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## From Critique to Audit: A Pragmatic Approach to the Climate Emergency

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## Working on a Deadline: The Pragmatic Tilt

[Figure 1]

As the skeleton wrestles with the nobleman in Hans Holbein's *Dance of Death*, the hourglass stands on the table, its sand trickling away in a constant stream. The nobleman tries to escape, but a bony foot -- moving with the agility of a tango dancer -- impedes his progress. It is only now that nobleman begins to understand that he can't win -- for who can defeat death, either with riches or by a sword? His concern with a transitory world -- as symbolized by his fine clothes, a metonym for the economic security from the famine and drought that plagues other individuals in Holbein's series -- has merited him nothing. Meanwhile, in the forgotten hourglass, the last grains of sand are slipping away.

Mankind has always known about deadlines. *Brevis lux*, says Catullus. *Carpe diem*, says Horace.

*Ho bíos brakhús,  
hē dē tékhnē makrē,*

says Hippocrates, and his aphorism continues: "opportunity [is] fleeting, and experimentations perilous." How is our age any different?

And yet: our rapidly-approaching deadline of 2030 to limit carbon emissions to produce no more than two degrees of warming is substantiated, and final, in a way that no earlier calls were. Unlike ordinary death -- inevitable yet always unexpected -- and unlike medieval apocalypses -- governed by calendars where numbers had allegorical value -- the 2030 deadline is precise in its linkage of timing to data.

The 2030 deadline is the result of peer-reviewed consensus based on enormous amounts of data collected and tested since the first ice-core samples that confirmed global warming were

drilled in the arctic during the 1960s. No man can foretell the hour of his death, says Matthew: but Matthew lived before the ice core's archives revealed the epic of a warming planet. The timeline that predicts a need for change now to meet the 2 degree limit by 2030—posits a literal and precise — rather than suggestive or analogous -- *dead*-line, where inaction predicts the displacement of coastal and island dwellers by rising tides, the disruption of food and water, and the consequent genocide of a proportion of the earth's inhabitants.

Unlike the invisible, unannounced visitations of death in the past, the timing of this reaper has been announced. The merchant in the picture may struggle against an invisible adversary whom he cannot defeat. But we know the forces that threaten us in detail: we can map rising sea levels, calculate the cost of hundred-year-storms becoming ten-year events; we can estimate the coming change of temperature and the consequences for agriculture to an astonishing degree. What would it mean to work as if we knew our deadline?

Outside the academy, the March for Science, the People's Climate March, and the actions of Extinction Rebellion have dramatized in different ways a popular demand for coordinated action. The People's Climate March called for governments to respond to environmental threats to indigenous populations and people of color, whereas the March for Science stressed the need for policy-makers to institutionalize a response to climate models, while Extinction Rebellion proposed a new model of democratic accountability — typified by sortition and citizen assemblies — that would liberate governments from market influence and make them directly responsive to citizen concerns. The movement's hourglass logo underscored that the 2030 deadline was a mobilizing focus, requiring urgent action of a kind that representative government — burdened by the influence of corporate lobbies -- had failed to effect. While each varied in their modeling of

where and how reaction to climate change has broken down, the three movements were united in their calls for an elevated response.

Deadlines also dominated the work of speakers and writers who galvanized the movements and provided their foremost interpretations. Among the most famous of responses was that of Greta Thunberg -- the Swedish teenager who inaugurated Europe's round of "school-strikes" by schoolchildren protesting climate inaction. In a series of widely-circulated speeches in early 2019, Thunberg urged the adult world to consider the lateness of the moment. Her injunction to the Davos forum in January 2019, "I want you to panic," was recirculated in tweets and newspapers and even painted by protestors onto placards. Her urgency was echoed by writers like the journalist and documentarian Naomi Klein, and more recently, by historians such as Andreas Malm, whose reflections on the urgency of the climate situation have prompted him to challenge traditions of *nonviolence*, instead suggesting squatting, dynamite, and even violent encounters with authority as one mode of urgency indicated by the temporality of working on a deadline.<sup>i</sup>

