

# Increasing Diversity in the Department of Geosciences

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A cursory look around the Department of Geosciences at Princeton University reveals that we can do better in terms of racial, ethnic, and gender diversity. Moreover, whatever the reality, we suffer from a self-perpetuating widely perceived lack of diversity. While we are hardly unique in this position among science departments at Princeton or in the nation, ours is a situation that we feel can, and should be improved.

At the core of our desire to remedy what we perceive to be a real problem for the long-term health of our Department, our University, and indeed, our profession, is the realization that representation and advancement in academic science positions are affected by a multitude of externalities unrelated to intrinsic ability, interest, or innate skills. To paraphrase from a statement published by the National Science Foundation, “*such factors include [1] stereotype threat, [2] societal impacts, [3] implicit and explicit bias, [4] organizational constraints of academic institutions; [5] differential effect of work and family demands, [6] lack of role models in academic leadership and decision-making positions*”. Loosely grouped, [1]–[3] might be the predominant root causes for the lack of *racial*, and [3]–[5] for the absence of much *gender* diversity, while [6] is a result that provides a nefarious feedback affecting both groups.

Broadening participation from *racial* minorities (hereafter: “minorities”) in the Geosciences will require creative and sustained efforts to achieve even modest growth; those will be necessarily different from the efforts to recruit, advance, and retain *women* throughout the academic career.

This brief report on our position does not purport to be an academic study. Much has been written and even more has been said about diversity in the sciences and at Princeton in particular, and a number of initiatives and Best Practices at the University level are in place to make progress on many fronts. Here, we identify a number of additional concrete steps that can be taken, by us, to make the Department of Geosciences at Princeton a place that *is* and *will become* more diverse: by instituting changes and calling for a number of new initiatives that can be accomplished in the short term, in the belief that such efforts will have cascading long-term impacts.

We arrived at the areas of focus highlighted in this document after ample consultation with the entire Faculty, and their rank order reflects a round of voting to identify our priorities for concerted action.

Finding out what the proposed initiatives might cost is easy; determining who will pay for them is another matter altogether. By not shying away from those numbers we hope to have a firm basis for discussion between the University and the Department to be able to make real and lasting progress.

## Committee on Diversity

To avoid that this modest proposal becomes dead letter, we are calling on ourselves, the (new) *Geosciences Faculty Committee on Diversity*, to keep the issues alive by meeting periodically to steer and review progress. Two members of the *Princeton Women in GeoSciences* (PWIGS) group, one post-doc and one post-graduate student, will join as members of the Committee, which is otherwise composed of the authors of this report until further notice. The Committee calls upon the *Undergraduate* and *Graduate Work Committees* for aid in addressing issues specific to their respective constituencies.

## Initiatives endorsed by the Geosciences Faculty

Proposed new initiatives that received the broadest support from the Faculty at the 9 April 2014 voting session were the establishment of [1] a **Graduate Bridge-Year Program**, enrolling up to two minority students per year, and of [2] a **Travel Support Fund** for faculty giving lectures and graduate-studies pitches at Historically Black Colleges and Universities (HBCU). Securing funding for paid [3] Academic-Year and Summer **Lab Assistantships** targeted for diversity (while encouraging our faculty to apply for supplemental awards through NSF's "Advancing Recruitment and Retention in Geosciences" and "Research Experiences for Undergraduates" programs) was favorably regarded. The earmarking of funds to have, at all times, one [4] **Honorific Post-Doctoral Appointment** filled by a woman or minority was seen by many to be an effective means of recruiting faculty from a diverse demographic (or sending them onto faculty positions elsewhere). The Committee called for the establishment of [5] a **Standing Search Committee** with the remit to identify one Target-of-Opportunity faculty candidate per year.

