

A reflection on faculty diversity in the 21st century

JoAnn Trejo*

Department of Pharmacology, School of Medicine, University of California, San Diego, La Jolla, CA 92093

ABSTRACT The 21st century is nearly two decades old, and the faculty ranks at our educational institutions remain sparsely diverse. While educational institutions are continually being challenged to increase the diversity of their faculty, progress is slow. This essay offers a perspective on the importance of diversity in our educational institutions as well as on the traditional metrics that our institutions use to evaluate faculty in hiring, promotion, and tenure. I also reflect on how my life experiences as a person of color provided me with the skills needed to succeed as an academic in science and inspired me to dedicate myself to work to increase the representation of women and people of color in science and in our educational institutions to create an inclusive environment for all members of the scientific community.

INTRODUCTION

The American Society for Cell Biology E.E. Just Award serves to memorialize the early-20th-century African-American biologist Ernest Everett Just by recognizing the outstanding scientific achievements of a minority scientist. I am honored to receive this award. E.E. Just was a brilliant scientist, magna cum laude BS Dartmouth College and PhD University of Chicago. Despite his extraordinary scientific achievements, Just was denied an academic appointment at elite institutions in the United States because of his skin color (Manning, 1983). There is no doubt that E.E. Just broke barriers by gaining access to elite academic institutions for his educational training, but he could not pierce the glass ceiling at elite institutions; therefore he could not gain



JoAnn Trejo

access to the faculty ranks. E.E. Just's experience represents an all-too-real aspect of the history of our educational institutions.

After decades of efforts aimed to increase the participation of historically underrepresented racial/ethnic groups in the sciences, the percentage of PhDs granted to African-Americans, Hispanics/Latinos, and Native Americans continues to lag behind the majority and is well below these groups' proportional representation in the U.S. population (National Science Foundation, 2015). Since faculty are recruited primarily from the U.S. doctorate pool, it is not surprising that the proportion of individuals from underrepresented groups among faculty across the United States lags significantly behind their proportional

representation in the population and drops further at each transition point in faculty promotions, especially in the sciences (Nelson and Brammer, 2010). A new analysis indicates that the lack of faculty diversity is also related to the disproportionately low rate of underrepresented faculty hires compared with well-represented faculty hires in medical school basic science departments (Gibbs *et al.*, 2016), further exacerbating the problem. In addition, faculty from underrepresented groups are less likely to be awarded funding from the National Institutes of Health (NIH) compared with individuals from the majority population (Ginther *et al.*, 2011). And while the number of PhDs granted to women is proportional to that of men in

DOI:10.1091/mbc.E17-08-0505. *Mol Biol Cell* 28, 2911–2914.

JoAnn Trejo is the 2017 recipient of the E. E. Just Award from the American Society for Cell Biology.

*Address correspondence to: JoAnn Trejo (joanntrejo@ucsd.edu).

Abbreviations used: IRACDA, Institutional Research and Academic Career Development Award; NIH, National Institutes of Health.

© 2017 Trejo. This article is distributed by The American Society for Cell Biology under license from the author(s). Two months after publication it is available to the public under an Attribution–Noncommercial–Share Alike 3.0 Unported Creative Commons License (<http://creativecommons.org/licenses/by-nc-sa/3.0>).

“ASCB®,” “The American Society for Cell Biology®,” and “Molecular Biology of the Cell®” are registered trademarks of The American Society for Cell Biology.

the United States, women's representation among faculty in science also remains far below their proportional representation in the faculty applicant pool (Nelson and Brammer, 2010). Although there have been reported gains in faculty diversity in the past two decades, the number of underrepresented minorities and women in tenure and tenure-track positions has only marginally improved and remains disproportionately low (Finkelstein *et al.*, 2016). Remarkably, fewer than one in 10 women faculty are full professors. The demographics of faculty at U.S. academic institutions is not a reflection of the gender or ethnic diversity of the U.S. population or of science.

