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Permalink

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Journal

Journal of Environmental Studies and Sciences, 15(1)

ISSN

2190-6483

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Publication Date

2025-03-01

DOI

10.1007/s13412-024-00995-1

Peer reviewed



Cultivating anti-racism in the classroom and beyond through collaborative learning in the environmental sciences

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Accepted: 18 November 2024 / Published online: 21 December 2024

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Abstract

Spurred by nationwide protests against anti-Black violence in the summer of 2020, academic departments across the USA saw an uptick in efforts to integrate belonging, diversity, equity, justice, and inclusion initiatives into their programs. In this vein, graduate students in the Department of Environmental Science, Policy, and Management at the University of California, Berkeley, developed and led a semester-long course, “Critical Engagements in Anti-Racist Environmental Scholarship.” The course cultivated anti-racist mindsets through collaborative learning and action projects. We designed and taught the class as a team of doctoral students, and course participants consisted of faculty, staff, postdoctoral scholars, and other graduate students, thus disrupting traditional academic power structures. In this article, we draw on our experiences from two years of developing and teaching this course. We begin by outlining our theory of change, depicted as a tree rooted in our pedagogical approach, which ultimately bears the fruit of anti-racist mindsets and actions. We then provide an overview of our pedagogical approach, which includes attending to the roots of curriculum, classroom structures, and teaching practices. Next, we highlight the four key elements of the course’s success: (1) *Centering Black voices and experiences*, (2) *Flattening academic hierarchies*, (3) *Fostering a community of learners*, and (4) *Developing action-oriented mindsets to sustain long-term anti-racist praxis*. To conclude, we reflect on the successes and challenges of this approach two years later. Overall, this article shares our experiences conducting an environmental sciences-specific version of this course, with the understanding that this model can be adopted by other departments seeking to implement anti-racist praxis through coursework and long-form professional development training for academics.

Keywords Anti-racism · Critical environmental scholarship · Pedagogy · Collaborative learning · Departmental culture · Professional development

Whitney Mgbara and Rosalie Zdzienicka Fanshel contributed equally.

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In 2020, the deaths of George Floyd, Breonna Taylor, Ahmaud Arbery, and Jacob Blake challenged higher education in the USA to reckon with racist organizational structures. Inspired by Black Lives Matter protests, pedagogical movements foregrounding anti-racism, diversity, equity, inclusion, and justice (e.g., Bratman and DeLince 2022; Denson and Chang 2009; Engle et al. 2024; Kishimoto 2018; Sleeter 1996), and decades of student-led organizing at the University of California, Berkeley, a diverse collective of graduate student leaders in the Department of Environmental Science, Policy, and Management (ESPM) came together to challenge what they felt to be insufficient departmental and campus-wide responses to national calls for change *and* ongoing instances of overt racism and anti-Black violence at Berkeley (Roberts-Gregory

2020; Rodríguez 2012; University of California Chancellor's Independent Advisory Board on Police Accountability and Community Safety 2020; University of California, Berkeley, Office of the Chancellor 2019; Watanabe 2020). This effort was led by the ESPM Graduate Diversity Council, a graduate student organization, and took two primary forms. First, Graduate Diversity Council members wrote a letter to faculty detailing a list of demands for departmental anti-racist action (Environmental Science, Policy, and Management Graduate Diversity Council 2020). Second, five Graduate Diversity Council members, all authors of this article (presented in Table 1), developed a 16-week course entitled "Critical Engagements in Anti-Racist Environmental Scholarship" (hereafter called the Course) for faculty, staff, graduate students, and postdoctoral scholars in ESPM.¹ In creating this course, we moved beyond the limitations of one-time, mandatory anti-bias/diversity training (Devine and Ash 2022; Dobbin and Kalev 2016; Onyeador et al. 2021; Pendry et al. 2007) to foster meaningful learning across multiple professional positions and personal identities, similar to other anti-racist long-term trainings/courses developed during this period (e.g., Morriss et al. 2024). We worked toward anti-racist praxis in our department by interrogating how anti-Black racism and intersecting oppressions structure academia, specifically in Western academic institutions and the environmental sciences (e.g., Dancy et al. 2018; Marín-Spiotta et al. 2020; Miriti et al. 2020; Mustaffa 2017; Schell et al. 2020). We first held the Course in the fall of 2020, followed by a second iteration in fall 2021,² which expanded to include the Department of Plant and Microbial Biology.³

The environmental sciences, as an interdisciplinary field that spans both academia and non-academic agencies and organizations, seeks solutions to environmental problems that are often racialized. However, as a discipline and in practice, environmental sciences largely eschews engaging with racial justice in research, education, and practice (Cronin et al. 2021; Marín-Spiotta et al. 2020; Miriti et al. 2020; Schell et al. 2020). Relatedly, environmentalist spaces in the Global North tend to be majority white, despite the fact that those most often on the frontlines of environmental harm and most intimately fighting against and working to create solutions to these harms

are Communities of Color, particularly Black communities (e.g., Finney 2014; Mascarenhas 2024). To counteract these trends and to center anti-racism in environmental research, education, and scholarship, current and future researchers, educators, and leaders need to be trained in anti-racist frameworks.

In this article, we describe and reflect upon the development and implementation of the Course, highlighting the institutional context in which it was built. Using a tree-based diagram (Fig. 1), we outline important elements of our pedagogical approach, which include curriculum, classroom structures, and teaching practices. We then lay out four key lessons for implementing similar courses: (1) Centering Black voices and experiences, (2) Flattening academic hierarchies, (3) Fostering a community of learners, and (4) Developing action-oriented mindsets to sustain long-term anti-racist praxis; all with the goal of creating change in individual mindsets and within our organizational proximities facilitated by the "learning-by-doing" approach of Collaborative Action Projects. Lastly, we conclude with a reflective discussion on our theory of change and the difficulties of enacting anti-racist change from within Western academic institutions.

Organizational context

During the feverish process of designing the course, the teaching team was knowingly and unknowingly influenced by the rich tradition of graduate student-led anti-racist organizing across the USA and the globe (e.g., Chu et al. 2022; Lantz et al. 2016; Museus and Sifuentez 2021; Rhoads 2016). We specifically want to highlight the local institutional context that influenced this course's development. The University of California, Berkeley, is a large, historically white land grant university situated in a racially and ethnically diverse urban area. Berkeley students have a long history of organizing around race and racism, using a variety of social movement strategies. For example, during the Free Speech Movement of 1964–1965 (Cohen and Zelnik 2002) and the Third World Liberation Front actions for the creation and continuation of ethnic studies in 1969 and 1999 (Dong 2009; Taylor 2010, University of California, Berkeley, Center for Race and Gender 2019), students staged sit-ins, teach-ins, and strikes to push the University to address race and racism in the academic curriculum and in policies around student admissions and conduct. More recently, in 2014–15 as part of the burgeoning Black Lives Matter movement, students in the Berkeley Black Student Union successfully protested for a set of demands including the creation of the Fannie Lou Hamer Resource Center as a gathering space for Black students (Dawson 2023; Parham 2016).

