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PRACTICE AND POLICY

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Increasing equitable access to graduate education through competitive hiring in the life sciences

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Abstract

Many professions necessitate a graduate-level education, and research conducted by graduate students is integral in many fields, particularly those in the life science programs like ecology and environmental sciences. However, practices for recruiting and selecting graduate students are inconsistent among and within institutions. Although some institutions, departments, or faculty members hire graduate students through open and competitive graduate student hiring processes, graduates are frequently selected through inconsistent processes that limit the pool of applicants and do not maximize the potential for increasing workforce diversity. Here, we review and evaluate six approaches to graduate recruitment processes common in ecology and environmental science degree programs in the US to determine which approaches, or combinations of approaches, could increase equity in career development opportunities, promote workforce diversity, and provide clear justifications to funding bodies. We compiled our list of recruitment methods through informal interviews with recruiters, administrators, faculty, and graduate students in ecology, natural resources, and environmental sciences. We determined that three of the six approaches examined were most effective in supporting equitable graduate student hiring practices, and three were not. While life science fields were the primary focus of this review, our approach to evaluating

graduate recruitment methods is widely applicable across disciplines where graduate students conduct research.

Practical Takeaways

- There are six main ways graduate students are recruited in the life sciences: competitive recruitment, candidate pool, student-driven, contact applicants, current employees, and preselected candidates.
- Three of the common recruitment methods for graduate students are more competitive (e.g., publicly announced, with clear instructions, a review committee or panel).
- Open and competitive graduate student hiring processes could increase equity in career development opportunities and promote workforce diversity.

INTRODUCTION

Increasingly, many careers require advanced degrees (e.g., M.S. or Ph.D.), particularly in the life sciences (Langdon et al., 2011). Despite this, graduate student recruitment in many life science fields, such as ecology, does not always occur in a clearly defined manner that is widely accessible, particularly for those from historically underrepresented backgrounds (Berhe et al., 2022). Equitable and transparent graduate student recruitment and hiring are key to greater equity across career paths—including university faculty and university administrators. However, current approaches to recruiting graduated students can differ widely among faculty members and across graduate positions and programs, limiting transparency for many prospective students. For instance, in many North American universities, graduate student recruitment is conducted by individual faculty members who have secured funds for student stipends and tuition. These individualized recruitment processes provide no standard method for prospective graduate students to find and apply for graduate positions and further reinforce existing barriers for prospective students who lack access to cultural and social academic capital (Mishra, 2020; Posselt, 2020; Ramirez, 2011). Without clear and consistent application processes, prospective students have limited information on applying for available graduate positions and may never be aware of graduate opportunities.

A principal drawback to common graduate student hiring approaches is the lack of accessibility to historically underrepresented groups in the life sciences (McGee & Keller, 2007; Morgan et al., 2022; Ramirez, 2011), and these disparities are amplified with career progression (Wanelik et al., 2020). Despite these apparent issues in graduate student hiring, increasing diversity among life science professionals has become a priority for many agencies, academic institutions, and professional organizations. For example, federal and state agencies (e.g., the United States Forest Service) have prioritized increasing workforce diversity to reflect the United States population (Weldon, 2015). Similarly, many colleges and universities have aimed to increase diversity among new faculty and staff appointments (Kayes, 2006). Scientific and natural resource professional societies,

including the American Fisheries Society, The Wildlife Society, the Ecological Society of America, and the American Association for the Advancement of Science, have created committees, position statements, and initiatives to improve workforce diversity (George et al., 2001; Penaluna et al., 2017; The Wildlife Society Council, 2020). This momentum has percolated into local and regional chapters of professional societies that have developed plans for promoting workforce diversity, with diversity being recognized in each instance as an asset that improves scientific and ecological professions (Armstrong et al., 2007). Despite pledges to increase workforce diversity in the life sciences from many sectors, barriers to diverse graduate student applicants must be identified and addressed at the graduate hiring level (or earlier) to promote diversity at academic institutions and among professional organizations that hire students after graduation.

