

The Future of Climate Education at Harvard University





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MESSAGE FROM THE VICE PROVOST FOR CLIMATE AND SUSTAINABILITY

THE FUTURE OF CLIMATE EDUCATION AT HARVARD UNIVERSITY

In September 2021, Harvard University President Lawrence Bacow announced a major, University-wide initiative to increase Harvard's academic efforts in the areas of climate change and sustainability. To lead those efforts, President Bacow created the position of Vice Provost for Climate and Sustainability.

Education is core to what we do as a university: teaching our students, developing curricular materials that can be used elsewhere, and educating the broader community. A core part of our climate initiative is ensuring that Harvard has the robust curricular and programmatic offerings that will prepare our students to be leaders in a world grappling with the inevitable harms wrought by climate change and the enormous challenge of eliminating anthropogenic greenhouse gas emissions.

The launch of the President's climate initiative provides a unique opportunity for the faculty to imagine what climate education should look like at Harvard. I therefore asked N. Michele Holbrook, Charles Bullard Professor of Forestry and Director, Harvard Forest, and Dustin Tingley, Professor of Government and Deputy Vice Provost for Advances in Learning, to co-chair a Committee on Climate Education comprised of 29 faculty members and senior teaching administrators from across all of Harvard's Schools. Their report summarizes the rich offerings in climate education

already at Harvard and, importantly, presents a vision of the great potential for expanding Harvard's efforts in climate education, both on campus and beyond.

This report is a result of the Committee's efforts. I am deeply grateful to the Committee members for shouldering this large task and helping to prepare such a thoughtful report. I am especially grateful to Professors Holbrook and Tingley for guiding this complex process, and to Courtney Ackerman for her unflagging efforts in supporting the committee's work. This report reflects a great deal of work in a short time and lays the foundation for expansion of climate education both within and across Harvard's Schools.

James H. Stock

Harold Hitchings Burbank Professor of Political Economy, Department of Economics, FAS and Vice Provost for Climate and Sustainability

EXECUTIVE SUMMARY

THE FUTURE OF CLIMATE EDUCATION AT HARVARD UNIVERSITY

Climate change is an urgent and multifaceted challenge facing all of society.

How can Harvard invest in the climate domain and dramatically scale the impact of these investments? Education. For centuries, education at Harvard has had an immense impact on the world. Investing in the future of climate education for our students, faculty, staff, and broader community will equip them to have an impact as citizens, professionals, and leaders. Just as research breakthroughs in engineering and the natural sciences, social sciences, and humanities help Harvard have impact at scale, so too does education. A strong and multidisciplinary educational program must be a cornerstone of Harvard's focus on climate and sustainability.

To chart a path for Harvard on climate change related education, the Vice Provost for Climate and Sustainability convened the Committee on Climate Education (CCE) which comprised senior leaders and faculty across the Schools whose research and teaching focus on preparing Harvard students for leadership in a world with a changing climate. The CCE worked throughout the Spring 2022 term to envision the future of climate education across Harvard for the long term, and to prioritize initial steps that can be taken to improve climate education at Harvard in the short run. Our approach emphasized a process where local groups could meet with their community to understand their needs and develop a vision to share with the larger University committee.

In this report, we lay out a strategic framework for the University that draws on and integrates perspectives from stakeholder reports and interviews we conducted. Specifically, Harvard climate education should meet learners where they are (e.g., providing a range of curricular pathways),

connect our learners to the world (e.g., partnering with alumni and external organizations), and take advantage of the whole of Harvard (e.g., integrating residential, cultural, and outdoor resources). The report details each component. To execute on this strategy Harvard should create a climate education accelerator program charged with catalyzing institutional innovation, scaling expertise and impact, and developing partnerships with organizations outside of Harvard. Harvard should hire more faculty, including faculty clusters, whose teaching commitments are related to climate change. Strategic hiring would augment existing programs and support new cross-school degree programs centered on climate change that will prepare students for emerging jobs and leadership roles. Our proposed new University-wide Standing Committee on Climate Education will ensure continued stakeholder participation and input. Finally, an external climate education advisory committee will help to facilitate partnerships and investments.

We provide an online appendix that includes each of the stakeholder reports. We emphasize that these reports are important in their own right. They describe both steps that can be taken locally and also tee up opportunities for the more coordinated University and community-wide opportunities that we discuss in our report.

N. Michele Holbrook

Charles Bullard Professor of Forestry and Director, Harvard Forest, co-chair

Dustin Tingley

Professor of Government and Deputy Vice Provost for Advances in Learning, co-chair



Introduction





INTRODUCTION

THE FUTURE OF CLIMATE EDUCATION AT HARVARD UNIVERSITY

Roger Revelle - noted by many as the US father of global warming science—began teaching at Harvard in 1964 and is credited by Al Gore for teaching him about climate change when he was a student at Harvard in the late 1960s. Much has changed since then. Human drivers of climate change have radically increased and the planet is warming at an alarming rate. Social movements motivated by climate change have emerged and morphed. Younger generations report increasing levels of existential angst about their collective future. There has been political progress and international cooperation in relation to the climate crisis, but also backsliding and unmet promises. The health consequences of climate change are becoming more apparent along with a range of disparate social impacts. But there are also signs of hope. Scientists continue to better understand the causes and consequences of climate change. New technologies are beginning to enable cost-effective alternatives to fossil fuels and designers and planners are charting out sustainable living and adaptation strategies. Businesses, investors, and social groups are mobilizing to scale and vastly increase access to enabling technologies and practices, taking into account the human health, social, and economic consequences of climate change.

Harvard is now positioned to increase the visibility and collective understanding of this topic through substantial investments in teaching and learning. We can develop learning experiences that build on and transcend classroom experiences. Experiences that recognize the deeply multifaceted ways that climate change will impact societies around the world. Experiences that recognize that humans are contributing to climate change in ways that are difficult to change. Experiences that remind our community to be both humble and energized. Experiences that will highlight issues of equity as due to disproportionate impacts of climate change on communities of color, poor communities and the global south. By doing so, the University can help ensure that the leaders of tomorrow are prepared to confront climate change.

Harvard needs a concerted effort to coalesce educational resources on the topic. Harvard also needs to invest in

faculty expertise in this area, particularly by bridging the professional schools and the College. The impact of additional investments can ripple across populations, reaching students, faculty, staff, alumni, and the broader public.