¹ Across the 2020 and 2021 iterations of the course there were 71 participants, including the teaching team: 42 PhD students, 2 masters students, 7 postdoctoral scholars, 17 faculty, and 2 professional staff.

² This article speaks to the first two iterations of the Course. In spring 2023, a "Deeper Dive" version of the Course was offered for alumni of the first two course iterations, and a third iteration of the original course was taught again in fall 2023.

³ Lorenzo Washington, an author on this article, a 2020 course participant, and member of the 2021 teaching team, was instrumental in expanding the course to include his home department, Plant and Microbial Biology.

Table 1 Author positionalities

Team member	Year of doctoral program graduation	Institutional position (Fall 2020; Y1)	Course role (Fall 2020; Y1)	Course role (Fall 2021; Y2)	Disciplines	Salient identities
Whitney Mgbara	2023 ^a	4th-year PhD student ^a	Teaching team/course development	Course development	Environmental Health and Epidemiology	Female, cis-gender, Nigerian-American
Rosalie Zdzienicka Fanshel	2025 (expected) ^a	2nd-year PhD student ^a	Teaching team/course development	Student participant/research observer	Critical University Studies and Agri-Food Systems	Non-binary, gay, white/Jewish, lower-working class background
Kenzo Esquivel	2024 ^a	2nd-year PhD student ^a	Teaching team/course development	Teaching team	Agroecology	Male, cis-gender, queer, mixed-race (Mexican-Japanese)
Natasha Shannon	2026 (expected) ^a	1st-year PhD student ^a	Student participant	Course development/speaker support	Political Ecology and Critical Agrarian Studies	Female, cis-gender, white, low-income background
Phoebe Parker-Shames	2022 ^a	5th-year PhD student ^a	Teaching team/course development	Teaching team	Conservation Ecology	Female, cis-gender, queer, white/Jewish
Damian O. Elias	2005 ^a	Professor ^a	Student participant	Teaching team	Animal Behavior and Evolutionary Biology	Male, cis-gender, Mexican-American, first generation
Lorenzo Washington	2024 ^b	3rd-year PhD student ^b	Student participant	Course development	Plant Biology	Male, cis-gender, queer, Black mixed-race, first generation
Aidee Guzman	2021 ^{a,c}	6th-year PhD student ^{a,c}	Teaching team/course development/lead GSI	N/A	Agroecology	Female, cis-gender, Mexican-American, first generation

All authors are/were affiliated with the University of California, Berkeley. Salient identities are all in the authors' own words

^aEnvironmental Science, Policy, and Management

^bPlant and Microbial Biology

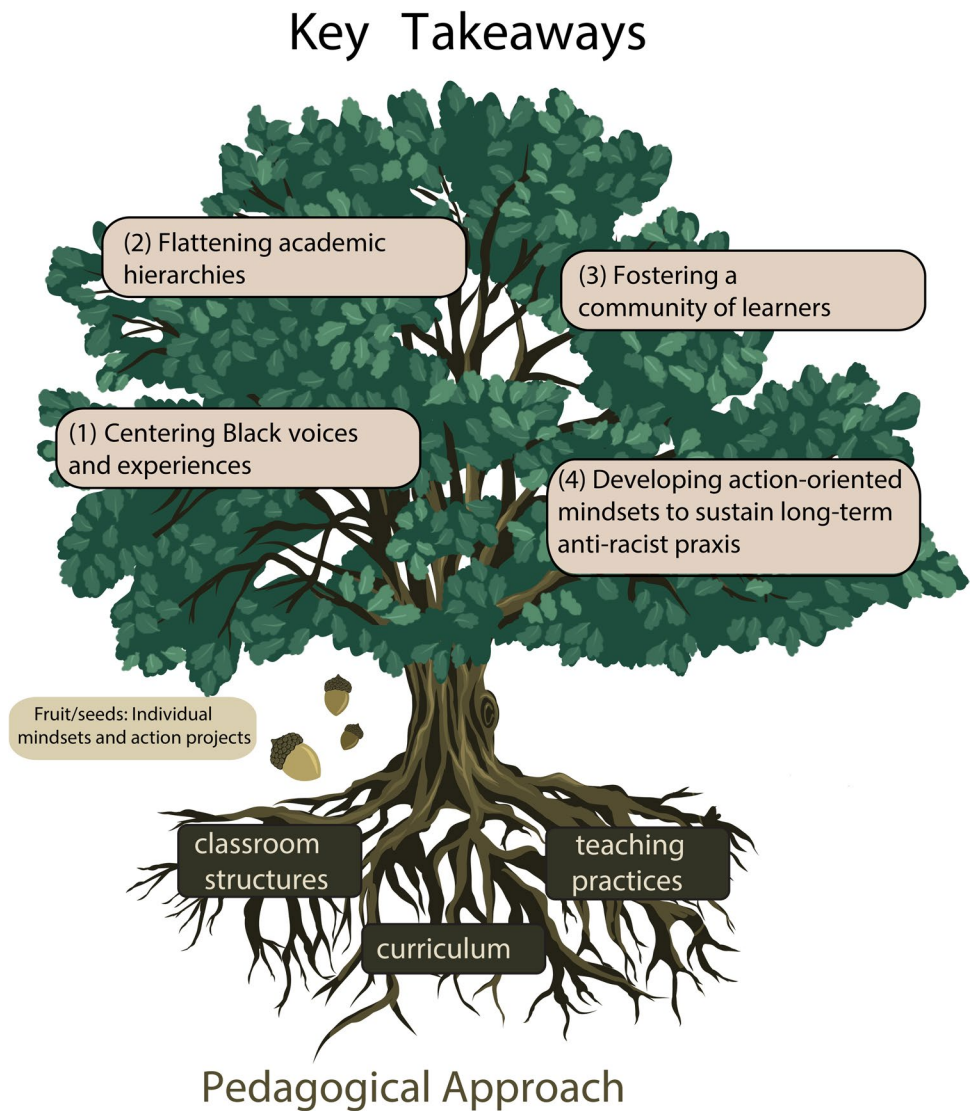
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At the same time, there is a long history of Berkeley student protests in regard to environmental curriculum and research (Rome 2003, Rudy et al. 2007). Sometimes causes centered on racism and environmentalism coalesce, as in the formation of student groups with dual aims. For example, the Berkeley Students of Color Environmental Collective was formed in 2015 to provide “a space for students of color to seek refuge from white-dominated environmental and social justice spaces...to foster conversation about environmental racism and justice” (Students of Color Environmental Collective n.d.). Around the same time, the ESPM Graduate Diversity Council emerged as a departmental student organizing body to create a space to support graduate students of color (particularly Black students) and advocate for anti-racist actions within the department. In 2014, Dr. Carolyn Finney, the only Black woman faculty in

ESPM and Rauser College of Natural Resources as a whole,⁴ was denied tenure. In response, the Graduate Diversity Council wrote a public letter to University of California, Berkeley, and departmental leadership and published an article in the University of California, Berkeley, student policy journal criticizing the decision and urging reforms in the tenure process (Environmental Science, Policy, and Management Graduate Diversity Council 2014; Corbin et al. 2015). Notably, many of the anti-racist organizing actions described here were aimed at changes to academic curriculum and/or used pedagogy as a movement organizing tool.

