

Ten simple rules for building an anti-racist lab

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NOTE: This article is written for inclusion in the [“Ten Simple Rules” Series](#) published by PLOS Computational Biology. There is a set format of only 10 rules and a title that begins with “Ten Simple Rules...”. We adhere to this format recognizing that 10 rules is far from exhaustive and that fostering an anti-racist lab won’t always be simple.

ABSTRACT

Demographics of the Science, Technology, Engineering, and Mathematics (STEM) workforce and student body in the U.S. and Europe continue to show severe underrepresentation of Black, Latinx, and Indigenous people. Among the documented causes of the persistent lack of diversity in STEM include bias, discrimination, and harassment of members of underrepresented minority groups (URMs). These issues persist due to continued marginalization, power imbalances, and lack of adequate policies against misconduct in academic and other scientific institutions. All scientists can play important roles in reversing this trend by shifting the culture of academic workplaces to intentionally implement equitable and

23 inclusive policies, set norms for acceptable workplace conduct, and provide opportunities for
24 mentorship and networking. As scientists are increasingly acknowledging the lack of racial and
25 ethnic diversity in science, there is a need for clear direction on how to take anti-racist action.
26 Here we present 10 rules to help labs develop anti-racists policies and action in an effort to
27 promote racial and ethnic diversity, equity, and inclusion in science.

28

29 **INTRODUCTION**

30 Racial and ethnic diversity in the Science, Technology, Engineering, and Mathematics
31 (STEM) workforce remains low, particularly at the Ph.D. level and above [1-3]. The May 2020
32 murder of George Floyd sparked a global uprising against systemic racism and police brutality
33 against Black people [4]. At the same time, racism faced by Christian Cooper while birding in
34 Central Park in New York City demonstrated the danger that Black scientists face in natural
35 spaces, including during scientific fieldwork and while being #BlackInNature [5]. Days later,
36 Black academics began sharing on social media thousands of harrowing stories accounting the
37 racism they face in academic institutions using the hashtag #BlackintheIvory [6]. On June 8,
38 2020, Black scientists initiated a global strike to eliminate racism and encouraged colleagues to
39 spend the day reading about anti-racism, reflecting on its pervasiveness, and developing anti-
40 racism plans of action [7].

41 Scientists increasingly acknowledge the problematic lack of racial and ethnic diversity in
42 science and are in search of clear actionable steps they themselves have the power to
43 immediately enact. Professional scientific organizations, universities, and departments all have
44 a role in developing programs and policies that promote racial and ethnic diversity, equity, and

45 inclusion (DEI). In addition, there are swift actions that research group leaders or primary
46 investigators (PIs) can take to build a lab environment that fosters a racially inclusive
47 environment and ultimately promotes DEI across scientific fields.

48 Scientists who are beginners to discussions of race, lacking guidance or background
49 knowledge, may adopt unevolved viewpoints or weak policies that unintentionally harm people
50 of color (POC) [8] or contribute to an erosion of trust among people of different racial or ethnic
51 backgrounds in a lab group. Harmful approaches include engaging in objectifying thought
52 experiments that question the instrumental value of POC in science; confusing race as a
53 biological entity as indicated by human genetic variation instead of a socially constructed
54 concept [9]; arguing that the unbiased nature of scientists precludes racial biases in science;
55 and hijacking discussions of race with anecdotes from other types of discrimination (e.g.
56 gender-based, class-based) without employing an intersectional framework [10]. As scientists of
57 color who actively engage in work to promote racial and ethnic DEI, we have encountered all of
58 these harmful scenarios and more.

59 Building a lab that is anti-racist is very different from building a lab that simply avoids
60 racism. Avoiding racism or stating that one's lab is "not racist" adopts a neutral stance in a
61 struggle that inherently has no neutrality [11]. As the scholar Ibram X. Kendi writes, "One either
62 allows racial inequities to persevere, as a racist, or confronts racial inequities, as an antiracist.
63 There is no in-between safe space of 'not racist.'" [12]. We support recent calls to promote the
64 health and well-being of lab members [13] and supportive lab groups that are resilient to
65 outside stressors [14]. But building an anti-racist lab goes beyond being kind, treating people
66 equally, or taking a color-blind approach. Being anti-racist means developing and supporting

67 anti-racist policies through ideas and action.

68 Many current and future PIs are looking for clear advice on how to move beyond
69 statements of solidarity and toward concrete achievable anti-racist action in their labs. We
70 share these 10 rules to contribute to anti-racist STEM discourse and help springboard scientists
71 toward immediate achievable action in realms under their control. It is our hope that partaking
72 in such actions will help lead to improved racial and ethnic diversity and inclusion in the lab and
73 successful scientific lives for all.