"There is deep interest in climate change throughout the University. Each of Harvard's Schools teaches and conducts extensive research on climate change. Meanwhile, the United Nations Intergovernmental Panel on Climate Change has reinforced the urgency of addressing climate issues in a more focused, deliberate, and systematic way, further underscoring our own call to a greater cohesion of our efforts."

Alan M. Garber '77, Ph.D. '82 Harvard University Provost

Why should Harvard invest considerable resources into learning experiences around climate change? There are three main reasons. First, we have an opportunity to scale meaningful impact throughout the world. Our students far outnumber our faculty and they go on to have profound influence across government, industry, science, culture, design, and more. Second, teaching and learning are deeply complementary to Harvard's research mission. A vibrant, interdisciplinary teaching and learning environment will facilitate more impactful breakthroughs. Third, as we discuss below, the climate change challenge is one that unites Harvard. It touches on a wide array of intellectual topics and areas of practical significance.

INTRODUCTION

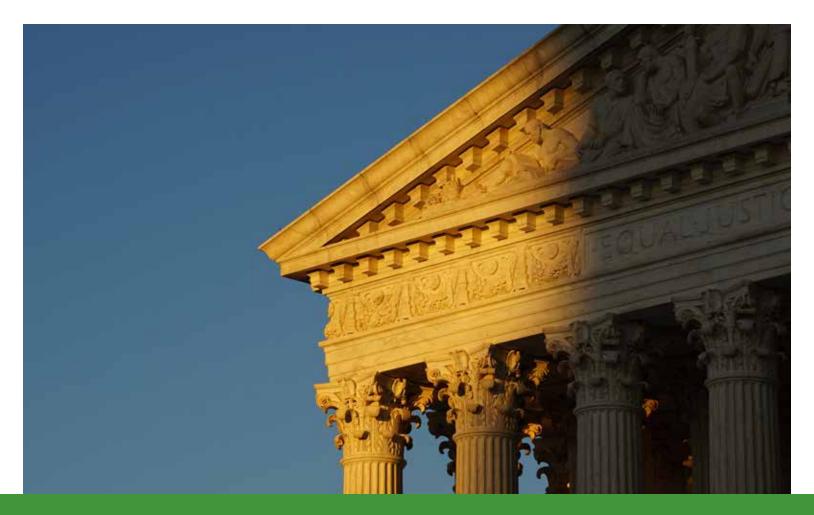
What will success look like 10 years from now—and hopefully sooner? Our students will understand the drivers and consequences of climate change and be able to critically analyze proposals for addressing and reversing these impacts. Our faculty will include many more leading experts—and exceptional teachers—on climate related topics in a range of fields. Our community will be filled with robust debate and innovation and our students will feel confident entering a world different from that which we inhabit today. We will have deep partnerships with a range of other institutions as we pursue shared educational goals.

Structure of the Report

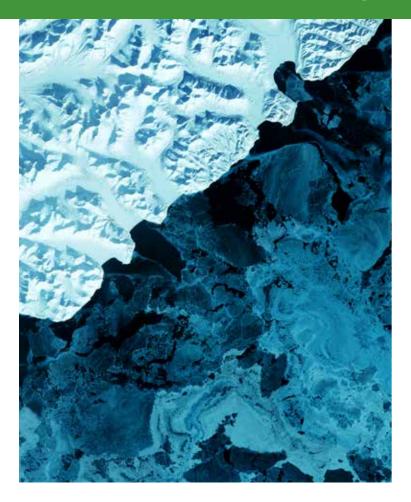
The work of this committee began intentionally with a range of stakeholders across all of Harvard. We wanted to listen from the ground up. This manifested in the organization of the committee (with members spanning schools), the instructions given to groups within the committee, and the solicitation of additional input from a variety of groups both in the form of written reports and insightful meetings. We also tried to understand efforts at other institutions and undoubtedly, there are unturned stones. Drawing on earlier conversations, this report was commissioned by Vice Provost James Stock to be completed along a very tight timeline. Reports like this could easily grow and morph but we needed to establish a launching pad (rather than a renewable energy driven rocketship, though hopefully that will exist in 10 years too...)

In what follows, we briefly characterize the existing state of play, make a core set of recommendations for the ways in which Harvard should approach climate education, discuss opportunities for institutional and partner innovation, and chart out next steps and a potential approach for implementation.





Existing State of Play





EXISTING STATE OF PLAY

THE FUTURE OF CLIMATE EDUCATION AT HARVARD UNIVERSITY

In assessing the current state of climate education across Harvard, three themes resonated across all of the groups surveyed:

- Educating the entire community students, faculty, staff, alumni, and the general public – about climate change and its impacts is of high importance and a major way in which Harvard can contribute to the climate challenges facing society.
- Climate education is already taking place across the University, with activity in virtually every corner.
- Harvard's immense disciplinary span gives us a comparative advantage given the multidisciplinary challenge of climate change.

Yet no group felt that they were where they wanted to be; a widely expressed sentiment was that we should be doing more. A shared goal is to develop core competencies that extend broadly across communities of learners, paired with opportunities for deeper study and specialization. Widely expressed challenges include how to add to already packed curricula and the need for more faculty whose disciplinary expertise has direct connections with climate change.

There was widespread appreciation from all of the sub-committees that the challenges posed by climate change are multifaceted and they span and embrace all disciplines. This means that the climate education tent must be large: no one area or discipline owns this space, rather contributions across the board are needed. Yet, climate education at Harvard is largely siloed in individual programs, with a lack of coordination at all levels and minimal cross-School interactions. One exception to this is the Harvard University Center for the Environment (HUCE), which supports educational programs that cut across disciplines and schools.

For example, HUCE funds research assistantships for undergraduates, hosts the <u>Graduate</u>
<u>Consortium on Climate & Environment</u>, the
<u>Climate Leaders Program for Professional</u>
<u>Students at Harvard</u>, the cross-disciplinary
<u>Environmental Fellows</u> post-doctoral program,
supports course development, and serves
as a de-facto home to the undergraduate
concentration in <u>Environmental Science and</u>
<u>Public Policy</u> which draws on faculty across
Harvard's schools.

And while there are other pockets of innovation that are pushing to expand learning experiences available to our community (e.g., at HMS a Climate and Health working group has recently convened to work with students to create a longitudinal curriculum around climate), we need a framework for fostering this bottom-up innovation and effort while also ensuring that the whole is greater than the sum of its parts. Our report proposes such a framework and how it can be implemented.



