Demographic Effects of Removing the Physics GRE Requirement in Graduate Admissions

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Results: Median Fractional Change in Applicant Pool

	Total	Domestic	Int'l	Women	URMs
PGRE Not Required*	+44%	+31%	+43%	+67%	+63%
PGRE Required**	+16%	+22%	-10%	+5%	+2%

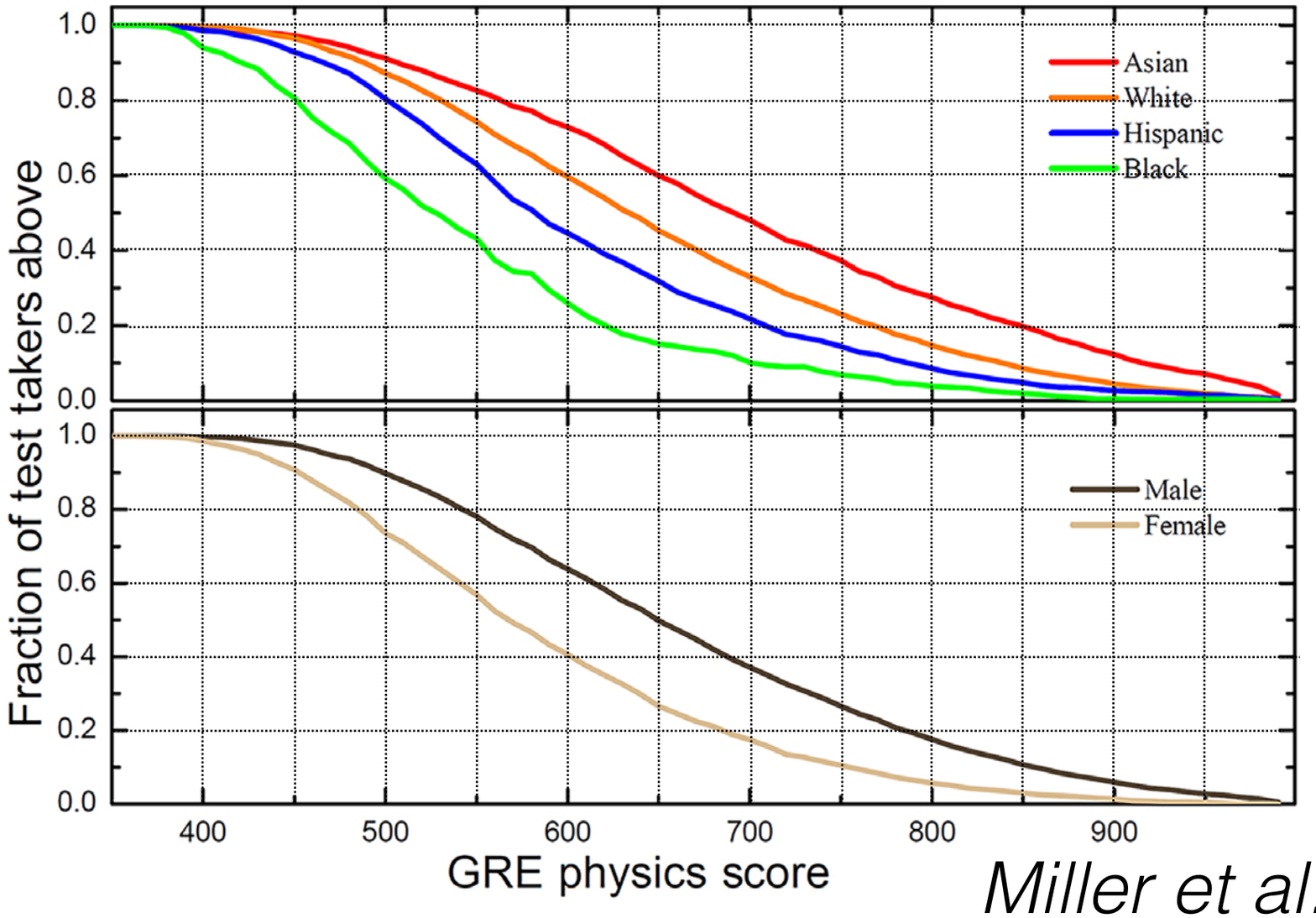
*Change from admissions cycle when PGRE requirement removed, N = 13 depts
**Change over last 4 years in programs that still require PGRE, N = 6 depts

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



Miller et al. 2019, Science Advances, Vol 5, no. 1

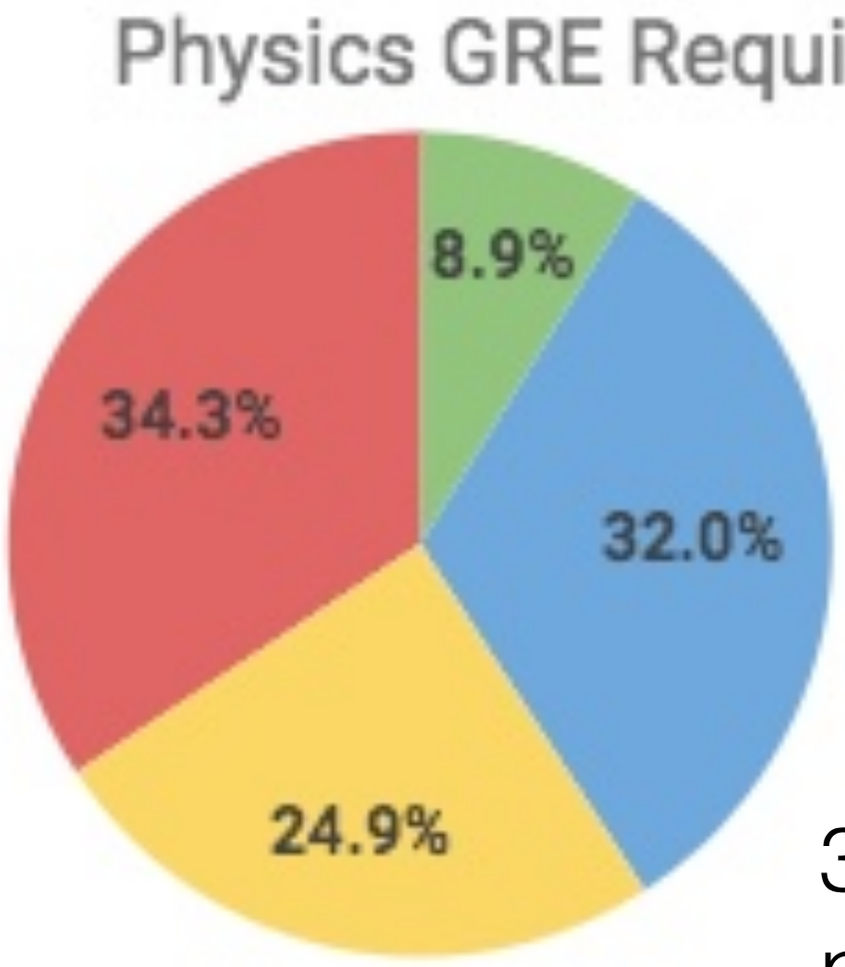
Reasons to Remove the PGRE Requirement

- 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/19UhYToXOPZkZ3CM469ru3Uwk4584CmzZyAVVwQJJcyc

Survey

Requested demographic data from 2016-2019 (last four admissions cycles) on applicant pools of 27 astronomy PhD granting institutions:

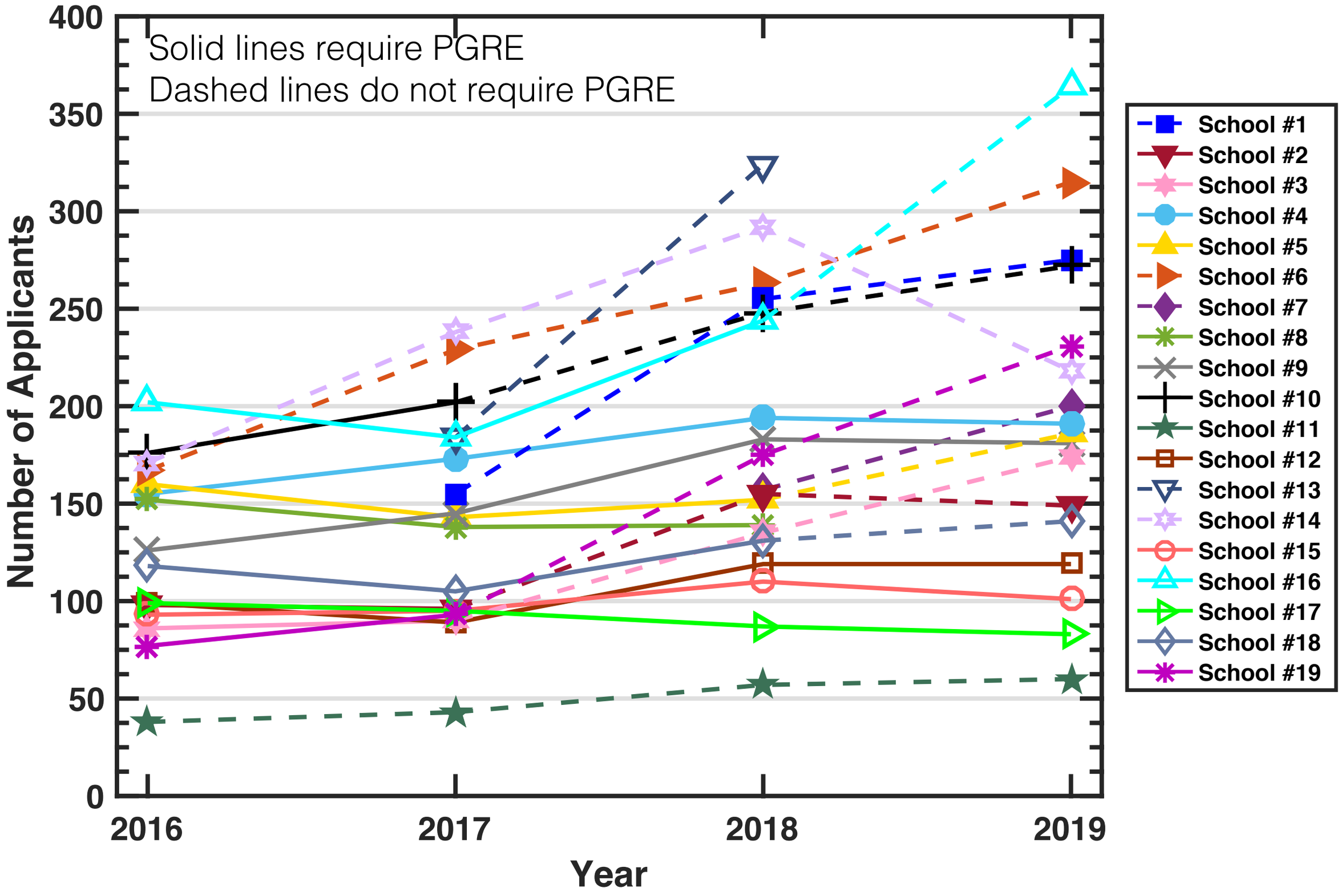
- Total number of applicants
- Total number of women applicants
- Total number of underrepresented minority applicants (Black, Latinx, Native American, Native Hawaiian)
- Total number of domestic and international applicants
- Year that PGRE was no longer required

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

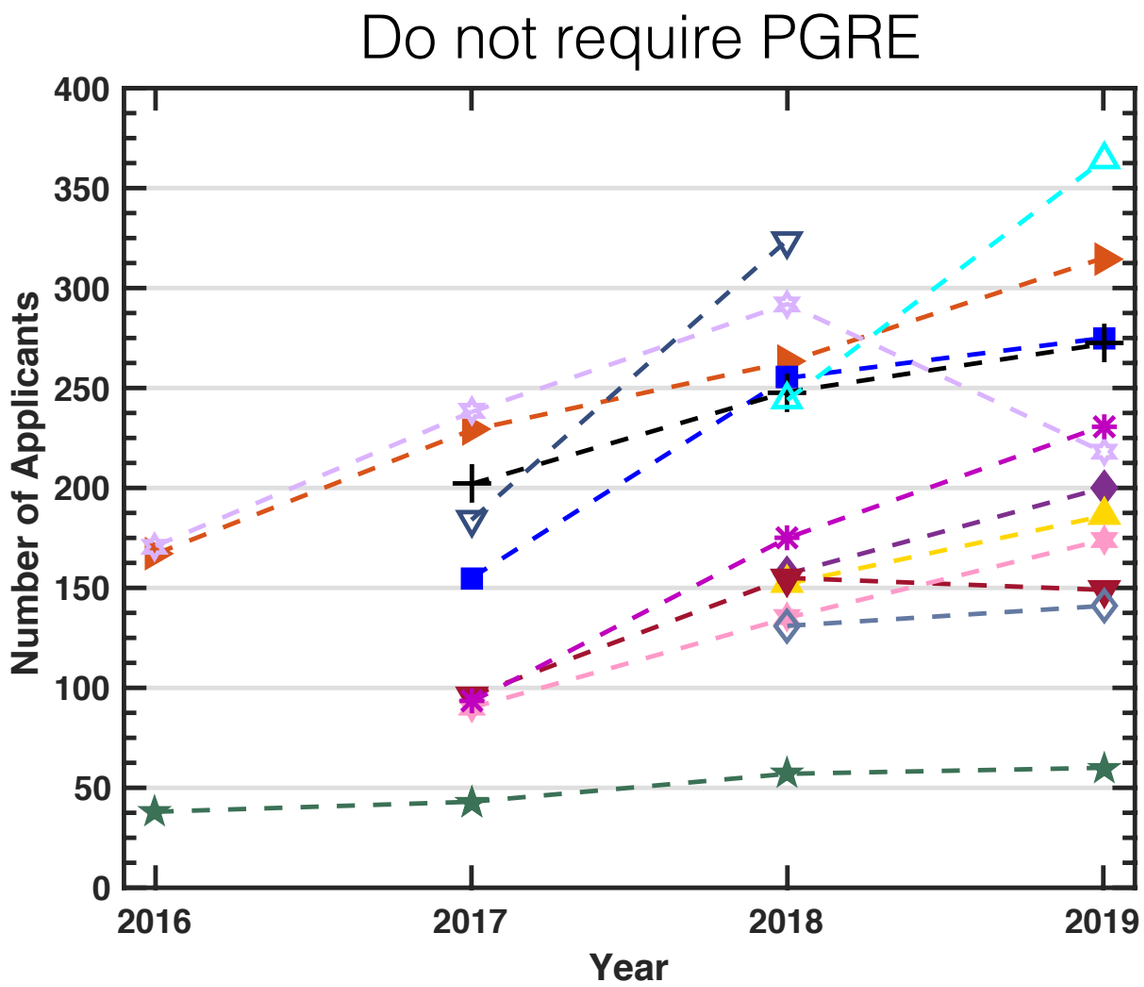
Caveats: data relied on self-identification, gender binary