74

75 **Rule 1: Lead informed discussions about anti-racism in your lab regularly**

76 Most PIs would be appalled to learn about members of their lab group being victims of
77 racism. Unfortunately, both overt and covert racist incidents (e.g. microaggressions, tokenism,
78 white savior complex, tone policing, etc.) routinely occur in science labs and go unreported.
79 Unreported racism leads to isolation, anxiety, and stress among POC and can ultimately lead to
80 POCs leaving STEM fields. Part of the responsibility of a PI in creating a safe working
81 environment is developing a lab environment where lab members feel comfortable talking
82 about race and reporting racism, including individual, institutional, or systemic racism in society
83 and especially within academic workplaces [15]. Leading regular discussions on race signals to
84 lab members, POC and white, that racial discrimination is not tolerated and that silence is
85 implicit [16]. PIs should initiate conversations informed by readings and actively moderate them
86 to ensure that privileged individuals do not dominate the conversation and racial and ethnic
87 minorities are heard [17].

88

89 **Rule 2. Address racism in your lab and field safety guidelines**

90 Racist violence targets POC in the workplace and threatens the ability of students and
91 staff to work safely. Black and Indigenous people of color (BIPOC) are particularly targeted,
92 **even** in academic institutions and at research sites. Lab and field safety guidelines should be
93 written with the recognition that some lab members require additional supports to safely
94 conduct their work. Ask BIPOC lab members what you can do to facilitate their safety on
95 campus and in the field. PIs should advocate for BIPOC lab members who may be harassed or
96 harmed by campus security that think they don't "belong" in academic spaces. In the field, PIs
97 should familiarize themselves with any historical and contemporary racist climate present at
98 field sites and prepare accordingly. Provide POC with safety nets such as easy-to-see
99 identification, official-looking field apparel, or work buddies. An open dialogue about race will
100 encourage POC lab members to speak up about what measures they want or need to ensure
101 their safety.

102

103 **Rule 3: Publish papers and write grants with BIPOC colleagues**

104 The most important metrics of success in the academy are papers and grants.
105 Publications and grants are also key to tenure, promotion, and/or career longevity in the
106 academic STEM professions. More and more, the most impactful science is done in teams [18],
107 but collaboration networks can be insular. Supportive peer networks in STEM that involve
108 diverse voices produce better quality and highly cited publications [19]. Hence, the most
109 important thing anyone can do to improve the success and retention of BIPOC folx in STEM is to
110 provide opportunities for collaborations that lead to publications and grants. For scientists that

111 work with marginalized communities, it is particularly important to ensure POC are involved in
112 not just manual work but also provide opportunities to make intellectual contributions that
113 lead to publications and further funding. When organizing workshops or symposia, invite
114 scientists of color to co-lead and not just participate.

115

116 **Rule 4: Evaluate your lab's mentoring practices**

117 Building anti-racism into your lab's mentoring strategy begins with the recognition that
118 racial biases, conscious and unconscious, have the potential to taint mentor-mentee
119 relationships and hinder mentee success. POC mentees report racially-motivated gatekeeping
120 behaviors by mentors such as being advised not to pursue advanced degrees or prestigious
121 opportunities, receiving little mentorship in areas associated with issues of identity, tone
122 policing, and being advised to avoid politics (real and perceived) [20]. Increasingly in STEM,
123 multi-mentor models are being favored over one-on-one top-down mentoring relationships to
124 better center mentee needs and career goals [21]. PIs can help mentees build networks of
125 mentors outside of the lab or institution through culturally-relevant professional societies (e.g.
126 SACNAS) or strong online communities (e.g. #BlackandSTEM, #VanguardSTEM) that contribute
127 to a greater sense of agency and confidence and lead to increased academic success. This also
128 encourages lab members to think deeply about their various mentoring needs (e.g. substantive
129 feedback, sponsorship, professional development, emotional support) and take an active role in
130 cultivating their own science networks [22, 23].

131

132 **Rule 5: Amplify voices of BIPOC scientists in your field**

133 Read papers by BIPOC scientists in your lab group meetings, cite the work of BIPOC
134 scholars, and nominate BIPOC for awards. Social media outlets like Twitter are a good place to
135 identify BIPOC scholars that are in your field but outside of your professional bubble. When
136 amplifying BIPOC voices, ensure to highlight their science achievements and not just their
137 contributions to DEI. For example, if you want a BIPOC scholar to speak about DEI to your group
138 or department, first make sure they have a venue to speak about their science. Even if you have
139 a policy of not compensating speakers for presenting on their scholarly work, consider
140 compensating them for the extra labor of educating your community on DEI initiatives.

