Climate Fiction and Social Change

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Abstract This chapter highlights our approach to teaching a first-year seminar at the intersections of climate fiction and social change. We consider our co-taught seminar in relation to Vandana Singh's framework for an effective climate change pedagogy. By bridging the seemingly disparate topics of climate fiction, theories of change, and applied environmental studies, our work helps students think critically and generativity about the local-to-global implications of climate change.

Keywords: environmental studies, climate change, education, pedagogy, science fiction, transdisciplinarity

Introduction

> *"How does social change happen in the context of sustainability and environmentalism, and what role can literature and speculative fiction play in the development of our visions for the future?"*
>
> *– Course Description for "Climate Fiction and Social Change," Fall 2023*

This chapter highlights our approach to teaching a first-year seminar at the intersections of climate fiction and social change. We consider our co-taught seminar in relation to Vandana Singh's framework for an effective climate change pedagogy, which calls for educators to address and embrace four key fundamental challenges of the climate crisis: "its transdiciplinarity, its spanning of large scales of time and space, its rich complexity, and its roots in injustice and power" (Teaching 25). By bridging the seemingly disparate topics of climate fiction, theories of change, and applied environmental studies, our course helps students think critically and generativity about the local-to-global implications of climate change.

Drawing on the individual expertise of each author, we emphasize the role that equitable and inclusive pedagogy, speculative fiction, and theories of social change can play for providing practical, philosophical, and conceptual frameworks for making sense of the complexity of our time. In particular, we highlight how our intentional course design, careful curation of content, and professional positionalities within the institution helped us adopt a transdisciplinary lens, one that embraces, emphasizes, and empowers students to think through the climate crisis in a multi-dimensional way.

Establishing Context: Climate Fiction and Social Change

Taught in the Fall of 2023, our First Year Seminar "Climate Fiction and Social Change" considered the intersections between climate change, environmental degradation, social change, literature and science fiction. All first-year seminars at our institution share common goals – to enhance students abilities in written and oral communication, critical thinking, and information literacy ("First Year Seminars"). Such an emphasis on skill-building and critical thinking allows for immense flexibility and agency in choosing course content. We wanted our course to be an invitation to develop these skills through an authentic examination of the role that literature, theory, and personal reflection can play in how we collectively imagine, discuss, and take action in response to the climate crisis. Drawing from our unique areas of expertise – Kylie in pedagogy and science fiction studies and Daniel in sustainability and community planning – we designed our course to consider the climate crisis through the dual lens of climate fiction *and* social change.

Why Climate Fiction?

As a genre distinction, climate fiction captures those works of literature that imagine the environmental consequences and social implications of a range of intersecting phenomena such as

rising sea levels, water shortages, loss of biodiversity, animal extinctions, regional epidemics, etc. Over the past decade, the idea that climate fiction might function as a powerful tool for initiating conversation and potentially spurring social action has continued to gain momentum within mainstream media and culture (Glass; Pérez-Peña; Gupta; Rothman). These discussions were brought to the forefront of literary studies with Amitav Ghosh's *The Great Derangement: Climate Change and the Unthinkable* (2016), a candid critique and disheartened plea to the literary establishment for what he saw as a surprising lack of literature engaging meaningfully with the climate crisis. "The climate crisis," Ghosh suggests, "is also a crisis of culture and thus of the imagination" (11). Ghosh's assessment of contemporary literary fiction's so-called failure of imagination largely dismisses science fiction as a genre capable of engaging with the present. As Singh points out, this omission is based in part on an interpretation of Margaraet Atwood's suggestion that science fiction is a vehicle for transporting us to other worlds ("The Unthinkability"). In fact, as Singh's own definition of the more expansive "speculative fiction" suggests: "...speculative fiction is about what cannot ever be, or what cannot be as yet. But it is also true that when it uses symbol and metaphor in certain ways, *speculative fiction is about us as we are, right now*" ("A Speculative Manifesto," 202, *emphasis added*).

