Demographic Effects of Removing the Physics GRE Requirement in Graduate Admissions

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Results: Median Fractional Change in Applicant Pool

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Domestic</th>
<th>Int’l</th>
<th>Women</th>
<th>URMss</th>
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<tbody>
<tr>
<td>PGRE Not Required*</td>
<td>+44%</td>
<td>+31%</td>
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<td>+67%</td>
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<tr>
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*Change from admissions cycle when PGRE requirement removed, N = 13 depts
**Change over last 4 years in programs that still require PGRE, N = 6 depts
Physics GRE Score Demographic Trends

Median Scores (2009-2015) of US citizens:

Men: 46 percentile
Women: 28 percentile

White: 39 percentile
Black: 17 percentile
Latinx: 28 percentile
Asian: 53 percentile
Native American: Not reported
Reasons to Remove the PGRE Requirement

• Scores do not correlate with success, e.g.:
  Miller et al. 2019: no correlation with degree completion.
  Levesque, Bezanson, & Tremblay 2015: national prize postdoc fellows earned all scores.

• Test is expensive: $150 for test + $27 per recipient school (https://www.ets.org/gre/subject/about/fees/)

• Missing applicants - with so many programs no longer requiring the PGRE, applicants may opt never to take test.

• Access is limited in certain locations / countries; e.g. here’s the locations of all PGRE tests offered in 2019 in 4 countries:
  Australia: Canberra
  Germany: Munich
  Japan: Okinawa or Fukuoka
  Mexico: Monterrey or Merida
34% of astronomy and physics PhD programs require PGRE in admissions

42% required PGRE in 2018-2019 cycle

List compiled and updated by James Guillochon: https://docs.google.com/spreadsheets/d/19UhYToXOPZkZ3CM469ru3Uwk4584CmzZyAVVwQJJJcyc
Survey
Requested demographic data from 2016-2019 (last four admissions cycles) on applicant pools of 27 astronomy PhD granting institutions:

- Total number of applicants
- Total number of women applicants
- Total number of underrepresented minority applicants (Black, Latinx, Native American, Native Hawaiian)
- Total number of domestic and international applicants
- Year that PGRE was no longer required

19 (70%) have provided data so far; 4 are still organizing data; 4 did not respond. Agreed to keep schools anonymous.

16 gave data on women, 12 gave data on race/ethnicity, 16 gave data on citizenship

Caveats: data relied on self-identification, gender binary
Total Number of Applicants

Solid lines require PGRE
Dashed lines do not require PGRE

Max in 2019 = 364 applicants
Total Number of Applicants

Do not require PGRE

Require PGRE

- Number of Applicants
- Year
- Total Number of Applicants
- Schools
Thick black line: fractional increase astronomy bachelors attainment since 2016 (35%) from AIP Statistical Research Center

Median (and Range) Changes:
Year PGRE was removed: +44% (+8 to 88%)
Over 4 years (PGRE removed): +67% (+16 to 200%)
Over 4 years (PGRE required): +16% (-16 to +44%)
Domestic Applicants

Median (and Range) Changes:
Year PGRE was removed: +31% (+7 to 74%)
Over 4 years (PGRE removed): +52% (+13 to 82%)
Over 4 years (PGRE required): +22% (-2 to +55%)
Median (and Range) Changes:

Year PGRE was removed: +43% (-23 to 186%)
Over 4 years (PGRE removed): +29% (-32 to +177%)
Over 4 years (PGRE required): -10% (-42 to +56%)
Women Applicants

Solid lines require PGRE
Dashed lines do not require PGRE

Max in 2019 = 136 applicants
Women Applicants

Do not require PGRE

Require PGRE

Number of Applicants

Year

2016 2017 2018 2019

School #1
School #2
School #3
School #4
School #5
School #6
School #7
School #8
School #9
School #10
School #11
School #12
School #13
School #14
School #15
School #16
School #17
School #18
School #19
Fractional Change in Women Applicants

Median (and Range) Changes:
Year PGRE was removed: +57% (+2 to 87%)
Over 4 years (PGRE removed): +94% (+0 to 340%)
Over 4 years (PGRE required): +5% (-24 to +38%)
Under-represented Minority Applicants

Solid lines require PGRE
Dashed lines do not require PGRE

Max in 2019 = 51 applicants
Under-represented Minority Applicants

Do not require PGRE

Require PGRE
**Under-represented Minority Applicants**

![Graph showing the number of applicants over years for different schools, with median changes and fractional change in applicants.]

**Median (and Range) Changes:**
- Year PGRE was removed: +63% (-32 to +257%)
- Over 4 years (PGRE removed): +76% (-8 to +200%)
- Over 4 years (PGRE required): +2% (-37 to +99%)
## Lessons / Takeaways

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Removing PGRE improves applicant pool demographics and better matches/exceeds increasing bachelors attainment.

Data can show programs are missing out by requiring PGRE, but it is necessary to collect that data (each program needs to collect it and then share)
Outstanding Questions

What other factors (e.g., climate) are important or necessary to maintain positive demographic trends?

What are the metrics that correlate most with success that should be used in graduate admissions?

Does a more diverse pool lead to more diverse admitted students, more diverse matriculated students?

Anecdotal answer:
At OSU, we admitted 16 / 186 students (10 women, 5 URMs). 1st year class: 5 students, all women, 2 URMs