

# DISCUSSION GUIDE

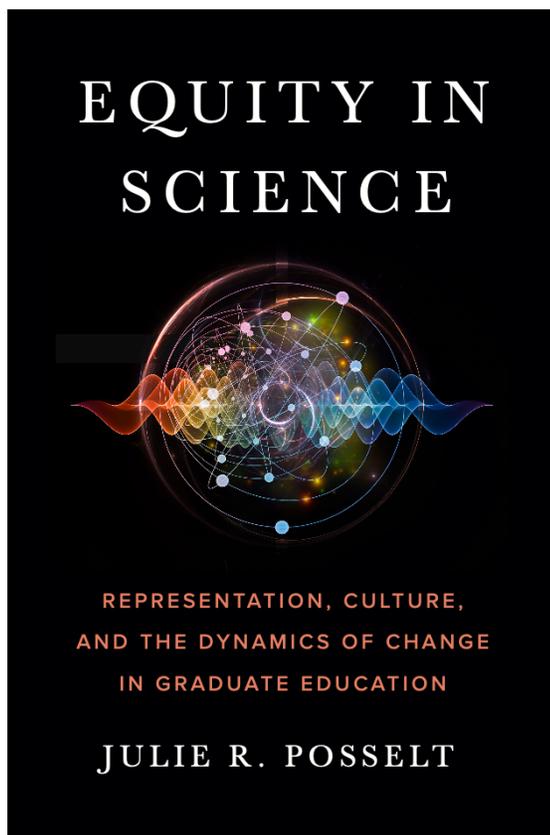
for

## Equity in Science: Representation, Culture, & the Dynamics of Change in Graduate Education

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## PREFACE

Welcome! As you read *Equity in Science* (Stanford University Press, 2020), this guide is written to encourage reflection, discussion, and action -- three activities that allow us to imagine better worlds and begin bringing them about. Learning individually and collectively to talk about racism, sexism, and other systems of power is critical to effective change. Discussion and reflection are especially important precursors of action for people with privileged identities and for groups whose members come to equity work from different perspectives.

*Equity in Science* synthesizes several years of my research aimed at advancing what we know about how change happens in STEM courses, departments, and disciplines -- its possibilities, limits, and how it is already occurring in some spaces. I was interested in understanding it in two sites: 1) high-status departments and disciplines (that may be least inclined to change because the *status quo* is serving them) and 2) places with bans on affirmative action (where a major lever for changing representation is unavailable). In short, I wanted to capture change where it's least likely to occur. If we can learn from these outliers, then it might not seem so daunting elsewhere.

I have conducted much of the research in the book collaboratively-- with social scientists and natural scientists from diverse backgrounds working in research-practice partnerships. The work was designed not only to benefit social science theory, but also everyday practices in the natural sciences.<sup>1</sup> With this guide, written from my home in Los Angeles during month 9 of the coronavirus pandemic, I hope to increase the book's impact by supporting the growth of equity-minded practitioners, and build their (your!) capacity and motivation for changing organizational policy, practice, and culture. I hope you and your colleagues find it supportive of your work. Please drop me a line about how you and your colleagues are putting it to use!

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<sup>1</sup>Special thanks to the Caltech Center for Inclusion and Diversity for permission to use several discussion prompts from their discussion guide for this book. I want to thank Stanford University Press for publishing *Equity in Science* as well as my collaborators on projects in which the research reported in the book took place: Fieldwork Inspiring Expanded Leadership for Diversity, the Inclusive Graduate Education Network, the California Consortium for Inclusive Doctoral Education, and the American Astronomical Society's Task Force on Diversity and Inclusion in Graduate Education. And although research on the following initiatives is not directly reflected in the book, I am grateful also for participation in the Cal-Bridge and ASPIRE projects, and the Astro2020 Decadal Survey, from which I have learned much about working across social-natural science boundaries on issues of equity and inclusion.