Core Recommendations for the University





THE FUTURE OF CLIMATE EDUCATION AT HARVARD UNIVERSITY

We are starting with a strong foundation but at the same time there is tremendous opportunity for institutional change and investment that will transform the educational opportunities and impact of Harvard. We make three core strategy recommendations: 1) Meet learners where they are, 2) Connect learners to the world, 3) Leverage the strength of Harvard as a whole.

Meet learners where they are

Harvard should provide learners with a robust set of meaningful climate education opportunities in ways that are easily discovered, inclusive of a full range of disciplinary and professional pathways, and complementary to other interests and present life circumstances. To achieve this goal, we recommend expanding and deepening our team of educators, supporting curricular and extracurricular innovations, and improving access to climate-related education.

Building a Team of Educators

The simple truth is that Harvard lacks a robust community of climate educators that matches the desires of our students. Building a diverse team of educators means investments in faculty, staff, students, alumni, and a broad partner community. A discussion of each follows.

Faculty

A common refrain across all of the Schools is that we have sizable gaps in our faculty, and by extension, in the ability to offer a robust climate curriculum. In many schools and departments, there are too few classes, if any, that focus on climate-related issues. Where offerings do exist, they tend to be standalone courses with no pathways for seeking advanced knowledge and experiences. Faculty hiring that considers strategic curriculum implications, in addition to research, should be a top priority. Departments and schools should articulate these strategic opportunities when it comes to hiring requests.

Second, and relatedly, existing models for advising are increasingly untenable. At the undergraduate, masters, and doctoral levels, the growing interest in climate in our student body is running up against substantial resource constraints. With students writing theses or seeking out climate related summer or career opportunities on the rise, faculty working on climate are stretched thin.

Faculty development opportunities could help. Harvard could identify professional development opportunities for individual faculty, or groups of faculty, to pivot towards the climate space and so by extension gain appropriate disciplinary expertise. Mechanisms to do this are discussed below, but focused hiring of faculty with related areas of expertise is needed given our aspirations.

Staff

The Harvard community is rich with scholars who, in many cases, have real-world expertise relevant to climate challenges but who do not hold teaching appointments. Included in this group are postdoctoral and research fellows, research staff, museum curators, librarians, and other qualified employees who work in programs such as the Office of Sustainability or the residential Houses. These individuals represent an important resource for our students and community. Yet in many cases their time is fully committed to job-specific projects, and thus they are unable to devote significant time to other educational endeavors. Finding ways to support the engagement of relevant staff in climate education will enhance the breadth of hands-on and experiential learning opportunities available to students.

Students

It is tempting to think of faculty as the sole locus of instructional excellence. But we know that students learn a tremendous amount from each other. The efficacy of peer learning is well documented, extends across disciplines, and has an important intellectual and institutional history at Harvard. The importance of involving students directly in climate education is amplified by the multifaceted nature of the climate challenge ahead. Our students come from diverse backgrounds and communities and therefore experience climate related issues in different ways. Furthermore, students who come to Harvard study in different programs and enroll at different career stages. The opportunity for business school students to learn from engineering students or for Harvard College students to learn from public policy students, for example, yields tangible benefits for everyone. Importantly, these exchanges might happen in classes, as part of research projects, or as part of joining a club or attending a public event. Bringing together these student experiences and perspectives will enhance the learning experience.

Alumni

Harvard alumni have long expressed interest in engaging with current Harvard students. They've experienced Harvard, but they've also had experience out in the world. They can help open that gamut of experiences that we want to expose our students to. In our survey, 80% of alumni respondents expressed interest in playing a role in climate education opportunities for current Harvard students.

"Climate change touches upon all aspects of our lives. Climate change education must, too. Alumni are critical to shaping the future of climate education and research at Harvard, whether as donors, practitioners, mentors, and more. Excellence in climate change education requires both cultivating students' expertise in their disciplines and connecting students and alumni across disciplines and generations to learn how to drive more effective and urgent climate action together. We commend the University's efforts to engage with the alumni community and help deliver the kinds of innovative, interdisciplinary, and intergenerational approaches needed to meet the moment."

Sanjay Seth, MPP '19/MUP '19 Daniel Bicknell, MPP '20/AB in Environmental Science and Public Policy

Co-Presidents, Harvard Alumni for Climate and the Environment

Offers for engagement ranged from serving as a guest speaker in courses, suggesting project ideas, partnering on class projects, and mentoring. But we lack systematic mechanisms to engage with this tremendous resource and right now this form of engagement is almost entirely ad hoc. The HBS report noted a strong desire to help identify alumni partners through the Business and Environment Initiative. Below we discuss potential mechanisms to institutionalize ways that Harvard can robustly engage with its alumni community.

External Experts

90% of student survey respondents said they would like to engage with alumni on climate topics as part of courses or in extracurricular capacity.

The range of potential educators outside of the Harvard community extends well beyond our alumni. One way to see this is through the rich set of visitor programs hosted by organizations like the Advanced Leadership Institute (ALI) and the Institute for Politics (IOP). Programs like these do on occasion bring in individuals with climate related interests and even deep climate related professional backgrounds. And there is a hunger for a dedicated program for practitioners to visit Harvard and be embedded in research programs and classes, especially those working with frontline and fenceline communities. These individuals crave the opportunity to be on the leading edge of climate education and impact. Yet, as with alumni, we lack systematic ways to tap into this energy and expose our students to diverse expertise. Busy instructors and experts pay the costs to make these collaborations happen.

Curriculum and co/extra-curriculum innovation

Curriculum innovation

As we plan for the next generation of climate education, there is an opportunity to think about not just "who" our educators are but also "how" the broader education context they are a part of can be structured. Harvard can more clearly structure its curriculum by developing a life cycle of climate education ranging from introductory to more advanced offerings, building curriculum in areas where there are large and important gaps, and developing new certificate and degree programs that are attractive to our students.

"A transformative climate education would consist of opportunities to engage with an interdisciplinary and multidisciplinary set of learning opportunities inside and outside of the classroom, not limited to coursework and research, but also with respect to internships, extracurriculars, and other public service opportunities. Such an approach would prioritize taking a holistic, systems thinking lens through which to analyze climate issues from a range of disciplines and perspectives, while helping students develop tangible quantitative, analytical, communication, leadership, and teamwork skills. Furthermore, students would have the opportunity to frequently connect with faculty and alumni leading cutting-edge solutions to various climate-related challenges."

