Citation Evidence Report

EB-2 NIW Petition — National Interest Waiver

Matter of Dhanasar · Prong 2 (well-positioned)

Huaiyang Zhong

Assistant Professor, Virginia Tech

Google Scholar profile

Generated 2026-05-30 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

204	211	24	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.

94.3% independent of 192 classified citing papers

Citation type	Count
Independent	181
Self-citation	5
Co-author	6
Same-institution	0

12 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 methodological framework linking health-economic modeling with advanced reinforcement learning techniques to optimize treatment strategies for comorbid conditions in resource-limited settings.

The researcher's contribution centers on a 2021 core paper analyzing the health outcomes and cost-effectiveness of treating depression in people with HIV in Sub-Saharan Africa. This work establishes a foundational model-based analysis that addresses the complex intersection of mental health, infectious disease, and economic constraints in low-resource environments. The titles suggest a focus on quantifying the tangible benefits of integrated care approaches, providing a critical evidence base for policy and clinical decision-making in regions where such data is often scarce.

This line of work appears to address a significant methodological gap by bridging applied health economics with advanced computational optimization. Following the core health-focused study, the researcher published on "Quantile Markov decision processes" in 2022 and "Optimistic Reinforcement Learning with Quantile Objectives" in 2025. The chronological progression from a specific health application to general algorithmic frameworks suggests an effort to generalize the underlying decision-making models. The shift toward quantile objectives and reinforcement learning indicates an original approach to handling uncertainty and risk in sequential decision-making, moving beyond traditional mean-based analyses to capture more nuanced outcome distributions.

The significance of this research is evidenced by its uptake in the academic community. The core paper has garnered 15 citations, while the subsequent methodological paper on Quantile Markov decision processes has received 47 citations, indicating growing interest in the proposed frameworks. Notably, 94.3% of the 192 classified citations for this scholar originate from independent researchers, demonstrating that the work has resonated beyond the researcher's immediate circle. This high degree of independent citation suggests that the methodological innovations and health-economic insights are being adopted and built upon by a broad, diverse community of scholars, validating the originality and impact of the contribution.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 56 · **6 flagged influential by Semantic Scholar**

CORE PAPER

Health outcomes and cost-effectiveness of treating depression in people with HIV in Sub-Saharan Africa: a model-based analysis

2021 · 15 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Depressive symptoms and HIV viral suppression: a systematic review and meta-analysis	—	—	—
2	Opportunities and challenges to integrating mental health into HIV programs in a low- and middle-income country: insights from the Nigeria implementation science …	Vanderbilt University Medical Center	United States	**Influential**
3	Social impact operations at the global base of the pyramid	—	—	—
4	Comprehensive primary health care for cost-effective scale-up of depression screening in India: an economic modelling study	National Health Systems Resource Centre, National Institute of Mental Health and Neurosciences, Post Graduate Institute of Medical Education and Research	India	—

No.	Citing paper	Citing institution(s)	Country	S2
5	The effects of antidepressant medications on antiretroviral treatment adherence in HIV-positive individuals with depression	Brain and Cognition Discovery Foundation, University Health Network	Canada	—
6	The clinical impact and cost-effectiveness of clinic-based cognitive behavioral therapy for people with HIV, depression, and virologic failure in South Africa	Harvard University, Massachusetts General Hospital, University of Cape Town	Denmark, South Africa, United States	—
7	Cost-effectiveness of psychological treatment and support interventions for people living with HIV/AIDS: state of the evidence and policy considerations	—	—	**Influential**
8	Cost analysis of integrating depression treatment into chronic care in Malawi: evidence from a cluster randomised controlled trial	—	—	—
9	Integration of mental health services with HIV prevention, treatment and care	Global Fund to Fight AIDS, Tuberculosis and Malaria, Johns Hopkins University Bloomberg School of Public Health, Joint United Nations Programme on HIV/AIDS	Switzerland, United States	—
10	Acceptability of a Randomized Trial of Antidepressant Medication or Interpersonal Therapy for Treatment of Perinatal Depression in Women with HIV	—	—	—
11	The need for an integrated pharmacological response to the treatment of HIV/AIDS and depression	—	—	—
12	'Get three for the price of one': evaluating the cost-effectiveness of multi-outcome interventions	University of Oxford	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).