## Objectives of this guide

**Reflection:** This guide can help you as an individual reader assess

- a) understanding of key themes and ideas in the book and
- b) implications for your thinking, behavior, & your organization's policies & practices.

**Discussion:** You and your colleagues can use this guide to get on the same page about the science of social change, so that you can more effectively apply it. Research shows there is a critical role for collective sensemaking in the change process, especially as a group encounters new and different ideas.

**Action Planning:** The guide will support you in applying lessons from the case studies by

- a) articulating specific actions that you or your organization might take,
- b) assessing the adequacy of efforts already underway or needs to course-correct,
- c) coordinating with others who hold complementary perspective and expertise.

## How to use it

1. *Chapter summaries* can accompany individual reading as a check on comprehension of key concepts and themes. For groups, they can ensure that people are on the same page about the high level points the book is making.
2. *Discussion questions* are suitable for opening conversation about experiences and/or implications for collective activity. In your group's first gathering, I recommend developing a short list of [discussion guidelines](#) to support constructive group behaviors on sometimes sensitive content.
3. *Reflection checklists* allow individual readers to make the content personal without a discussion group. For groups, they provide additional discussion prompts and ways to encourage reflection before or after a discussion.
4. *Additional readings and resources* can deepen your understanding of key themes in the chapter.
5. *Note for groups:* The number of chapters lends itself to a seven-session series; however, if you are looking for a four-session series, I recommend combining the following chapters:
  - i. Preface, Ch. 1-2: Background and Context
  - ii. Ch. 3: The power of everyday interactions
  - iii. Ch. 4-5: Change at the department/PhD program level
  - iv. Ch. 6-7: Assessing and improving the culture of change work

## CHAPTER 1: Equity Work as Science

### SUMMARY

1. Key concepts:
  - a. “**Equity work** is reconfiguring structures, cultures, and systems to empower marginalized groups and close disparities” (p. 2).
  - b. “**Culture** is a system of inherited values, goals, and language that provides members with a shared sense of who they are and common purpose for action” (p. 3).
  - c. “**Complex systems** are, by definition, composed of many interrelated parts that have relationships, dependencies, and interactions, both internally and with the environment” (p. 12).
2. Equity efforts in science benefit when scientists have a better understanding of culture than is typically provided in their training. Cultures in STEM and values that are common to them (e.g., meritocracy and objectivity) have been identified as serious impediments to equity because they are used to legitimize unequal outcomes.
3. Graduate education is a worthy focus of change if you care about the future of science because
  - a. it is increasingly important to labor market opportunities in science,
  - b. it manifests deep and long standing intersectional inequities, and
  - c. it is the site where the next generation of scientists is socialized.
4. Systems thinking offers a useful framework for thinking about change in STEM graduate education because multiple areas of practice (e.g., teaching, admissions, mentoring), multiple levels of activity (e.g., individual, department, disciplinary society), multiple communities and identities (e.g., racial, gender, ability), and multiple goals (e.g., diversity, equity, inclusion) are all in need of change. We need theory that can speak to this complexity. That’s where chapter 2 comes in.

## DISCUSSION QUESTIONS

1. As you are getting started, please consider sharing your gender pronouns and how you identify racially/ethnically. Discuss why you are participating in discussing this book, and what you hope to gain from reading and discussing it.
  
2. “*Equity work manifests in metrics, movements, in everyday experiences, and in professional practice*” (p. 2): What is one place where you have seen equity work manifesting? How can you recognize it as such? How does the very meaning of equity seem to be different in these different sites? What are the similarities?
  
3. Beliefs about meritocracy are at the crux of academic culture. How are those concepts beneficial and harmful?



## ADDITIONAL READING

National Academies of Science, Engineering, and Medicine. (2018). *Graduate STEM Education for the 21<sup>st</sup> Century*.