141

142 **Rule 6: Support POC in their efforts to organize**

143 Support the development of safe and brave spaces for POC to organize and discuss
144 issues surrounding race in the absence of white people. For students and trainees, provide
145 meeting space (and additional resources to facilitate effective discussions) where POC can meet
146 and share experiences without fear of retribution. Likewise, support faculty of color in efforts to
147 form separate identity affinity groups within your institution and/or professional organizations.
148 As scholars, we should not forget that our job literally is to educate and mentor the next
149 generation of scholars on how to identify barriers that affect our academic endeavors (including
150 issues related to justice, equity, and inclusion), and come up with plans of actions needed to
151 break down barriers that can prevent us from furthering scientific knowledge.

152

153 **Rule 7: Intentionally recruit BIPOC students and staff**

154 After working to foster an inclusive, anti-racist lab environment, PIs can begin to

155 evaluate their lab hiring practices for racial biases. This rule focusing on increasing lab diversity
156 is purposefully placed after the above rules, which prioritize efforts towards inclusion and
157 retention that should be addressed first. In recruitment efforts, do not assume racial or ethnic
158 identity from appearances or names; information should be collected from lab members or
159 applicants in a self-reported and voluntary manner. Many of the same efforts used to improve
160 equity in faculty hiring such as candidate and job ad diversity statements, reaching out
161 personally to promising candidates, and targeting listservs and databases (e.g.
162 DiverseScholar.org) also apply to recruiting BIPOC lab personnel and trainees [24].

163

164 **Rule 8: Adopt a dynamic research agenda**

165 PIs may be hesitant to hire prospective trainees or staff of color if their research
166 interests do not align closely with the specific research agenda of the lab. A flexible research
167 agenda that accommodates intellectual perspectives outside of the prevailing conversations in
168 one's field could not only help diversify the lab but also lead to more innovative science. URM
169 scholars produce higher rates of scientific novelty, but are also more likely to have their novel
170 contributions discounted and not incorporated into dominant paradigms [25]. PIs, by cultivating
171 dynamic research agendas, can amplify and champion out-of-the-box, innovative contributions
172 from scholars of color.

173

174 **Rule 9: Advocate for racially diverse leadership in science**

175 Too often, POC are encouraged to participate in the scientific endeavor in purely
176 supportive or subjugative roles. Go beyond mentoring POC scholars in your lab, to sponsoring

177 them (i.e. talk about them to others) to improve their chances of securing jobs, fellowships,
178 awards, and eventually leadership roles. Efforts to promote racial and ethnic diversity in science
179 must advocate for POC in leadership positions in labs, institutions, professional societies,
180 editorial boards, and funding agencies. Nominate POC for *status elevating* roles in science. Early
181 career scholars working in your group should feel empowered to get involved in leadership and
182 advocacy groups within the university and beyond. If possible, their labor in advocating for
183 leadership that addresses the needs of all members of the research group should be
184 accommodated including with provision of time and resources.

185

186 **Rule 10: Hold the powerful accountable and don't expect gratitude**

187 The goal of cultivating an anti-racist lab group is to improve a broader system with
188 known racial inequities. Recognize that white scientists are frequently lauded for DEI work
189 while people of color are punished for it [26]. Recognize the difference between performative
190 action and action that doesn't bring personal glory. We should educate ourselves on effective
191 bystander intervention techniques for addressing issues of inequity, harassment, and
192 discrimination. We should also be able to use accountability mechanisms in our own
193 institutions (if we don't have them, work to set them up) and hold our colleagues and ourselves
194 accountable for creating healthy workplace climates. Academics are noted for holding those
195 who mishandle text or data (plagiarize or fabricate data) accountable as we consider these acts
196 to be scientific misconduct. Well, if these constitute misconduct, then mistreating people who
197 do the research should definitely rise to the same level of concern and be considered scientific
198 misconduct too [27].

199

200 **CONCLUSION**

201 Scientific labs play an important role in confronting the racism that permeates our social
202 institutions and PIs are uniquely positioned to step up and be leaders in confronting this racism
203 in our everyday work environments. Despite the title of this paper, it may not be easy to rectify
204 the long history of racist behaviors and structures that permeate all scientific disciplines [28].
205 However, as leaders in science, it is our responsibility to take action and simple concrete steps
206 can and must be made toward addressing individual, institutional, and systemic racism. The
207 work in our labs can begin today - no additional committees, focus groups, or surveys are
208 required.

209

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215

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