Science fiction (or speculative fiction) has long been imagining apocalyptic scenarios involving environmental destruction and human-interference with the natural world, even if the genre is often dismissed from the literary establishment (Ditum). Interestingly, with the emergence of "climate fiction" as a genre distinction, the distance between literary fiction and science fiction has begun to collapse. Indeed, climate fiction is often referred to as "cli-fi" for short, an abbreviation that recalls and mimics the seemingly less serious, popularized shorthand for science fiction – "sci-fi." (Tonn). With Singh's more expansive definition in mind, speculative fiction seems uniquely

positioned to help students grapple with the temporal scales, economic complexities, local-to-global implications, and urgency of the climate crisis. Yet, the proposition that climate fiction can actually, *successfully* spur social action is not without its critiques (see, for example: Vandermeer; Schneider-Mayerson; Harper), so we argue that it's critical to ground our discussions of climate fiction within a more practical and real-world context, and theories of social change provide one such framework for this sort of constructive discourse.

Why Social Change?

Theories of social change have tremendous potency for being able to provide theoretical and conceptual frameworks for helping individuals make sense of the complexity of intractable issues such as climate change, global environmental degradation, and the interrelated social structures of inequity and injustice. Through philosophizing and considering how any type of change happens, we have the ability to move from being passive bystanders in an industrial culture that often degrades life to being active participants charged with designing the world that we want to live in (see, for example: Holmgren; Brock). Complex issues that can be characterized as being "wicked problems" can often be so immense that they can result in leaving individuals feeling like they have little or no agency over the issues that are affecting them, or unsure about how they should respond (see, for example: Moser and Dilling).

By theorizing how change happens, our praxis strives to encourage self-inquiry, meta-cognitive capacities, and agency for students in seeding their own ability to decide who they want to be and how they want to live. Some of the theories of change and frameworks that we consider in our class include: the Nested Systems Model, Emergent Strategy, Jevon's Paradox, Living Systems Thinking, and nature-based frameworks such as Permaculture Design and Biomimicry (Brown; Polimeni; Holmgren; Benyus). By being cognizant of the dynamics of social change, educators

have the capacity to create the conditions for participatory and active learning, empowering students to identify their own relationship to change, to consider how they might want to change for the future, and to imagine what unique role they might play in creating positive change for a more just, equitable, and livable future.

Why Us?

As co-authors of this piece, we inhabit this space through a lens of critical inquiry and inclusive pedagogy in pursuing how we might benefit the world around us from our position as educators. In striving to model and catalyze non-dominant ways of being, teaching, and learning, our aim is to uplift the wisdom of the natural world around us and to honor the voices of those in past, present, and future generations who've been marginalized and oppressed by inequitable power structures. Kylie's teaching career spans both the high school and college level, including providing professional development for college faculty in three very different institutional contexts. This non-traditional trajectory through the academy informs and strengthens her work as a teacher, scholar, facilitator, and lifelong learner. Daniel's work within and outside of the classroom seeks to cultivate community and collaboration by emphasizing active, inclusive, and equity-minded strategies for teaching and learning with others. He serves as a facilitator, educator, and practitioner pursuing the integration of sustainability and climate justice into curricular and co-curricular opportunities, organizational structure, and capacity building. Daniel's work leverages the intersections of theory and practice through leaning into questions of social change, nature inspired design, and human ecology. We recognize the privilege that our collective positionality holds as being people working primarily within a private institution of higher education and acknowledge the limitations that this presents for our own discourse. We aim to leverage our collective positionality for modeling new ways of being for our students in exploring the most pressing

questions that they have for becoming who they want to be in this world.

Key Principles of Praxis: Unsettling Environmental Studies

In reflecting back on our First Year Seminar, we offer up three key principles of our praxis as a way to contribute to reimagining and enhancing environmental studies pedagogy: transdisciplinarity, equitable and inclusive teaching, and a focus on local-to-global praxis.