Charles Hua

Harvard College '23, Joint Concentrator in Statistics and Mathematics, Secondary in Energy and Environment, Council of Student Sustainability Leaders, Member of the Presidential Committee on Sustainability

A robust "lifecycle" experience for learners embedded in Harvard's curriculum would begin with learning opportunities for students with little to no background on climate topics. This could come in the form of pre-matriculation offerings, or even as a component of existing introductory courses taken in the first semester. The multifaceted nature of climate change means that such opportunities for incorporation early on are ripe.

For example, the Harvard College Writing Program offers a buffet of early courses that touch on climate topics and is deeply thinking about how to "harness the power of writing about the climate crisis to influence audiences outside of the classroom." Faculty interested in offering such opportunities for learners in early stage classes could receive targeted support. Coordinating these investments is important so students do not have redundant early stage experiences across courses (what Dean Amanda Claybaugh refers to as the '101 Problem').

Curriculum innovation should not stop at the introductory course offering stage. There are few clear paths for students within schools/departments or across schools to deepen their knowledge and skill set in a structured manner. In part this stems from there being few advanced offerings in many schools (in others the gap is at the introductory stage) and a lack of instructional capacity.

"Climate education curricula should also be developed to be engaging and interdisciplinary, drawing in perspectives from the sciences, policy, research, and industry. Hands-on experiences and applicable skills for those going into climate-oriented careers should be integrated into courses as well, such as through stronger vertical integration of undergraduate programming with the graduate schools."

Seo-Hyun Yoo

Harvard College '23, A.B. Candidate in Environmental Science and Public Policy, Secondary in Global Health and Health Policy, Council of Student Sustainability Leaders.

This then precludes opportunities for layering various credentialing options (e.g., "certificates" or "tracks"). Schools such as HMS noted this lack of a "longitudinal" approach to the curriculum and are working to address this via a HMS Climate and Health Faculty working group.

As discussed below, Harvard should work to build out clearer pathways for students across the University who seek some level of specialization around climate but who might not want to join a concentration specifically dedicated to this. Non-credit or non-full credit "micro" courses that dive deeper in certain areas and offered during Winter session/J-term might also provide a vehicle for students.

Right before the beginning of the Covid-19 pandemic, 35 undergraduates participated in a series of climate workshops hosted by HUCE during the January Wintersession and taught by faculty from HBS, FAS, HKS, GSD, SEAS, and HSPH. HBS runs Short Intensive Programs (SIPs) during January that feature climate content and can draw in faculty across the University.

A systematic view of the curriculum life cycle maximizes the chances that every Harvard student graduates with explicit exposure to climate related topics no matter what school, program, or concentration they participate in. It meets students where they are by providing various opportunities for deeper engagement with climate change along a student's journey.

Innovation can also happen both in the form of significant investment in existing unserved programs and in new programs and classes. For example, the FAS Social Sciences and Arts and Humanities/Divinity School CCE sub-committee reports noted how few courses are being offered with climate connections, let alone climate-focused classes. This is despite the array of deep social and cultural causes and impacts of climate change. Indeed, we heard scholars and students in the natural sciences fields and economics often refer to the fundamental role played by politics, history, and sociological forces in determining the efficacy of technological and economic innovations.

Currently there are three undergraduate concentrations with an explicit connection to the environment: Earth and Planetary Sciences (EPS), Environmental Science and Public Policy (ESPP) and ESE (Environmental Science and Engineering), plus one secondary field (Energy and Environment). ESPP is overseen by a standing committee composed of faculty from multiple schools (FAS, SEAS, HBS, and HKS) and within FAS from both natural and social sciences. Noting that the "key impediments to climate solutions are cultural, economic, and political," the Arts and Humanities/Divinity School sub-committee proposed broadening the ESPP concentration to include a programmatic home for students whose interests in climate change lean towards questions of history, values, cultural differences, ethics and aesthetics. Further discussions of how undergraduate concentrations can best support climate education in the College are exciting and clearly needed.

The Law School sub-committee's work led to a fascinating new course to be first offered in the Spring of 2023 on "Climate Lawyering". The course will chart a diverse range of ways that the legal profession will play in climate related issues.

The "Climate Lawyering" course will examine the constructive role that lawyers can play in addressing climate change in most every legal practice area, beyond classic pollution control and natural resource management, including, for example, agricultural law, corporate law, energy regulation, financial regulation, food law, national security law, patent law, public international law, and transportation law. The course will also consider the constructive role that lawyers can play in different practice settings (e.g., public, private, advocacy). ... It has the potential to be open through cross-registration if space allows to students outside the law school and has the potential to be designed in a way that is both accessible and valuable to non-law students interested in the climate issue.

Interest in this content is likely to extend beyond matriculated HLS students in part because it could help create curricular "glue" across schools and connect with College to professional school pre-matriculation thinking.

Finally, Harvard should target opportunities for new cross-discipline/school level degree programs. There are areas of potential opportunity that will require school level leadership. At the level of new degree programs, a cross-School masters in climate and sustainability, for example, could draw on expertise housed in multiple schools including Harvard Business School, Harvard Kennedy School, and the Graduate School of Design as well as the experience of the Division of Continuing Education (the Extension School). Establishing pathways from undergraduate studies to Masters, Ph.D., and other programs (e.g., specialized certificates) is another substantial opportunity.

Existing degree programs might also be augmented. For example, masters students in one year programs complained about severe constraints. Such students might have access to certificate programs that would enable these students to add a year and take courses in the climate domain that would complement their core masters degree. Finally, Harvard could explore unique fellowship opportunities for Ph.D. students who want to expand their studies and research substantially beyond their admitting department, perhaps with formal co-advising at the start of their studies.

Co/extra-curriculum innovation

Harvard is more than classes and degrees. It offers a rich campus life embedded in a broader ecosystem of shared interest groups and social networks. Yet only 20% of student survey respondents said there were sufficient opportunities to engage with climate topics outside of class (clubs, public events, etc.). Harvard should increase coordination between class content and external experience and interests while increasing support for co/extra-curricular programming.

First, there can be more climate related coordination between classes and what students are pursuing or interested in outside of their classes. This is a missed opportunity that is not confined to the climate space. Harvard's teaching and learning community should explore how to better make these connections.

To take one example of class/outside of class connections, students in a Harvard Law course "Climate Solutions Living Lab" built out a playbook for how Harvard Athletics could lower its own carbon footprint. In the future, student-athlete leaders might help decrease the carbon and environmental impact of athletics at Harvard and beyond.

Harvard is more than classes and degrees. It offers a rich campus life embedded in a broader ecosystem of shared interest groups and social networks. Yet only 20% of student survey respondents said there were sufficient opportunities to engage with climate topics outside of class.