*Initiatives [1] through [5] were ranked by the Diversity Committee in that order after broad Faculty input. The Diversity Committee is of the opinion that by going forward immediately on these five fronts, the Department will gain most momentum with the support of most of its Faculty members, thereby presenting its most unified approach to broadening participation.*

*Items [6] and [7] below were favorably received but require strong leadership from individual Faculty members (who self-identified), and, moreover, were deemed appropriate to garner organizational and financial support through existing mechanisms at the Department and University levels.*

*Items [8] through [10] below are, with some proposed twists, existing University initiatives of which the Department of Geosciences wants to partake.*

The organization of, and participation of a [6] **Summer School**, received mixed buy-in, although with leadership from the committed and provided some extra incentives (e.g., via the establishment of a summer salary pool), a weeklong summer event appeared doable. In fact, one such proposal was submitted to the Graduate School on March 21st, 2014. With the target being (prospective) graduate students, further coordination with the Graduate Work Committee was recommended. Similarly, the creation of a [7] **Freshman Seminar** built around the theme *Habitable Earth*, involving one or more South African universities that have had success educating the underrepresented, was discussed as an effective recruitment tool for undergraduate students. Here too, channels for teaching innovation exist to be followed, and coordination with the Undergraduate Work Committee was recommended.

The Diversity Committee recommends that *all faculty members and post-docs* complete a [8] **Workshop on Unconscious Bias** offered by the University. Unconscious bias affects our perception of women as well as minorities, and we should make sure that both receive equal billing in these workshops. Since it is believed that unconscious bias *grows* with time, avenues to give our *graduate students* some similar level of "diversity training" should be explored. As we are unaware of any such activities currently targeted at the graduate student population, organizing such a training may be a role to play for the *Princeton Women in GeoSciences* (PWIGS). It is clear that the coordination of activities to increase diversity requires *some* sort of sustained follow-up, and that the Diversity Committee needs some "boots on the ground" to be able to do so effectively. One possibility is to go through the Graduate School program of Diversity Fellows, who are graduate students whose role is to encourage prospective students to apply to Princeton. We recommend that our Department have two such [9] **Diversity Fellows** at all times, and here too, the *Princeton Women in GeoSciences* (PWIGS) may play a crucial supporting role. We discussed at length what it would take to appoint a [10] **Diversity Officer**. Such a person could be crucial to link and coordinate the various initiatives enumerated in this document. Ideally it should be a *scientist* who has the ear of the graduate population and the confidence of the faculty, with a departmental longevity of a low number of years. Such a new appointment could be fractional, or shared with other science departments or programs. While some of us could envisage our own post-docs assuming such a role, at least for a small portion of their time, many were skeptical that such a person could be found.

## Background, motivation, and broader discussion

Some of our initiatives might require rerouting of Departmental Funds; others could necessitate new financial involvement from the Office of the Provost. Some of our proposed programs might be attractive to outside funders such as the Mellon Foundation's "*Diversity Initiatives*", which the Diversity Fellows, Officer or Committee should pursue. At any rate, our thought processes continues to require careful reflection. The initiatives that we discussed break down in two ways. The challenges to achieve diversity in terms of (A) *racial and ethnic minorities* on the one hand, and (B) *gender diversity* on the other hand, are simply too different to lump them all together under the same header. At the same time, the initiatives proposed can be considered under the separate categories of (I) *undergraduate and graduate student initiatives*, and (II) *faculty initiatives*. The threads of either subdivision ran through all of our discussion.

## Minorities

### Undergraduate Minorities

Many of us are involved in **outreach activities** as part of NSF or NASA sponsored research, but such efforts rarely specifically target minority students or involve travel to the places where we would be maximally effective (e.g. inner-city schools). Yet there are a number of Science Camps that take place on Princeton's campus over the summer, and a number of those seemingly cater to minority students. Geosciences should seek contact with these initiatives, and interface with them to organize, e.g. a yearly **Geosciences Summer Event** to capture the attention of this demographic. We should think of a simple system whereby faculty, post-docs, and graduate students would be *rewarded* for reaching out in this way, designing the award appropriately to motivate them to make the extra effort. Graduate students and post-docs could be motivated using Departmental funds; for the faculty a summer salary pool might be established and allotted on a "competitive" basis via the Diversity Officer and Committee.

None of us are involved in the **undergraduate admission process**, but undergraduate participation for our classes might be stimulated via a **summer mailing** to all admitted students, highlighting the opportunities for study and work in the Department. We should pursue earmarking funds to employ minority undergraduates in our labs during the academic years. We currently have many such undergraduate workers, but no positions are specifically funded to enhance minority participation (majors or non-majors). Supplemental funds for such year-round or summer **paid internships** filled by underrepresented racial minorities would be needed, and once again, these could be disbursed via the Diversity Officer and Committee.