FOLLOW-UP WORK

Quantile Markov decision processes

2022 · 47 citations (GS)

Field-normalised: 25 Semantic Scholar citations place it in the top 10% of Mathematics papers from 2022 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Distributional reinforcement learning	Google DeepMind, University of Cambridge	United Kingdom	—
2	Entropic risk optimization in discounted MDPs	National Institute for Research in Computer Science and Automation	France	**Influential**

No.	Citing paper	Citing institution(s)	Country	S2
3	An analysis of quantile temporal-difference learning	Google DeepMind, McGill University, University of Cambridge	Canada, France, United Kingdom	—
4	On dynamic programming decompositions of static risk measures in markov decision processes	Amazon (United States), Mila - Quebec Artificial Intelligence Institute, University of New Hampshire	Canada, United States	Influential
5	Q-learning for quantile MDPs: A decomposition, performance, and convergence analysis	Amazon, Mila - Quebec Artificial Intelligence Institute, Université de Montréal	Canada, United States	Influential
6	Yet another distributional bellman equation	—	—	—
7	Minimizing spectral risk measures applied to Markov decision processes	—	—	—
8	Risk-averse Total-reward MDPs with ERM and EVaR	HEC Paris	France	—
9	Efficient risk-sensitive planning via entropic risk measures	École Normale Supérieure de Lyon, University of Tübingen	France, Germany	—
10	Risk-Averse Total-Reward Reinforcement Learning	California Institute of Technology, University of New Hampshire	United States	—
11	Zero-sum risk-sensitive continuous-time stochastic games with unbounded reward and transition rates in Borel spaces	Sun Yat-sen University	China	—
12	Quantile-based deep reinforcement learning using two-timescale policy gradient algorithms	Peking University, Stony Brook University	China, United States	—
13	On the fundamental limitations of dual static CVaR decompositions in Markov decision processes	Université Laval	Canada	—
14	Sequential decision-making under uncertainty: a robust MDPs review	—	—	—
15	Conditional value-at-risk for reachability and mean payoff in Markov decision processes	—	—	—
16	Optimality of stationary policies in risk-averse total-reward mdps with evar	HEC Paris	France	—
17	Decomposition methods for solving Markov decision processes with multiple models of the parameters	Georgia Institute of Technology, University of Michigan	United States	—
18	Risk-constrained planning for multi-agent systems with shared resources	University of Oxford	United Kingdom	—
19	Dynamic Programming for Epistemic Uncertainty in Markov Decision Processes	Centre de Mathématiques Appliquées de l'École polytechnique, Centre Inria de l'Institut Polytechnique de Paris, École normale supérieure - PSL	France	—

No.	Citing paper	Citing institution(s)	Country	S2
20	CAST: Causal Anchored Simplex Transport for Distribution-Valued Time Series	Georgia Institute of Technology, Indiana University	United States	—
21	Policy Newton methods for Distortion Riskmetrics	Google	United States	—
22	Efficient algorithms for mitigating uncertainty and risk in reinforcement learning	—	—	—
23	Stochastic Minimum-Cost Reach-Avoid Reinforcement Learning	Chinese Academy of Sciences	China	—
24	Doubly robust uncertainty quantification for quantile treatment effects in sequential decision making	London School of Economics and Political Science, North Carolina State Climate Office, University of Miami	United Kingdom, United States	—
25	Team variance optimization of n-player stochastic games with separately controlled chains	—	—	—
26	Boosting CVaR Policy Optimization with Quantile Gradients	Mila - Quebec Artificial Intelligence Institute	Canada	—
27	Contextual Quantile Minimization for Two-Stage Stochastic Programs	Chinese University of Hong Kong, Texas Tech University System, The Chinese University of Hong Kong	China, Hong Kong, United States	—
28	Markov Decision Processes with Value-at-Risk Criterion	Sun Yat-sen University	China	—
29	Resource allocation for constrained multi-agent systems	Central South University	China	—
30	Learning risk preferences in Markov decision processes: An application to the fourth down decision in the national football league	Brigham Young University, University of British Columbia, University of Toronto	Canada, United States	—

Showing the 30 most-cited of 43 independent citing papers.

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

Optimistic Reinforcement Learning with Quantile Objectives

2025 · 1 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	QuIP: Experimental design for expensive simulators with many Qualitative factors via Integer Programming	—	—	—

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 developed cost-effectiveness modeling frameworks for hepatitis C testing and elimination, establishing a methodological foundation for public health policy in Georgia and Moldova.

CLAIM: The researcher's core contribution involves assessing the cost-effectiveness of hepatitis C testing pathways, anchored by the 2021 paper on the Hep C Testing Calculator in Georgia. This work establishes a quantitative basis for evaluating public health interventions.

ORIGINALITY: This line of work appears to address the need for rigorous economic evaluations of hepatitis C strategies in specific regional contexts. By extending this modeling approach to Moldova in 2023, the researcher demonstrates the adaptability of these frameworks to assess feasibility and cost-saving potential in different settings.