Policy Link. (2015). The equity manifesto. Retrieved from <https://www.policylink.org/about-us/equity-manifesto>

Carter, D. F., Dueñas, J. E. R., & Mendoza, R. (2019). Critical examination of the role of STEM in propagating and maintaining race and gender disparities. In *Higher education: Handbook of theory and research* (pp. 39–97) M. B. Paulsen & L. W. Perna (Eds.). Cham: Springer.

Posselt, J. R., & Grodsky, E. (2017). Graduate education and social stratification. *Annual review of sociology*, 43, 353-378.

Freire, P. (1970). *Pedagogy of the Oppressed*. New York: Continuum Press.

## CHAPTER 2: Managing Complexity in Institutional Change

### SUMMARY

1. The chapter introduces three perspectives for managing the complexity of equity-based change: small wins, quantum theory, and symbolic boundaries.
2. **Small wins** are an important component to the change process, but without coordinated effort, they may not be sustained and can turn into incrementalism. The most useful small wins are those that change how people think, in ways that also change how they are likely then to act.
3. Systems thinking via analogies from **quantum theory** offer tools to think about and manage relational complexities in equity-based change:
  - a) **The foci of change** efforts must include both human interactions, attitudes, and practices, as well as the technologies we create like policies, algorithms, and tools, software, & structures. Barad & I describe this as a “*post-humanist*” point of view; that is, it includes but is not limited to directly human activity.
  - b) **The process of change** involves human agency (i.e., freedom to make choices) not as individual but entangled. Our actions are always creating the context for others’ actions, and long-term ripple effects can emanate from seemingly small actions;
  - c) **We see the non-linearity of change** through the lens of quantum theory, relative to the metaphors for change that classical dynamics provide: inertia, momentum, trajectory. Some change is more linear than others;
  - d) **Our embeddedness in change** is apparent when we remember that just as we are part of the reality that we strive to understand as scholars, we are part of the groups we are trying to change. Our identities matter, and the very same barriers to equity that hold back our organizations can affect our change efforts.
4. **Symbolic boundaries** are distinctions that we use to “categorize objects, people, practices, and even time and space” and are salient to cultural change. Changing who and what is understood to “fit” certain categories of value (i.e., what counts as an admissible student, what is good mentoring, what acceptable representation statistics look like for our field) is often necessary, because our traditional standards are exclusionary by privileging groups who are overrepresented.

## DISCUSSION QUESTIONS

1. Have you noticed any “small wins” in your workplace over the last few years, as people and groups advocate for change?
2. Have you ever been part of a change effort that reflected the same dysfunctions or flaws of the group it was trying to change? What happened? What resources were helpful in dealing with this (or might have been helpful)? In your discussion group, are there power gradients or other threats to equity that you should be careful to manage?
3. **Cultural translation** is “*sustained effort to decode, comprehend, and appreciate cultural knowledge that is outside the worldviews into which we have been socialized*” (p. 30). Talk about a space in which there is need for people from a privileged group to learn how people from a marginalized group see the same situation differently. What experiences have you had that might enable you to make one group’s way of thinking intelligible to another?

4. Additional notes you are thinking about as a result of the discussion with your colleagues:

## REFLECTION CHECKLIST

- Toward developing as a cultural translator, think about what symbols you might draw upon from your own discipline to illustrate issues around (in)equity or social justice in science.
- How can you or your organization develop or practice cultural humility? What would it look like in practice?

## ADDITIONAL READING

Weick, K. E. (1984). Small wins: Redefining the scale of social problems. *American Psychologist*, 39(1), 40.

Barad, K. (2007). *Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning*. duke university Press.

Kezar, A. (2012). Bottom-up/top-down leadership: Contradiction or hidden phenomenon. *The Journal of Higher Education*, 83(5), 725-760.

Lamont, M., & Molnár, V. (2002). The study of boundaries in the social sciences. *Annual review of sociology*, 28(1), 167-195.

Prescod-Weinstein, C. (2017). Curiosity and the end of discrimination. *Nature Astronomy*, 1(6), 1-3.