The urgency of this charge has given many serious observers pause. There are academic critiques, for instance, that advise contemplation as a remedy to cultural panic. Some scholars have responded by calling attention to the artificiality and constructedness of the climate deadline. "There is a long history of climate deadlines being set publicly by commentators, politicians and campaigners," observes Cambridge geographer Mike Hulme, "and then of those deadlines passing with the threat unrealized."<sup>ii</sup> One group of geographers and sociologists has warned that too much attention to deadlines, or "deadline-ism" might offer the pretext for the rise of authoritarianism.<sup>iii</sup> Ironically, one might say that the critique of urgency represented by this

line of thinking is to recommend more contemplation: the opposite, as it were, of the action urgently recommended by the data.

Some scholars have already taken action in the form of traditional research, newly refocused on the environment. Historians of science such as Robert Proctor and Lorna Scheibinger have called for a new investigation into the making and unmaking of scientific and political consensus. Malm has meanwhile reviewed complex causality behind climate change, noting the linkage between fossil fuel regimes, latent capitalism, and empire. Bruno Latour has called for a new “terrestrial” focus in academic research.<sup>iv</sup>

Studies such as these demonstrate an ethical alignment with protesters who demand a politics accountable to survival and a challenge to the political and corporate interests whose influence is responsible for delay. Their writing is urgent, and their investigations tuned to the questions of their time. Urgency informs their epistemic questions.

But by and large, these writers have not applied themselves to the question of whether urgency demands anything different not only in our economic and political *episteme*, but also of our *praxis* of research.

One exception is the work of the philosopher Stephen Gardiner, who has been articulating the features of the climate debate that make consensus and timely action so difficult to organize. Gardiner identifies three: “intergenerational conflict,” conflict between the global north and global south, and self-interested discourse by what calls “corrupted” actors or academic sectors whose patterns of thought turn every conversation from survival to profit.<sup>v</sup>

Perhaps the most scrupulous deliberation over how urgency might affect academic undertakings comes not from the liberal arts but from management science, where Jem Bendell has underscored the need for individual and collective accountability. While Bendell’s paper has

been critiqued – especially by climate scientists who, while endorsing Bendell’s overall picture of an urgent situation, have taken issue with his characterization of the science of irreversible ice melt in the arctic -- Bendell has taken further than almost any other writer the question of what a timely *praxis* inside academia might look like.<sup>vi</sup>

Drawing on prognoses of civilizational collapse, Bendell voices a dire warning about the criticality of climate change for all human systems – economic, political, and pedagogical -- whose work is premised upon predictable access to food and water. Bendell frames his recommendations against vivid examinations of the urgency of the crisis, including predictions of the inability of fish to reproduce themselves, a proliferation of mosquito and tick-borne illnesses, and the disturbance of seasonal rains depended on for agriculture and drinking water. For Bendell, these mounting, expensive disasters spell that we may have *limited time* in which to work in the comfort of present-day alignments of research and teaching. Facing a deadline, we might not have time for recondite speculation. "We might pray for time," he writes, "But the evidence before us suggests that we are set for disruptive and probably uncontrollable levels of climate change, bringing starvation, destruction, migration, disease and war."<sup>vii</sup>

Part of what is remarkable about Bendell’s work is that he is so extremely self-conscious of the fact that the urgency of this message falls outside traditions of critical analysis in the academy. Admitting that his tone might strike some readers as “unacademic” Bendell nevertheless underscores that urgency is the accurate reflection of the present-day situation described by numerous scientific papers.<sup>viii</sup> His words are chosen, he writes, in order to “cut through the sense that this topic is purely theoretical.”<sup>ix</sup>

Bendell urges academics to therefore move from contemplation to praxis. He urges scholars to prioritize practical teaching and investigation of the “systems of denial” that

contribute to a crisis of collective inaction around the climate emergency. He underscores the failures of nations to keep up with the commitments to their national climate plans – which are currently on track for only half of the commitments needed to limit carbon emissions to two degrees by 2030.