Improving the equability of graduate student hiring practices in the life sciences requires evaluating what hiring practices are currently used and how the features of those practices benefit or disparage students, faculty, and administrators. Here, we explore and evaluate the graduate student hiring practices used by ecology and environmental science to potentially offer a model for other disciplines to follow. Specifically, we sought to (1) categorize common practices used by various public universities with life sciences departments, (2) evaluate the features of each graduate student hiring practice based on a universal rating system developed herein, and (3) provide recommendations for faculty and administrators seeking to make graduate student hiring practices more equitable at their university.

METHODS

Determining and evaluating graduate student hiring methods

We conducted informal phone or in-person interviews with faculty and/or administrators from various ecology or environmental science programs across the United States. Our interviews included administrators from the Davis Graduate Group in Ecology at the University of California, the School of Environmental and Forest Sciences at the University of Washington, and the Ecology Department at Montana State University. We also met with faculty and graduate students who had worked at or applied to multiple life sciences graduate programs across the United States, including Montana State University, the University of Montana, the University of Tennessee system, the University of Maine, Virginia Polytechnic Institute and State University, the University of Wisconsin system, and several other programs. Based on these informal interviews, we categorized standard recruitment practices for graduate students into six methods: (1) competitive recruitment, (2) candidate pool, (3) student-driven, (4) contact applicants, (5) current employees, and (6) preselected candidates.

After identifying six main graduate student hiring practices common in the ecological sciences, we determined important features that could be evaluated for each practice relevant to prospective reviewers (faculty or administrators) and potential graduate students. We then ranked each standard recruitment method using nine different graduate student hiring features (e.g., clarity for applicants, time commitment for faculty) in a report-card style (Hansen & Phillips, 2018). Ranking was based on scores for each feature: if the feature was always/almost always accurate, it received a green rank (+1 point); sometimes accurate, it received a yellow rank (+0.5 points); and never/rarely accurate, a red rank (+0 points). We discussed the ranking of each method before finalizing the scores, with possible scores ranging from 0 (lowest) to nine (highest).

TABLE 1 The six recruitment methods and how we defined them. These recruitment methods are not mutually exclusive (e.g., a student-driven hire could also be a contact applicant), and multiple approaches may be used within and among departments. Competitive methods are marked with an asterisk (*).

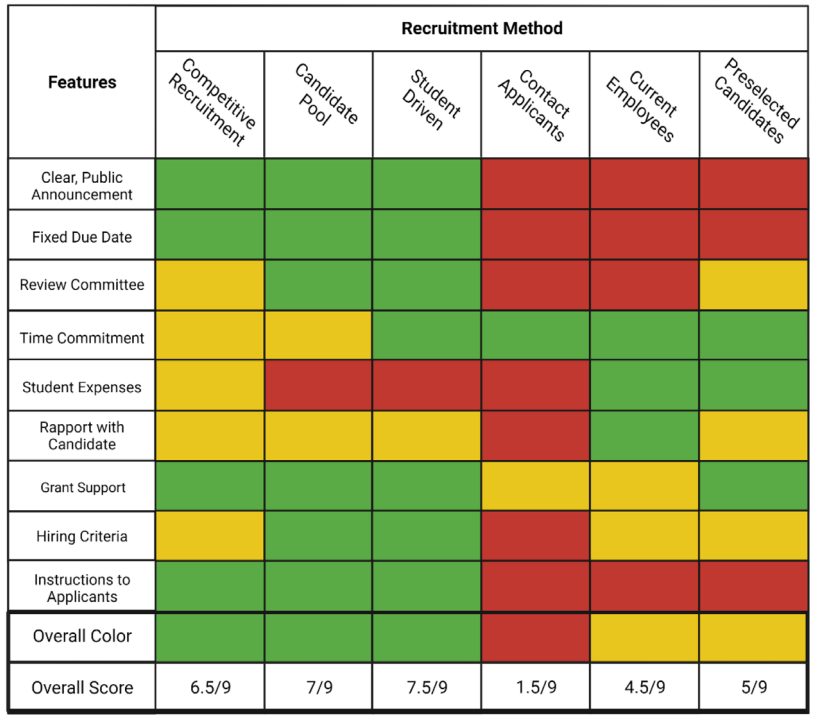
Recruitment method	Definition
Competitive recruitment*	Publicly posted graduate positions (e.g., on a job board or listserv) and applications are open to everyone. An individual faculty member or lab group usually makes such posts.
Candidate pool*	University has a set period where all prospective students apply to a program, are evaluated and ranked by a faculty committee, and then placed in positions/labs after acceptance or lab rotation. Recruitment notices are always shared publicly (e.g., available on university webpage).
Student-driven*	When a student independently seeks funding through competitive channels (e.g., NSF Graduate Research Fellowships Program (GRFP), https://nsfgrfp.org/). This can occur after a student has already found a faculty advisor through other recruitment methods or before a student contacts potential faculty advisors. The funding channels are always shared publicly.
Contact applicants	When a prospective student contacts (e.g., emails or calls) faculty members about openings and successfully connects with an advisor.
Current employees	Graduate students are hired after some set time working as technicians or in other lab positions, the position they are hired for is never shared publicly.
Preselected candidates	Candidates are hired based on their affiliation with state or federal agencies for career advancement. The position they are hired for may be shared publicly but with a short turnaround to dissuade other applicants (i.e., 2 weeks or less).