All of us are involved in **undergraduate teaching**, but we pay no attention to designing classes that might be of particular interest to the minority population who are enrolled at Princeton, but not taking Geosciences classes or majoring in our Department. One concrete proposal came from George Philander, whose **Freshman Seminar** would be themed around *The Habitable Earth* and would involve a semester-long educational experience (including a week-long break trip) *with* a minority-dominated institution in South Africa (partly via two-way online course participation). Such an initiative would fit well within the existing *Princeton in Africa* activities, but radically depart from the easy model under which such classes and exchanges are currently mostly *de facto* vehicles to further the educational experience and careers of a few select *white* students and academics. Our committee endorsed the creation of such a new Freshman Seminar, and asks for sustained support for it beyond the typical two-or three-year runs of the Freshman Seminars.

### Graduate Minorities

Undergraduate institutions feed our graduate program, but many of the Historically Black or otherwise minority-dominated colleges do not have research-heavy Geosciences departments, and as a result, rarely do students at those institutions get exposed to the opportunities and possibilities of a Princeton Graduate education. All of us travel the nation giving talks at our peer institutions. We should establish connections with those colleges that

would not normally invite us as speakers, and make **lecture-travel funds** available to be able to give research talks *and* make a pitch for graduate studies in the Geosciences at Princeton. Some of these mechanisms already exist: we should take advantage of them, advertise our involvement more widely, coordinate with our Diversity Officer, and finally, once again, work out an incentive system under which we each could be reasonably expected to participate, e.g., in one such activity per year.

When it comes to ranking candidates for admission to our graduate program, yearly there are instances where intellectually capable minority candidates from middling institutions remain underqualified when compared to their peers who apply from more elite colleges. Similarly, every year we have the experience where some of our Lab Managers are admitted to graduate programs elsewhere. Last year, one of us appointed a first-generation college student (and 2013 Princeton graduate) as a Research Specialist. This year, said student was admitted to seven (and counting) top graduate programs in Planetary Science. While working on a research project, the Research Specialist also enrolled in two courses (as an Auditor). Clearly the experience of doing supervised research (and taking some classes) at Princeton, for one or two years, serves a role in preparing such individuals for the rigors and pleasures (not to mention, the delayed gratification) of Graduate School.

We propose institutionalizing a Master's *level* (for course credit though not as a *degree*) **Bridge-Year Program** for minorities. The students would be supervised in research by an individual faculty member and would enroll (for credit) in 2–4 undergraduate or even graduate classes. The students would be advised by a mentoring committee composed of at least one member of the Diversity Committee and the Diversity Officer who would also help them with graduate applications. One outcome for the Bridge-Year Program students could be that *we* would admit them for graduate studies. Another, equally successful outcome would be that such students would qualify for graduate studies elsewhere. We advise against granting an actual Master's *degree* since the emphasis would be on acquiring, cementing and solidifying knowledge in preparation for graduate studies. The program should *not* become a vehicle to add the Princeton credentials, in the form of a degree, to the resumes of those seeking lucrative positions in the private sector. Candidates for the Bridge-Year Program could come from within our graduate applicant pool, although we could also advertise the opportunity directly, and review applications at the same time as the graduate applications. The Bridge-Year Program should be tuition free; a stipend at the level of Research Specialist should be paid. The costs could be split between the hiring Faculty member, the Department, and the University.

Having more than one Bridge-Year student per year is important to generate a cohort-mentality among them, and ultimately, having more than one minority graduate student entering our program per year will build the feeling of belonging and inclusiveness even more. Ultimately, we will need to provide **mentoring** to those students for whom graduate studies might remain a stretch or a challenge, and here too, we would need new diversity-oriented activity within our Department to be able to do this effectively. We are thinking about the possible tie-ins with undergraduate instruction, the summer and internships programs, and so on. Every student “graduating” from the Bridge-Year Program would have an exit interview with the Diversity Committee, and the findings of the Committee (what did the student achieve?) would be kept on file for later study.