Second, Harvard has seen student groups organically form, including the Harvard Outing Club founded in 1939, the Climate, Energy, & Environment Professional Interest Council in HKS, Students for Environmental Awareness in Medicine (SEAM) in HMS, and the Climate Leaders Program, founded in 2018 in partnership with HUCE. However, one thing we heard from students is that opportunities and funding are limited and that demand is outstripping supply. Student organizations and clubs that have a shared interest in climate are also often isolated across schools or are highly specialized. Some of this is to be expected, but taken too far we will miss opportunities for deeper social connections and peer learning. Given that climate change is expected to have disparate social impacts, we expect that opportunities for public service will increase. Existing institutions including the Center for Public Service and Engaged Scholarship, the Radcliffe Institute, HSPH's C-Change Student Ambassador program, and the Safra Center could serve as nodes for student engagement and with additional support their role could grow.

Finally, Harvard's Undergraduate House system offers opportunities to help students translate the oftentimes overwhelming, anxious, and technical realities of climate change into the realm of everyday choices, experience, and behavior. Climate education related engagement with the professional Schools through Tutors and Senior Common Rooms, and deeper institutional collaboration with partners such as the Office of Physical Resources and Planning, Harvard Dining Services, Harvard Office for Sustainability, and the Harvard Office for Undergraduate Education would yield transformative opportunities for inter-generational engagement with real-world questions at manageable scale, and outside of the stresses of graded coursework. Such programming may have the added effect of bringing intellectual mission to necessary (and costly) changes in House Renewal and infrastructure. In this sense, the Houses might be seen as genuine Living Laboratories in the context of climate change.

Discovery and Access

Simply offering more courses, advisors, curriculum innovations, student clubs, etc., will not matter if it is hard for learners to discover and access these opportunities and share them with their networks. Further, for many potential learners, in person/synchronous participation requirements can produce additional frictions. Harvard should make it easier to access information about courses, advisors, and communities at Harvard and invest in content and technology that will help spread learning opportunities beyond Harvard's campus.

While HUCE and HBS have led efforts to create "lists" of climate related classes, these efforts could be amplified. Every student-facing advisor, program officer, etc, could be equipped every semester with an up-to-date digital playbook of opportunities for students who express an interest in climate. Further, members of the Harvard community and beyond should have access to a portal representing climate related events and news from Harvard. Technology to support these types of activities are already in play at Harvard (e.g., Harvard Link's Climate Channel).

Barriers to education are not simply informational/technological. They are also institutional. Harvard continues to face challenges when it comes to students being able to engage with opportunities throughout all of Harvard. While there has been some progress on topics like "cross-registration", challenges remain. Solving these problems will be crucial because our Schools should be innovating with curricular offerings which in turn will attract substantial student interest across Harvard. Senior staff leadership will be crucial here.

Expanding access to climate education beyond our local community sets up an exciting challenge and opportunity. Fortunately, Harvard has become a pioneer in using digital technologies to reach learners wherever they are in the world. Harvard has launched online courses via HarvardX that deal with climate issues, the Harvard Extension School offers credit bearing courses on climate that are delivered remotely, and Harvard has helped to create digital resources for high school instructors.

But as outlined in the recent Future of Teaching and Learning report this is just scratching the surface of what is possible. When it comes to a digital climate education strategy we should be investing in a series of courses on climate that draws in faculty across the University. While HUCE has produced some modular "short-form" content, more is needed including more content that is more contemporaneous in nature or highlighting interesting snapshot perspectives so learners can broaden their climate knowledge even if they do not have the time to take complete courses. We should imagine a digital campus where climate topics and expertise can be explored across Harvard.

Indeed, we are already seeing efforts like this emerge organically such as the alumni-focused Climate Boot Camp (see Harvard Alumni for Climate and Environment sub-committee report). The opportunity to scale our impact by meeting Harvard learners everywhere cannot be emphasized enough. As one alumnus put it in our survey, "by not focusing significant attention on alumni, I feel that you risk missing out on the members of the global Harvard community who may most benefit from additional climate education—in the life-long learning sense—and who may be able to most immediately and significantly impact our global response." Of course, the educational interests of the Harvard community parallel those of learners throughout the world, setting up the co-opportunity for scaling the impact of digital climate education experiences.

Importantly, these digital investments have the potential to circle back and be useful for our local community. Several social science faculty already use short form video assets produced by HUCE that describe specific science issues as a way to help their students get up to speed on some background science topics germane to their courses. The HBS sub-committee report noted ongoing efforts to create educational materials, including those that extend beyond the video. For example, interactives and even simulations/games can be created and reused across a range of courses.

Connecting learners to the world

The call for learning opportunities from students did not stop at the classroom door. Instead, there was a clear desire not just for bringing the world into the classroom (as discussed above) but also for there to be clearer, more robust and scalable opportunities to engage with the world outside of Harvard. Harvard should be proactive in establishing clear, accessible, and fulfilling paths for students to connect their climate interests to opportunities throughout the world.

During the summer and during term-time our current students work in internships with external organizations. And when our students graduate they go on to work with a variety of organizations. Yet while increasing numbers of students report having a salient interest in climate and climate related careers and experiences, they also report substantial frictions in finding opportunities.

Part of these frictions stem from the supply side. There are not enough positions available to meet student and graduate demand (and Harvard is not the only institution with students keen to work in this space). Another friction is the search cost for students. There are few systematic and curated internship and career guidance opportunities for students interested in the climate space. Students report that while career service offices try to be helpful, there remains a gap and those with climate interests find it difficult to navigate.

"As undergraduates, we know that dozens, if not hundreds of recruiters from the private sector will show up on campus in September of our senior year with extremely streamlined job recruiting processes. These are highly attractive and compelling to students before even starting your final year of college, you can know with certainty that you will graduate with a prestigious job. It is an enormous comfort. Unfortunately, however, organizations/firms/companies working in climate are not typically represented. Although this may indeed be because these organizations do not have the long-term certainty, funding, HR capacity, etc. to make hires many months in advance, I've found that the effect is that students default to pursuing the other options that are right in front of them. Students need more streamlined guidance from career service offices about how to navigate the slower timelines and typically more casual recruiting processes inherent to many organizations working in climate."