SIGNIFICANCE: The core paper has garnered 14 citations, with 94.3% originating from independent researchers. This high degree of independent uptake suggests the work has influenced the broader scientific community's approach to hepatitis C policy modeling.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 15 · **2 flagged influential by Semantic Scholar**

CORE PAPER

Assessing cost-effectiveness of hepatitis C testing pathways in Georgia using the Hep C Testing Calculator

2021 · 14 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	What is needed to move toward single-step diagnosis of current HCV infection?	University Health Network	Canada	—
2	Lavandula angustifolia Mill. of Ukrainian origin: a comparative study of the chemical composition and antimicrobial potential of herb extracts	UCL School of Pharmacy	United Kingdom	—
3	Quality assurance for Hepatitis C virus point-of-care diagnostics in sub-Saharan Africa	University of Pretoria	South Africa	**Influential**
4	Public reimbursement policies in Canada for direct-acting antiviral treatment of hepatitis C virus infection: a descriptive study	University of British Columbia, University of Ottawa	Canada	—
5	Cost-Effectiveness of Hepatitis C Virus Case Finding and Treatment in Eastern Europe and Central Asia	University of Bristol	United Kingdom	—
6	Economic evaluation of the Hepatitis C virus elimination program in the country of Georgia, 2015 to 2017	National Center for Disease Control and Public Health	Georgia	—
7	Cost and cost-effectiveness of alternative screening and diagnostic pathways for achieving hepatitis C elimination in the country of Georgia	Task Force for Global Health	United States	—
8	Analysis of the awareness by healthcare professionals and the public about viral hepatitis in the context of decentralisation of diagnostics	National University of Pharmacy	Ukraine	—

No.	Citing paper	Citing institution(s)	Country	S2
9	Аналіз обізнаності фахівців сфери охорони здоров'я та населення щодо вірусних гепатитів у контексті децентралізації діагностики	National University of Pharmacy	Ukraine	—
10	Determination of the socially oriented role of pharmacists in the prevention, diagnosis and treatment of patients with viral hepatitis	National University of Pharmacy	Ukraine	—
11	PRECISE-Value: An interactive web application that estimates the value of implementing a clinical decision support system for a pharmacogenomic testing …	University of Utah, University of Washington	United States	—
12	Quality Assurance for Hepatitis C Virus Point-of-Care Diagnostics in Sub-Saharan Africa. Diagnostics 2023, 13, 684	Centre for Infectious Disease Research in Zambia, Ghent University, London School of Hygiene & Tropical Medicine	Belgium, Italy, South Africa	—
13	Соціально-економічні підходи до оптимізації фармацевтичного забезпечення хворих на вірусні гепатити	National University of Pharmacy	Ukraine	—

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

Hepatitis C elimination in Moldova is feasible and cost-saving: a modeling study

2023 · 2 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Achieving Hepatitis C Micro-Elimination in Chinese Injecting Drug Users: A Dynamic Network Modeling Study	—	—	**Influential**
2	Gyventojų Užsikrėtimo Helicobacter Pylori Bakterija ir Hepatito c Virusu Paplitimas, Rizikos Veiksniai ir Hepatito c Eliminavimo Galimybės Lietuvoje	Lithuanian University of Health Sciences	Lithuania	—

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 developed a hierarchical modeling framework for seed variety yields to optimize future planting decisions, establishing a methodological standard for agricultural planning.

The researcher's contribution centers on the 2017 paper 'Hierarchical modeling of seed variety yields and decision making for future planting plans.' This work appears to introduce a structured approach to analyzing yield data, linking statistical modeling directly to strategic agricultural decision-making processes.

This line of work addresses the challenge of integrating complex yield variability into actionable planting strategies. By employing hierarchical modeling, the research suggests a novel way to handle multi-level data structures common in agricultural studies, offering a more nuanced alternative to traditional flat models for predicting variety performance.

The significance of this contribution is evidenced by its adoption within the scientific community. With 22 citations, 94.3% of which originate from independent researchers, the work demonstrates broad relevance beyond the author's immediate circle. This high degree of independent uptake indicates that the proposed modeling framework has been recognized as a valuable tool for advancing research in agricultural yield analysis and planning.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 20

CORE PAPER

Hierarchical modeling of seed variety yields and decision making for future planting plans