## Gender

The Department's record in educating female undergraduates does not suggest that additional steps need to be taken to serve this constituency with any greater specificity than is currently the case. On the other hand, we should look into whether a greater fraction of our male undergraduate majors continue on (ultimately) to graduate school compared to our female graduates. Armed with these numbers the Department should investigate whether such an outcome might be the effect of mentoring differences for our male and female undergraduates, and follow the situation over multiple years — years during which, it is hoped, diversity at the Faculty level should be increasing.

## Graduate and Post-Doctoral Women

The department does not seem to suffer from a lack of female applicants for graduate studies, nor do we appear to have any noticeable differences enrolling them. Where males and females differ, is in completion rates (to the Ph. D.), and in the reasons behind their decisions to complete (and when), whether voluntary or not.

At least one of those reasons for not completing the Ph. D. lies in family life. Having children while in graduate school is a rare reality, and the university needs to have a firm and favorable policy in place for those who wish to start a **family** to be able to do so while continuing to work towards completing their Ph. D., especially when it comes to retaining **access to housing and the health plan**, or securing subsidized **day-care spots and back-up care**. These policies should be discussed *consultatively* with the graduate student and post-doctoral representatives from *every* department, and our own Department should lead the way in providing input on how to make life for graduate students (and post-docs) with families more — normal.

Another reason identified by the *Princeton Women in GeoSciences* (PWIGS) group is the **mentoring styles** of the faculty. While completion of the Unconscious Bias Workshops and an overall increased diversity might, over time, erase (or at least, change for the better) the opposite-gender advising style differences (compared to the same-gender ones) somewhat, there is a role for the Diversity Officer, backed up by the Committee, to hold at least **two individual mentoring meetings per year** with our female graduate students and post-docs. Often the simple question “how are *you* doing” is enough to unearth serious and trivial problems alike which, when appropriately further discussed with a view toward solving them, can have a great impact in stanching the leaky pipeline.

The need for family-friendly policies and increased, scheduled, mentoring oversight is necessary to promote graduate-student and post-doctoral gender diversity alike. And of course, family policies are not only a matter of concern for the female of the species. Once again the Department should work with the male graduate students and post-docs towards advising the development of a fair and equitable policy of parental paid leave, with the same provision for access to health insurance, housing, and back-up care.

## Post-Doctoral Women

The post-doctoral years are the most critical in a woman’s academic career. They could be a launching pad for a faculty job, but they often are women’s last academic experience before dropping out of academic science altogether. Post-doctoral appointments are often too short, too inflexible and too subject to direction from a faculty adviser, especially when funded from outside sources. Furthermore, project-based (e.g. NSF or NASA sponsored) post-doctoral appointments are simply made on the basis of suitability and availability: the grant comes first, the post-doc next.

As many of our peer institutions have come to realize, **Honorific Post-Doctoral Fellowships** are the prime vehicle that feeds into academic appointments (locally or elsewhere). At one point, Princeton led the way with the Hess Fellowship. (Three of our male professors were *Hess Fellows* before being hired! Most if not all of our Hess Fellows are now in professorial-level appointments elsewhere). We simply cannot afford to let an Honorific Post-Doctoral Fellowship die as the Hess Fellowship has done (at least temporarily). Our peer institutions all have such Fellowships — and most of them *think* that we still do, too.

The Hess Fellowship should be revived, in *name* (it is widely recognized) if not in the source of its funding. The committee recommends having two fully funded (for two years *at a time*) Hess Fellows in the Department at any one time, and having **one of them targeted to a woman or underrepresented minority** — which would be tantamount to reverting to the *de facto* average situation of the last decade or so, except for the explicit new goal to use the Hess Fellowship as a vehicle to promote diversity.

## Faculty Women

With all the policies in place at the University level to make Princeton a welcoming place for women to be appointed and promoted, and for all of the support and mentoring that the Geosciences offers its Assistant

Professors on a gender-blind basis, it would seem like an anomaly that Geosciences has not done better in terms of rectifying our gross gender imbalance.

One of the problems that the committee identified is that we have, in recent years, simply not taken advantage of the existing Target-of-Opportunity program. The Department will establish a **Standing Search Committee** to identify, by the end of January of every year, one Target-of-Opportunity *faculty* candidate *per year*. The Committee will work with the existing *Departmental Lecture Series Committee* to bring in at least one such candidate per year to campus for recruitment purposes, and will widely consult with the Department (also via the Tuesday and Thursday seminar series) to keep a watch list of promising young scientists.

