

# Leveraging Hispanic-Serving Institutions within physics education research

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\*Please note that the opinions, findings, conclusions and recommendations expressed here are ours and do not necessarily reflect the views of the National Science Foundation.



Illustration from: *Hispanic Serving Institutions (HSIs) in Practice: Defining "Servingsness" at HSIs*, edited by Gina Ann Garcia

## Background & Motivation

Hispanic-Serving Institutions (HSIs) are federally designated as higher education institutions in the US that enroll (1) at least 25% Hispanic or Latino students and (2) at least 50% students who are eligible for need-based financial aid. Institutions' designations evolve and the number of HSIs has tripled in the last three decades. HSIs enroll two thirds of all Hispanic and Latino students in the US, as well as more Black and Native American students than Historically Black Colleges and Universities (HBCUs) and Tribal Colleges and Universities (TCUs) (Garcia et al, 2019).



As noted by Kanim & Cid (2020), PER's body of research disproportionately studies whiter and wealthier students than the population of physics students in the US.

Research done in HSI contexts have the potential to instead center racially and economically minoritized communities.

The landscape of HSIs is not a monolith (Núñez et al, 2016), but includes many institutional contexts to learn in. The extent that HSIs center and serve their students can also vary, especially with the large number of new HSIs. In the same spirit of (and inspired by) Kanim and Cid's work, we hope to understand:

**RQ1: What fraction of PER literature has been produced at HSIs?**

**RQ2: How do demographics at high-publishing HSIs compare to the demographics of other high-publishing institutions in PER?**

**RQ3: To what extent do publications from authors at HSIs acknowledge and take up their positionality at an HSI?**

## Publication Sample and Context



Physics Education Research Conference Conference Proceedings

In our publication sample, we included all papers published during **2010-2021** in the journals *Physical Review Physics Education Research* (PRPER) and the *Physics Education Research Conference Proceedings* (PERC Proceedings).

### RQ1: What fraction of PER literature has been produced at HSIs?

For every paper, we connected every author to their listed affiliation (at time of publication), and every affiliated institution to its country and type (e.g. higher ed., K12, nonprofit). Because federally designated HSIs must be higher education institutions from the US, this allowed us to identify and compare comparable institution sets.

Number and percentage of papers affiliated with countries' institutions: papers with multiple country affiliations are multiply counted.

Country	PRPER	PERC	% of PRPER	% of PERC
USA	609	1015	75.0%	92.4%
Canada	30	22	3.7%	2.0%
Germany	28	14	3.4%	1.3%
China	24	3	3.0%	0.3%
Norway	21	9	2.6%	0.8%
Israel	20	11	2.5%	1.0%
Croatia	20	2	2.5%	0.0%
Italy	19	2	2.3%	0.2%
Belgium	16	1	2.0%	0.1%
Scotland	14	14	1.7%	1.3%
Ireland	14	9	1.7%	0.8%
Sweden	14	5	1.7%	0.5%
Finland	14	3	1.7%	0.3%
Taiwan	13	4	1.6%	0.4%
Spain	12	3	1.5%	0.3%
England	12	1	1.5%	0.1%
Australia	11	1	1.4%	0.0%
Mexico	9	26	1.1%	2.4%
Austria	9	3	1.1%	0.3%
Chile	8	8	1.0%	0.7%
South Africa	8	7	1.0%	0.6%
Japan	8	4	1.0%	0.4%
Netherlands	7	0.9%	0.9%	0.0%
Turkey	7	0.9%	0.9%	0.0%
Slovenia	6	2	0.7%	0.2%
Bosnia and Herzegovina	6	0.7%	0.7%	0.0%
New Zealand	6	0.7%	0.7%	0.0%
India	5	0.6%	0.6%	0.0%
Brazil	4	2	0.5%	0.2%
Switzerland	4	2	0.5%	0.2%
Thailand	4	1	0.5%	0.1%
France	4	0.5%	0.5%	0.0%
Denmark	3	1	0.4%	0.1%
Argentina	2	0.2%	0.2%	0.0%
Portugal	2	0.2%	0.2%	0.0%
United Arab Emirates	1	1	0.1%	0.1%
Bahrain	1	0.1%	0.1%	0.0%
Ethiopia	1	0.1%	0.1%	0.0%
Greece	1	0.1%	0.1%	0.0%
South Korea	1	0.1%	0.1%	0.0%
Uruguay	1	0.1%	0.1%	0.0%
Vietnam	4	0.0%	0.4%	0.0%
Oman	1	0.0%	0.1%	0.0%
Panama	1	0.0%	0.1%	0.0%
<b>Distinct Total</b>	<b>812</b>	<b>1098</b>		

Of the USA affiliated PRPER papers, 607 of 609 included a US higher education affiliation. Of the PERC papers, 1010 of 1015 USA affiliations were associated with an institution of higher ed. These are the subset of papers that could possibly be affiliated with our federal definition of an HSI.

We identified papers with at least one HSI-affiliated author by connecting institutions to the Dept. of Education's eligibility matrix.