Let us examine one sector of practice in the modern academy in light of the practical questions raised by Gardiner and Bendell. Is contemporary work in the humanities helping us to overcome the divides of rich and poor nations, older generations and younger ones, that make collaboration on the problem so difficult? Do they help us to challenge the legacy of empire and capitalism, to identify and to counter what Bendell calls “systems of denial”?<sup>x</sup>

Largely, yes. Humanists in general, and historians of the environment in particular have been heroic actors in identifying systems of denial and holding them to account. Humanistic engagements include Dipesh Chakrabarty’s engagement with the legacy of colonialism in the developing world, where imperial extraction of resources in centuries past is now being compounded by the effects of climate change, which most models predict will have its most severe consequences in areas such as Africa and South or Southeast Asia – areas, that is, where the legacy of colonialism and underdevelopment is still strong.<sup>xi</sup> Other humanistic engagements have pointed to how indigenous people are currently the brunt of climate change, even while their institutions of self-governance are ignored at international bodies from the IPCC to the WTO.<sup>xii</sup> Historians have been engaging climate in the mode of litigation for at least a decade, cross-examining the cases of acid rain, DDT, air pollution and the precautionary principle to understand when limits were enforced and when broken.

Perhaps the most urgent of these analyses is Oreskes and Conway’s *Merchants of Doubt*.

In Oreskes and Conway's account, the discovery of a climate emergency in the 1960s was met with urgent pleas from the scientific community for federal attention and sustained research. By the 1980s, however, a handful of rogue scientists with close ties to the fossil fuel industry began to deliberately distort the analysis of climate change, using doctored graphics, and bringing defamation law-suits against the scientists who tried to argue with them. Weak reporting by the *Wall Street Journal* further undermined the case of truth, with the result that doubt was cast upon the broadcast consensus of climate scientists, whose scientific consensus was routinely thereafter denounced as a "hoax."<sup>xiii</sup>

By naming names, Oreskes and Conway bring something like a suit of litigation against the Wall Street Journal and other interlocutors, underscoring how small acts of distortion have added up to a political crisis of delay. Historians often imagine their work as that of litigants: cross-examining the evidence, putting the documentary record in plain view, and persuading the judge and jury to right the wrongs of the past. We might call the organizational principle behind such studies as this the "litigative" mode of writing in the humanities.

Confronting the timeliness of the climate emergency might urge us to ask: is litigation timely in its work? A litigation-type work of history often works with less urgency than an *actual* lawsuit that it might enable, for instance of [Juliana vs. United States](#), where an Alaskan teenager, Nathan Baring, is suing the U.S. government over climate change, based on the claim that the government knew about climate change and did nothing to stop it – a claim that rests, in part, on the facts compiled by Oreskes and Conway. If the lawsuit holds, it may reshape basic concepts of culpability, perhaps arming the courts with the power of forcing governments to take action around climate in a timely fashion. *If or when* the epistemological intervention in question



comes to be accepted as universal and therefore binding, the historical consequences will be profound.

Another question is whether humanities research *needs* to be timely in order to be useful. Oreskes herself has urged the case for history as an aid in the slow and patient analysis of facts and the construction of slow-moving but effective policies. A decade ago, she explicitly rebuffed calls for immediate and radical action as antithetical to the principle of slow fact-gathering in the humanities. Posing the question, “Is global warming an emergency?,” Oreskes urged her readers to abandon calls for “immediacy,” warning that invoking “emergency measures” by government was likely to inflame conservatives’ inclination to resist an expanding state. She urged a moderate course, instead, characterized by further scientific research to understand sea acidification, measures to protect the non-human population, and the slow, bureaucratic work of cap-and-trade taxation of carbon.<sup>xiv</sup>