⁴ ESPM is one of five departments/graduate groups in the Rauser College of Natural Resources.

Fig. 1 Pedagogical approach. We represent our course strategy as a tree, where the pedagogical approaches are the roots nourishing our change-making, our key takeaways (detailed below) are the branches that emerge out of our change-making process, and our results (mindset changes and the Course's Collaborative Action Projects) are fruits and seeds of our work that may inspire further change



Anti-racist pedagogy and theory of change

Our aim in creating the Course was to instigate conditions to enact long-lasting anti-racist change in academia, using an anti-racist classroom pedagogical approach incorporating experiential learning and facilitating tangible outcomes through Collaborative Action Projects. Scholars in this anti-racist pedagogical tradition are focused on the explicit goals of instigating social change with regard to racism. They distinguish anti-racist pedagogy from multicultural education and diversity efforts, as the latter lacks critical analysis of structural racism and power relations (e.g., Blakeney 2005; Kandaswamy 2007; Kishimoto 2018). For our Course, our iterative, working definition of anti-racism was the active, non-neutral confrontation of racial inequities via design,

practice, and application of the following: lifelong learning, action, and critical self-reflection on racism; recognizing and challenging white supremacy in interpersonal and organizational-level interactions; and community accountability for racial equity and justice in micro-, meso-, and macro-practices and outcomes (after Chavez 2012; Kendi 2019; Welton et al. 2018). We also used this definition to interrogate key racialized elements of the founding, structuring, and pursuit of environmental sciences as a discipline.

Our initial pedagogical decision-making drew on our experiences with the racist, violent academic structures we wished to disrupt. Now, to understand and illustrate which course components were most successful in fostering anti-racist change and why, we primarily pull from the rich scholarly traditions of critical race theory, critical pedagogy, and social

movement and organizational theory. In the spirit of reflective articles on developing and instituting anti-racist pedagogy (e.g., Ikeda et al. 2021; Kishimoto 2018; Teel 2014; Wagner 2005; Zembylas 2012), we also draw on our lived experiences, roles as scholars in environmental sciences, collective dialogue as a teaching team, participant feedback, and theory-oriented reflection. In designing the first iteration of this course, we sought to cultivate “internal change agents” (Cox 2001; Hartley et al. 1997; Patrick and Fletcher 1998) in our academic circles by bringing course participants together in a community of learners (Brown and Campione 1994; Matusov 2001; Rogoff et al. 1998) to collectively examine the structures and processes of our department(s) through an anti-racist lens. We hoped that by instigating changes in individual mindsets and actively applying lessons learned to our immediate organizational contexts, course participants would go on to enact, facilitate, and support broader anti-racist institutional change(s) beyond the course (Welton et al. 2018).

Here, we illustrate how the Course’s pedagogical approach—made up of curriculum, classroom structures, and teaching practices (Morales-Doyle 2017)—served as the foundation for these change-making goals, providing the conditions to nurture our anti-racist community. We highlight the curricular content of the Course, made up of six modules that built upon each other; our radical disruption of traditional academic hierarchies through innovative classroom structures; and distinct teaching practices such as “two-way participant interviews” and the Collaborative Action Projects, which encouraged the reciprocal relationship between theoretical course concepts and experiential realities by implementing anti-racist organizational changes in our departments (see “Pedagogical approach,” below). These conditions are captured by four key takeaways (presented in Fig. 1). We understand the fruits and seeds, so to speak, born of these efforts to be both changes to individual mindsets and the Course’s Collaborative Action Projects, as anti-racist mindsets do not create change without action, and anti-racist action can simultaneously inspire mindset changes (Welton et al. 2018). We hope that these outcomes and takeaways can serve to inspire and catalyze change in other departments, colleges, and institutions.

Pedagogical approach

In applying our change-making approach to an academic setting, we looked to the field of critical pedagogy, which attempts to “understand how power works through the production, distribution, and consumption of knowledge within particular institutional contexts and seeks to constitute students

as informed subjects and social agents” (Giroux 2010, p. 717). *Anti-racist* critical pedagogy explicitly serves as “a method for addressing race, ethnicity, power, and class” (Blakeney 2005, p. 121). For our course, we worked to examine and challenge these power dynamics through three key components of pedagogy: *curriculum, classroom structures, and teaching practices* (Morales-Doyle 2017). We see these pedagogical components as foundational roots for change-making in academic settings, from individual to institutional scales. Here, we define and briefly outline these three components.

Curriculum

We define curriculum as the organization of course topics and materials. In our course, the curriculum consisted of six-course modules, outlined below. In choosing topics and designing the syllabus, we sought specifically to interrogate the hidden curriculum that ideologically informs academic culture in environmental sciences (Bang et al. 2012; Hansson 2018; Kelly 2009). Each module included learning objectives that built upon knowledge developed in prior modules and topically relevant guest speakers (see Table 2 for a summary of all modules).

Course modules

We began first with a module on “Framing the Conversation,” which aimed to lay community foundations of mutual trust and develop a shared working language around anti-racism, structural and institutional racism, and intersecting oppressions. The second module, “Centering Black, Indigenous, and other People of Color’s (BIPOC) Voices,” worked to decenter whiteness in environmental scholarship through a theoretical exploration of the centering concept (e.g., Price et al. 2020) and by uplifting the lived experiences and scholarship of minoritized environmental scientists. While the module title used the term “BIPOC” to allow future course iterations to highlight a diverse set of voices, in the 2020 and 2021 courses, we specifically sought out Black speakers to counter anti-Black racism given events at the time of course conception (Dancy et al. 2018; Fasching-Varner et al. 2015; Mustafa 2017; Smith et al. 2006). The decision of whose voices and scholarship to focus on in this module is critically important in order to ensure that minoritized experiences and viewpoints are authentically and compassionately represented. Our choice to center Black voices was based on the particular socio-political context of 2020 and, more importantly, on the histories of environmental injustices facing Black communities and their exclusion from the professional spheres of environmental sciences (Finney