Ray, V. (2019). A theory of racialized organizations. *American Sociological Review*, 84(1), 26-53.

## CHAPTER 3: Eroded Boundaries & Everyday Interactions in Geoscience Fieldwork

### SUMMARY

1. This chapter draws attention to the power of micro-level interactions in science as a factor in creating, maintaining, and disrupting inequitable power dynamics. Everyday communication patterns are critical to the cultures of research and learning environments, and how we define what counts as acceptable in our interactions affects influence, safety, and belonging. Often these are gendered, racialized, and associated with other social identities.
2. The focus on geoscience fieldwork also highlights how temporal and spatial aspects of a science work environment shape what is thought of acceptable relational boundaries. In good ways and bad, the erosion of usual boundaries on the use of time & space in the field encourages norms of togetherness and informality. *“Many enjoy this way of life, but others miss the clarity, structure, and personal time and space. The relaxed boundaries and pressure to ‘roll with it’ muddle and complicate what count as shared expectations” (p. 40).*
3. Physically challenging conditions in fieldwork add a norm of toughness. Alcohol is understood as a reward for toughness and as an aid in social interactions that reflect their norm of togetherness. Participants recognized it could be a double-edged sword that further adds to risks of safety and inclusion.
4. Research found gendered patterns of communication including a) women’s concerns going inadequately addressed, b) men being centered & women being marginalized in discussions and seminars, and c) men challenging instructor authority. When unchecked, graduate students of all genders implicitly learn gendered communication is normal; it is part of the **“hidden curriculum”** about STEM culture that graduate education provides. Many women experiencing these types of interactions questioned themselves, self-silenced, or accepted a marginal position, though some maneuvered around dominant communication patterns.
5. The case of this graduate-level geology field course demonstrates a broader pattern: *all* disciplines have styles of interactions that are part of their culture, and that are worth evaluating as part of the cultural change process. Some of the patterns observed in this class are present in other STEM fields as well. Specific changes needed include: a) professional development and bystander intervention, b) reducing barriers to speaking up, and c) leaders advocating for communication norms that reflect commitments to equity and inclusion.

## DISCUSSION QUESTIONS

1. The communication patterns in this chapter centered on gender dynamics due to the composition of the class. In your observations, how does gender intersect with other social identities when it comes to who has voice and influence in science environments?
2. What can educators do to design learning, research, or seminar environments in which men do not dominate the sonic space? What can leaders do to deal with ingrained patterns of inequitable or rude communication?
3. Patterns of small but negative everyday interactions can erode a person's satisfaction and their commitment to science. Interpersonal support is always good, but what structural interventions could be designed to support people who are feeling discouraged? To check people who are responsible for invalidating interactions?

4. Additional notes you are thinking about as a result of the discussion with your colleagues:

## REFLECTION CHECKLIST

- Pay attention to the flow of communication in your meetings and classes. Consider your own frequency and types of contributions. How often are you amplifying ideas or contributions of people from marginalized backgrounds?
- How could you determine whether there are people in your organization who may be self-silencing as a result of repeated instances of being ignored, interrupted, and/or harassed? What could you do to support people in navigating a field that was not made for them?

## ADDITIONAL READING

*(on intersectional risks of harassment in STEM)* Clancy, K. B., Lee, K. M., Rodgers, E. M., & Richey, C. (2017). Double jeopardy in astronomy and planetary science: Women of color face greater risks of gendered and racial harassment. *Journal of Geophysical Research: Planets*, 122(7), 1610-1623

*(on racism in geosciences)* Dutt, K. (2020). Race and racism in the geosciences. *Nature Geoscience*, 13(1), 2-3.

*(on micro-level interactions and STEM persistence)* Estrada, M., Young, G. R., Nagy, J., Goldstein, E. J., Ben-Zeev, A., Márquez-Magaña, L., & Eroy-Reveles, A. (2019). The influence of microaffirmations on undergraduate persistence in science career pathways. *CBE—Life Sciences Education*, 18(3), ar40.