Clea Schumer

Harvard College '20, Environmental Sciences and Public Policy Harvard should lean into this opportunity. While we discuss implementation strategies below, there are a wealth of tactics for Harvard to consider. Recruiting fairs might request that companies and organizations make climate related opportunities part of their presentations and recruitment pitches. We could form durable relationships with established external organizations and create a predictable flow of talented Harvard students into their internship programs and beyond. We should learn from multiple existing programs at Harvard such as those in HBS, GSD and HSPH (e.g., the Environmental Health Department) that routinely work with private and public partners as part of their curriculum.

Programs that blend research and field experiences are of great interest to our students, and pilots such as the Fellows at the Forefront program in Harvard College are drawing on ideas from across the University.

The Fellows at the Forefront program run by the Center for Public Service and Engaged Scholarship has faculty lead a summer cohort of students working either as research assistants for the faculty lead or place in a public impact organization. Throughout the summer the cohort convenes to exchange experiences working at the forefront of research or public impact. I joined the program's first cohort that focused on climate change and worked at Green for All. Having the interplay between on the ground front line work and research helped me see the huge range of ways to have an impact in this space."

Naomi Davy

Harvard College '23, Social Studies

Durable relationships with community partners and large organizations might even develop into cohort models that draw in students across multiple Schools – creating cross-Harvard bonds between our students. As discussed below, centrally located clearinghouse models could help match students across the University with climate opportunities. Of course, crucially, community partnerships need to be genuine and predicated on the needs of communities rather than Harvard's needs.

Another opportunity is for field based courses and opportunities. For example, Linda Bilmes, Daniel Patrick Moynihan Senior Lecturer in Public Policy, teaches the Rappaport Greater Boston Lab and Bloomberg Cities Applied field lab that has worked with a range of cities on projects as part of the course. "There is enormous demand for such projects. Dozens of cities reach out to me every year and I can only accommodate a tiny fraction of them. By establishing a Harvard-wide climate field lab, we could serve a far broader community, and provide many more students with the chance to work on a clinical technical project in this area."

Taking advantage of the whole of Harvard

How do we effectively bring the "whole" of Harvard as it relates to climate to our diverse set of learners? By the whole of Harvard we mean much more than what traditionally comes to mind: our classes, academic programs, and schools. We instead mean the entirety of the lived experience at Harvard. Harvard should integrate its rich residential, cultural, and outdoor resources into its climate education strategy.

As discussed above, our undergraduate House system represents one such opportunity. Because climate change is the result of how we use energy and resources, the residential Houses could provide a testbed for students to grapple with their own willingness to make the changes necessary to reduce their climate impact as well as how to be part of a diverse community in which others make different choices.

Our performing art and museum community facilitates the cultural, spiritual, and creative foundations of our community. This community is deeply committed and wants to provide even more opportunities for climate related topics in its programming. It is also keen to explore how to integrate climate resources into courses and finds the topic is very well suited for the creative arts given the multifaceted nature of the climate challenge ahead of us.

Programs that blend research and field experiences are of great interest to our students, and pilots such as the Fellows at the Forefront program in Harvard College are drawing on ideas from across the University.

"The Harvard student art scene is as vibrant and varied as the student community itself. With students from around the globe, one is constantly exposed to artistic and cultural expression that expands one's idea of who we are as a community and what makes this community so special. For many of these students, art making is a way to engage some of the most pressing challenges that we face as a society—climate change, justice, and economic inequity, to name a few examples. Enabling this kind of creative engagement sparks reflection among all members of our community and, I believe, inspires change."

Jack Megan

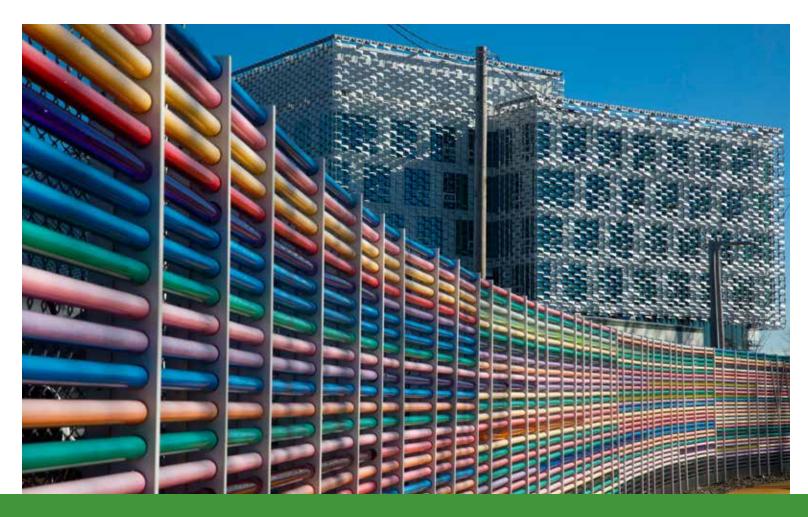
Director of The Office for the Arts

Harvard is home to an amazing array of natural history collections and research sites that include the Museum of Comparative Zoology, the Harvard University Herbaria, the Arnold Arboretum, and the Harvard Forest. How climate change affects biodiversity and ecosystem health is central to the research and educational missions of these four institutions. All four of these allied institutions are actively engaged in climate education with both the surrounding community and with Harvard students, but there are substantial opportunities to deepen engagement across the Harvard community.

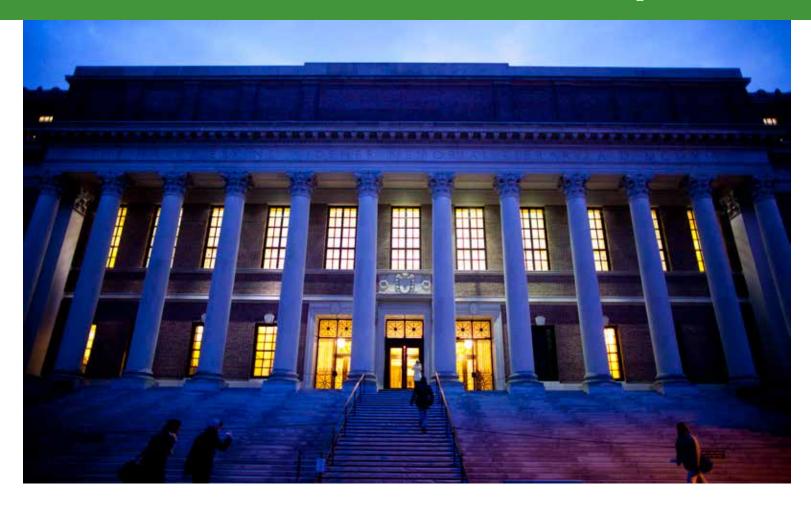
Harvard Library is another institutional resource for climate education. Its collections span books, journal articles, newspaper and other media, climate-related maps, data sets, and databases that are instrumental for student research and exploration. The library provides both the published fruits of scholarship and support for faculty and students to apply and create new knowledge. Harvard Library also makes library research guides, teaches library and data classes, teaches how to make audiovisual presentations, provides reserve materials for courses, and consults with teachers and learners from Harvard and around the globe. Services for Academic Programs (SAP) specializes in data reference, data visualization, teaching, and multimedia work and works regularly with a number of classes.