Transdisciplinarity

Our work together and the reason behind our co-taught first year seminar stems in part from the recognition that to teach effectively about the climate crisis requires educators to reach across disciplinary boundaries and seek out multiple perspectives. The complexity of the climate crisis demands new ways of thinking and knowing, and the remembering of old ones, which often can't be easily sketched out in advance or transferred from a textbook to a course syllabus. Singh calls this particular feature of climate change its inherent "transdisciplinarity" – a feature that is both the greatest pedagogical challenge and most intriguing pedagogical opportunity presented by the crisis (*Teaching,* 38). For Singh, transdisciplinarity is distinct from *inter*disciplinary and *multi*disciplinary approaches to teaching (*Teaching* 38). Drawing her distinctions from transdisciplinary approaches to research (Leavy), Singh explains that while in interdisciplinary teaching "two or more disciplines are combined in an integrative way" and in multidisciplinary teaching "multiple disciplines provide separate viewpoints on a particular subject"; in transdisciplinary teaching, "the distinction between disciplines is transcended to create a new way of thinking" (*Teaching* 38). This emphasis on provoking new ways of thinking and knowing – ones that are not bound by the boundaries or constraints of strict disciplinary thinking – resonates with what we hoped to facilitate within our co-taught seminar. In other words, a desire for a

*trans*disciplinary approach is exactly what brought the two of us together as co-instructors.

As a literary scholar who specializes in science fiction studies, Kylie was interested in designing a course that would use speculative fiction as a springboard for discussing the increasingly urgent and difficult to grasp complexities of the climate crisis. Such a desire was tempered by questions about whether Kylie's background in literary studies would provide a strong enough foundation to create a course that was meaningful and responsible in its engagement with the topic. The possibility of co-teaching the course with someone who would bring a different set of experiences, expertise, and perspective to the design and facilitation of the class was the nudge that she needed to propose the course as a first-year seminar. As someone working at the intersections of community planning, social change, education, and sustainability, Daniel has found that theories of change have provided him with conceptual and practical frameworks for thinking and acting more constructively amidst the climate crisis and its complexities. Through applying theoretical frameworks associated with social change to the domain of climate fiction, our collective work aims to braid theory and practice in supporting our students in envisioning more just, equitable, and regenerative futures.

Because of the unique position that each of us occupies within the institutional structure of the university, transdisciplinarity as a concept, a way of thinking, and an orientation towards teaching and learning resonates deeply. As Associate Director for Sustainability and Environmental Justice, Daniel facilitates faculty development programs focused on the integration of sustainability across the curriculum, supports curricular development towards education for sustainability, and is supporting the development of the University of Richmond's equity minded practice and climate justice lens. Likewise, as Assistant Director of the Teaching and Scholarship Hub, Kylie leads initiatives related to inclusive pedagogy and acts as a teaching consultant for faculty from all

disciplines and at various stages of their teaching careers. Thus, as staff members whose work demands that we routinely communicate and collaborate across disciplinary, departmental, and institutional boundaries, the space we occupy within the university infrastructure is inherently transdisciplinary. This aspect of our work uniquely positions us to help students think through the climate crisis from this transdisciplinary lens. As Singh points out, in general "our siloed system of education does not easily allow space for a truly inter/transdisciplinary exploration of climate change" (*Teaching* 21). With our first year seminar, we hope to create one such space for transformative learning by provoking transdisciplinary thinking.

Equitable and Inclusive Teaching

Our transdisciplinary orientation to our work as educators and life long learners is constructed and strengthened by our shared commitment to equitable and inclusive teaching. In *Inclusive Teaching: Strategies for Promoting Equity in the College Classroom*, Kelly Hogan and Viji Sathy challenge college professors to adopt an inclusive teaching mindset: an orientation to teaching which seeks to promote a culture of inclusion and strives for an equitable learning experience for all students who enter our classrooms (4-5). As they point out, such a culture "requires intentional and deliberate strategies," and striving towards equity "requires naming and dismantling the systems, structures, and oppressive forces that act as barriers for some students more than others. When we work to remove barriers, more individuals succeed" (4-5). The intentional dismantling of oppressive structures inherent within the context of higher education marks one of the ways our deliberate course design seeks to unsettle traditional methods of teaching and learning. Rather than adopt a content-focused and lecture-heave pedagogical praxis, or what Paulo Freire calls the "'banking' concept of education, in which the scope of action allowed to the students extends only as far as receiving, filing, and storing deposits"; our discussion-heavy, inquiry-based approach

attempts to create the conditions for knowledge to be co-constructed, "through invention and re-invention, through the restless, impatient, continuing, hopeful inquiry human beings pursue in the world, with the world, and with each other" (72). To achieve this requires deliberate strategies for building community, for decentering our positions of power within the classroom, and for humanizing the classroom and the curriculum. Here, we'll offer three specific examples from our praxis to show how we sought to achieve this goal of unsettling traditional methods of teaching through equitable and inclusive course design.