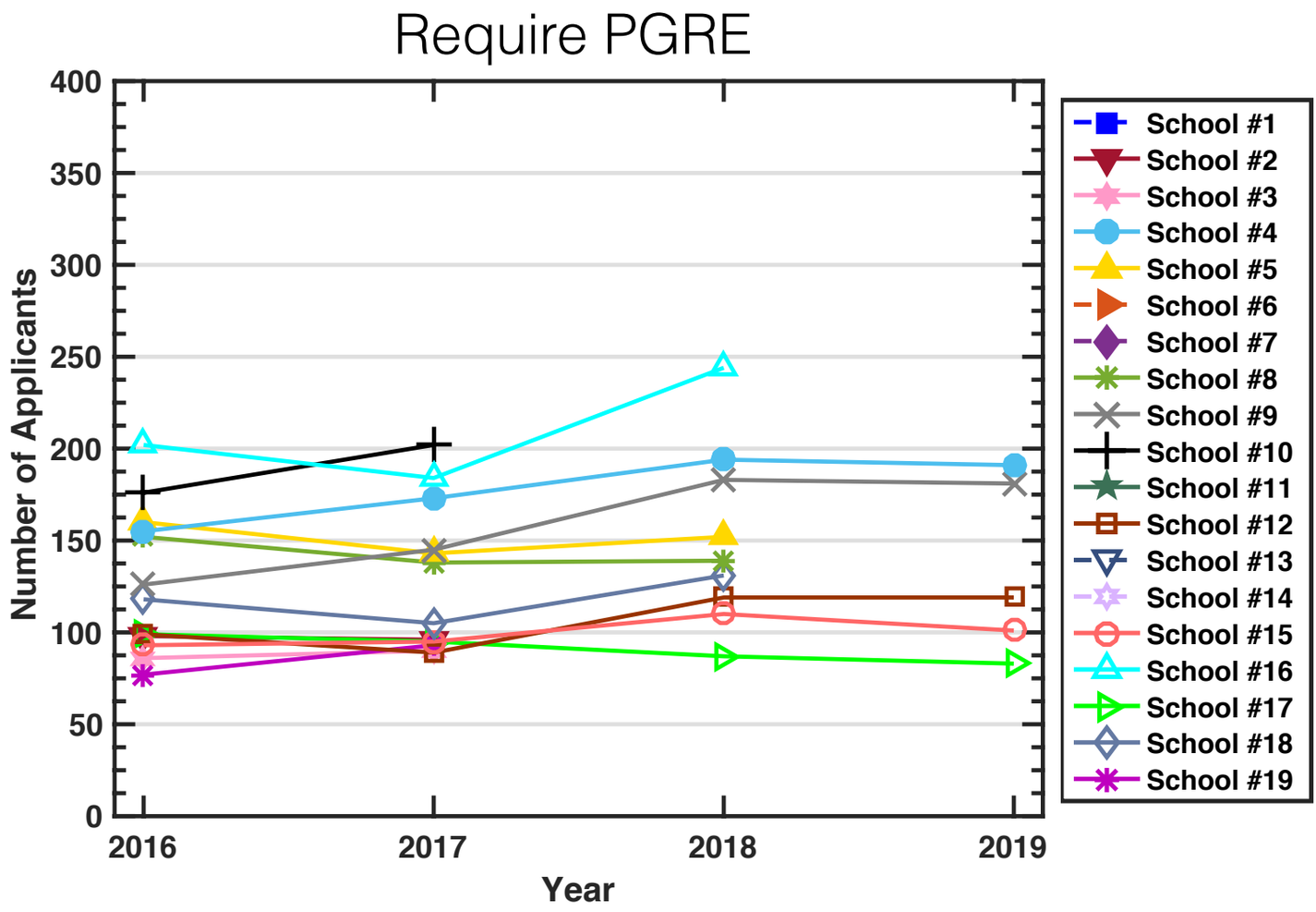
Total Number of Applicants



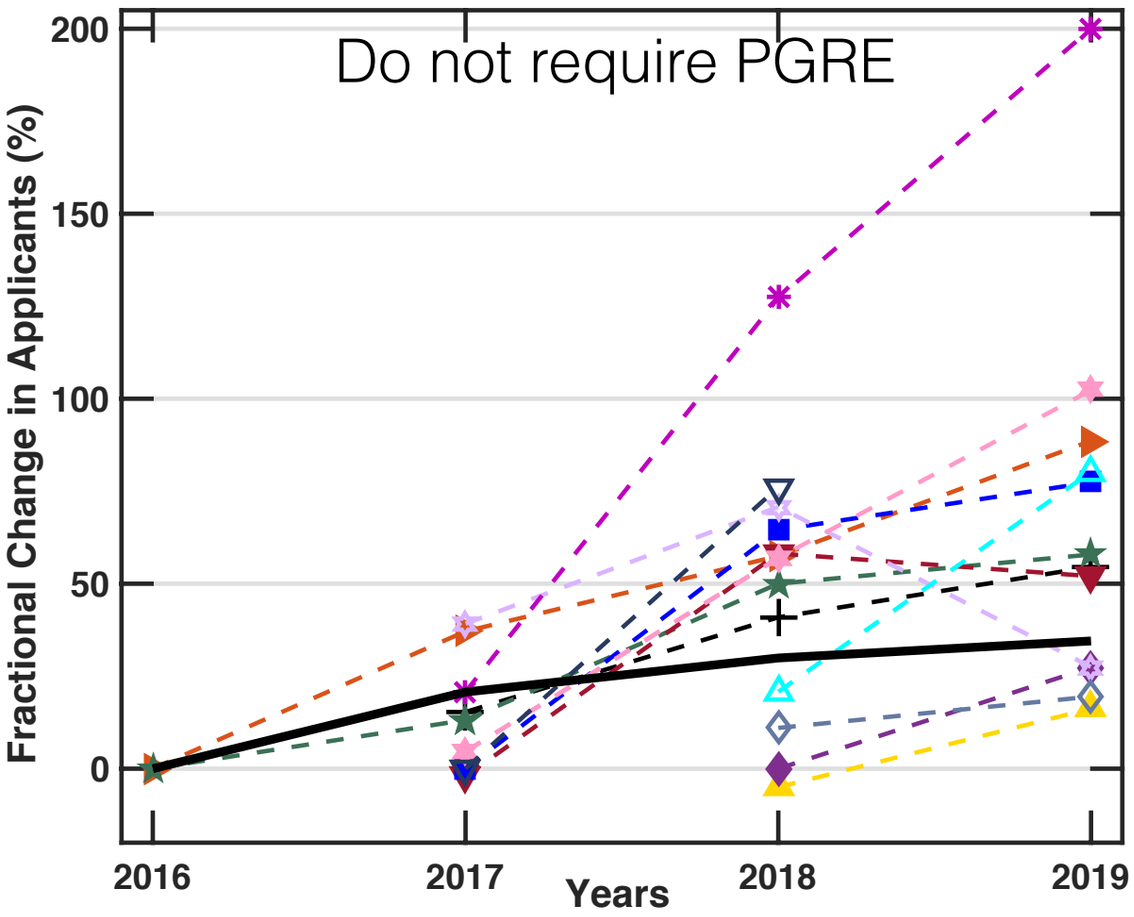
Max in 2019 = 364 applicants

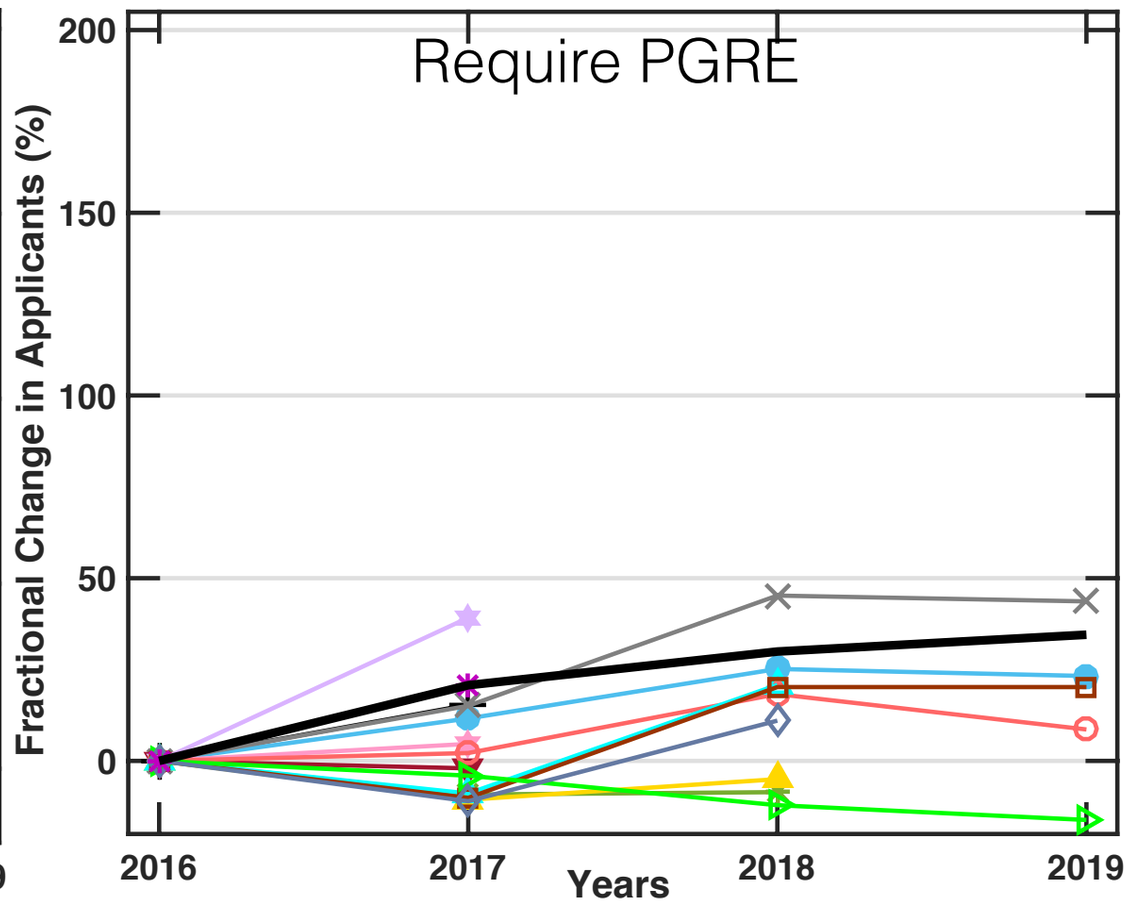
Total Number of Applicants

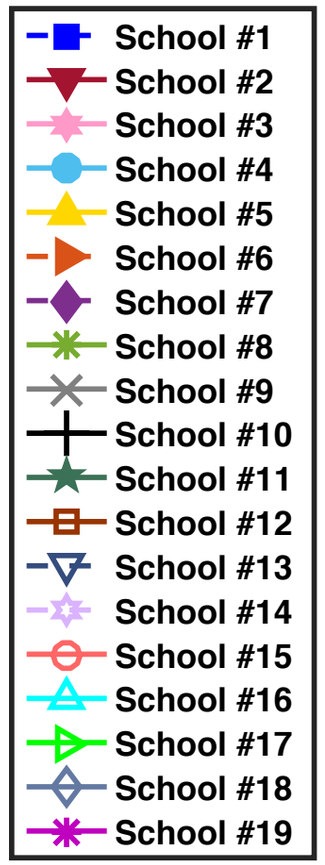




Fractional Change in Applicants