Table 2 Fall 2020 course modules

Overall course vision and learning objectives	<ul style="list-style-type: none"> • Foster growth, both at the personal and community level within the Department of Environmental Science, Policy, and Management at the University of California, Berkeley, in our understanding of the racist structures and cultures that exist in academia • Develop an anti-racist praxis around environmental scholarship • Uplift the voices and lived experiences of racially minoritized scholars in environmental science and adjacent fields represented in the Department of Environmental Science, Policy, and Management • Provide the tools necessary for faculty, postdoctoral scholars, staff, and graduate students to act on anti-racist values to create tangible change in our community and beyond
Module	Module goals and learning objectives
1: Framing the conversation	<p>Goal: Begin building community, mutual trust, and a common working language. Get excited about learning together</p> <p>Learning objectives:</p> <ul style="list-style-type: none"> • What is the difference between an anti-racist and a non-racist? Why is it important to be an anti-racist? • What steps can we take to practice (or learn more about) anti-racism? Preview of the work ahead • What is intersectionality? This class is framed around racism but recognizes how it relates to other forms of oppression
2: Centering BIPOC (Black, Indigenous, and other People of Color) voices	<p>Goal: Engage as anti-racists scholars by being open to people with different identities</p> <p>Learning objectives:</p> <ul style="list-style-type: none"> • What does it mean to center racially minoritized—specifically Black—voices? Why is it important? • Recognize how socially constructed viewpoints of Black intelligence and competencies decenter them as learners in educational institutions • Describe, understand, and listen to racially minoritized scholars' works, research, and/or lived experiences
3: Advising and mentoring	<p>Goal: Identify common problems that racially minoritized (and all) graduate students encounter and provide guidelines for creating collaborative learning mentor–mentee relationships</p> <p>Learning objectives:</p> <ul style="list-style-type: none"> • How do student and faculty identities and lived experiences play out in the mentor–mentee relationship? • Recognize that mentees are not reservoirs for faculty ideas but rather younger colleagues
4: Improving academic settings in environmental science A: The lab B: Recruitment, retention, and department culture C: The classroom	<p>Goal: Unpack the culture of the Department of Environmental Science, Policy, and Management as it relates to fostering inclusive spaces for faculty, staff, graduate and undergraduate students, and postdoctoral scholars of color</p> <p>Learning objectives:</p> <ul style="list-style-type: none"> • How to create an intentionally anti-racist and inclusive culture in lab groups, department at large, and classroom
5: Engaging in the research process in environmental science A: Colonialism B: Fieldwork	<p>Goal: Examine how identity influences the research process and gain tools to decolonize the research process, particularly in fieldwork</p> <p>Learning objectives:</p> <ul style="list-style-type: none"> • How do the history and context of colonialism influence the goals and methods of research both in the USA and abroad? • What role(s) do researchers play in perpetuating neo-colonialism and how do we decolonize our research? • How is an individual's approach to fieldwork (including field safety) affected by different identities?
6: Scaling out	<p>Goal: Transgressions against racially minoritized scholars do not occur in a vacuum. Racially minoritized scholars are faced with challenging situations, ideals, and people beyond the campus and into their communities. We must address these issues within academia and beyond. How can we apply what we have learned in a broader context?</p> <p>Learning objectives:</p> <ul style="list-style-type: none"> • Understand that anti-Black ideals are represented beyond academia in environmentalism and environmentalist spaces (NGOs, government agencies, industry) • What is the importance of keeping track of the state of diversity in environmental organizations? • How can we increase co-conspiratorship in these spaces?

See Supplementary materials 2 for a download link to the full syllabi for the 2020 and 2021 iterations of the course

2014; Graves 2019; Hayes 2020; Mascarenhas 2024; Miriti et al. 2020; Schell et al. 2020). Similar arguments could be provided for centering other minoritized voices, for example, Indigenous scholars.⁵ Importantly, the goal of the module must be to “decenter whiteness” and embed racially minoritized perspectives in all subsequent modules/discussions.

After rooting the course in the development of a shared (if by definition never “finished”) understanding of anti-racist principles and the centering of minoritized voices, we then spent the next three modules drilling into specific structures and processes embedded within environmental sciences departments and academia more broadly. For each of these modules, we aimed to expose and untangle harmful power dynamics and engage in alternative anti-racist praxis. We began with module 3 on mentorship, as it is a throughline that influences every aspect of one’s experience in academia—it can be a site of generative affirmation or harm, or often an ambiguous mix of the two (Estrada et al. 2018a),⁶ with worse outcomes for racially minoritized individuals (Estrada et al. 2018b; Griffin et al. 2020; Martinez-Cola 2020; McCoy et al. 2015, 2017). Here we offered tools for creating collaborative, multi-directional relationships between mentees and mentors (Estrada et al. 2018a; Montgomery 2017). In module 4, we honed in on organizational structures that are particularly relevant in environmental sciences departments: inclusion and belonging in lab culture (Berkeley Agroecology Lab 2020; Chaudhary and Berhe 2020; CLEAR 2021), power dynamics in author order (Liboiron et al. 2017), racially minoritized faculty recruitment and retention (e.g., Fasching-Varner et al. 2015; Harley 2008; Harris 2017; Stanley 2006), and disability justice in the classroom (Garcia 2020; Karpicz 2020; Shelton 2020). Module 5 focused on colonialism in the research process, particularly the colonial origins and imperialist deployment of environmental sciences subdisciplines (Gray and Sheikh 2021; Raby 2017; Roy 2018) and how environmental sciences training and fieldwork have perpetuated the logic of both settler and exploitation colonialism (Bang et al. 2012; Nejadmehr 2020; Smith 2012). Readings and activities emphasized the inherently political nature of science and the research process, encouraging participants to consider how both their fields’ colonial orientations and their own identities impact how they conduct their research, from research questions to research methods (i.e., data collected and evaluated) to manners of engagement with landscapes and communities (Free Radicals 2020).

The sixth and final module, “Scaling Out,” expanded beyond academia to discuss racism—and anti-Blackness

specifically—in the environmental movement at large. Topics for readings and discussions included the racist foundations of majority-white, eugenics-affiliated conservation movements (Brune 2020; Purdy 2015) and the continuing lack of diversity in leadership of mainstream environmental organizations (Taylor 2014), despite increased attention to environmental racism and social equity (Jennings and Osborne Jelks 2020). We emphasized the importance of pursuing anti-racist action beyond the ivory tower, which is particularly vital in departments such as Environmental Science, Policy, and Management, where a large portion of graduate students go on to seek environmental careers outside of academia.

Classroom structures

In addition to carefully crafting course curricula, we also fostered sustained engagement through intentional classroom structures, which included interdependent components of sharing authority, designing tasks, and evaluating students (Ames 1992). To allow participants to grapple with the material through cycles of inquiry (Engeström 2001), we sought to flatten academic hierarchies, hold all participants accountable to learning, and promote active learning. We provide an overview of our approach here and provide more specifics for implementation in Supplementary materials 1.

Reframing authority

Academic hierarchies, which often threaten classroom participants’ sense of safety, drastically exacerbate the type of discomfort that accompanies anti-racism work (Esmonde and Booker 2017; Freire 2018; hooks 1994). We created two intentional structures to foster “classroom counterspaces” (Masta 2021) that attempted to ameliorate these harmful academic hierarchies. First, the Course was co-taught by a five-graduate student teaching team rather than a single faculty member,⁷ and participants included faculty, staff, postdoctoral scholars, and graduate students. Second, from the beginning, we framed the teaching team as non-experts intent on learning alongside course participants. Each session was developed and collaboratively co-led by rotating members of the full teaching team, and our intersectional identities and diverse disciplinary backgrounds informed how each of us “showed up” in the space. By modeling the active questioning of “inquiry-as-stance” (Cochran-Smith and Lytle 2009) and designing and delivering highly participatory course content and classroom tasks, we aimed to create an overarching ethos of a “community of learners” (Brown and Campione 1994; Matusov 2001; Rogoff et al. 1998).