One strategy we employed often was to leave the classroom space and take our teaching and learning to non-traditional academic spaces and natural areas around our campus. As we'll discuss later, the University of Richmond's Eco-Corridor became a sort of secondary, outdoor classroom space for our class. We also strategically held our second class of the semester in our institution's Book Arts Studio, a hands-on learning lab where students learn about historic and contemporary book structure and craft ("Book Arts Studio"). In groups of 4-5, we learned together how to fold and stitch hand-made notebooks that we would later use to capture our personal reflections and in-class writing throughout the semester. This activity served as an important community building moment for our class and gave our students a chance to see their instructors make mistakes, ask questions, seek help, and lean on the expertise of others–including other students in the class–for support as we learned something new. In this way, the Book Arts Studio served as a space where we, the primary course instructors, were repositioned as non-experts and co-learners alongside our students. Our trip to the book arts studio offers a concrete example of how we set the foundation for the way we hoped students would engage with us and with one another from the start of the semester.

Another strategy we used often for building community and inviting students to contribute their

perspective to our class discussions was our version of what James Lang has called "invitational participation." Rather than grade students on how much (or how little) they verbally participated in class, we instead sought to create a welcoming, engaging, and intellectually stimulating environment for our students that encouraged all students to *want* to contribute to their own learning and to the learning of others within the class. As bell hooks points out in *Teaching to Transgress*, such an environment requires an intentional, deliberate, and ongoing collective effort from the students and the instructor. As hooks explains:

> As a classroom community, our capacity to generate excitement is deeply affected by our interest in one another, in hearing one another's voices, in recognizing one another's presence…any radical pedagogy must insist that everyone's presence is acknowledged. That insistence cannot be simply stated. It has to be demonstrated through pedagogical practices. To begin, the professor must genuinely *value* everyone's presence. There must be ongoing recognition that everyone influences the classroom dynamic, that everyone contributes (8).

The in-class engagement journals that we created in the Book Arts Studio served as a key tool and structure for inviting each person's voice and perspective into our classroom space. These journals became a part of our class routine; students were regularly prompted to respond in writing to questions posed during class. Then, we would ask each student to share something from their response–either by reading verbatim from their engagement journal or paraphrasing something that they wrote for the rest of the class. In this way, hearing and responding to one another's voices and perspectives became the norm and expectation for our class discussions. And, by using the engagement journals to share messy, unpolished ideas, we set the tone that our contributions were always in draft form, open to feedback and growth. We hope that establishing this work-in-

progress tone served to lower the stakes of classroom participation, making it easier for many in the class to feel comfortable and compelled to participate. We believe that cultivating this sort of classroom community is especially important when teaching a class related to the climate crisis, since it is a topic that can be intimidating, difficult, and emotional for students to discuss.

Finally, the assessment structure we used in the class – specifications grading – was another deliberate way that we sought to create a learning environment that supported communal learning, personal growth, and community building (Nilson). As Streifer and Palmer explain:

> Specifications grading is a method of assessing student work that emphasizes students' mastery of skills and knowledge in alignment with a course's learning objectives. Though students ultimately earn a letter grade for the course, the method of determining that grade differs from the traditional practice of calculating a weighted average. In specifications grading, instructors set clear, comprehensive expectations for each assignment (these are the assignment's specifications, also called expectations or criteria). Instructors then bundle together assignments to create pathways to each grade level (245).

Whereas traditional assessment structures are often rooted in performance-based evaluation and can create an atmosphere of competition amongst students, specifications grading (or "specs grading") is a growth-minded grading system (Clark and Talbert). By seeking to make the learning outcomes as transparent as possible and providing opportunities for students to revise and resubmit until their work demonstrates that they have met those desired outcomes, a specs grading system emphasizes *and* rewards growth over time (Nilson). In theory, such a system shifts the focus (of both students and instructors) away from the arbitrary notion of a grade and instead centers attention on feedback and learning.