Competitive versus non-competitive hiring

We determined that graduate hiring processes can be broadly categorized as either competitive or non-competitive. When hiring is open and competitive (e.g., a recruitment committee-based evaluation), applicants respond to recruitment and advertisement materials about available graduate positions, submit applications through a straightforward process, and are judged according to their relevant professional experiences and competencies. We determined graduate student hiring practices that actively solicit applicants for available openings followed by a standardized selection process based on carefully considered criteria as competitive graduate student hiring processes. In contrast, recruitment practices that have limited solicitations for applications and through which some selection criteria may not be objectively defined we defined as non-competitive graduate student hiring practices. These non-competitive practices limit accessibility to graduate school for prospective students who may lack knowledge of non-competitive practices.

RESULTS

Based on our interviews, we categorized graduate student hiring approaches into six hiring methods (Table 1), each with unique costs and benefits for hiring entities, faculty, administrators, and prospective students (Figure 1). Of the six methods we commonly found in the life sciences, we determined three were competitive, and three were non-competitive (Table 1) based on their feature scores. We suggest that competitive recruitment, candidate pool, and student-driven graduate student hiring practices are competitive and equitable means to hire graduate students. Alternatively, contact applicants, current employees, and preselected candidates are not.



Hiring Features	Ranking Explanation
Clear, Public Announcement	A high rank (green) necessitates the position to be posted online or in another media source (e.g., a journal), and a low score indicates that the position is not posted or shared (red).
Fixed Due Date	A high ranking (green) requires applications to have a defined due date or a program with rolling admissions and a low score indicates where no due date is provided.
Review Committee	This feature focuses on if a review committee conducts hiring (green) or if it falls to a single individual (red) to score and select candidates.
Time Commitment	This ranking is based on the time commitment by faculty, and considered both the volume of potential applicants (more in competitive processes) and the number of reviewers needed to handle that volume.
Student Expenses	This feature is based on both the time and money a student spends applying. Applications that require both little time and money for applicants rank higher (green) than those requiring both time and money to find graduate positions (red).
Rapport with Candidate	This ranking indicates whether the faculty advisor has an existing working relationship with the applicant (green) or not (red). Knowing that an applicant works well within the lab or with the advisor is often a primary justification for non-competitive hiring practices.
Grant Support	This ranking indicates whether applicants have guaranteed institutional (e.g., TA) or agency funding through the hiring method (green) or not.
Hiring Criteria	This feature indicates whether the reviewer had predetermined hiring criteria on which to score a prospective student (e.g., a rubric; green) or not.
Instructions to Applicants	This feature indicates whether the process includes clear instructions that make applying more equitable for applicants without institutional or academic knowledge (green) or not.

FIGURE 1 A report card summarizing feature scores for each of the six recruitment methods and an explanation of what features represent. For each of the nine features, a green score indicates that the feature statement is accurate a majority of the time (1 point), a yellow color score indicates that the feature statement is accurate sometimes (0.5 points), and a red score indicates that the feature statement is rarely accurate (0 points). Overall color is based on the overall score where 0–3 receives a red score overall, 3.5–6 receives a yellow score overall, and 6.5+ receives a green score overall. Figure created using BioRender.