⁵ The fall 2023 iteration of the Course-centered Indigenous scholars and understandings of Native identity to focus on socio-political issues that had emerged in our department.

⁶ Estrada’s emphasis on micro- and macro-affirmations in addition to the more commonly addressed micro- and macro-aggressions (Estrada et al. 2018a) was particularly impactful for the class, as expressed in course evaluations (see Supplementary materials 3).

⁷ One faculty member worked with the teaching team in 2020 to navigate administrative requirements and provide input on course development but entered the classroom as a co-learner.

Designing tasks for active learning

As we designed this course during the early stages of the COVID-19 pandemic when in-person classes were not possible, we sought to incorporate online classroom tasks that would foster active learning (Harris et al. 2020). We enhanced the intimacy and accessibility of the remote learning environment through the use of Zoom chat features, professional captioning, live-time polls, and frequent use of breakout rooms. We also created action-oriented classroom assignments designed to facilitate applied learning in addition to reading and discussion (see “Teaching practices” below for more detail).

Participant evaluation and accountability

Our method for participant evaluation also intentionally disrupted academic hierarchies. We took an “ungrading” approach (Kohn and Blum 2020): graduate students received a “credit/no credit” rather than a letter grade, with engaged participation—understood as a shared commitment to the community and learning goals—as the evaluation criteria. We want to acknowledge that the use of upgrading can come with risks, especially for BIPOC or otherwise minoritized students (when grades are used as scholarship and job criteria) *and* instructors (when disrupting expectations can affect teaching evaluations). As McCloud (2023, p. 102) cautions, in the context of how white supremacy structures academia, “Removing grades from the classroom presents a challenge when other areas of the institution use grades as currency.” In the context of this specific course, we feel that ungrading was still an effective tool for reducing pressure to perform “correctly,” particularly given that the Course was elective and accompanying grades thus unlikely to have a strong future impact. While course participants of all positions were considered student peers, technically only graduate student members of the class were enrolled in official course units. The teaching team was concerned that faculty, staff, and postdoctoral scholar members in particular would attrit as the semester progressed. To counter this risk, each faculty, staff, and postdoctoral scholar participant signed an agreement to commit to full participation in the course at the same level of credit-receiving graduate students: attending all course sessions, actively engaging in the classroom, and completing all assignments. This strategy was effective in 2020 but less so in 2021, likely due to greater commitments that faculty and staff in particular faced with the return to in-person activities.

Teaching practices

Here, we provide examples of specific practices and assignments we used to foster dialogue and collaborative learning between all course participants, regardless of formal academic position. In designing our teaching practices, we relied on Freire (1994, 2018), hooks (1994, 2003), and other

critical pedagogical visionaries to disrupt “banking models” of curriculum delivery that view learners as empty boxes to be filled by instructor expertise. Rather than this one-way approach, we favored multi-directional, community-based learning. See Supplementary materials 1 for more detailed descriptions of several practices outlined below.

Two-way participant interviews

One of the most effective teaching practices in the 2020 course was the use of “two-way interviews” to present curricular concepts through the lived experience of course participants who had progressed through a number of ecological and environmental sciences departments throughout their academic training. For these sessions, the two leads prepared a series of questions for each other in advance and then held a live, free-flowing conversation on these topics during class. All other course participants served as witnesses, respectfully holding the space for the two speakers. After 45 min of the two-way interview, we then opened the conversation up to all participants to ask follow-up questions of the speakers, contribute their own experiences on the same topics, and reflect on their reactions to colleagues’ stories. In 2020, we conducted two-way interviews between two graduate students and then two faculty members; in 2021, we had a faculty panel with a similar structure. This teaching practice was particularly powerful for community-building because it allowed space for participants’ intense emotional responses to their colleagues’ vulnerable, resilient, and honest perspectives on navigating the department, academia at large, and environmentalist spaces. Inviting emotion into the classroom enhances intercultural learning (Jokikokko 2016; Zembylas 2008).

Inclusive selection of guest speakers and topics

Another core teaching practice was our inclusion of guest speakers as part of each module. Our desire to center Black scholars meant we wanted to provide a platform for them to share their expertise in environmental sciences. By engaging with Black scholars about their academic subjects and assigning their publications as required readings, the course worked to dismantle racist assumptions about Black intelligence (Evans-Winters 2014) and position Black scholars as holders of environmental knowledge. Of note, to uphold our commitment to compensating Black scholars for their time and expertise, guest speakers, when possible,⁸ were paid for their contribution to the course. As at the University of

⁸ The Rausser College of Natural Resources’ policy is that university funds cannot be used to pay honoraria to University of California employees, so we were unfortunately unable to pay honoraria to every single guest speaker, despite our best efforts.

California, Berkeley, courses are not given funding for such expenses, the teaching team fundraised through the campus Office of Graduate Diversity for speaker honoraria.

Balancing lecture and dialogue

In addition to guest speakers, the teaching team often provided brief introductions or summaries of topics, readings, and modules. At the same time, we tried to minimize lectures and “sage on the stage” teaching models (King 1993) to emphasize flattened classroom hierarchies. To maintain this balance, we interspersed lecture components with opportunities for class participants to share their understandings and learnings from readings through full group discussion, small group discussion, and pair-shares (see below).

Peer-to-peer learning

To forefront our “community of learners” ethos, in every session we balanced time spent as a whole class, in small group or pair discussions, and in individual reflection. Breakout rooms in Zoom facilitated this mix of practices. Small group activities provided the opportunity to exercise deep listening (Sangha and Bramesfeld 2021), for which we provided explicit guidance. When placing course participants into small group breakout rooms, we were intentional that a mix of faculty, staff, postdoctoral scholars, and graduate students were present. After breakout rooms, we held full group reportbacks. Keys to impactful reportbacks were as follows: providing clear but participant-driven instructions on what to share back; having participants choose a group spokesperson in advance; and allocating adequate time for each group to share discussion highlights as well as time for full group conversations.

Course assignments

Assignments served several key purposes: preparing participants for class discussion, providing an opportunity to reflect on learnings, and catalyzing Collaborative Action Projects (see below). Assignments included weekly readings and written reflections in response to prompts about key takeaways from the previous week, lingering questions, and how participants might apply new learnings into their daily lives (e.g., in the lab, in the classroom, or beyond). We also held one online discussion forum per module.