Journal	# of papers	# of HSIs	% of US Higher Ed. papers	% of All papers
PRPER	127	30	20.9%	15.6%
PERC	223	24	22.1%	20.3%

### RQ2: How do demographics at high-publishing HSIs compare to the demographics of other high-publishing institutions in PER?

Within the subset of PER published higher education institutions in the US, we connected to data from the Integrated Postsecondary Education Data System (IPEDS) to compare students' demographics (race/ethnicity and Pell Grant status) across the highest-publishing institutions (both among HSIs and generally).

HSI	Institution	# of PRPER papers	# of PERC Papers	Total # papers	Hisp %	Pell %
	University of Colorado Boulder	90	157	248	12.7	16
	Michigan State University	47	70	120	5.2	22
	University of Pittsburgh	46	73	119	5	15
	Kansas State University	32	58	90	7.4	23
Y	Florida International University	39	50	89	65.1	48
	Ohio State University	44	29	73	4.7	21
	University of Maryland-College Park	35	38	73	9.2	18
	University of Washington-Seattle	22	42	64	8.9	21
	Seattle Pacific University	21	40	61	14.2	30
	University of Maine	28	32	60	4.1	29
	Western Michigan University	20	32	53	7.1	32
Y	University of Central Florida	12	38	50	27.5	38
	Oregon State University	16	31	47	10.8	26
	Rochester Institute of Technology	14	31	45	8.1	29
Y	California State University-Fullerton	12	30	42	46.1	49
	University of Illinois at Urbana-Champ.	24	17	41	12.9	23
Y	Texas State University	6	34	40	39.6	37
	Cornell University	15	18	33	13.8	17
Y	Cal Poly Pomona	12	19	31	47.5	48
Y	California State University-Chico	8	22	30	35	45

	Hisp %	Pell %
Average (non-HSIs)	10.5 ± 0.4%	26.2 ± 0.7%
Average (HSIs)	42.7 ± 2.8%	42.3 ± 1.9%

## Hispanic-serving institutions have played and will continue to play a critical role in diversifying our community's research contexts.

HSI affiliated publications make up about 20% of the PER body of literature. There are many high-publishing HSIs in PER. By definition, they enroll higher fractions of Hispanic and Latino students and Pell Grant recipients, but the difference is considerably large. Fewer than half of publications from HSI affiliated researchers use HSI data, and fewer than half of papers with HSI data acknowledge their HSI context. Many use collaborators' data; this makes sense, since many HSIs are PUIs and have been historically (and currently) underfunded. Especially with our oversampling of white & wealthy student populations, building on, centering, and acknowledging HSI contexts can provide much-needed context and expertise for the future of PER.

## Authors' Positionalities

Both authors are currently working at the National Science Foundation with the Hispanic-Serving Institutions Program. In this context, they have been steeped in thinking about and interacting with HSIs. The first author has worked at an HSI and will resume teaching and research at an HSI. Neither author is Hispanic or Latina, and the first author was a Pell Grant recipient.

### RQ3: To what extent do publications from authors at HSIs acknowledge and take up their positionality at an HSI?

We selected the subset of {all papers from PRPER} to analyze more closely for publications' positioning re: HSIs. For each PRPER paper, we evaluated whether the data in the study came from an HSI, and if so, whether the paper mentioned the data's HSI context. We also used MAXQDA to do counts on keywords related to race and other equity terms within the papers.

Of 127 PRPER papers with an HSI affiliated author

- 83 had HSI affiliated researchers as the first author
- 47 papers primarily used data from an HSI. Within those 47: 21 acknowledged their HSI status.

Keywords*	HSI freq	non-HSI freq	% of HSI papers (of 127)	% of non-HSI papers (of 685)
Race	1.45	0.78	26.8%	16.5%
Ethnicity	1.19	0.46	29.1%	13.4%
Hispanic	2.09	0.64	37.8%	14.9%
Black	1.92	1.08	44.9%	26.9%
Asian	0.83	0.42	25.2%	12.6%
Native POC	0.47	0.29	21.3%	17.4%
Equity	3.46	0.69	31.5%	16.4%
Identity	7.47	4.05	38.6%	26.7%
Gender	9.58	9.05	59.9%	40.6%
Women	16.39	12.40	59.8%	45.1%
LGBTQ+	0.09	0.03	3.1%	1.9%
Disability	2.39	0.08	10.2%	4.8%

\*Some keyword categories include variations: Hispanic includes Hispanic, Latino, Latina, Latinx, Latinas, Latinos; Black includes Black, African American; POC includes BIPOC, POC, of color; equity includes equity, equitable, equitably; identity includes identity, identities; women includes woman, girl, female; LGBT includes LGBT, LGBTQ, LGBTQA, LGBTQIA, LGBTs, lgbtphysicists.

Over all the keywords, the frequency of use within HSI papers was higher than the use across non-HSI papers. Additionally, a larger percentage of HSI papers used each keyword at least once, compared to the percentage of non-HSI papers to use the keywords.