Thick black line: fractional increase astronomy bachelors attainment since 2016 (35%) from AIP Statistical Research Center

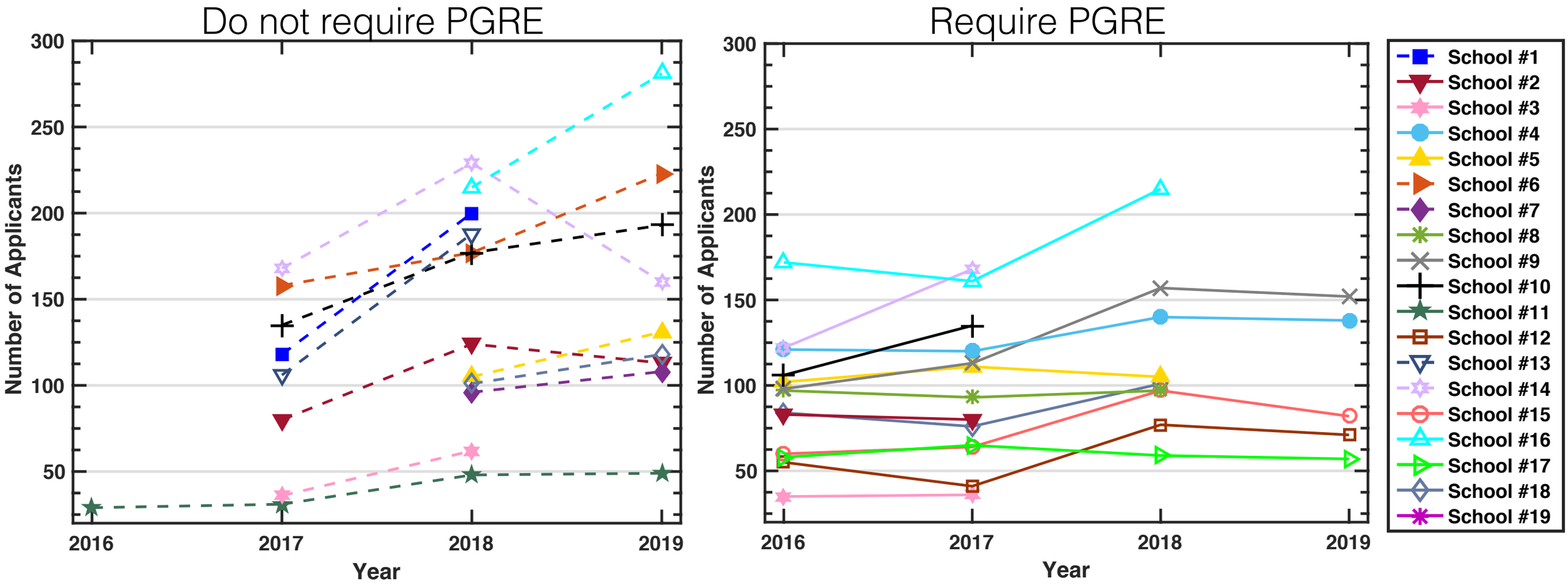
<u>Median (and Range) Changes</u>:

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



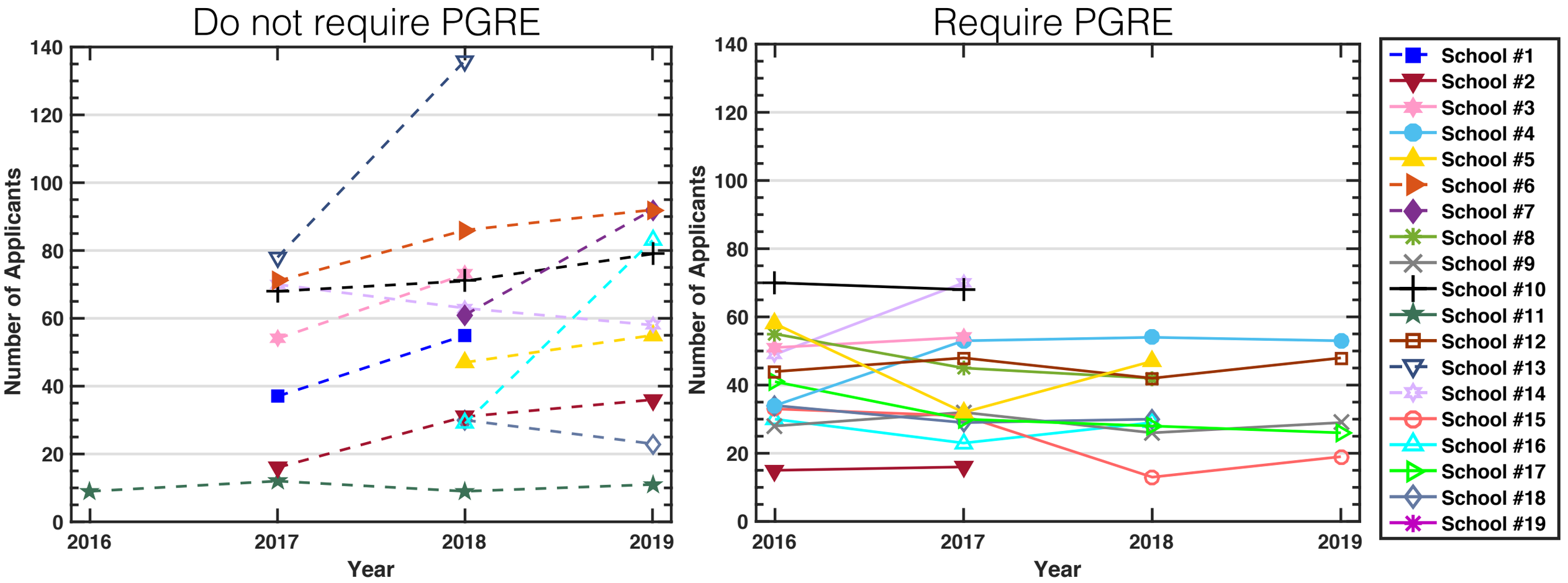
Median (and Range) Changes:

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%)