Competitive graduate recruitment methods

The first competitive method we defined was the candidate pool recruitment method, whereby prospective students apply to a publicly posted graduate position (e.g., on a job board or listserv). Such posts are usually made by an individual faculty member or a lab group. We gave this competitive method an overall score of 6.5/9. This recruitment style allows for broad recruitment efforts with clear instructions to applicants on how and when to apply.

The candidate pool method was the second competitive method for recruiting students, which received a 7/9. For this graduate student hiring method, universities allow all prospective students to apply to a program (either at a set time or have rolling admission), and prospective students are evaluated and ranked by a faculty committee before being placed. This approach may also include lab rotations, so students are exposed to each research area and faculty mentor, but this is inconsistent across programs. Such recruitment notices are always publicly shared (e.g., on a university webpage).

The final, and highest-ranking, competitive method we identified was student-driven research, with a score of 7.5/9. We defined student-driven graduate student hiring as occurring when a student independently seeks funding through competitive channels. This method can occur after a student has already found a faculty advisor through other recruitment methods or before a student contacts potential faculty advisors. This avenue is open for all prospective students through developing a research project and pursuing supporting funding through programs such as the National Science Foundation Graduate Research Fellowships Program. Student-driven research has the advantage that these opportunities are equally available to any prospective student that puts together the effort of proposing, developing, and securing funding for a graduate student position. However, this would restrict opportunities to only individuals with the time and resources needed to put forth that effort. Furthermore, it may be difficult for a student to secure funding and support for potential research projects without early assistance from faculty members or researchers.

Non-competitive graduate recruitment methods

We also identified three non-competitive recruitment methods. The first of these, contact applicants, occurs when a prospective student contacts (e.g., emails or calls) faculty members about openings and successfully connects with an advisor. We scored this method the lowest, at 1.5/9. While this method requires prospective students to show initiative to pursue a graduate education by directly contacting advisors with research specialties that match the interests and skills of the prospective student, this method is unknown (i.e., may be considered part of the "hidden curriculum") to many students without academic cultural capital. Furthermore, there is a higher likelihood that applicants may not know what criteria are being used to evaluate applications, and they will likely have little to no instruction on how to be considered for positions that become available. Additionally, this method requires students to put forth a large effort to create letters of inquiry and resumes that may not even be considered if a faculty member is not looking for a new student. This can potentially inhibit the ability of students with limited resources to make the necessary number of contacts to find a faculty member that will accept them into a graduate program and can be discouraging for prospective students.

The second non-competitive recruitment method we identified was hiring preselected candidates. This occurs when individuals currently working for an agency are hired based on their affiliation with state or federal agencies for career advancement. The position they are hired for may be shared publicly but with a short turnaround to dissuade other

applicants (i.e., 2 weeks or less). This approach scored a 4.5/9 and has the advantage of selecting students with a proven work history and who may already have some skills and experience that will be useful in carrying out a given research program. However, because these students come from within the funding organization, this method severely restricts access to educational opportunities by not considering individuals outside the funding organization.

Similarly, hiring current employees as graduate students is classified as non-competitive and received a score of 5/9 (Figure 1). Although current employees (e.g., technicians) may have relevant experiences and rapport with faculty members at an institution, this method excludes people outside the research institution. Furthermore, because many research technician positions are seasonal or low-paying, prospective students with limited financial resources may be unable to take jobs as research technicians, excluding them from using this method.

DISCUSSION

There is a growing recognition that increased diversity can only be achieved through equitable practices and dismantling barriers early in students' educations (Wanelik et al., 2020). However, based on current graduate hiring practices in STEM, applicants from historically underrepresented groups seeking employment or admission into academic programs can be excluded or inadvertently overlooked when objective and transparent evaluation criteria are not used in the selection processes (Moss-Racusin et al., 2012). We successfully categorized common graduate student hiring methods, evaluated these methods, and identified three competitive and equitable approaches. We hope our categorization can help those reviewing applications evaluate and compare the benefits of different graduate student hiring and recruitment strategies. Based on the criteria we provided, we also recommend that faculty and administrators seeking to make graduate student hiring practices more equitable at their university consider how competitive hiring practices would increase equability in the life sciences.