*(on the culture of geoscience fieldwork)* Mogk, D. W., & Goodwin, C. (2012). Learning in the field: Synthesis of research on thinking and learning in the geosciences. *Geological*

*Society of America Special Papers*, 486(0), 131-163.

(*on power and sonic space*) Sargent, C. (2009). Playing, shopping, and working as rock musicians: Masculinities in “de-skilled” and “re-skilled” organizations. *Gender & Society*, 23(5), 665-687.

(*on disciplinary cultures*) Trowler, P. R. (2001). *Academic tribes and territories*. McGraw-Hill Education.

## CHAPTER 4: Impression Management & Organizational Learning in Psychology & Chemistry

### SUMMARY

1. This chapter argues representation is but a starting point in tracking progress toward equity. To obtain a fuller picture of what is happening, we need to look beyond the numbers to the trajectories of organizations over time and the quality of interactions, experiences, and whose interests are privileged.
2. Through comparison of psychology and chemistry departments that both achieved better-than-average representation of typically excluded groups, we see how different foci (i.e., diversity, equity) and strategies for action can yield more and less sustainable outcomes.
3. In both departments, shame with their performance motivated change (i.e., gender of faculty they were promoting, race of students they were admitting). Improving gender & racial diversity outcomes is increasingly part of what makes a university, department, or discipline legitimate (i.e., worthy of respect). Negative attention drawn to this aspect of organizational performance can light a fire.
4. However, the process of change was different between these departments: *“Chemistry’s reputation changed slowly, one professor at a time, as it turned around its approach and ability to recruit, retain, and promote women faculty. Psychology’s intense and immediate focus on transforming the public image via the website exemplifies how diversity work can easily become a matter of impression management and performance... while unresolved cultural debates and avoidance of the thorniest issues marked the backstage of life”* (p. 85).
5. In sum, an organization has to do more than get busy changing their image toward recruitment that changes representation. There needs to be substantive, coordinated effort that may not be seen publicly. Key actions include a) making it normal to be improving multiple areas of policy and practice simultaneously, b) holding people accountable for the quality of their teaching, advising, and lab supervision, c) dedicating resources and rewards for work in these areas, and d) vocal support from leadership at all levels. Without these, change is not likely to touch the climate of micro-contexts like classrooms, labs, and advising relationships that are important to graduate students’ experiences and outcomes.
6. Chemistry exemplifies how systematically making change in one area can develop confidence and skill that makes other policy change less difficult. Confidence



3. How would the following reorientations change what actions a department takes:
  - a. refocusing from a goal of diversity to one of equity?
  - b. broadening from a focus on access to also include wellbeing?
  - c. changing from a strategy of impression management to one of organizational learning?
  
4. Additional notes you are thinking about as a result of the discussion with your colleagues:

## REFLECTION CHECKLIST

- Think about examples you have seen of organizations trying to manage optics on racial diversity, whether inside or outside of academia. This chapter has focused on negative consequences of impression management as a change strategy, but what are some positive consequences of communicating your diversity when it is an organizational reality? What would an ethical approach be to recruiting people from minoritized backgrounds when you don't have a record of success?
- Consider what the ideal conditions would be for your colleagues coming together to make equity an area of organizational learning or collective responsibility. If it is difficult to think of this in a general sense, pick a single area of policy/practice that you believe is important. What is likely to motivate your colleagues to change? Who is one person you can talk to about creating some structure for purposeful learning in this area?

## ADDITIONAL READING

Bensimon, E. M. (2005). Closing the achievement gap in higher education: An organizational learning perspective. *New directions for higher education*, 2005(131), 99-111.

Gildersleeve, R. E., Croom, N. N., & Vasquez, P. L. (2011). "Am I going crazy?!": A critical race analysis of doctoral education. *Equity & Excellence in Education*, 44(1), 93-114.