Hiring tenured women away from other institutions is not seen as an effective tool to promote diversity: educating undergraduates, mentoring graduate students, grooming post-docs, and making appointments, supporting, and advancing junior people to the level of tenured professor are the common goals of our efforts to promote diversity in the Department of Geosciences in a systemic manner.

## Budgetary Considerations: Unit Amounts, on a Per-Year Basis

1	Hess Post-doctoral Fellow	One year of salary and benefits	78000
2	Bridge-Year Student	One year of salary and benefits	52647
3	Summer Conference	Twenty-odd faculty and student attendees	38550
4	Brochure Hard-copy	Printing and mailing for admitted students	16000
5	Graduate Student	Summer stipend for Teaching Externship	8200
6	Post-doctoral Diversity Fellow	One month of salary and benefits	6200
7	Graduate Student Diversity Fellow	One month of tuition, stipend and benefit	5600
8	Princeton Women in GeoSciences	Support for various activities	5000
9	Summer Salary Pool	One week of salary and benefits	5000
10	Undergraduate Intern	Ten Summer weeks	4635
11	Graduate Student	Travel abroad for Teaching Externship	3300
12	Undergraduate Intern	Twenty-four Academic Year weeks at six hours	1620
13	Faculty Outreach Seminar	Special trip to HBCU	1200
14	Faculty Outreach Seminar	Add-on trip to HBCU	400

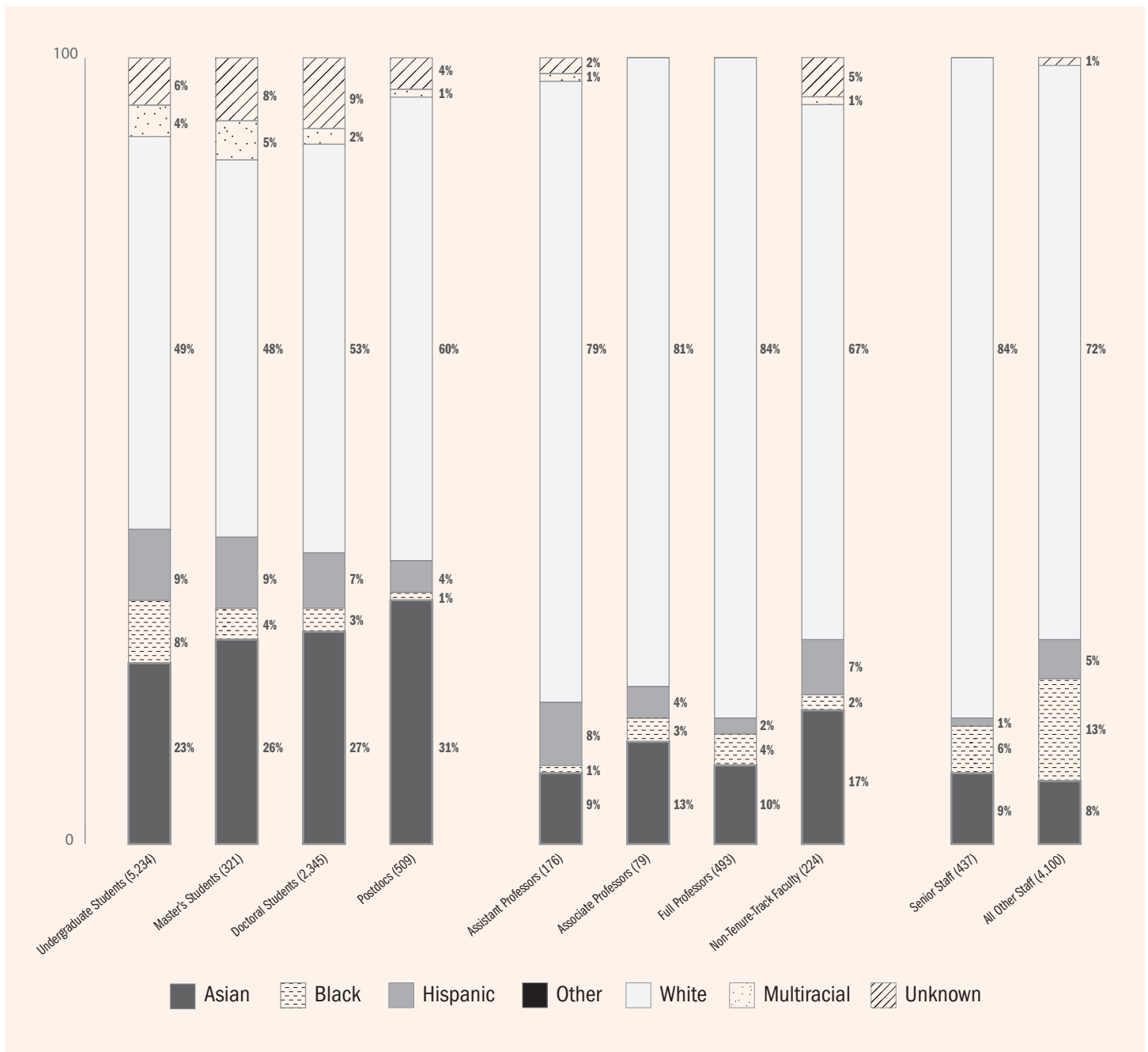
Table 1: Budget line items. Note that the specific recommendations call for at least *two* each of items #2 and #7, and *several* of items #13 and #14.

