

FREQUENTLY ASKED QUESTIONS ABOUT DOCTORAL EDUCATION



Inclusive Graduate Education Network

IGEN is committed to achieving an audacious goal of increasing the number of UREM (underrepresented racial/ethnic minority) students to erase the gap in attainment rates by such students between bachelor's and doctoral degrees. Through systemic reforms of bridge programs and the IGEN Design & Development Launch Pilot, physics PhD programs are already on track to achieve this goal.

Using a collective impact approach, disciplinary societies & scholars are working together to realize similar results. Closing the participation gap can be achieved in a relatively short period of time by replicating the innovative recruiting strategy used in physics and strengthening the movement for institutional change in STEM. Sustaining this outcome will require a shift in paradigms that underlie graduate admissions, retention, and completion practices. This project champions such efforts. The IGEN Research Hub has produced this document, drawing from published research and demonstrated community successes.

WHAT PRACTICES INFLUENCE Ph.D. COMPLETION?



Peer Mentoring ¹



Intergration & Sense of Belonging ²



Supportive Faculty Mentors ³



Progress Monitoring ¹



Fit / Match of Student & Program ²



Critical Mass of Students Who Share Similar Backgrounds ³

WHAT ARE THE BENEFITS OF DIVERSITY FOR SCIENTIFIC TEAMS?

- Research cited more from increased quality and/or larger network of people noticing the work ⁷
- Better at problem-solving; more innovative ^{8,9}
- Better ideas and performance ¹⁰
- Increased team collaboration ¹¹
- Diversity helps teams recruit and retain diversity in the future ¹²
- Group members are more prepared, anticipate alternative viewpoints, and are prepared to engage in consensus building processes ⁹

WHAT ADMISSIONS PRACTICES DOES IGEN RECOMMEND? ^{14, 6, 8}

- Align admissions criteria with the mission and goals of your program. Make diversity & inclusion explicit.
- Holistic review of applications: Review should be *comprehensive* (considering many applicant qualities, including non-cognitive/socio-emotional skills & contributions to diversity); *contextualized* (taking into account students' opportunities & barriers, known sources of error & the predictive validity of metrics); and *systematic* (base review on shared, predefined criteria).
- Evaluation rubrics promote more efficient, consistent, and equitable review.
- Admissions committees should be carefully selected & trained, should be diverse, should not turn over annually, & should have opportunities to review files together with a rubric before setting out on their own.

WHAT GOES INTO THE NATIONAL RESEARCH COUNCIL (NRC) RANKINGS?¹³

- Publications per allocated faculty
- Cites per faculty publication
- Percent of faculty with grants
- Percent faculty interdisciplinary
- Percent non-Asian minority faculty
- Percent female faculty
- Awards per allocated faculty
- Average GRE-Q
- Percent 1st year students with full support
- Percent 1st year students with portable fellowships
- Percent non-Asian minority students
- Percent female students
- Percent international students
- Average PhDs 2002-2006
- Percent completing within 6 years
- Time to degree full and part time
- Percent students in academic positions
- Student work space
- Health insurance
- Number of student activities offered

WHAT TYPES OF CHANGES ARE OBSERVED IN PHD PROGRAMS THAT IMPLEMENTED THE APS BRIDGE PROGRAMS?¹

- Students have increased *financial support*, including access to funds for moving and other expenses related to starting a graduate program.
- Programs design and implement *induction efforts* to ease students' transitions, including diagnostic exams to gauge preparation, scheduling graduate and undergraduate sections of the course at the same time (when possible) so students can move up or down a level if necessary, allowing students to begin by rooming with more senior graduate students, creating and supporting physics graduate student associations for personal and professional networking
- Programs facilitate *mentoring relationships*, including adopting a multiple-mentor model, involving staff members, advisers, and instructors. It is important that the team meets regularly to gauge students' success in and out of class
- Completing *progress monitoring*, to check on all students regularly, especially in the first year, provides opportunities to fix problems early and address red flags
- In 2017, 46 students were placed in graduate programs, which will more than erase the gap between bachelor's and doctoral attainment in physics for UREM students once this cohort graduates
- Students have been retained (88%) in PhD programs at rates above the national average in physics (59%)

WHAT FACTORS AFFECT JOB PLACEMENT UPON GRADUATION?

- Most PhD graduates do not follow academic career paths⁴
- Alignment (or lack thereof) between faculty life and personal goals²
- Faculty at elite programs are likely to be graduates of elite programs⁶
- Subject knowledge, understanding, and skills⁵
- Relevant experience⁵
- Career management skills (knowledge about navigating the job application process)⁵
- Non-cognitive skills: Teamwork, self-awareness, , communication, attention to detail¹⁵

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