Kezar, A., Gehrke, S., & Elrod, S. (2015). Implicit theories of change as a barrier to change on college campuses: An examination of STEM reform. *The Review of Higher Education*, 38(4), 479-506.

Porter, K. B., Posselt, J. R., Reyes, K., Slay, K. E., & Kamimura, A. (2018). Burdens and benefits of diversity work: emotion management in STEM doctoral students. *Studies in Graduate and Postdoctoral Education*.

Posselt, J., Porter, K. B., & Kamimura, A. (2018). Organizational pathways toward gender equity in doctoral education: Chemistry and civil engineering compared. *American Journal of Education*, 124(4), 383-410.

Slay, K. E., Reyes, K. A., & Posselt, J. R. (2019). Bait and switch: Representation, climate, and tensions of diversity work in graduate education. *The Review of Higher Education*, 42(5), 255-286.

## CHAPTER 5: Inclusive Design & Disciplinary Boundary Work in Applied Physics

### SUMMARY

1. This chapter presents a case study of a PhD program that has, over the last 25 years, greatly increased its racial diversity to become a leader in the field. Central to how they did so was by creating an inclusive culture, and defining itself against a typical physics program.
2. Research identified specific types of change made over time, common to which was a “willingness to erase, relocate, or deactivate boundaries that had implicitly created barriers to access and inclusion for underrepresented students” (p. 89).
  - a. **It institutionalized a flexible, interdisciplinary paradigm** that privileged application of physics to other fields. Students of color and women spoke about the desirability of a program that actively valued the application of disciplinary knowledge, specifically to problems with social consequences.
  - b. **It reformed admissions and recruitment to align with a distinctive, more inclusive view of the ideal student** as “intellectually adventurous.” Leaders de-emphasized elements of an applicant profile that are conventionally valued in physics, but disproportionately found among already overrepresented populations. They created a bridge program, and developed respectful relationships with minority serving institutions, from which they recruited PhD students.
  - c. **It empowered administrative staff of color** as cultural translators across racial differences and across faculty-student status. Every person interviewed cited the importance of staff in recruiting students of color, supporting enrolled students directly, and/or helping faculty and program leaders understand Black student engagement. Cultural translation was also critical to resolving misunderstandings before they escalated.
  - d. **It created close, trusting relationships** (i.e., thinking of themselves as a family) that “*would set their climate apart from the more hierarchical, impersonal dynamics they say in other physics programs*” (p. 89). Every single person interviewed cited the ethic of care as important to the department’s culture, and every student mentioned it in reference to their decision to enroll and/or their satisfaction with their education.



3. The Applied Physics program actively worked to embed a unique standard of excellence-- “intellectually adventurous”-- into the design of its admissions process and curriculum expectations. This was an important cultural shift from the typical standard of “conventional achievement.” The shift enabled new ways of thinking about what knowledge, behaviors, and people would be valued.
  - a. In your own department or discipline, what forms of knowledge and behavior are most highly valued?
  - b. What implications does this have for equity and inclusion more broadly?
  - c. What policy levers could be pulled to shift the incentive or reward structure to broaden what knowledge and behavior are highly valued?
  
4. Additional notes you are thinking about as a result of the discussion with your colleagues:

## REFLECTION CHECKLIST

- This chapter talks about a variety of boundaries that are present in an academic department. What are the salient boundaries in your area of study or your experience?
- Reflect on how you have benefited from or been hurt by the established standards for access and advancement in your field. How have these standards affected your sense of belonging?
- Think about a department or program operating as a “family.” How does this change expectations on how people should interact? What are the limits on the usefulness of this metaphor?

## ADDITIONAL READING

Burgstahler, S. (2009). Universal Design in Education: Principles and Applications. *DO-IT*. <https://files.eric.ed.gov/fulltext/ED506545.pdf>

Lerma, V., Hamilton, L. T., & Nielsen, K. (2020). Racialized equity labor, university appropriation and student resistance. *Social Problems*, 67(2), 286-303.