Local-to-Global Focus

Recognizing the important role that place and context play in thinking and responding more effectively in the climate crisis, our First Year Seminar spanned "time and space" through providing local-to-global, place-based connections to our curriculum. Place shows up as an important consideration for evaluating proposed solutions to the climate crisis, as a solution that might work well in one context might be a failure in another. Place shapes us, and ultimately, we also shape it.[1] Through using the University of Richmond's, Eco-Corridor (an 18-acre suburban stream restoration and green infrastructure project) and the City of Richmond's local climate equity action plan, RVA Green 2050, our methods strived to ground students in real world applications to climate action and equitable policy development. Alongside these localized examples and resources, the supportive climate fiction literature we read in class helped provide a macro-level emphasis on these dimensions at a planetary scale.

Historically, the mainstream environmental movement has viewed issues of ecological integrity and social inequity as being somewhat disparate, and from the beginning of our class, it was critical for us to expose students to the idea that social and environmental issues are ultimately inextricably connected; we cannot have a healthy and livable planet without just and equitable social structures where all beings have the opportunity to live life to their highest potential.[2] Thus, the first theory or framework we introduced to the class was that of Climate and Environmental Justice. In utilizing both the campus as a living laboratory for teaching and learning, the Eco-Corridor served as a hyper localized example of the role that tree canopy cover in the built environment can play in the

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[1] Our understanding of place is informed by the concept of placemaking; see, for example, the pamphlet, *Placemaking: What If We Built Our Cities Around Places?* Project for Public Places, 2022.
[2] For discussion of the interconnectivity of social and environmental issues, see for example, Leah Thomas's *The Intersectional Environmentalist: How to Dismantle Systems of Oppression to Protect People and Planet.*

social and environmental determinants to health. Like many cities, Richmond continues to deal with historical land use policy and planning inequities that contribute to issues like the Urban Heat Island Effect, the phenomenon that cities and the built environment are typically warmer than the countryside due to albedo. In other words, they capture heat in greater quantities due to blacktop, hardscapes, and gray infrastructure (Plumer et. al). In Richmond, the Urban Heat Island Effect, in addition to a complex and diverse array of other social, physical, and environmental determinants to health, have resulted in nearly a 20-year disparity in life expectancy between some of the more resourced and some of the most under-resourced communities in the City (Saverino, Kelly C., et al; VCU's Center on Society and Health). Through exploring these local and regional issues of inequities, students had the opportunity to think critically about the intersections of place and human-nature interactions.

The local-to-global case studies and place-based examples explored in our FYS also worked to support critical inquiry in thinking about how change happens across scale. In our class, we incorporate this lens through the articulation of the Nested Systems model, which is also referred to as "Rings of Influence" or "fractal" (Dresdale 105-106). The Nested Systems framework invites us to consider how any type of change can happen across scale, from that of the individual, group, organization, the community and regional level, and the nation-state or global level. Although the Nested Systems model doesn't in itself hold the answers to complex problems, it can serve as a guiding framework for how we might think more constructively and generativity about both problems and solutions of a given topic and how they show up across scale. From a meta-perspective, we explored the application of the Nested Systems framework in terms of both real-world problems and in relation to stories from works of climate fiction that we explored. As with any framework or construct, the Nested Systems model has its limitations and can be critiqued. Its

application in our context invites us to move beyond the somewhat limited articulation that it is solely up to the individual to solve systemic issues and empowers us to hone the agency that we do have as individuals in making meaningful change happen across scale. The Nested Systems model is one lens for articulating how global, structural issues affect us, and how we can affect them.

Fig. 1. Nested Systems Model: Articulating Change Across Scale, Office for Sustainability, University of Richmond.