Harvard also has a rich set of research centers and institutes that can further be drawn in as a resource not just for research but also our education mission. These centers and institutes span disciplines but many also have important international/area foci that education around global climate change can draw on. Some like HUCE already play such a role, but we heard a very clear desire for more activity and support that enables the unique areas of expertise represented by these organizations to take on climate education themes.

How can we innovate given these immense resources? Virtual tours/discussions featuring new installations in our museum system, library, and elsewhere are becoming possible just as for-profit companies like Amazon are serving as a clearing house for tours and experiences around the world (see Amazon Explore). Even the Harvard Forest has embedded wi-fi connections throughout its landscape, enabling virtual tours and live discussions for classes who are unable to visit in-person.



Innovation and Institutional Partnerships



INNOVATION AND INSTITUTIONAL PARTNERSHIPS

THE FUTURE OF CLIMATE EDUCATION AT HARVARD UNIVERSITY

Taking advantage of the whole of Harvard also means recognizing that Harvard sits within a broader higher education landscape composed of other institutions and partners. Local institutions such as MIT and UMass-Boston are also building up their climate related research and education plans. Harvard should form partnerships with a range of institutions and become a leader in climate education.

How can Harvard learn from the teaching and learning innovations happening at other institutions, and how can they learn and benefit from Harvard's investments? A range of plans for higher education institutions are reviewed in the online appendix. At a minimum there are opportunities for shared learning. Thinking at a bigger scale, are there opportunities for joint projects between students, classes, and organizations and could Harvard help coordinate and facilitate these efforts?

Harvard also sits within various accreditation institutions that could be encouraged to work with us to develop systematic approaches to articulating climate related competencies that we want our students to have as they enter the world. Can Harvard along with other organizations help to codify the importance of certain competencies and skills as they relate to climate?

An important new opportunity to push innovations in climate education comes from the newly established education non-profit set up between Harvard and MIT. The new non-profit is just now being formed, but its mission is highly compatible with aspirations the Harvard community has around climate education. Investments in new digital learning technologies could help Harvard open up a digital campus experience for the world around climate education. Partnerships with underserved communities and educational institutions could open up new opportunities for Harvard instructors and students to partner with frontline and fenceline communities that have and will face the scourge of environmental degradation and a changing climate.

"At the 2022 HBCU Climate Change Consortium meeting, I learned firsthand from the exciting multidisciplinary climate research and education being led by HBCUs. The consortium's successful mentoring program offers Harvard faculty the opportunity to learn from people living across the fencelines of petrochemical pollution, and at the frontlines of adaptation to climate change. As we imagine what climate education at Harvard can be, I think we would do well to remember the celebrated injunction: nothing about us, without us. Nihil de nobis, sine nobis."

Jason Beckfield

Robert G. Stone Jr. Professor of Sociology

INNOVATION AND INSTITUTIONAL PARTNERSHIPS

Issues of equity have similarly been highlighted in the health domain, which recently brought together organizations across Harvard and beyond to discuss the broad range of effects of climate change on clinical practice and health equity (see HMS report in the online appendix).

Another area of impact is on K-12 educational opportunities. While this is perhaps outside of the sweet spot for much of Harvard, we do have students graduating with an interest in this area both as educators but also in the policy/implementation side. Recently international organizations such as Teach for All (the umbrella organization of Teach for America) have set up efforts in the climate space that are being led by Harvard alumni.

While now somewhat out of date, <u>The Habitable Planet</u> (sponsored by the Annenberg Foundation in 2007 and coordinated by Professor. Dan Schrag) is a 13-unit series of environmental science (they specifically prohibited us from going into policy) — designed for high school science teachers. The award winning course has 13 units, each one organized by a Harvard faculty member.







Strategy implementation



STRATEGY IMPLEMENTATION

THE FUTURE OF CLIMATE EDUCATION AT HARVARD UNIVERSITY

What concrete steps can Harvard take to achieve our ambitious climate education goals? We recommend four interconnected efforts: faculty hiring, institutionalizing a standing committee on climate education, staffing and substantially funding a climate education accelerator program, and establishing an external climate education advisory committee.

Faculty Hiring

The first order issue identified by many groups was faculty hiring. Harvard has talented faculty in the climate space, but in many areas our aspirations as a leader in education and the demand of our students far outstrip what faculty can supply. Disciplines studying the social aspects of climate change have little presence and even strongholds such as applied economics could use reinforcement. Science and engineering, long the center of climate change research at Harvard, must also strengthen and expand. The humanities — and their interplay with the natural and social sciences — will play a key role in marshaling the willingness to confront human-caused climate disruption. Harvard's professional Schools draw on all of these traditions and face gaps in their faculty.

Across the board faculty and staff are excited by the prospects of taking on climate change education, but many feel stretched thin. The important role of staff in all of our plans is not to be underestimated. A failure to resolve these constraints will hinder one of the greatest ways Harvard will scale its impact on climate: through teaching and learning.

Perhaps, though, hiring of individual faculty, or even clusters of faculty, will be the easy part. The hard work will be embedding a diverse range of current and future educators and learners in a University strategy that can move fast and achieve longer term transformative goals. For Harvard truly to be more than the sum of its parts we require an ambitious strategy for harnessing, supporting, and bringing together complementary local efforts across Harvard. In what follows, we sketch out what a centralized implementation of our climate education strategy might look like.

Institutionalize the Committee on Climate Education

Harvard should establish a Standing Committee on Climate Education (CCE). The Spring 2022 ad hoc Committee on Climate Education produced fantastic School/group level plans and began the process of sharing, collaborating and planning. An institutionalized CCE would enable groups to collectively explore progress, pitfalls, and shared opportunities that could engender deeper collaborations across groups. We see this as a crucial process driven step for Harvard.