Meyerson, D., & Tompkins, M. (2007). Tempered radicals as institutional change agents: The case of advancing gender equity at the University of Michigan. *Harvard Journal of Law & Gender*, 30, 303.

Patton, L. D. (2009). My sister's keeper: A qualitative examination of mentoring experiences among African American women in graduate and professional schools. *The Journal of Higher Education*, 80(5), 510-537.

Posselt, J. R., Reyes, K. A., Slay, K. E., Kamimura, A., & Porter, K. B. (2017). Equity efforts as boundary work: How symbolic and social boundaries shape access and inclusion in graduate education. *Teachers College Record*, 119(10), 1-38.

Schreffler, J., Vasquez III, E., Chini, J., & James, W. (2019). Universal design for learning in postsecondary STEM education for students with disabilities: A systematic literature review. *International Journal of STEM Education*, 6(1), 8.

## CHAPTER 6: Advocacy and Management in Astronomy and Physics

### SUMMARY

1. The book now moves from analyzing meso-level departmental equity efforts to the macro-level, through analysis of the organizational cultures of two disciplines' equity efforts.
2. Graduate education is known for its “**dual institutionalization.**” That is, it is organized by universities/ departments, as well as by disciplines.
3. Disciplines can influence field-wide movement toward equitable training in ways that align with **institutional isomorphism**, defined as “*conditions under which organizations in a field tend to converge on new models*” (p. 114)
  - a. **Coercive isomorphism** “*describes tendencies of people and organization to conform to the expectations of high-status resource providers*” (p. 114). Disciplinary societies & associations can effectively regulate or enforce equity-advancing behaviors by making them a condition of receiving resources such as accreditation, awards, or grants.
  - b. **Normative isomorphism** includes “*professional socialization processes [that] shape what whole new generations of members understand to be acceptable standards of practice*” (p. 114). Disciplinary societies have convening power through meetings and discourse-shaping power through their advocacy.
  - c. **Mimetic isomorphism** “*captures the tendency of people and organizations to model their behavior on the most powerful within a field*” (p. 115). The IGEN pilot led by the American Physical Society carefully selected six large, respected, selective, PhD programs with a recognition that if they changed their practices to become more equitable, that other programs that look to them as examples might also make such changes.
4. Broadly speaking, the organizational cultures of equity work in astronomy and physics correspond to what Berquist & Pawlak call advocacy and managerial cultures. These are bottom-up and top-down oriented, respectively, and both are needed to overcome institutional inertia: “*Advocacy can point out problems and recommend solutions, while managerialism has a role in implementing change*” (p. 141). In the long term, the learning focus inherent in developmental cultures, may also have a role, in helping sustain change. See also Chapter 4 on the role of organizational learning in achieving a virtuous cycle toward equity.

## DISCUSSION QUESTIONS

1. What current actions or resources does your main disciplinary society/ association have that are supporting change toward equity? How could it more effectively leverage one of the processes of isomorphism described?
2. Do you resonate more with advocacy or management when it comes to DEI work? Why do you think that is? What strengths come with your natural tendency? What might you be missing in defining and bringing about change as a result of your own internal tendency?
3. Bergquist & Pawlak originally argued that the advocacy culture is a reaction to the managerial culture because the latter is insufficiently concerned with people's needs. Have you ever seen this dynamic occur-- where an advocacy or activist movement developed in response to an impersonal, bureaucratic culture? What happened? How did it resolve?



Abbott, A. (2010). *Chaos of disciplines*. University of Chicago Press.

Bergquist, W. H., & Pawlak, K. (2008). *Engaging the six cultures of the academy: Revised and expanded edition of the four cultures of the academy*. John Wiley & Sons.

DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 147-160.