At the core of the Nested Systems model (see Fig. 1) is the individual, and our teaching strived to create the conditions for students to explore their own relationship with themselves through critical self-reflection and meta-cognitive strategies which students were invited to consider in the reclaimed journals that they created together at the beginning of the semester. The role of the group stands at the second concentric level of the Nested System in this model. In applying participatory and active learning pedagogy to this lens, students had the opportunity to engage in dialogue with one another in dyads or triads to consider content throughout the semester. The third concentric level of the Nested System in this model invites us to consider the way that organizations and institutions made up of groups of people and individuals might function in addressing social and

environmental issues. In our case, the University of Richmond served as a living laboratory for place-based learning at this scale. Utilizing the Eco-Corridor and campus infrastructure supported the grounding of theory into practice in our local context. The fourth ring of the Nested systems in this model was thought of as the region surrounding the University, including the City of Richmond, Virginia. RVA Green 2050, the city's climate equity action plan, served as a framework for the students to explore how local climate action and justice efforts were taking place at the municipal level. The outer ring of the Nested Systems model in this framework examines the global implications of anthropogenic climate change and its related issues of inequity. The global or planetary implications of this outer ring can be difficult for students to conceptualize; however, for us, climate fiction helped students grasp the global implications and complexity of the crisis.

The Nested Systems model, along with the other frameworks introduced in our class, became powerful tools and language for our students to consider in relation to the climate fiction that we looked at together as a class. For example, in our discussions of Octavia Butler's *Parable of the Sower* (1993), students regularly invoked the Nested Systems model to explore both the positive and negative impacts that the actions and influence of leaders, like the main protagonist Lauren Olamina, can have on individuals, groups, and society at large. Likewise, adrienne maree brown's *Emergent Strategy,* a theoretical and practical guide to social change that was inspired by the thinking and ways of being explored within Octavia E. Butler's speculative fiction, was another touchstone for our discussions of Butler's work. *Emergent Strategy* also showcases a real-world example of the potential for fiction to inspire and inform the work of activists and the strategies used within social movements. Finally, our selections of climate fiction helped us to conceptualize and discuss the "vast scales of space and time" that make the climate crisis such a difficult problem

to address (Singh, *Teaching,* 6). As Singh emphasizes, "the climate crisis is a global phenomenon, but we experience it in locales or climes. It manifests differently in Northern Alaska than in Jharkhand, but the local and the planetary are both important" (*Teaching,* 6). In our class, we read both Kim Stanley Robinson's *Ministry for the Future* (2020) and Vandana Singh's, *Entanglement* (2015), two works of climate fiction that capture this tension between the local and the planetary through their narrative form. Each story offers the reader a multiplicity of narrative accounts, simultaneously narrating the rippling effects of individual actions, climate-related weather events, political decisions, and even attempts at technological solutions. By jumping between different perspectives, these two works preserve the specificity of local, place-based climate impacts (and proposed solutions) while also emphasizing the climate problem as one that is planetary in its impact and therefore necessarily a geo-political problem that requires collective, global action.

Considerations: Present and Future

As proponents of critical reflection and inclusive teaching, we recognize the importance of not only celebrating the successes we have in the classroom, but also in recognizing areas where we can continue to grow and develop as educators and practitioners. In reflecting back on our aims with the course, we find Singh's four dimensions of effective climate change pedagogy to be a useful tool for critical reflection on teaching. By engaging with these four interrelated dimensions –the scientific-technological, the transdisciplinary, the epistemological, and the psychosocial-action – we believe that instructors in any discipline can create an effective pedagogy of climate change–one that, according to Singh, "embraces the key characteristics (teachings) of the problem and empowers the learners to take part in meaningful action" (*Teaching,* 25). We will briefly discuss the four dimensions and consider how our first-year seminar effectively engaged (or not)

with each. We also offer some reflection on how we might teach the course differently in the future.

As already discussed, one of the strengths of our course was its orientation towards transdisciplinarity. According to Singh's framework, the transdisciplinary dimension seeks to help students understand both the "societal and ethical implications of climate change" and "how climate change is related to other major social-ecological problems" (*Teaching,* 26). The intersection of content within our class, our emphasis on environmental and climate justice, and our focus on the local-to-global implications helped to contextualize climate change in relation to other major social, ethical, and ecological problems. The transdisciplinary dimension also aims to empower students "to critically examine proposed climate solutions from a climate justice perspective" (*Teaching,* 26). While we considered *fictional* solutions proposed within the climate fiction we discussed in our course, in the future, we could design our course to more directly and intentionally invite students to interrogate proposed climate solutions.