Collaborative Action Projects

The closing course assignment was a Collaborative Action Project, an active learning approach utilizing the reciprocal relationship between theoretical course concepts and the

experiential realities of implementing defined anti-racist projects. The goal of the project assignment was to facilitate change in both the learner’s mindsets and our proximate organizations, both represented as fruits and seeds in our conceptual diagram (see Fig. 1). Teams of mixed positions (students, postdoctoral scholars, staff, and faculty together) developed action plans to extend beyond the end of the course. The projects, which received unanimous feedback as one of the most effective aspects of the Course, wove together pedagogy, participatory research, and activism (Freire 2018; Hale 2008) by enabling participants to practice change-making at the scale(s) of individual labs, the department, and the college. Topics ranged from creating a departmental disability justice guide to writing a lab-based anti-oppression plan to conducting an anti-racist assessment of ESPM’s undergraduate Food Systems Minor (see Table 3 for all final projects from 2020 to 2021, and Box 1 for a more in-depth example). We invited groups to present in a public town hall meeting several months after the completion of the Course as a way to create community accountability and check in about ongoing project progress.⁹

Iterative course changes

We view self-reflective iteration as fundamental to our pedagogical approach, in adherence to our view that anti-racism is a lifelong learning process. During and after each semester of the Course, we committed to assessments and improvements to ensure that it was responding to the specific needs of class participants. For example, in our second-course iteration, we expanded the course to include the Department of Plant and Microbial Biology, and we tailored several reading options and course activities to be more disciplinarily relevant. As we worked through “improvement cycles” (Welton et al. 2018), we continued to evaluate how our curriculum, classroom structures, and teaching practices would best foster a non-hierarchical community of learners. We incorporated feedback from brief polls at the end of class sessions, a mid-semester evaluation, and an end-of-semester evaluation. For example, we modified reflection assignments mid-way through fall 2020 and shifted the course to a hybrid format mid-way through fall 2021, both in response to participant feedback. We also shifted the module organization and reading content for 2021 based on 2020 feedback (see Supplementary material 2 for further details).

⁹ The first town hall, in April 2021, was attended by 75 people—the majority of the 2020 course participants, as well as other department members, University of California, Berkeley, administrative leadership, and visitors from multiple environmental sciences departments at other universities. We also hosted a second town hall in April 2022, which featured final action projects from the 2021 course as well as follow-up presentations from groups first formed in the 2020 course.

Box 1 Advancing inclusion and anti-racism in the college classroom: a rubric and resource guide for instructors.

In response to the 2020 graduate student letter calling for departmental action to address anti-Black racism (Environmental Science, Policy, and Management Graduate Diversity Council 2020), an ESPM faculty–graduate student working group formed to create an anti-racist teaching tool entitled, “Advancing inclusion and anti-racism in the college classroom: a rubric and resource guide for instructors” (Blonder et al. 2022). The teaching tool was informed by and developed in tandem with the 2020 Course, with nine of the twelve tool authors participating in the Course. The tool authors also collaborated with staff at Berkeley’s Center for Teaching and Learning and drew on curricular materials from the American Cultures Engaged Scholars Program.

In keeping with the Course’s tenet that anti-racism is always an ongoing journey, the team designed the tool for iterative self-assessment over time. It contains sections on writing syllabi; exploring student and instructor positionality; rethinking assessments; cultivating inclusive learning environments; establishing and maintaining anti-racist norms and expectations; engaging with student feedback; and orienting curricular materials toward social justice, anti-racism, and anti-colonialism. The team initially created the tool for environmental sciences courses, but it is widely applicable to other disciplines.

In 2021, a draft version of the teaching tool was piloted with two courses as part of another Course Collaborative Action Project, an anti-racist assessment of ESPM’s undergraduate Food Systems Minor (see Table 3). In 2022, the project team received grant funding to hire several graduate students, who then worked with faculty to apply the tool to ten courses in ESPM and adjacent departments. Course changes included the creation of instructor positionality statements, new grading schemes, inclusion of more decolonial, justice-centered, and/or Indigenous perspectives in course materials, and increased centering of student experiences in course materials, among others.

As of December 2024, this publicly available resource has over 10,000 unique downloads. See the tool at: <https://zenodo.org/records/5874656#.YeiKrf7MJyx>

Discussion

The pedagogical approaches outlined above provided the roots for individual and departmental change-making. We understand the following four takeaways to be the key branches growing from these roots (Fig. 1): (1) *Centering Black voices and experiences*; (2) *Flattening academic hierarchies*; (3) *Fostering a community of learners*; and (4) *Developing action-oriented mindsets to sustain long-term anti-racist praxis*. These lessons reflect not only the teaching team’s own analysis but also the feedback of participants about what they found most valuable about the course (see Supplementary material 3 for a selection of participant comments). These four lessons were essential to the Course’s success, and much like we see the Collaborative Action Projects and anti-racist mindsets as facilitating further change, we believe these takeaways can also bear fruit—they can be applied to the development of similar anti-racism courses in the USA and beyond.

Note that while each of these takeaways—and many of the pedagogical practices that led to them—are relevant in the undergraduate setting, our particular approach was aimed at graduate students, faculty, staff, and postdoctoral scholars because these are positions that train to/work in higher education for the long term. That said, we encourage the application and adaptation of each of the four takeaways as principles and practices for undergraduate courses as well.

1. Centering Black voices and experiences

Courses on anti-racism must embed racially minoritized—especially Black—perspectives throughout the curriculum, inside classroom structures, and within teaching practices. All too often, anti-racism training seeks to appease and uplift white experiences rather than centering racially minoritized experiences, consequently reinforcing white supremacy (Ikeda et al. 2021). For example, in the same manner that environmental racism (particularly in the USA) excludes Black and other communities of color from accessing clean water, clean air, and outdoor recreation, the professional sphere of environmental sciences also excludes Black and other Scholars of Color from educational, research, and job opportunities (Finney 2014; Graves 2019; Hayes 2020; Mascarenhas 2024; Miriti et al. 2020; Schell et al. 2020).

With these disparities in mind, when developing our anti-racist critical pedagogy, we embedded perspectives of racially minoritized scholars across guest lectures, assigned readings, and in-class activities. We dedicated an early module (“Centering BIPOC voices”) to centering and uplifting the knowledge and scholarship of Black environmental scientists, whose research ranged from inequities in urban green spaces to Black feminist environmentalisms. We centered Black scholars in particular to combat the anti-Black sentiments prevalent in the USA that violently flared up in 2020. As whiteness is too often the norm in our environmental sciences academic spaces, we found this centering important to critical learning in anti-racism.

The 2020 two-way interview addressing the racialized atmosphere in academic departments was especially impactful because it centered on the lived experiences of Black and Latinx scientists on our teaching team. Similarly, the two-way interview between two faculty participants, who are both first-generation college students and respectively identify as Mexican American and queer, revealed how insidiously racism and the intersecting oppressions of classism and homophobia affect each aspect of the faculty experience (Stanley 2006).