International Applicants



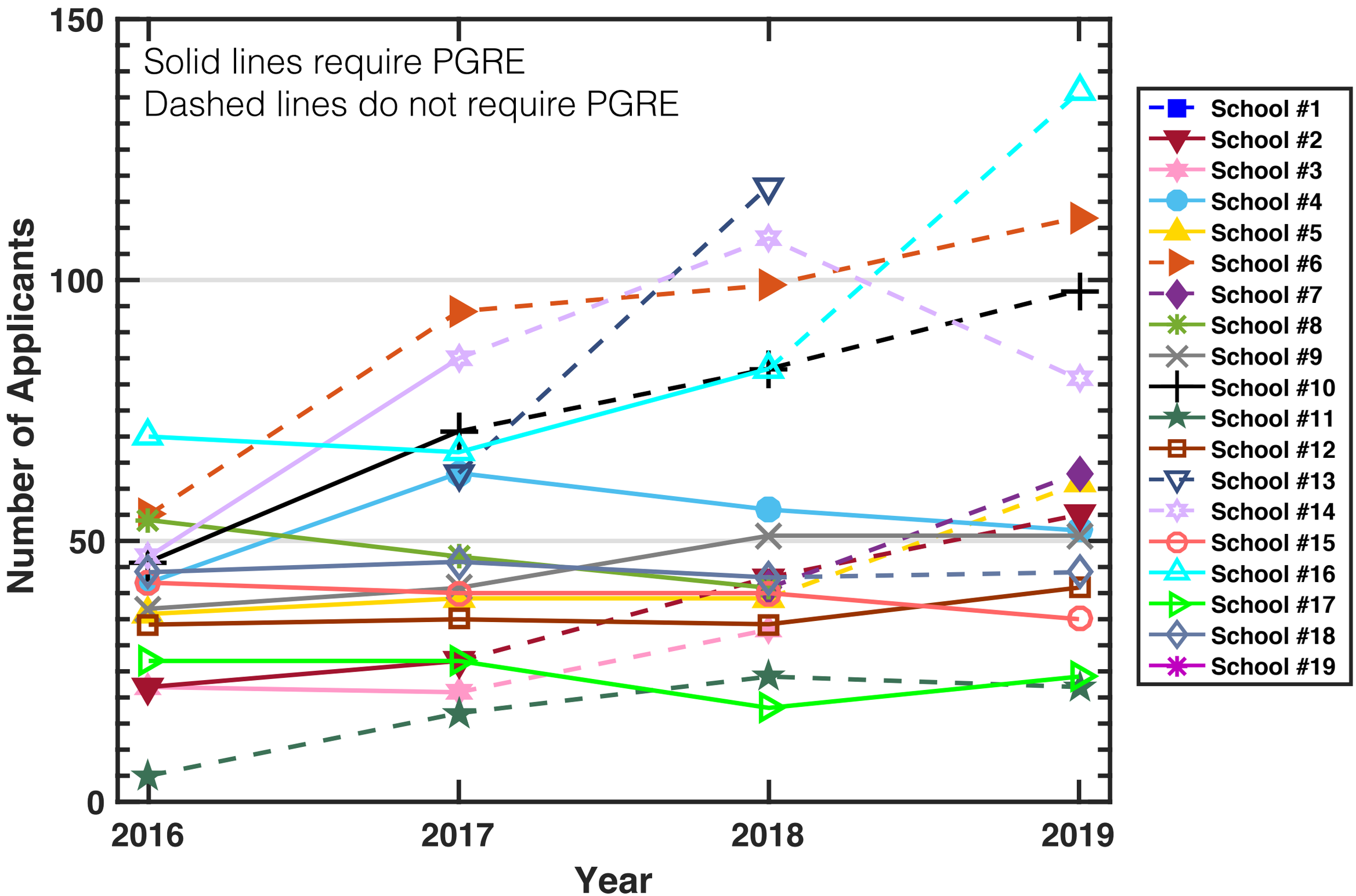
Median (and Range) Changes:

Year PGRE was removed: +43% (-23 to 186%)

Over 4 years (PGRE removed): +29% (-32 to +177%)

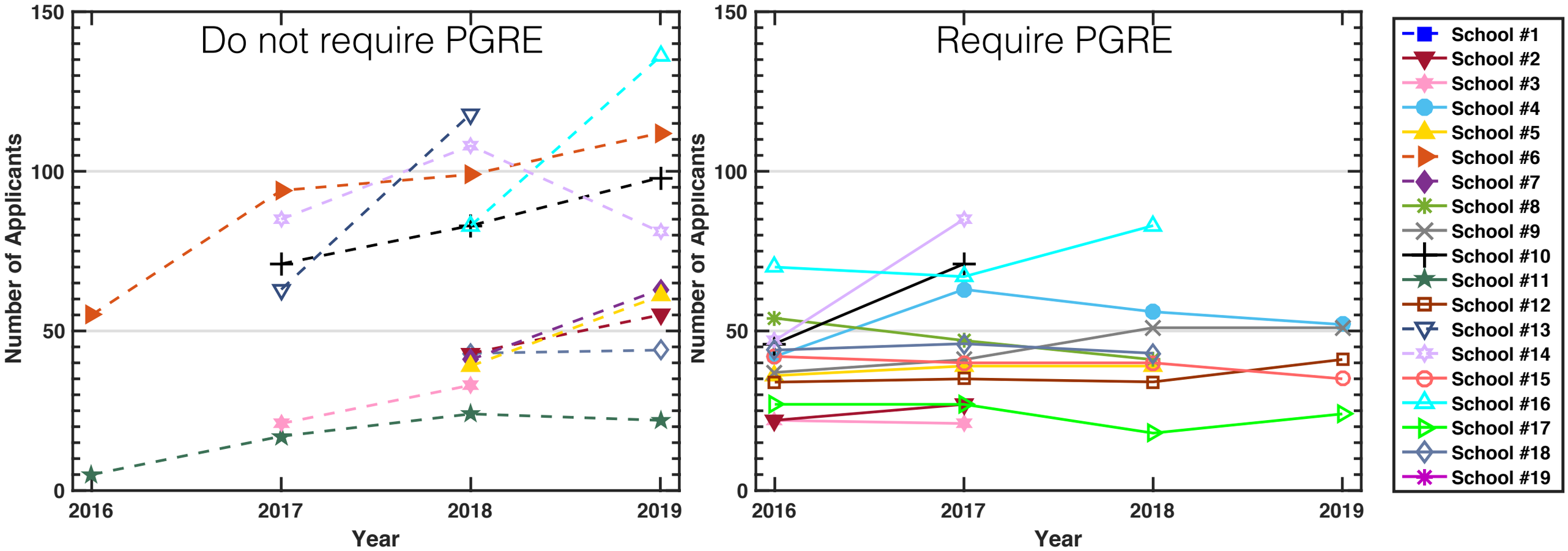
Over 4 years (PGRE required): -10% (-42 to +56%)