Several aspects of our course also advanced the epistemological and psychosocial-action dimensions of Singh's framework. Our emphasis on theories of social change and discussion of climate-related issues at our institution and our city, sought to help students "see the climate crisis as a symptom of a social-scientific framework or paradigm" and "to articulate the need for new alternative social-scientific frameworks in order to usefully engage with the crisis" (*Teaching* 26). The integration of speculative fiction within the course also brought the history and legacy of colonialism into our discussions of science fiction and social change. Many of our course assignments engaged students in personal and metacognitive reflection, inviting them to connect course content and questions about social change to their own lives, values, actions, and intentions. In this way, we hope that our course "inspire[d] students to explore their own affective and

cognitive responses to the crisis, as well as their agency" – a key aspect of the psychosocial-action dimension of Singh's framework (*Teaching,* 26). We recognize that our course largely kept students within the intellectual and theoretical realms of these two dimensions and that more could be done to emphasize collective action and to engage students in local efforts responding to the crisis. One way to strengthen this area would be to work with our office of civic engagement to integrate community-based learning into the design of our course. Taking our students off campus and into the community would give them a chance to learn from local changemakers and contribute as a class to ongoing efforts within our community.

Finally, because neither of us are climate scientists, it is not surprising that our course holds the most potential for growth when it comes to our integration of the "scientific-technological" of Singh's pedagogical framework. With this dimension, the aim is to help students build a "fundamental understanding of the basic science, impacts, and evidence of climate change, including its complex, nonlinear nature, as well as the future projections based on various scenarios" (*Teaching* 25). This aspect of our course was largely confined to student-driven research projects that were completed in the second half of the course. Our students independently chose topics related to climate change and were tasked with completing an annotated bibliography, literature review, and ultimately, a research-informed final project. Many students chose topics that required them to find, read, analyze, and synthesize the basic science, impacts, and evidence of climate change, however, because this was largely self-directed research, the scope and depth by which students engaged in the scientific-technological dimension of the climate crisis varied widely. In the future, our course design would benefit from a more explicit and intentional integration of a unit (or units) devoted to the scientific-technological aspect of climate change.

Singh's interrelated dimensions of the scientific-technological, transdisciplinary, epistemological, and psychosocial-action, invite us to hold complexity and entanglement as we pursue what an effective pedagogy for climate change might be. We intend to use these reflections and the framework to formulate revised learning objectives for our courses and to continue to improve our praxis.

A Final Offering

Our collaborative work in teaching this First Year Seminar on Climate Fiction and Social Change has led us to consider a variety of guiding questions, exploring what it might mean to further the discourse on unsettling environmental studies and deconstructing mechanistic methods of teaching and learning that are requisite for the transition to a more livable and just world. Through leaning into questioning who we are and the role of the academy in cultivating changemakers capable of creating better futures in the 21st century, we continue to return these questions for our work as teachers, facilitators, and learners. We leave you with these questions in hopes that they might inspire and inform the work of others:

- *What role should education play in broader efforts of social change?*

- *How might we best help students explore who they want to become in the world?*

- *What is the relationship between industrial civilization and the role of the academy and higher education in the 21st century?*

- *If higher education was rooted in the wisdom of the natural world that sustains us, how might it look different than the way it currently functions today?*

- *What worldviews and perspectives in us, and in the broader culture need to change in order for there to be a more sustainable and just future?*

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Daniel Emmett Hart is the Associate Director of Sustainability and Environmental Justice at the University of Richmond in Richmond, VA. Daniel's work supports the creation of conditions for a more equitable, just, and livable world and explores the questions of: "how does social change happen?" and "what can the natural world teach us about individual, organizational, and broader social change?" His previous experience includes working as Sustainability Coordinator and Adjunct Faculty at the University of Cincinnati, serving as Vice-Chair of the Board Directors of the Cincinnati Permaculture Institute and on the City of Cincinnati's Environmental Advisory Council, working at the University of Colorado Environmental Center and at Environmental Stewardship Concepts, and doing a fellowship at Dancing Rabbit EcoVillage. Outside of UR, Daniel currently serves as the Chair of the City of Richmond's Sustainability and Resilience Commission and is Faculty Affiliate in the School of Environment and Sustainability at the University of Cincinnati.

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