## Departmental Questionnaire: How much (between 0 and 100 %) are you in favor of:

1	making a visit to a Historically Black College or University?
2	participating in a <i>month</i> long Summer school?
3	participating in a <i>week</i> long Summer school?
4	leading a <i>month</i> long Summer school?
5	leading in a <i>week</i> long Summer school?
6	... in return for a month of summer salary?
7	teaching a new course with online sections directed at broadening participation?
8	recording your lectures for broadcast from departmental website?
9	hiring a Diversity Officer shared with another department?
10	hiring a Diversity Fellow at the post doc level?
11	having one of your post-docs be the Diversity Fellow half time?
12	hosting a Bridge-Year student in your research group?

Table 2: Questions put to the Faculty at the 9 April 2014 Meeting. Most unanimous support was voiced for items #1 and #12, many were in favor of items #3 and #8. All other questions received scattered support.

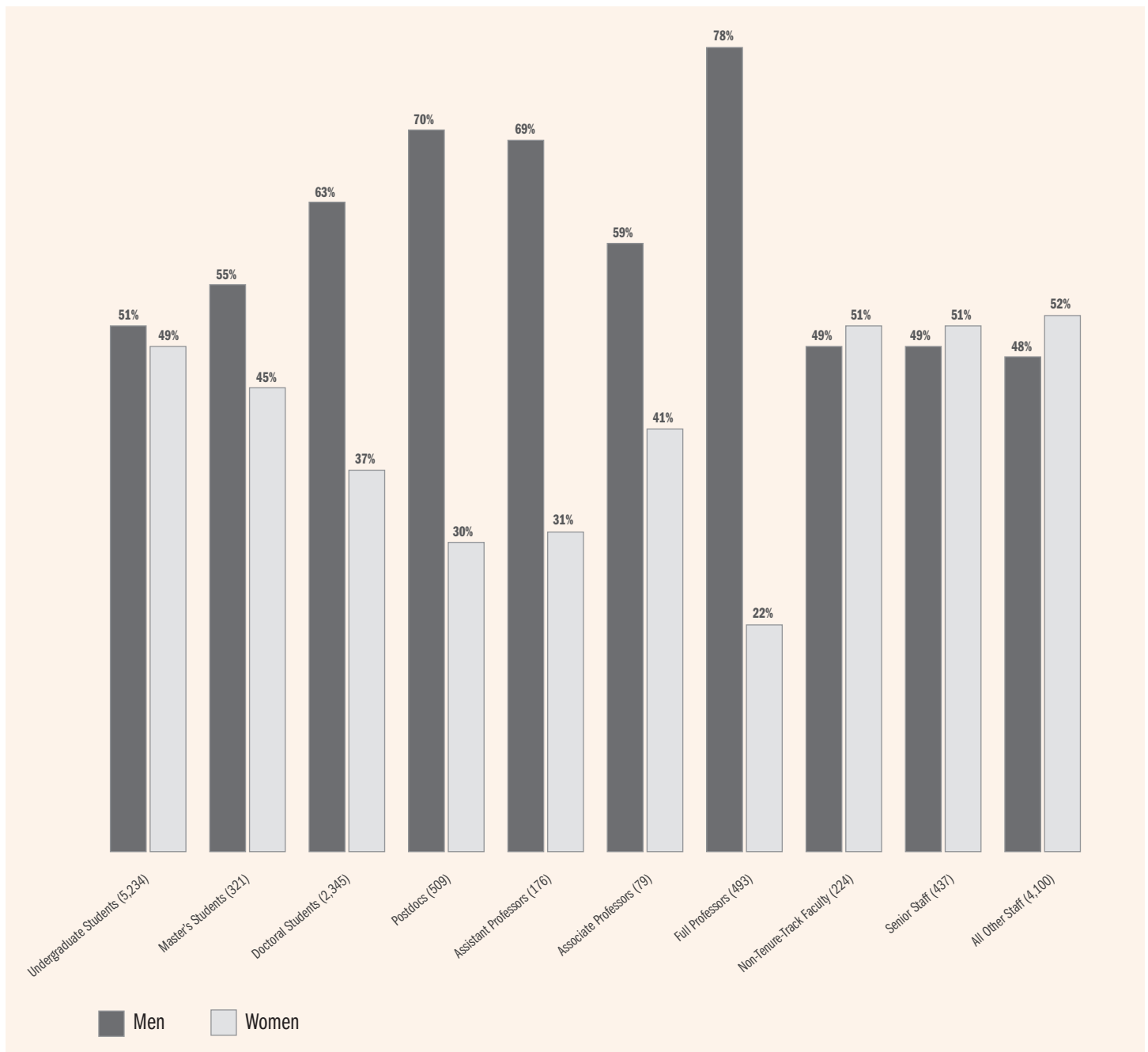
## Race/Ethnicity of Princeton Campus Populations (Academic Year 2014)