Women Applicants

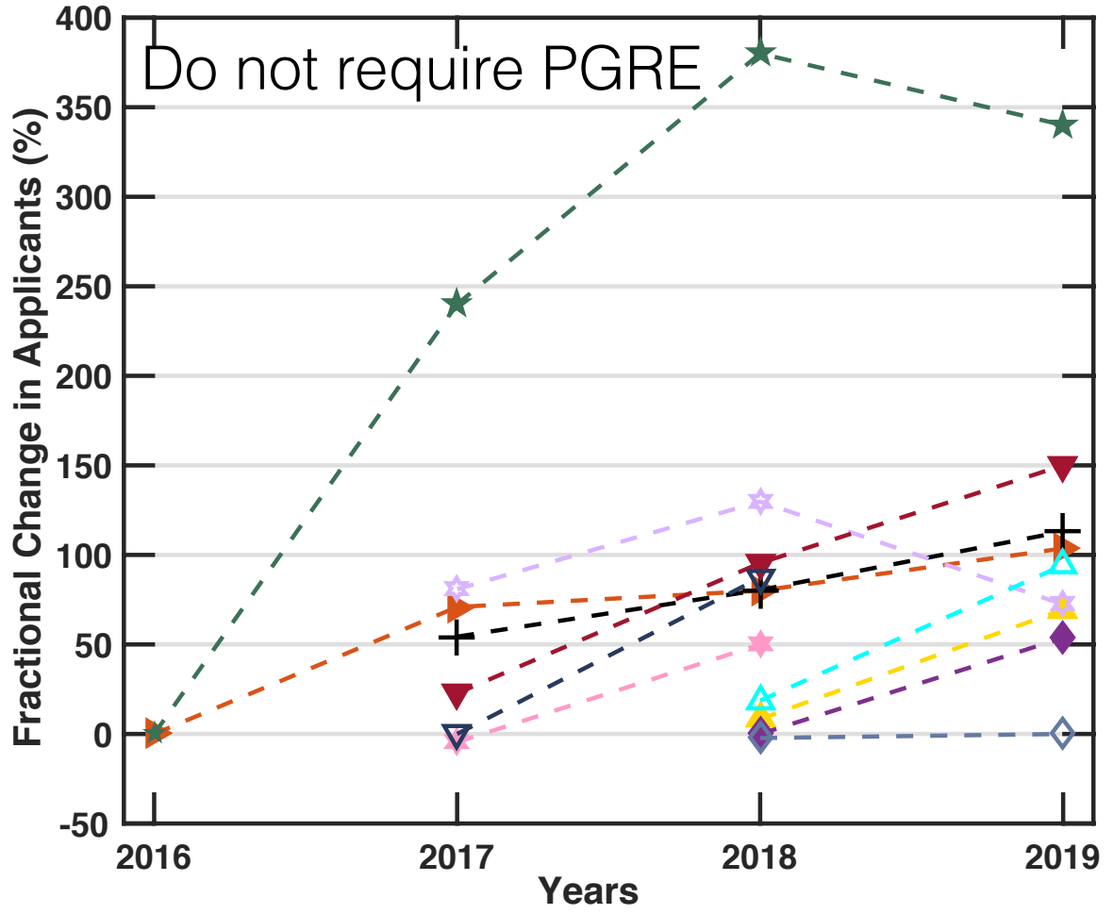


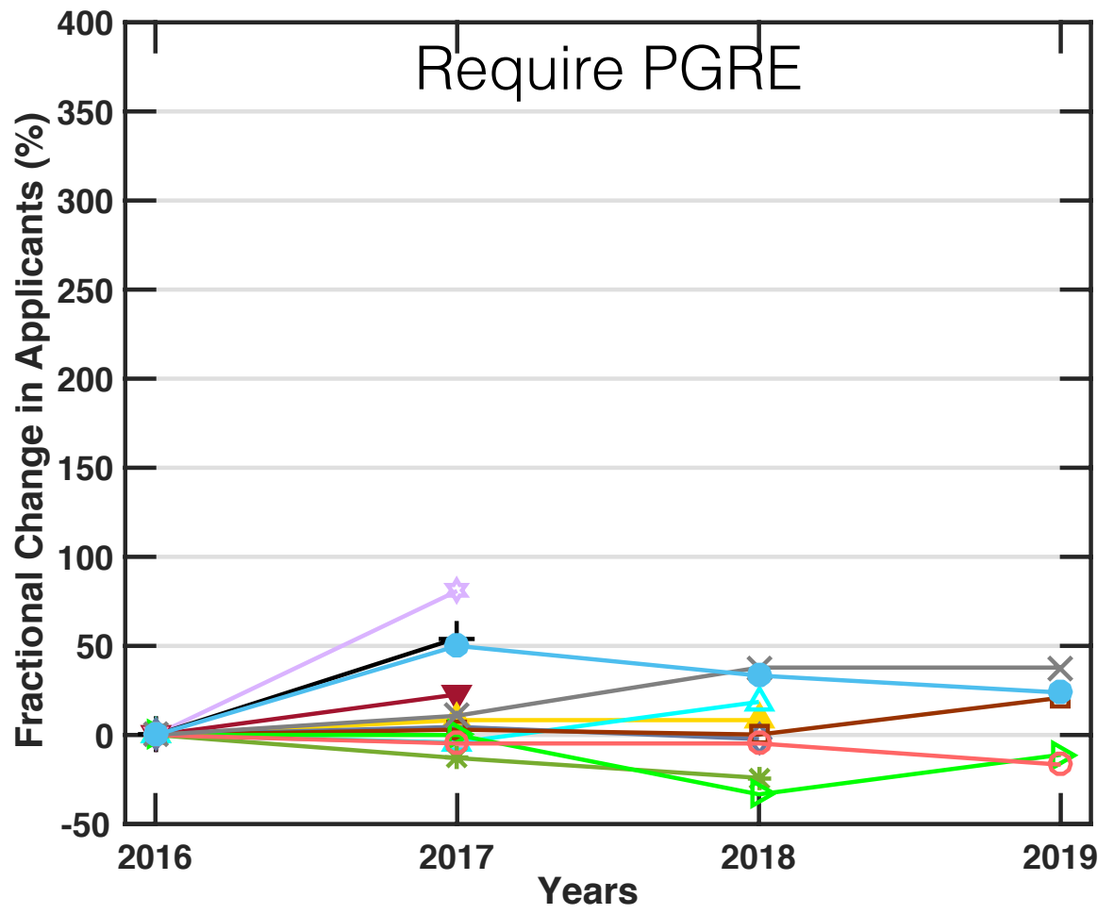
Max in 2019 = 136 applicants

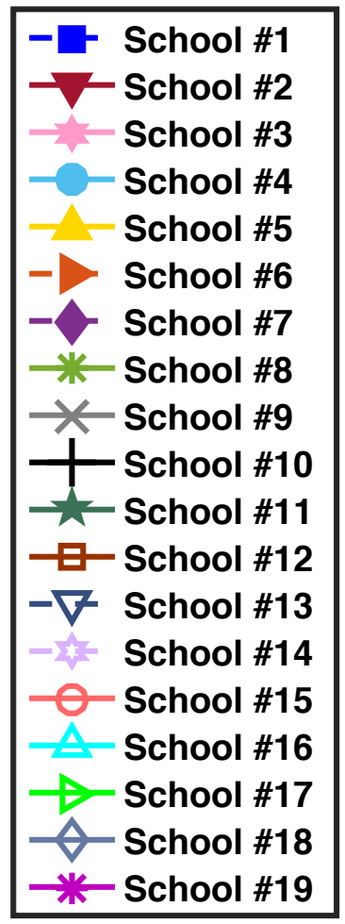
Women Applicants



Fractional Change in Women Applicants







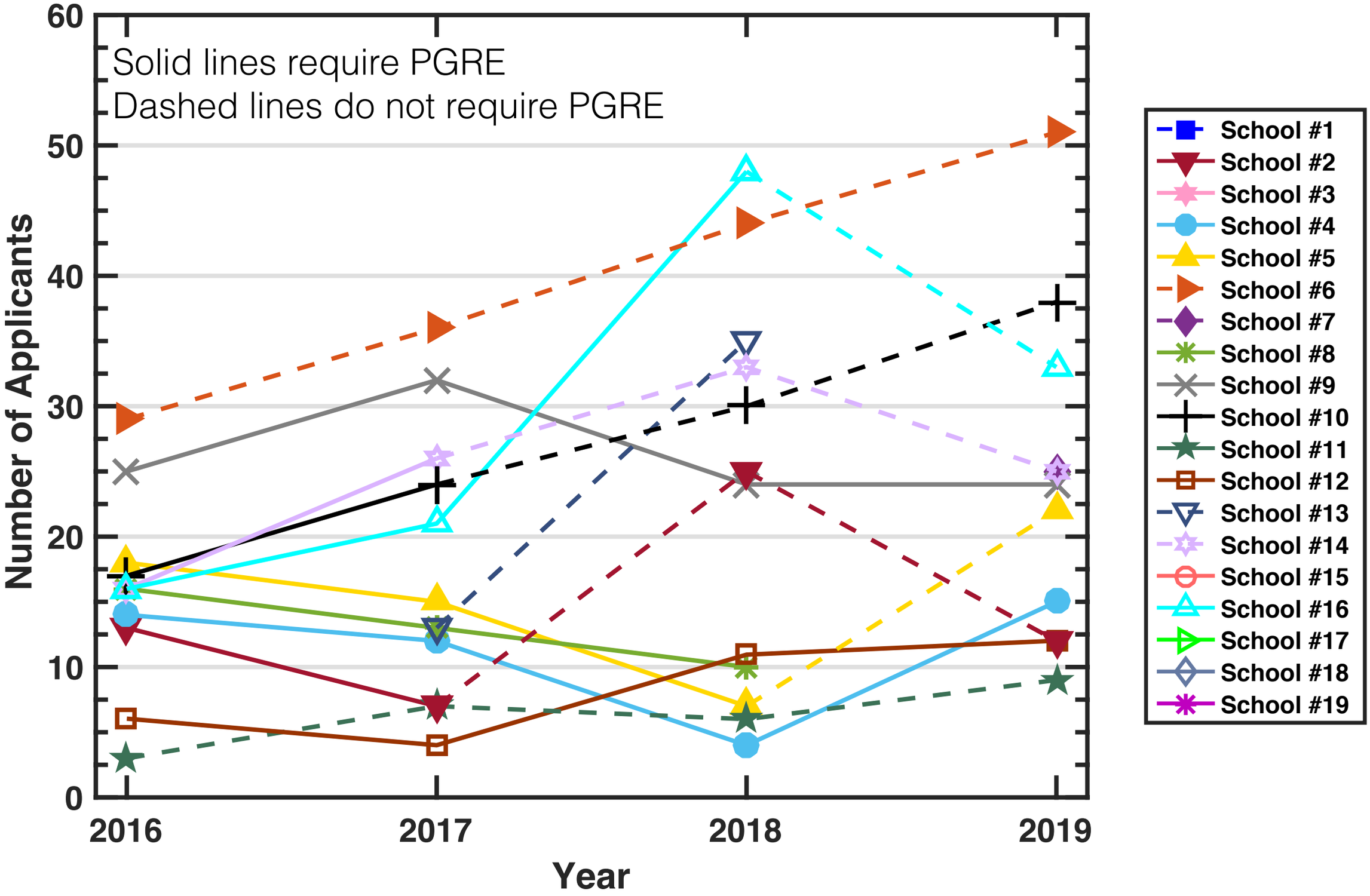
<u>Median (and Range) Changes</u>:

Year PGRE was removed: +57% (+2 to 87%)

Over 4 years (PGRE removed): +94% (+0 to 340%)

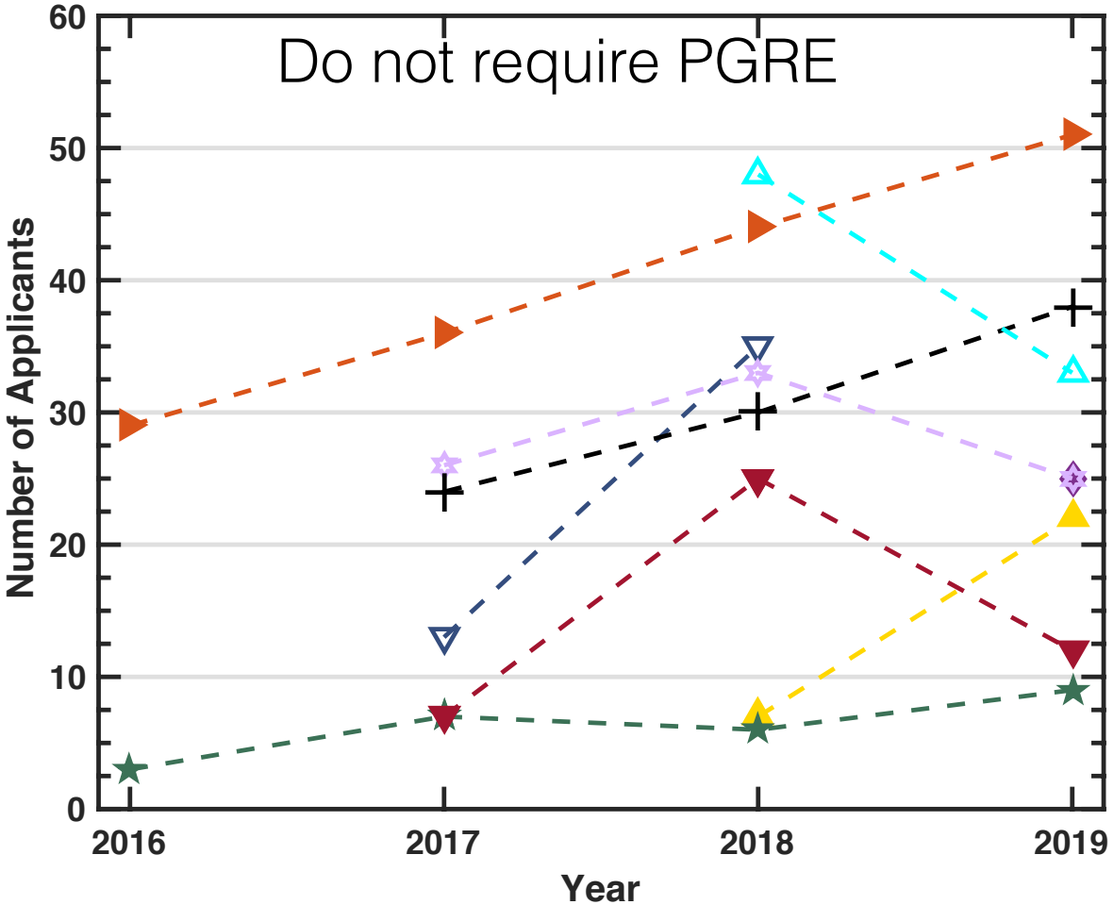
Over 4 years (PGRE required): +5% (-24 to +38%)