This group could also take on various tasks. These could include (but are not limited to):

- Exploring and helping to push forward new degree offerings (BA, MA, PhD, etc.) and certificates in the climate and sustainability space. New cross-School programs like a masters in climate and sustainability discussed above, or collaborations around medicine and health, will be easier to create and make world-class by investing in the range of complementary efforts discussed in this report. But our committee's work to date did not directly take up the intellectual or market-driven merits of new degree programs or certificates.
- Consider climate education requirements, including in the General Education program for the College
- Consider the establishment of a new undergraduate concentration that expands and builds on ESPP but allows for a greater diversity of student interests (e.g., the humanities)
- Advise on how to build out specific programming, including the creation of consortia and competitions (as proposed in the GSD report) and cross-University speaker series

STRATEGY IMPLEMENTATION

Interested members of Harvard's CCE could be a part of linking up and working with partner education institutions around climate education. This would be one mechanism for ensuring Harvard is part of a network of climate teaching and learning efforts.

Staff and Substantially Fund a Climate Education Accelerator Program

Harvard should establish a program that will help execute larger, medium to longer term, strategic investments around climate education. These education efforts should play a signature role for Harvard alongside research investments. These investments can come in different forms: institutional innovation, scaling diverse expertise/facilitating partnerships, and technological investments.

Example workstreams for each of these buckets include:

Institutional Innovation

- Establish a clearinghouse (or "HUB" as referenced in the GSE and GSD reports) model to support experiential learning activities of students. These experiences could include up to date research assistantships opportunities, internships with external partners, and providing strategic and financial support to student-led organizations.
- Establish a clearinghouse for matching alumni and external experts with Harvard instructors and programs in order to facilitate and manage durable partnerships that bring in rich expertise from our alumni and partner communities.
- Create and pilot solutions to cross-registration across Harvard's Schools. Recent years have seen progress in this space, but it will continue to require financial and human capital investment to iron out.

- Create connections between different degree programs.
 Pre-matriculation type programs help to provide glue between programs and Harvard has existing expertise in the digital space such as HBS's Core program, HMS's HMX, HLS's 0-L program, and HSPH's Foundations for Public Health. But offering climate centered courses, such as the Climate Lawyering class discussed above, to a broader audience will help provide connections between schools
- Support cross-School guest speakers in courses and extracurricular activities. For example, the Law School noted they "can do a better job of bringing onto its campus as speakers in courses and extracurricular activities faculty from other parts of the University with expertise on climate issues, whether scientists, economists, political scientists, or public health experts." Other Schools voiced similar aspirations, but efforts to do this are ad hoc.
- Foster research oriented students via pipeline programs as they build a presence in fields that have historically had less climate related work.
- Mobilize curriculum and pedagogy coordination with University teaching and learning centers, Harvard Initiative on Learning and Teaching, and the academic professionals and technologists of the Teaching and Learning Consortium. This could also be a place for University-wide convenings as noted in the GSE sub-committee's report.
 Research centers and institutes should play an important role here.
- Analyze the intellectual and market justifications for new degree programs.
- Facilitate a transformation of the residential House system into Living Learning Laboratories

STRATEGY IMPLEMENTATION

Scaling Expertise and Facilitating Partnerships

- Upskill faculty for example through a faculty fellows program that recruits and supports faculty as they create and revise climate related curricula. As with other programs like the Mindich Engaged Scholarship program, small stipends and course design support could be provided to faculty.
- Establish climate residency programs for practitioners, including those from frontline/fenceline and underrepresented communities, that coordinates with other fellows programs (ALI, IOP, etc.) and has an appropriate teaching/mentoring component.
- Implement and oversee education/pedagogy requirements for research grants overseen by the Office of the Vice Provost for Climate and Sustainability. These requirements will help produce training models and other materials that will take transformative research happening at the University and put it at the fingertips of learners and leaders at Harvard and throughout the world.
- Develop relationships with other higher education institutions and identify opportunities for coordination around projects and instructional resources.
- Identify promising local, regional, and international organizations and companies that our student can work with.

Invest in learner centered technology

- Integrate climate education with the new "Digital Campus" vision outlined in the Harvard Future of Teaching and Learning report. This will enable Harvard educators to deliver rich learning experiences in the form of classes, panel discussions, short-form experiences, and other digitally delivered materials (e.g., reusable digital pedagogical tools such as interactives and simulations and remote access to Harvard museums and Harvard outdoor resources such as Harvard Forest and the Arnold Arboretum) all through a digital campus experience that highlights the diversity of Harvard and its potential for impact.
- Identify technologies that will enhance student/faculty research and coursework around climate topics. For example, GSD noted the opportunity for a university-wide "Hub" for analyzing and representing the spatial and place-based implications of climate change.
- Articulate and strategically guide technological investments for clearinghouse models that address issues around discovering courses, advisors/mentors, internships and jobs, events, news and community discovery. These investments could draw on prototypes such as the Climate channel at Harvard Link, which automatically harvests climate related news and events from hundreds of sources across campus.

Establish an external advisory committee on climate education

Harvard should establish an external advisory committee on climate education. We heard loud and clear from our alumni and partner community that they are committed and want to be involved. Ensuring we have a steady flow of strategic expertise will ensure that we are making smart and impactful investments. This group could also serve to help facilitate conversations with pockets of expertise and financial support that recognize Harvard's key role in climate education.

CONCLUSION

THE FUTURE OF CLIMATE EDUCATION AT HARVARD UNIVERSITY

Harvard should be a world leader in climate education. We have faculty, students, staff, and alumni whose interests and expertise cover the many challenges of combating and responding to climate change. We have expertise in pedagogy and new ways of learning that involve technology. We have creative engineers and artists alongside cultural and outdoor resources. Our potential for impact through education – which dramatically scales these resources – is not to be underestimated.

However, as noted in the GSE report, we should recognize and resist the risk of addressing the complexity of climate change by incorporating it in shallow ways leading to students who end up engaging in superficial advocacy rather than in the essential, but harder, intellectual and creative work of developing solutions to the complicated challenges, and assessing the difficult tradeoffs.

Importantly, our community is energized by the prospects of our making significant investments in climate education. Alumni are mobilized, schools are already making plans, and opportunities for systematic cross-School programs and coordination are being discussed. Our students are excited for the challenges that lie ahead. Fostering and unleashing their talents and passion on the world will mark a major contribution Harvard can make to the world.

For the individual working group reports, please visit: www.harvard.edu/climate-and-sustainability/climate-education



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THE FUTURE OF CLIMATE EDUCATION AT HARVARD UNIVERSITY

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