Greenwood, R., Suddaby, R., & Hinings, C. R. (2002). Theorizing change: The role of professional associations in the transformation of institutionalized fields. *Academy of Management Journal*, 45(1), 58-80.

Hodapp, T., & Brown, E. (2018). Making physics more inclusive. *Nature* 557, 629-632.

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

Rudolph, A., Basri, G., et al. (2018). Final Report of the 2018 AAS Task Force in Diversity and Inclusion in Astronomy Graduate Education.

<https://baas.aas.org/pub/2019i0101/release/1>

Stassun, K. G., Sturm, S., Holley-Bockelmann, K., Burger, A., Ernst, D. J., & Webb, D. (2011). The Fisk-Vanderbilt Master's-to-Ph. D. Bridge Program: Recognizing, enlisting, and cultivating unrealized or unrecognized potential in underrepresented minority students. *American Journal of Physics*, 79(4), 374-379

## CHAPTER 7: Retooling Science Through Cultural Translation

### SUMMARY

1. This final chapter presents themes that cut across the case studies. It synthesizes lessons in support of change efforts present and future. Across all settings studied:
  - a. There was at least one **cultural translator**, who “used the language and sensibilities of the existing culture to to communicate and collaborate across boundaries-- decoding, valuing, and applying new perspectives.
  - b. There was change to the criteria and processes used for admissions. For representation to change, evaluation and selection systems need updating to broaden what counts as merit.
  - c. In programs that sustained diversity over time and moved toward more equitable practices and inclusive cultures, faculty and other leaders
    - i. took seriously the quality of faculty-student interactions
    - ii. created holistic sets of policies & practices for supporting students.
    - iii. In addition, leaders displayed what Estela Bensimon calls equity-mindedness and Paulo Freire calls critical consciousness, “the ability to recognize and analyze systems of power and the commitment to intervene in those systems in order to change them” (p. 170).
2. The chapter also argues that we must begin to incorporate equity work into our expectations of what it means to do good science. This will take some **cultural retooling** on the part of most scientists: “learning new cultural knowledge (e.g., concepts, skills, practices, norms) in order to broaden the boundaries of effective professional practice.” Effectively selecting, serving, and conducting research with a more diverse population will take additional, different tools than those with which most graduate programs equip their students.
3. In any change process, resistance is to be expected. Perspective for some common arguments is presented on pages 160-163.
4. The standpoints we hold, the focus of our efforts, our priorities, and the theories we bring to change are four factors that can affect how different people view the same collaborative equity effort. In addition, two common sources of tension in collaborative change work are defining what success means beyond participation metrics and defining standards for leadership and decision making. Awareness that these can become issues is the first step to preventing them from undermining the work.

## DISCUSSION QUESTIONS

1. Among the inclusive practices listed on p. 147, which ones do you see at your institution? Given what you have learned in the book, what would be the risk in treating equity work solely like a checklist?
2. Holistic review is recommended for situations involving evaluations of students, and holistic support is recommended for improving interactions with students. What does holistic mean to you? What are a few things you could do to make your evaluations or support of students more holistic?
3. How could you and your colleagues better make visible, value, and incentivize the time and labor involved in equity work? For people of color and especially women of color involved in equity work, there is often an added layer of emotional labor: managing one's emotions to present in ways that do not reinforce negative stereotypes. Discuss how leaders could recognize and compensate this kind of labor.

6. Additional notes you are thinking about as a result of the discussion with your colleagues:

## REFLECTION CHECKLIST

- Revisit the reflection you did early in reading this book about being a cultural translator. What is their role? How could you play this type of role, given the types of perspectives you hold? For whom and what can you translate?
- Fundamentally, “*people are not particles*” (p. 149), which means the science of change and the science of racial equity work need to be approached differently than many of the questions natural scientists ask. What are you taking away from this book as especially important for stepping up the quality of your engagement in racial equity work? How will you commit to supporting systemic change in your department, university, and/or discipline?