Implementation of competitive practices

Implementing competitive hiring processes for recruiting graduate students requires understanding previous recruitment practices, identifying institutional values, developing criteria for evaluating applicants, creating guidance and best practices for recruiting applicants, and regularly reviewing recruitment and selection methods. Faculty members should be surveyed to understand how they advertise for and select graduate students and what attributes are most valued in prospective students. Institutions should then identify goals they wish to achieve by implementing a standardized recruitment process (e.g., increased diversity of graduate students, greater accessibility to educational opportunities, etc.) and draft selection procedures to help them meet those goals. Faculty members should be given the opportunity to provide feedback on the proposed goals and processes for selecting and recruiting new graduate students. Some institutions have already established standardized, competitive graduate student hiring procedures that can be used as models to develop new selection procedures at other institutions (e.g., U.C. Davis Graduate Group in Ecology, https://ecology.ucdavis.edu; University of Washington School of Environmental and Forest Sciences, https://sefs.uw.edu). The success of competitive graduate student hiring in such programs highlights the benefits of competitive hiring practices for the institution and the life sciences. We recommend that institutions create living

documents outlining recruitment and selection processes so that such efforts can be continually evaluated to ensure they achieve institutional goals.

While many challenges are associated with modifying current graduate student recruitment at an institutional level, one of the most significant challenges is the lack of predictable funding for research projects. Funding is one of the key determinants affecting when and how graduate student recruitment occurs. Funding requirements can further complicate graduate student hiring practices if secured funding is associated with project deliverables or deadlines that may limit the time available for advertising and recruiting applicants for a given opening. In theory, standardized, competitive graduate student hiring processes should account for anticipated modes of funding for new students and incorporate means to handle uncertainty and variability in funding opportunities while recognizing that types of support available to graduate students can influence student success and persistence (Gururaj et al., 2010). We recommend that administrators and faculty work with graduate students to determine how to best account for the uncertainty and variability inherent in funding for the life sciences.

Importance of implicit bias

Equitable processes only alleviate some of the burdens on historically underrepresented groups in STEM. It is also critical to recognize how our biases (e.g., based on perceived race, ethnicity, or gender of job applicants) can influence how we evaluate resumes (Derous & Ryan, 2019) and the rates at which prospective students receive responses to inquiries about research opportunities and are granted meetings with faculty members (Milkman et al., 2012). Prospective students from communities of color are less likely to attend more selective institutions than white students with equivalent qualifications (Carnevale & Strohl, 2013). The application process can be further complicated by the educational background of prospective students, potentially influencing which programs they consider when searching for available educational opportunities (Delaney & Devereux, 2020). Most faculty members and university administrators are likely aware of the importance of promoting and training a diverse workforce, and most make concerted efforts to make the life sciences more inclusive. However, if left unaddressed, implicit bias can result in graduate student hiring evaluations that select against individuals from underrepresented groups (Beattie & Johnson, 2012). Without a transparent and equitable recruitment process, implicit bias or biases associated with convenience (i.e., the prospective student was present and available when the faculty needed to hire a new student, and the student met minimal admissions requirements) will likely influence the selection of graduate students.

Additional recommendations

There are several additional criteria we recommend for graduate student hiring committees to use in facilitating competitive hiring and diversifying the life sciences. First, we suggest that selection processes should include the evaluation of professional competencies based on traits that are indicative of success in academic and post-graduation settings, such as curiosity, desire to help others through science, emotional intelligence, experience with networking, and experience with program leadership (Blickley et al., 2013; McGee & Keller, 2007; Victoroff & Boyatzis, 2013) in addition to the traditional expectations that prospective students have some minimal background in math, oral and written communication, biology, and the physical sciences. However, we caution against the use of metrics such as GPA and GRE scores as a part of the evaluation process because they may not

accurately predict student performance and disproportionately disadvantage applicants who are female or from underrepresented groups (De Los Reyes & Uddin, 2021; Miller & Stassun, 2014; Moneta-Koehler et al., 2017). Additionally, reviewers should avoid judging applicants' raw or innate talent to avoid stereotypical beliefs about applicants' suitability for a given opening based on characteristics such as gender or race (Leslie et al., 2015). Recruitment efforts should reach a broad audience and be readily visible on the websites of universities and professional societies. The posted announcements' wording must be carefully considered to avoid unintentional preference toward individual groups of applicants (Gaucher et al., 2011).