DIVERSITY IS AN ASSET FOR SCIENCE INNOVATION

To me, the lack of equitable representation in academia is concerning because a diverse faculty is valuable. Faculty diversity enhances the breadth, depth, and quality of research and teaching. Diversity increases the variety of experiences, perspectives, and scholarly interests among faculty and students (Denson and Chang, 2009; Campbell *et al.*, 2013). Diverse groups of individuals are also smarter, make better decisions, and are better at problem solving than homogeneous groups of people (Page, 2007; Rock and Grant, 2016). Diverse perspectives disrupt "groupthink" and the entrenched ways of thinking that can lead to misrepresentation of facts and errors. The diverse population of the United States is an asset that should be leveraged to increase the academic excellence of our educational institutions. The U.S. population will only continue to grow increasingly diverse. Latinos/Hispanics represent the fastest growing group; expected to reach 31% of the U.S. population by 2060 (U.S. Census Bureau). In the fall of 2014, for first time, the number of Latino/Hispanic, African-American, and Asian students collectively in K–12 public schools surpassed the number of non-Hispanic whites. This was driven largely by an increase in the Latino/Hispanic population (Maxwell, 2014). And while our schools are becoming increasingly diverse, only a small percentage of teachers share similar backgrounds with their students, resulting in a significant teacher–student diversity gap. Moreover, studies suggest a positive correlation between teachers of color and student performance in K–12 public schools (Gay, 2000; Achinstein and Ogawa, 2011). Teachers who more accurately reflect the demographics of their classrooms bring many educational benefits, including more culturally based instruction, higher student expectations, and a perspective that counters negative stereotypes. No doubt, the educational institutions of U.S. colleges and universities also benefit from faculty diversity because diversity enriches educational experiences and fosters innovation and the type of forward thinking that is essential for the advancement of science. If the United States is to maintain its status as a world leader in science and economic competitiveness, then we need to leverage our inherent asset of a diverse population and draw upon the talent of all of our people, not just some of them.

REFRAMING MERIT IN ACADEMIC ADMISSIONS AND FACULTY HIRING

Studies have shown that, despite their aptitude and intellect, many aspiring women and underrepresented minorities fail to meet educational institutions' normalized standards of merit. Because of this they are denied access to institutions of higher education. While I did reasonably well in college, I was not a straight A student. I am also not a good "test taker" and did not have a grasp on the vocabulary or strategies needed to perform well on the GRE. Were these numbers that were associated with my

aptitude and intellect by educational institutions truly the best predictors of my success as a scientist? Are numerical assessments in general truly the best predictors of anyone's success in science? I think not. New studies suggest that GPA and GRE scores are a misguided means to screen applicants and are not useful in predicting success in biomedical research (Hall *et al.*, 2017; Moneta-Koehler *et al.*, 2017). Other objective criteria including personal statements and the standing of undergraduate institutions also fail to correlate with scientific productivity or success (Weiner, 2014). The single most powerful predictor of success that emerged from these studies was letters of recommendation that documented an applicant's ability to persevere and maintain focus and enthusiasm when confronted with challenges (Weiner, 2014; Hall *et al.*, 2017).

If numbers don't seem to predict the scientific promise of students, and if numbers tend to exclude candidates from diverse populations, should numbers really be used to identify the most promising people to hire in academia? Search committees and educational institutions also use numbers to assess faculty candidate qualifications as well as for promotion and tenure. Research publications are often judged by the journal's impact factor, which is an average score that has serious inherent limitations and is not the best measure of the scientific impact of any individual's piece of work (Verma, 2015). The numbers of publications and grants are also used in determining a candidate's qualifications for hiring, promotion, and tenure. However, inadequate mentoring of women and underrepresented minority faculty has been shown to lead to low numbers in these areas (Thomas, 2001; Morzinski and Fisher, 2002; Ginther *et al.*, 2011). Given the existence of such inequities, is it fair to use these metrics as a means to evaluate a candidate's potential for success in academia? Numbers should not deter educational institutions from their pursuit to increase faculty diversity, but clearly currently they do. We know in our hearts and minds that we are bigger, better, and more precious than numbers and more complex than any test or number can describe. Our challenge is to reframe merit so that we can recognize the merit that is standing right in front of us. Without my own grit and perseverance, I would not have succeeded in science. I don't let numbers define me as a scientist and neither should our educational institutions.