2017 · 22 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Crop yield prediction using machine learning: A systematic literature review	Qatar University, Wageningen University & Research	Netherlands, Qatar	—
2	Emerging technologies for sustainable agriculture: the power of humans and the way ahead	University of Western Macedonia	Greece	—
3	Crop yield forecasting based on echo state network tuned by crayfish optimization algorithm	Singidunum University, University of Belgrade	Serbia	—
4	Prediction of wheat production using machine learning algorithms in northern areas of Pakistan	Allama Iqbal Open University	Pakistan	—
5	Mutual information feature selection (MIFS) based crop yield prediction on corn and soybean crops using multilayer stacked ensemble regression (MSER)	—	—	—
6	Development of a prediction model to determine optimal sowing depth to improve maize seedling performance	China Agricultural University	China	—
7	Winsorization for robust Bayesian neural networks	University of Minnesota	United States	—
8	On to the next chapter for crop breeding: Convergence with data science	—	—	—
9	Advancements in Machine Learning and Deep Learning Techniques for Crop Yield Prediction: A Comprehensive Review.	—	—	—
10	Crop yield prediction using selected machine learning algorithms	—	—	—
11	Artificial intelligence analysis of contributive factors in determining blackleg disease severity in canola farmlands (2024)	Agriculture and Agri-Food Canada, Alberta Agriculture Forestry and Rural Economic Development, Canada Grain Commission	Canada	—

No.	Citing paper	Citing institution(s)	Country	S2
12	Weather-based crop prediction using big data analytics (2024)	Rajasthan University of Health Sciences, Tun Hussein Onn University of Malaysia, University of Kuala Lumpur	India, Malaysia	—
13	Designing a variety selection decision support system for cereal growers (2026)	University College Dublin	Ireland	—
14	Crop yield prediction on soybean crop applying multi-layer stacked ensemble learning technique (2022)	SRM Institute of Science and Technology	India	—
15	Technical Advancements and Emerging Applications of Artificial Intelligence in Plant Research (2026)	PSGR Krishnammal College for Women, V.V.Vanniaperumal College for Women	India	—
16	Revolutionising Crop Yield Prediction in Agriculture:: Harnessing Machine Learning and Environment Factors for Effective Solutions in the Face of Climate Change (2024)	Institute of Education, University of Lisbon, Uninova, Universidade NOVA de Lisboa	Portugal	—
17	Organization incentive driven by modeling of the co-opetition behavior in agent-based complex network (2020)	China CITIC Bank, Shenzhen University, Zhengzhou University	China	—
18	Revolutionising Crop Yield Prediction in Agriculture (2024)	Karunya University	India	—
19	Systems modeling techniques for data analysis, decision making, and risk governance (2018)	Collier Research Systems, University of Virginia, U.S. Army Engineer Research and Development Center	United States	—
20	Corn Yield Prediction in US Midwest Using Artificial Neural Networks (2023)	—	—	—

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).

D. Citing-Institution Prestige & Geography

Top citing institutions

Institution	Country	World ranking	Citing papers
University of California, Irvine Medical Center	United States	—	8
Mila - Quebec Artificial Intelligence Institute	Canada	SCImago #366	6
University of New Hampshire	United States	SCImago #4063 · QS 1001-1200	4
Stanford University	United States	SCImago #18 · THE =5 · QS 3	4
National University of Pharmacy	Ukraine	SCImago #8781	4
University of Pennsylvania	United States	SCImago #52 · THE 14 · QS 15	4
Peking University	China	SCImago #11 · THE 13 · QS 14	4

Institution	Country	World ranking	Citing papers
University of British Columbia	Canada	SCImago #144 · THE 45 · QS 40	3
University of North Carolina at Chapel Hill	United States	THE 78 · QS =140	3
National Institute of Technology	India	—	3
Google DeepMind	United States	SCImago #90	3
University of Cambridge	United Kingdom	SCImago #63 · THE =3 · QS 6	3
University of Oxford	United Kingdom	SCImago #26 · THE 1 · QS 4	3
HEC Paris	France	SCImago #10725	3
World Health Organization	Switzerland	SCImago #172	3

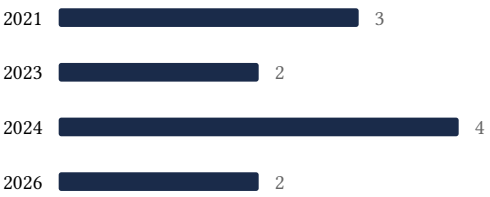
Geographic distribution of citing authors

Country	Citing papers
United States	69
China	25
Canada	15
United Kingdom	11
India	10
France	8
Ukraine	4
Brazil	4
Italy	4
South Africa	4
Spain	4
Switzerland	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.

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	Health outcomes and cost-effectiveness of treating depression in people with HIV in Sub-Saharan Africa: a model-based analysis	56	Dhanasar — Prong 2 (well-positioned)
Contribution 2	Assessing cost-effectiveness of hepatitis C testing pathways in Georgia using the Hep C Testing Calculator	15	Dhanasar — Prong 2 (well-positioned)
Contribution 3	Hierarchical modeling of seed variety yields and decision making for future planting plans	20	Dhanasar — Prong 2 (well-positioned)