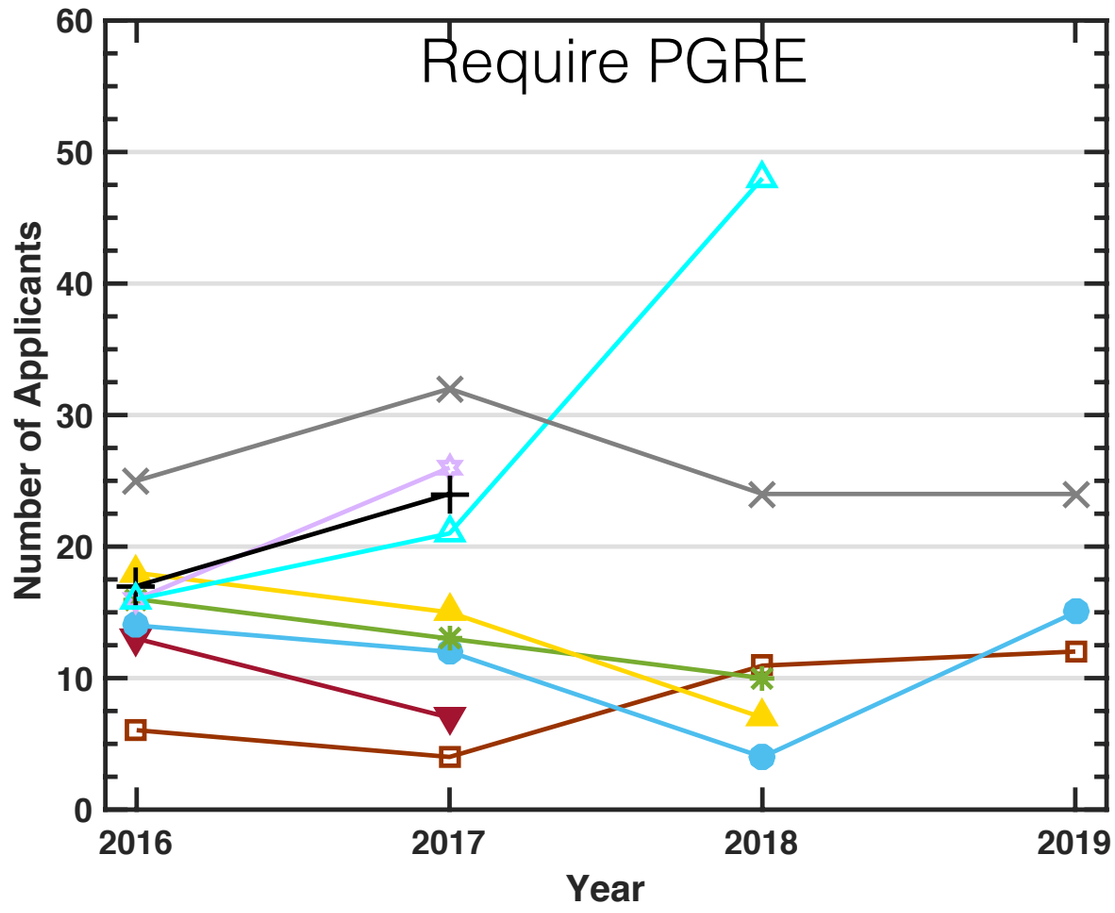
Under-represented Minority Applicants

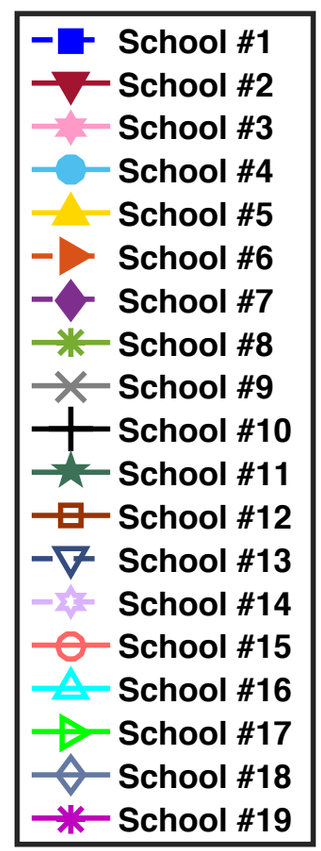


Max in 2019 = 51 applicants

Under-represented Minority Applicants







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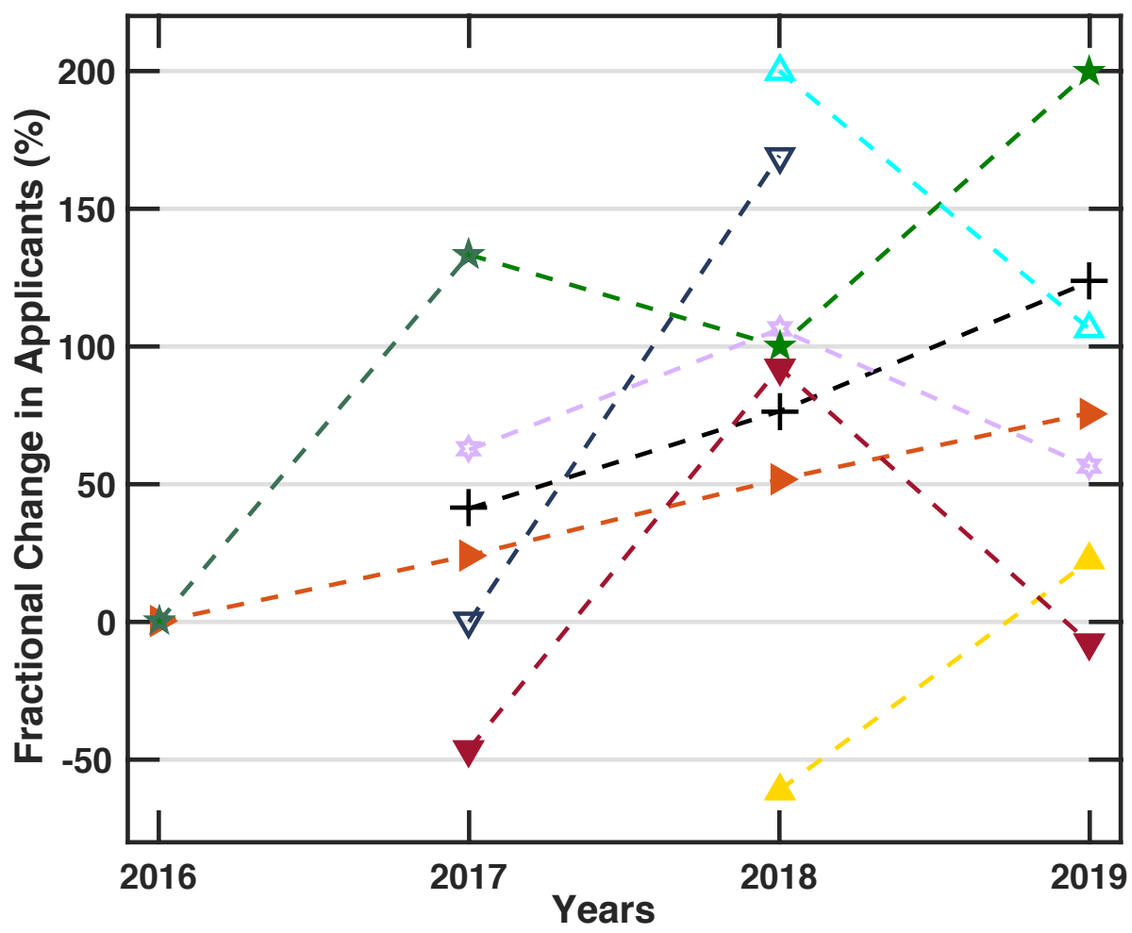

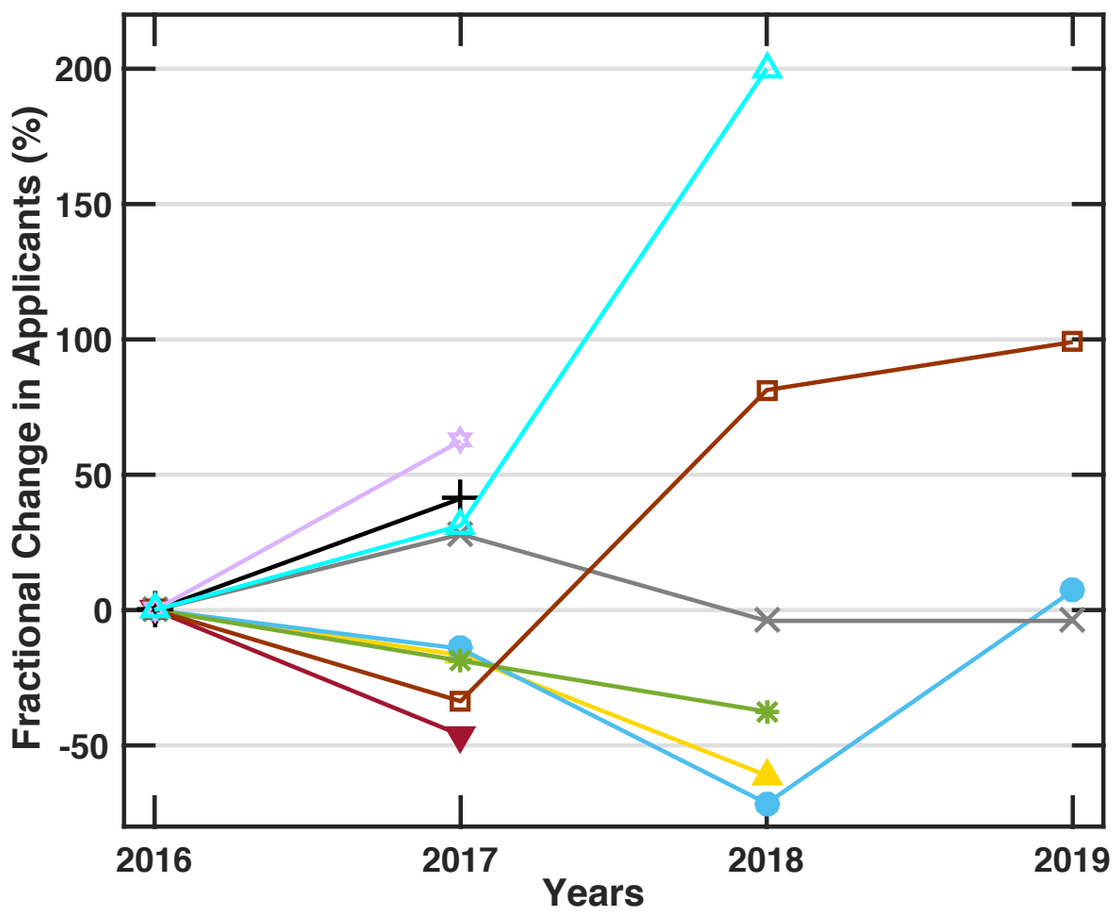

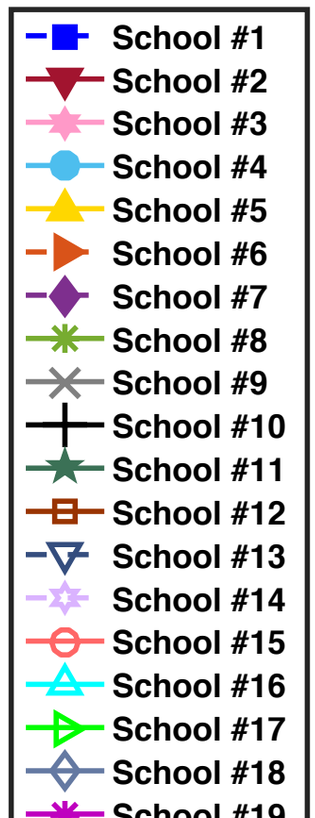

Median (and Range) Changes:

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

Results: Median Fractional Change in Applicant Pool

	Total	Domestic	Int'l	Women	URMs
PGRE Not Required*	+44%	+31%	+43%	+67%	+63%
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*Change from admissions cycle when PGRE requirement removed, N = 13 depts
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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