A BORN CHAMPION FOR DIVERSITY

My early life experiences, my struggles, and my complicated relationships with educational institutions have provided me with important insight and inspired me to become a champion for diversity. I am the youngest of five children raised in the Central Valley of California in a family of Mexican migrant farmworkers led by a single mother with little education. I credit my mother's grit and strong work ethic along with my teachers' support in helping me become a leading educator and world-class researcher in the field of cell biology and pharmacology (Trejo, 2009). However, because of my skin color, socioeconomic status, and family background, I was often treated as a second-class citizen. I was raised in a home that did not share the educational norms of the white middle and upper classes (Trejo, 2014). I was denied access to resources and quality education because the institutions of public education viewed me as someone not worthy of becoming a scientist. In those institutions, the valuable life experiences that I accrued growing up were considered a deficit. Because of this, my experiences in those educational institutions often led to self-doubt and feelings of not belonging. But I knew in my mind and heart that I possessed the intellect, drive, and



FIGURE 1: *Professors for the Future*, UC San Diego IRACDA Program 2017. A talented and diverse group of postdoctoral scholars committed to pursuing independent research and teaching careers in academia. Left to right: Peter Ramirez, Tony Davis, Keolu Fox, Anel Lizcano, Francisco Contijoch, Brian Leon, Stacy Ochoa, John Lapek, Jessica Sowa, Jeremiah Keyes, Olivia Molinar, JoAnn Trejo (Faculty Director), Sergio Ita, Eillen Teclé, Morgan Mouchka, Alison Songstad, James Hall, Angelica Riestra, Edwin Paz, and Apollo Kacsinta. Not pictured: Rachael Barry and Angelina Hernandez-Carretero.

skills to solve problems as well as the grit and perseverance to succeed in science. I knew that I examined problems from a unique perspective that was different from that of the mainstream institution. I indeed had the skills one needs to succeed in science.

I continue to strive to be an innovative researcher who pioneers new frontiers in cell signaling. In addition, my life experiences have enabled me to make important contributions that serve to increase the representation of women and people of color in science, creating an inclusive environment for all members of the scientific community. I have trained 65 scientists, nearly half of whom are underrepresented minorities. I am the director of the Institutional Research and Academic Career Development Award (IRACDA) Postdoctoral Training Program at the University of California, San Diego (Figure 1). IRACDA is an NIH-sponsored postdoctoral training program that aims to increase the diversity of academia. The San Diego IRACDA program has an impressive track record, with 67% of the trainees, mostly underrepresented minorities and women, obtaining faculty positions at academic institutions, including several hires at UC San Diego. A key to success of the IRACDA program is the outstanding mentoring and training provided to diverse postdoctoral scholars that traditionally would have been left out. As the Associate Dean for Health Sciences Faculty Affairs, I work to institutionalize faculty diversity by creating and implementing strategies, programs and initiatives for the recruitment, retention, and development of a diverse faculty. I am tremendously honored to be part of this work. I am committed to the scientific community and to increasing the diversity of science. I am realistic and hopeful that my story will inspire others to embrace this work because changing the culture of our educational institutions is possible only with a collective movement.

