# Citation Evidence Report

EB-2 NIW Petition — National Interest Waiver

Matter of Dhanasar · Prong 2 (well-positioned)


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**Generated 2026-05-21 by CiteMap.** This report organises Google Scholar citation data into the structure USCIS adjudicators apply to Prong 2 of Matter of Dhanasar (the petitioner is well positioned to advance the proposed endeavor) — the prong where past citation evidence is most probative. 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

| 60 | 60 | 2 | 1 |
|---|---|---|---|
| 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.

**92.9% independent** of 14 classified citing papers

| Citation type | Count |
|---|---|
| Independent | 13 |
| Self-citation | 0 |
| Co-author | 1 |
| 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 developed a 55nm neuromorphic accelerator with stochastic synapses and embedded reinforcement learning for autonomous micro-robots, presented at ISSCC 2018.*

The researcher's core contribution is the design of a 55nm time-domain mixed-signal neuromorphic accelerator featuring stochastic synapses and embedded reinforcement learning for autonomous micro-robots, as detailed in their 2018 ISSCC paper. This work appears to address the challenge of integrating learning capabilities directly into low-power hardware for small-scale autonomous systems. The titles suggest a novel approach to embedding reinforcement learning within the physical constraints of micro-robotics, leveraging stochastic synapses to enable adaptive behavior without external computational overhead. The absence of follow-up papers by the same researcher indicates this stands as a singular, foundational contribution in this specific hardware-architecture niche. The work has garnered significant attention, with 88 citations, indicating its relevance to the field. Notably, 92.9% of citing papers originate from independent researchers, suggesting broad adoption and validation of the proposed architecture by the wider scientific community beyond the researcher's immediate circle.

**INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 13** · **1 flagged influential by Semantic Scholar**

**CORE PAPER**

**A 55nm time-domain mixed-signal neuromorphic accelerator with stochastic synapses and embedded reinforcement learning for autonomous micro-robots**

2018 · 2018 IEEE International Solid-State Circuits Conference - (ISSCC) · 88 citations (GS)

Field-normalised: 57 Semantic Scholar citations place it in the top 10% of Computer Science papers from 2018 indexed by Semantic Scholar, by citation count.

| No. | Citing paper | Citing institution(s) | Country | S2 |
|---|---|---|---|---|
| 1 | A Survey on Silicon Photonics for Deep Learning (2021) | Colorado State University | United States | Background |
| 2 | ReckOn: A 28nm sub-mm² task-agnostic spiking recurrent neural network processor enabling on-chip learning over second-long timescales (2022) | University of Zurich and ETH Zurich | Switzerland | — |
| 3 | ANP-I: A 28-nm 1.5-pJ/SOP Asynchronous Spiking Neural Network Processor Enabling Sub-0.1-μ J/Sample On-Chip Learning for Edge-AI Applications (2024) | National Tsing Hua University, SynSense, Tsinghua University | China, Taiwan | **Influential** |
| 4 | TIMELY: Pushing Data Movements and Interfaces in PIM Accelerators Towards Local and in Time Domain (2020) | Rice University, Stanford University, University of California, Santa Barbara | United States | Background |
| 5 | Low-Power and Scalable BEOL-Compatible IGZO TFT eDRAM-Based Charge-Domain Computing (2023) | BNRist, Tsinghua University, National University of Singapore | China, Singapore | Background |
| 6 | Advancements in memory technologies for artificial synapses (2024) | Indian Institute of Technology, Roorkee | India | — |
| 7 | 7.6 A 65nm 236.5nJ/Classification Neuromorphic Processor with 7.5% Energy Overhead On-Chip Learning Using Direct Spike-Only Feedback (2019) | Seoul National University | South Korea | Background |

| No. | Citing paper | Citing institution(s) | Country | S2 |
|---|---|---|---|---|
| 8 | Ferroelectric Relaxation Oscillators and Spiking Neurons | — | — | — |
| 9 | Long short-term memory network design for analog computing | Louisiana State University | United States | **Result** |
| 10 | A voltage-controlled, oscillation-based adc design for computation-in-memory architectures using emerging rerams | Delft University of Technology, Forschungszentrum Juelich GmbH, IBM Thomas J. Watson Research Center | Germany, Netherlands, United States | Background |
| 11 | HiPER: Hierarchically-Composed Processing for Efficient Robot Learning-Based Control | University of Michigan | United States | — |
| 12 | CNN based detectors on planetary environments: a performance evaluation | Instituto Politécnico Nacional | México | Background |
| 13 | Digital compatible synthesis, placement and implementation of mixed-signal time-domain computing | 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).

**Citing-text excerpts — how the field used this work**

> **RESULT** Long short-term memory network design for analog computing
>
> *"Design in the work of Amravati et al. (2018) is suitable for applications in portable devices, and its energy efficiency is higher than in our work."*

## D. Citing-Institution Prestige & Geography

### Top citing institutions

| Institution | Country | World ranking | Citing papers |
|---|---|---|---|
| National University of Singapore | Singapore | SCImago #59 · THE 17 · QS 8 | 1 |
| University of Zurich and ETH Zurich | Switzerland | — | 1 |
| SynSense | Switzerland | — | 1 |
| BNRist, Tsinghua University | China | — | 1 |
| Indian Institute of Technology, Roorkee | India | SCImago #3065 · QS =339 | 1 |
| National Tsing Hua University | Taiwan | SCImago #1590 · THE 401–500 | 1 |
| Louisiana State University | United States | THE 601–800 · QS 851-900 | 1 |
| Rice University | United States | SCImago #818 · THE =103 · QS =119 | 1 |
| University of Michigan | United States | SCImago #43 · THE 23 · QS 45 | 1 |
| Northwestern University | United States | THE 30 · QS =42 | 1 |
| Georgia Institute of Technology | United States | SCImago #270 · THE =41 · QS =123 | 1 |
| Tsinghua University | China | SCImago #8 · THE 12 · QS =17 | 1 |
| Colorado State University | United States | QS =458 | 1 |
| IBM Thomas J. Watson Research Center | United States | SCImago #443 | 1 |

| Institution | Country | World ranking | Citing papers |
| --- | --- | --- | --- |
| Seoul National University | South Korea | SCImago #135 · THE =58 · QS =38 | 1 |

### Geographic distribution of citing authors

| Country | Citing papers |
| --- | --- |
| United States | 7 |
| China | 2 |
| India | 1 |
| México | 1 |
| Netherlands | 1 |
| Singapore | 1 |
| South Korea | 1 |
| Switzerland | 1 |
| Taiwan | 1 |
| Germany | 1 |

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 | A 55nm time-domain mixed-signal neuromorphic accelerator with stochastic synapses and embedded reinforcement learning for autonomous micro-robots | 13 | Dhanasar — Prong 2 (well-positioned) |