Potential benefits to students

Hiring graduate students through transparent and consistent application processes also makes providing constructive feedback to prospective students easier. In workplace settings, clear feedback is associated with improved performance and a better understanding of job requirements (Whitaker et al., 2007). Even if feedback is not directly provided, candidates who are not selected, but applied through a competitive hiring channel, have the means to assess their competency based on the required and preferred qualifications listed in the recruitment materials. Without these clear criteria, prospective students have limited information on what skills to develop to become more competitive for future graduate positions.

CONCLUSIONS

Using ecology and environmental science programs to explore and evaluate graduate student hiring practices can provide insights into equitable hiring that extend far beyond the life sciences. Our evaluation of existing programs highlights that many graduate students face unseen barriers that decrease their access to graduate education opportunities when hiring practices lack a robust and equitable recruitment process. Furthermore, inconsistent graduate student hiring processes hinder efforts to make the ecological profession more inclusive and diverse, which is likely true in many other fields. Without clear application procedures and broad recruitment efforts, applicant pools are restricted to a subset of prospective students, and processes do not exist to help prevent implicit bias from influencing decisions regarding the selection of graduate students. Recruiting students through competitive selection processes can be more time-consuming than other recruitment methods. However, moving toward a standardized, open, and competitive selection process for hiring graduate students will support equitable access to educational opportunities and the promotion of workforce diversity across graduate programs.

AUTHOR CONTRIBUTIONS

Kathleen A. Carroll: Writing, Visualization, Reviewing, and Editing; **Michael J. Lance**: Conceptualization, Writing, Reviewing, and Editing; **Brian V. Smithers**: Writing, Reviewing, and Editing; **Diane M. Debinski**: Writing, Reviewing, and Editing.

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REFERENCES

Armstrong, M. J., Berkowitz, A. R., Dyer, L. A., & Taylor, J. (2007). Understanding why underrepresented students pursue ecology careers: A preliminary case study. *Frontiers in Ecology and the Environment*, *5*(8), 415–420.

Beattie, G., & Johnson, P. (2012). Possible unconscious bias in recruitment and promotion and the need to promote equality. *Perspectives: Policy and Practice in Higher Education*, *16*(1), 7–13.

Berhe, A. A., Barnes, R. T., Hastings, M. G., Mattheis, A., Schneider, B., Williams, B. M., & Marín-Spiotta, E. (2022). Scientists from historically excluded groups face a hostile obstacle course. *Nature Geoscience*, *15*(1), 2–4.

Blickley, J. L., Deiner, K., Garbach, K., Lacher, I., Meek, M. H., Porensky, L. M., Wilkerson, M. L., Winford, E. M., & Schwartz, M. W. (2013). Graduate student's guide to necessary skills for nonacademic conservation careers. *Conservation Biology*, *27*(1), 24–34.

Carnevale, A. P., & Strohl, J. (2013). *Separate and unequal: how higher education reinforces the intergenerational reproduction of white racial privilege*. Center on Education and the Workforce.

De Los Reyes, A., & Uddin, L. Q. (2021). Revising evaluation metrics for graduate admissions and faculty advancement to dismantle privilege. *Nature Neuroscience*, *24*(6), 755–758.

Delaney, J. M., & Devereux, P. J. (2020). Choosing differently? College application behavior and the persistence of educational advantage. *Economics of Education Review*, *77*, 101998.

Derous, E., & Ryan, A. M. (2019). When your resume is (not) turning you down: Modelling ethnic bias in resume screening. *Human Resource Management Journal*, *29*(2), 113–130.

Gaucher, D., Friesen, J., & Kay, A. C. (2011). Evidence that gendered wording in job advertisements exists and sustains gender inequality. *Journal of Personality and Social Psychology*, *101*(1), 109.