ACKNOWLEDGMENTS

I am grateful that my life has been touched by extraordinary people. I thank my mother, Lupe Torres Arroyo, and sister, Mary

Torres; teachers (Dorothy Astorga, the Dominican Sisters, Terry Cort, Jack Bartley, Min Oppenheim, and Professor Antoni Oppenheim); mentors (Professors Joan Heller Brown, Shaun Coughlin, and Vivian Reznik); and for enduring support my spouse, Libby Montagne. I also thank the many undergraduates, graduate students, postdoctoral fellows, junior faculty, and colleagues who have taught me how to be a better mentor, teacher, and scientist. I am also grateful for the support I receive from the NIH/National Institute of General Medical Sciences (R01 GM090689, R01 GM116597, K12 GM068524), the UC Tobacco-related Disease Research Program (26IP-0050), the American Society for Pharmacology and Experimental Therapeutics Summer Undergraduate Research Fellowship Program, the Health Resources and Services Administration Hispanic Center of Excellence (D34HP31027), and UC San Diego Chancellor Pradeep Khosla and Vice Chancellor for Health Sciences David Brenner.

REFERENCES

- Achinstein B, Ogawa RT (2011). *Changed(d) Agents: New Teachers of Color in Urban Schools*, New York: Teachers College Press.
- Campbell LG, Mehtani S, Dozier ME, Rinehart J (2013). Gender-heterogeneous working groups produce higher quality science. *PLoS One* 8, e79147.
- Denson N, Chang MJ (2009). Racial diversity matters: the impact of diversity-related student engagement and institutional context. *Am Educ Res Assoc* 46, 322–353.
- Finkelstein MJ, Conley VM, Schuster JH (2016). Taking the measure of faculty diversity. *Advanc High Educ* April 2016.
- Gay G (2000). *Culturally Responsive Teaching: Theory, Research and Practice*, New York: Teachers College Press.
- Gibbs KD, Basson J, Xierali IM, Broniatowski DA (2016). Decoupling of the minority PhD talent pool and assistant professor hiring in medical school basic science departments in the US. *Elife* 5, e21393.
- Ginther DK, Schaffer WT, Schnell J, Masimore B, Liu F, Haak LL, Kington R (2011). Race, ethnicity, and NIH research awards. *Science* 333, 1015–1019.
- Hall JD, O’Connell AB, Cook JG (2017). Predictors of student productivity in biomedical graduate school applications. *PLoS One* 12, e0169121.

- Manning KR (1983). *Black Apollo of Science: The Life of Ernest Everett Just*, New York: Oxford University Press.
- Maxwell LA (2014). U.S. school enrollment hits majority-minority milestone. *Educ Week* August 9, 1.
- Moneta-Koehler L, Brown AM, Petrie KA, Evans BJ, Chalkley R (2017). The limitations of the GRE in predicting success in biomedical graduate school. *PLoS One* 12, e0166742.
- Morzinski JA, Fisher JC (2002). A nationwide study of the influence of faculty development programs on colleague relationships. *Acad Med* 77, 402–406.
- National Science Foundation (2015). 2015 Doctorate Recipients From U.S. Universities, Arlington, VA.
- Nelson DJ, Brammer CN (2010). A national analysis of MINORITIES in science and engineering faculties at research universities. www.cssia.org/pdf/20000003-ANationalAnalysisofMinoritiesinScienceandEngineeringFacultiesatResearchUniversities.pdf.
- Page SE (2007). *The Difference: How the Power of Diversity Creates Better Groups, Firms, Schools and Societies*, Princeton, NJ: Princeton University Press.
- Rock D, Grant H (2016, November 4). Why diverse teams are smarter. *Harv Bus Rev*, 1.
- Thomas DA (2001). The truth about mentoring minorities. *Race matters. Harv Bus Rev* 79, 98–107.
- Trejo J (2009). Diversity in science: the importance of mentoring. *Am Soc Cell Biol Newsl* 32, 35–37.
- Trejo J (2014). *Imagining Possibilities. Open a World of Possible. Real Stories About the Power and Joy of Reading*, New York: Scholastic.
- Verma IM (2015). Impact, not impact factor. *Proc Natl Acad Sci USA* 112, 7875–7876.
- Weiner OD (2014). How should we be selecting our graduate students? *Mol Biol Cell* 25, 429–430.