2. Flattening academic hierarchies

Our pedagogical strategies created a learning space for graduate students, faculty, postdoctoral scholars, and

Table 3 Collaborative action projects in 2020 and 2021

Year	Project Title	Publicly Available Link
2020	Improving Mentorship Practices Module for ESPM-Required Core Graduate Student Class	
	Berkeley Freshwater Labs Anti-Oppression Plan	https://www.youtube.com/watch?v=ByFOtru98sE
	Food Systems Minor Anti-racism Assessment	
	Interdisciplinary BIPOC Paper and Author Database (parallel project with POC In Wildlife Ecology Database)	https://docs.google.com/spreadsheets/d/14qyTDQNNnoQH6jZDwNfVePLYfaSdieTy4DZ7bQjiM4A/edit?usp=sharing
	Disability Justice Best Practices Guide	
	ESPM Graduate Student Exit Interviews	
	Indigenous Partnerships Project	
	Indigenous Science Book Club	
2021	Advancing Inclusion and Anti-Racism in the College Classroom	https://zenodo.org/record/5874656#.Y5uwGuzMI6E
	Providing Equitable Research Experience for Undergraduates	
	K-12 Outreach Project	
	Centering Equity in Plant and Microbial Biology Qualifying Exams	https://docs.google.com/document/d/1A_-7MVwf7oB0QioLbjPwxDi7iJy8KoR/edit?usp%3Dsharing%26ouid%3D117680838385157441961%26trpof%3Dtrue%26sd%3Dtrue
	Inclusion in Plant and Microbial Seminar Series	
	Improving the Efficacy of ESPM's First-Year Curriculum	
	Demystifying the Graduate School Process	https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/bes2.2029
Assessing the Course as a Site of Organizational Change and Anti-Racist Meaning Making		

professional staff alike. This approach recognized that any course participant, regardless of their position, can provide new and crucial insights into course topics and concepts. Graduate students, who, due to shifting demographics in graduate admissions, are more likely to embody minoritized identities than faculty members (Arbeit and Yamaner 2021), bring valuable lived experiences and fresh perspectives. Staff bring their professional expertise as programmatic enactors of university policies and may also manage faculty–student relationships. Postdoctoral scholars, who are at a crucial transitional stage between student and faculty (or other professional positions), have distinct expertise in shifting academic priorities. Lastly, faculty can contribute their in-depth knowledge of teaching, research, and power structure nuances derived from their experiences at university decision-making tables.

The mentorship module in particular illustrated the importance of these varied perspectives. Activities in this module facilitated cross-dialogue between graduate students, postdoctoral scholars, and faculty around their approaches to mentorship as well as their lived experiences and needs as mentors and mentees. Staff added a valuable birds-eye view of departmental mentorship policies and practices. These multi-positional, multi-directional dialogues between co-teacher–learners increased the Course's potential to actualize change. This collective approach also worked to flatten hierarchies in an attempt to mitigate the harm that graduate

students may experience when engaging in departmental activism without access to the institutional power available to faculty (Perez et al. 2022). Importantly, experimental higher education approaches with flattened hierarchy have a rich history. For example, at our university, the Democratic Education at Cal (DeCal) program—which offers student-led courses for credit that are not represented in the traditional curriculum—emerged during the 1960s Free Speech Movement. Additionally, the Conservation and Resource Studies major in our department has a particularly long history of offering DeCal courses (Democratic Education at Cal 2019). Other examples at US universities include Oberlin College's Experimental College courses and Warren Wilson College's emphasis on student decision-making (Oberlin ExCo n.d.; Reid 2013).

3. Fostering a community of learners

Change-making, from individual to institutional scales, is an inherently relational process (Engeström 2001; Phillips and Lawrence 2019). Open dialogue must occur to effectively address racism, colonialism, and other intersecting forms of oppression and can only be achieved by developing a trusting community with a shared commitment to the work (hooks 1994). Given how rarely faculty, staff, postdoctoral scholars, and graduate students come together as co-learners in a classroom, our pedagogical approach sought

to build relationships among course participants with varying identities and positions to subvert the power dynamics between them. To this end, we drew on community agreements and collective vulnerability to cultivate “brave” rather than “safe” spaces (Arao and Clemens 2013), the latter of which often centers on the safety of white people (Leonardo and Porter 2010). We also employed intentional active learning teaching methods to encourage participant interaction and collaboration. Learning communities have proven to be effective at fostering change across different contexts. Participants frequently cited this opportunity for community-building as a major highlight of the course (see Supplementary material 3).

4. Developing action-oriented mindsets

All too often, a final lesson marks the end of anti-bias training/courses. In contrast, collective “action learning”—that is, learning-by-doing—encourages participants to apply anti-racist change mindsets beyond the classroom. Action learning is key to broader systemic change because it combines the critical reflection of individual transformational learning with an applied focus of activity (Henderson 2002). For both iterations of the Course, the Collaborative Action Projects were one of the most effective tools for anti-racist interventions across multiple scales, from individuals to departments to the larger college. Importantly, we emphasized that work accomplished during the semester was only the beginning: to advance their projects, participants needed to sustain active engagement beyond the end of the course. We asked for long-term action plans as one of the final course assignment deliverables. We then held a town hall check-in several months later to provide additional means for accountability. While some final action projects did not maintain momentum beyond the end of the course, many have continued three to four years out (presented in Table 3).

Reflections on challenges

In reflecting on the challenges of implementing the first iteration of this course as well as sustaining it in subsequent years, we identified several areas worth further consideration. First, there were challenges associated with working within the academic system (“challenging the status quo from within”) and the waxing and waning of support for anti-racist initiatives as broader socio-political forces shifted within our department and in the USA. Second, there were challenges associated with the misalignment of priorities among class participants, largely driven by differences in the needs and timelines of different stakeholders (graduate students, postdoctoral scholars, staff, and faculty).

Difficulties of challenging the status quo

Since the anti-racist change promoted by the Course is situated within the racist and colonial institution of academia, the impacts of any efforts like our Course are limited without fundamental change to academic structures. Radical transformation depends on addressing large-scale, institutional-level challenges, which the Course’s action projects did not directly address. The primary focus was on change-making for participants and their surrounding organizational contexts, including lab groups, departments, and the college. We hoped that the experience of developing action projects would result in mindset changes, thus preparing participants to continue anti-racist change-making in new institutions and thereby seeding a broad network of anti-racist “change agents” (Cox 2001; Hartley et al. 1997; Patrick and Fletcher 1998). While there are limitations to focusing on individual mindset change (Welton et al. 2018), the Course’s emphasis on relationship-building illustrates that cultivating co-conspirators and comradeship is vital for collective anti-racist change-making in our departmental and college communities. This is especially important as we address past, present, and future racialized harm in our departments and actively contend with the anti-racism commitments made during the Course.