**Notes:** Numbers in parenthesis on the X-axis represent the total number of individuals in each population. Data for all populations is as of October 15, 2013. "Other" includes Native American, Native Hawaiian/Pacific Islander, and undisclosed. "Unknown" accounts for those who did not specify race or ethnicity. Student data includes Princeton's full-time undergraduate, masters and doctoral degree candidates. Student data excludes visiting students. "Postdocs" includes postdoctoral research associates and postdoctoral research fellows. Data for all faculty ranks and staff populations includes "benefits eligible" individuals and excludes visitors. "Non-Tenure-Track Faculty" includes instructors, lecturers, and senior lecturers. "Senior Staff" includes (i) non-faculty administrators at grades 8-11 and related ranks, (ii) information technology professionals at grades 4 and 5, and (iii) PPPL executive officers and administrators grades 8-12. "All Other Staff" includes all benefits-eligible non-faculty employees and grade levels across campus (e.g., administrators, librarians, professional researchers, clerical and support staff, technical professionals, and service workers). Percentages may not add up to 100 percent due to rounding.



## Gender of Princeton Campus Populations (Academic Year 2014)



**Notes:** Numbers in parenthesis on the X-axis represent the total number of individuals in each population. Data for all populations is as of October 15, 2013. Although Princeton’s campus populations include individuals who do not identify as either male or female (e.g. transgender), the chart uses data collected in conjunction with the requirements of the U.S. Department of Labor and U.S. Department of Education (which require that all individuals be reported as male or female). Student data includes Princeton’s full-time undergraduate, masters and doctoral degree candidates. Student data excludes visiting students. “Postdocs” includes postdoctoral research associates and postdoctoral research fellows. Data for all faculty ranks and staff populations includes “benefits eligible” individuals and excludes visitors. “Non-Tenure-Track Faculty” includes instructors, lecturers, and senior lecturers. “Senior Staff” includes (i) non-faculty administrators at grades 8-11 and related ranks, (ii) information technology professionals at grades 4 and 5, and (iii) PPPL executive officers and administrators grades 8-12. “All Other Staff” includes all benefits-eligible non-faculty employees and grade levels across campus (e.g., administrators, librarians, professional researchers, clerical and support staff, technical professionals, and service workers). Percentages may not add up to 100 percent due to rounding.