George, Y. S., Neale, D. S., Van Horne, V., & Malcolm, S. M. (2001). *In pursuit of a diverse science, technology, engineering, and mathematics workforce: Recommended research priorities to enhance participation by underrepresented minorities*. American Association for the Advancement of Science. Retrieved December 4, 2018 from. http://ehrweb.aaas.org/mge/Reports/Report1/AGEP/?downloadURL=true&loId=EB79A2C2-3280-4404-AAF3-0D5D3F8A9D6D

Gururaj, S., Heilig, J. V., & Somers, P. (2010). Graduate student persistence: Evidence from three decades. *Journal of Student Financial Aid*, *40*(1), 31–46.

Hansen, A. J., & Phillips, L. (2018). Trends in vital signs for Greater Yellowstone: Application of a Wildland Health Index. *Ecosphere*, *9*(8), e02380.

Kayes, P. E. (2006). New paradigms for diversifying faculty and staff in higher education: Uncovering cultural biases in the search and hiring process. *Multicultural Education*, *14*(2), 65–69.

Langdon, D., McKittrick, G., Beede, D., Khan, B., & Doms, M. (2011). STEM: Good jobs now and for the future (ESA Issue Brief#). *US Department of Commerce*, 03–11.

Leslie, S.-J., Cimpian, A., Meyer, M., & Freeland, E. (2015). Expectations of brilliance underlie gender distributions across academic disciplines. *Science*, *347*(6219), 262–265.

McGee, R., & Keller, J. L. (2007). Identifying future scientists: Predicting persistence into research training. *CBE—Life Sciences Education*, *6*(4), 316–331.

Milkman, K. L., Akinola, M., & Chugh, D. (2012). Temporal distance and discrimination: An audit study in academia. *Psychological science*, *23*(7), 710–717.

Miller, C., & Stassun, K. (2014). A test that fails. *Nature*, *510*(7504), 303–304.

Mishra, S. (2020). Social networks, social capital, social support and academic success in higher education: A systematic review with a special focus on 'underrepresented'students. *Educational Research Review*, *29*, 100307.

Moneta-Koehler, L., Brown, A. M., Petrie, K. A., Evans, B. J., & Chalkley, R. (2017). The limitations of the GRE in predicting success in biomedical graduate school. *PLoS one*, *12*(1), e0166742.

Morgan, A. C., LaBerge, N., Larremore, D. B., Galesic, M., Brand, J. E., & Clauset, A. (2022). Socioeconomic roots of academic faculty. *Nature Human Behaviour*, *6*(12), 1–9.

Moss-Racusin, C. A., Dovidio, J. F., Brescoll, V. L., Graham, M. J., & Handelsman, J. (2012). Science faculty's subtle gender biases favor male students. *Proceedings of the National Academy of Sciences*, *109*(41), 16474–16479.

Penaluna, B. E., Arismendi, I., Moffitt, C. M., & Penney, Z. L. (2017). Nine proposed action areas to enhance diversity and inclusion in the American Fisheries Society. *Fisheries*, *42*(8), 399–402.

Posselt, J. R. (2020). *Equity in science: Representation, culture, and the dynamics of change in graduate education*. Stanford University Press.

Ramirez, E. (2011). "No One Taught Me the Steps": Latinos' experiences applying to graduate school. *Journal of Latinos and Education*, *10*(3), 204–222.

The Wildlife Society Council. (2020, 10/13/2020). *TWS standing position: Workforce diversity within the wildlife profession*. Retrieved 9/11/2021, from https://wildlife.org/tws-standing-position-workforce-diversity-within-the-wildlife-profession/

Victoroff, K. Z., & Boyatzis, R. E. (2013). What is the relationship between emotional intelligence and dental student clinical performance? *Journal of Dental Education*, *77*(4), 416–426.

Wanelik, K. M., Griffin, J. S., Head, M. L., Ingleby, F. C., & Lewis, Z. (2020). Breaking barriers? Ethnicity and socioeconomic background impact on early career progression in the fields of ecology and evolution. *Ecology and Evolution*, *10*(14), 6870–6880.

Weldon, L. (2015). *Diversity and inclusiveness at the Forest Service*. Retrieved 11/4/2018, from https://www.fs.fed.us/speeches/diversity-and-inclusiveness-forest-service

Whitaker, B. G., Dahling, J. J., & Levy, P. (2007). The development of a feedback environment and role clarity model of job performance. *Journal of Management*, *33*(4), 570–591.

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