In addition, we also faced difficulties derived from the limited and unequal distribution of labor, funding, and resources that are commonplace in academic institutions, particularly as they relate to anti-racist initiatives and working in a primarily white institution. The 2020 surge of interest in anti-racism due to the Black Lives Matter movement significantly buoyed engagement and investment (energy, time, and funds) in the first iteration of the Course. These resources did not remain so freely available in subsequent years, as funding became scarcer and fewer faculty and staff participated (likely due to declining interest and because many interested faculty and staff had already taken the course). That said, we obtained financial resources for the class by making use of several types of campus funding structures that may also be available at other academic institutions, such as competitive small grants from the graduate and faculty research divisions and discretionary funds by offices dedicated to equity and inclusion (see Supplementary materials 2 for details on funding). University support (particularly financial) can be key to operationalizing anti-racism efforts, and in our case, we emphasized the need to “walk the talk” by using institutional mission statements about diversity, equity, and inclusion to justify consistent funding for these types of courses.

By the second iteration, key members of the Course’s founding team had graduated, and new members joined the teaching team, reflecting the ephemeral nature of graduate

and postdoctoral scholar positions (discussed further below). This presented a challenge in maintaining longevity and consistency across years and course iterations. However, by embracing the cycle of academia, the team renewal brought in new voices, ideas, and leadership styles and pushed the team to depart from the “status quo” organizations of hierarchical leadership and labor.

Finally, and perhaps most challengingly, interpersonal difficulties emerged as the team had to contend with dynamics of race, privilege, lived experiences versus theoretical training, relative organizational power (including challenges of implementing flattened power hierarchies within the team), and emotional exhaustion (brown 2017; Garza 2020; Tittler and Wade 2019). In contending with these realities, the importance of having multiple, continued conversations about mental health, whiteness, workload (including emotional workload), and accountability cannot be understated, and we continue to wrestle with these dynamics to this day.

Misalignment across academic timelines

While implementing the Course we had to consider that one of the barriers to radical transformation in academia is a misalignment between the needs and timelines of different stakeholders (Jones 2016; Kezar 2010; Perez et al. 2022; Porter et al. 2018; Posselt 2020). Although racist ideologies are continuously upheld across time by the discursive, relational, and material elements of universities as an organizational field (Phillips and Lawrence 2019), academic communities are temporally dynamic, with members ranging from semi-permanent (faculty and staff) to more ephemeral (graduate students and postdoctoral scholars). As challengers to dominant ideologies (Fligstein and McAdam 2012), internal “change agents” (Cox 2001; Hartley et al. 1997; Patrick and Fletcher 1998) must work to cultivate a future that is more inclusive, creative, and anti-racist through sustained, long-term engagement across stakeholders operating on different timelines. The Course had to continually create a space for these different stakeholders to come together, bond as a community, and deeply interrogate multiple interlocking academic values and structures. By cultivating community and shared action goals, we worked to realign the priorities of participants from different positions and timelines to foster collective buy-in to the long-term anti-racist goals of the course.

Application beyond environmental sciences

While our course was rooted in environmental sciences in the USA, we believe that the overarching structure and pedagogical tools could be applied for anti-racist training across disciplines and academic institutions and locations, albeit with important caveats. We understand racism

in environmental spaces and sciences as a specific form of harm that cannot be equated with racism in other contexts and disciplines. We also understand that the specific histories of settler colonialism, forced labor, and slavery have created a particular cultural and political context in the USA. While this is the case, we recognize that these histories are part of a broader systemic devaluation of BIPOC voices, experiences, and knowledge across academia and Western institutions as a whole. Given these connections, we see the structure—though not all the content—of the course as applicable to a broad range of disciplines and departments in the USA and other parts of the world. For example, a key element of the course was interrogating the underlying assumptions, scientific structures, and historical foundations of environmental sciences as a field, including, the white supremacist origins of the conservation movement and the colonial nature of international field stations (Brune 2020; Purdy 2015; Raby 2017). A similar interrogation could be applied in adjacent disciplines, such as evolutionary biology, where hypotheses about reproduction (i.e., sexual selection) have roots in the eugenics movements of the first half of the twentieth century (Milam 2011; Kamath and Packer 2025), or in anthropology, where humans were historically categorized and ranked into different “races” or “civilizations,” providing “scientific” justification for white supremacy (Beliso-De Jesús et al. 2023). Almost all academic disciplines contend with racialized hierarchical systems and issues of recruitment and retention of BIPOC and other underrepresented students. Thus, these sections of our course (those focused on mentorship, lab culture, and fieldwork) may also be easily applied across disciplines. Action projects, which in our case were specific to our environmental sciences context, can also be replicated and tailored to other departmental and disciplinary contexts. While centering BIPOC voices in the environmental sciences context is informed by a specific history of disenfranchisement of non-white voices, the principles of centering and community building are also widely applicable. Class materials and discussions must be tailored to the histories, contexts, and disciplines of each course, with particular attention to the specificity and forms of racist harms in those fields. However, the importance of identifying and counteracting those racialized harms remains consistent across the board.

Conclusion

The nationwide protests against anti-Black violence in the summer of 2020 inspired many scholar-activists across academia to reimagine anti-racist training, moving beyond short “one-off” diversity workshops. For example, the Unlearning Racism in Geoscience (URGE) group created a 16-week curriculum to highlight existing literature, engage with

experts on anti-racist practices, and foster discussion within groups (“pods”) across institutions, professional societies, and non-profit organizations (Morriss et al. 2024). Our goal in this article is to facilitate the implementation of similar courses that, in part, aim to effect change at more local levels. We see such courses as one of the fruits of our tree of change. We hope that our course incubated a community of “change agents” capable of working effectively both inside and outside academia, at different scales, for the long term (Cox 2001; Hartley et al. 1997; Patrick and Fletcher 1998). By necessity, anti-racism work is never finished, as racism and anti-Blackness are long-standing, insidious societal and structural harms. Nevertheless, through the experience of developing anti-racist praxis, our course participants are better equipped to make substantive changes at different scales and levels, including in environmental sciences, academia, and beyond.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s13412-024-00995-1>.

Acknowledgements Special thanks to Drs. Alastair Iles and Ben Blonder. Additionally, we would like to acknowledge the many faculty and graduate students who provided ideas during the conception of the course; the invited course speakers and panelists for Fall 2020 and Fall 2021; and the 71 participants in the first two iterations of the course, who formed our anti-racist learning community in the Environmental Science, Policy, and Management and Plant and Microbial Biology departments at the University of California, Berkeley. The work for the course was supported with funds made available by (1) the Department of Environmental Science, Policy, and Management; (2) the Rausser College of Natural Resources Office of the Dean; and (3) the Office for Graduate Diversity at the University of California, Berkeley. Specifically, we would like to thank Drs. Paolo D’Odorico, Isha Ray, David Ackerly, and Denzil Street for their assistance in securing funding. This work was in part supported by the National Science Foundation under (1) grant DEB-1940481 (DOE) and (2) the Graduate Research Fellowship Program DGE 2146752 (RZF, NS, LW). Any opinions, findings, conclusions, or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

Data availability This “Practitioner Voices” article does not contain a dataset. The quotes provided in Supplementary materials 3 were derived from completely anonymous course evaluations.

Declarations

Conflict of interest The authors declare no conflict of interest.

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