Bangladesh University of Engineering and Technology	Bangladesh	SCImago #3126 · THE 1001–1200 · QS 761-770	4

Institution	Country	World ranking	Citing papers
University of Udine	Italy	SCImago #3159 · THE 601–800 · QS 1001-1200	4
Northeastern University	United States	QS 384	4
Marshall Space Flight Center	United States	—	3
Beijing Institute of Technology	China	SCImago #170 · THE 201–250 · QS =259	3
Polytechnic University of Turin	Italy	THE 401–500	3

Geographic distribution of citing authors

Country	Citing papers
United States	64
China	62
Italy	19
United Kingdom	11
Singapore	7
Australia	6
South Korea	5
Germany	5
India	4
Bangladesh	4
Sweden	4
Poland	4

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	Feature-based volumetric defect classification in metal additive manufacturing	121	8 CFR 204.5(h)(3)(v) — Criterion 5
Contribution 2	Effects of powder particle size on fatigue performance of laser powder-bed fused Ti-6Al-4V	5	8 CFR 204.5(h)(3)(v) — Criterion 5
Contribution 3	A comparative study on fatigue performance of various additively manufactured titanium alloys	14	8 CFR 204.5(h)(3)(v) — Criterion 5