Oreskes’ contention that research takes time is bound up with a history of litigative practice in the humanities. The research behind a litigation happens once, over a long time, in the preparation of documents to substantiate a case establishing culpability. Because the action in question is limited to the efforts of lawyers and their collaborators, the model of litigation will always leave some readers wondering about how urgent action can be undertaken by *other* citizens. It is therefore crucial to return to Bendell’s questions of urgency: what can we write, teach, or code *now* that arms students and citizens who *aren’t* lawyers or politicians with the tools for effecting an urgent change? How can we make opportunities for critical thinking about climate as broadcast and democratic as access to the web?

Let us therefore examine the case for another framework for historical practice: auditing. In distinction to *litigation*, an *audit* is typically performed on a regular basis. Audits are

conducted, producing new analyses, on a regular and cyclical calendar. Traditionally, corporations are responsible for auditing their own accounts on a quarterly basis; the government audits taxes on an annual basis. Audits also have the feature of being flexible as to time: we submit annual taxes, but an official audit by the IRS requires individuals to prepare documentations stretching back into time. Audits are routine, repeatable, and potentially automated on a daily or even hourly basis.

What would an “audit” of climate discourse look like? One answer comes from the digital humanities, where scholars have been producing audits of gender, race, and class, based on digitalized textual data gleaned from the records of the past. In recent years, the computational analysis of large-scale textual corpora – or “distant reading” – has made strides in the aggregating repeated semantic assertions that constitute cultural world views (for instance, in folklorist Tim Tangherlini’s work applying parts-of-speech analysis to the tracking of conspiracy theories) as well as in deconstructing temporal relationships (for instance, in historian Melvin Wevers’ tracing of causal relationships in European newspapers).<sup>xv</sup> Some of these innovations have appeared in *PNAS*, *Nature* or *Science*; I would also direct readers to the field-making new journal, *Cultural Analytics*.<sup>xvi</sup> One quality of most of such studies is that they can be generalized over time and over new text bases – making them, potentially, extensible tools for *showing culture back to itself*.

Consider three recent examples, which have taken relatively straightforward approaches by way of proving how these tools can be applied to analyzing contemporary discourse about gender, race and class.

## FIGURE 2

The first is Richard Jean So’s audit of the race of novelists whose books were published by major presses in the U.S. So’s data visualization (FIGURE 2) diagnoses the silencing of non-white voices by an industry designed to create best-sellers to affluent (and mainly white) readers, as channeled by white editors. It is most incriminating in the lack of change over recent years; which proves how entrenched unconscious bias is in certain industries, even as recently as 2018.<sup>xvii</sup>

### FIGURE 3

Consider another example from social science, where Chicago sociology grad student Austin Kozlowski (with professors Matt Taddy and James Evans) used word embeddings to track a century of change to the racial, gender, and class valence of different professions and categories of music (FIGURE 3).<sup>xviii</sup>

### FIGURE 4

Consider also an audit of gender in the classic British reference work, the *Dictionary of National Biography*, conducted by CMU literature professor Chris Warren. The audit revealed that gender biases of an earlier age were at work in today’s instrument, such that the #3 employment for which women listed in the DNB are identified (when ranked by the total number of years in which any female subjects of the category were identified as living) is “royal mistress” (FIGURE 4).<sup>xix</sup>

While audits of this kind haven't been automated, they could be. Chris Warren says as much in his article, throwing down the gauntlet for the DNB editors to use his study as a shopping list for new articles about women: here is the first audit, expect the next one on a regular basis. Warren's audit is multi-dimensional; it gives 20 different charts that break down the articles of the DNB by period, gender, continent, and employment; any one of those audits could be automatically repeated, thus producing an index of how far the field of history has come over recent decades, at least as represented by the DNB.

A calendered audit gives the analyst – and the public – evaluations that are updated with each new moment in time. As we have seen in the rollout of reactions to Covid, up-to-date information about how a crisis is unfolding is crucial to the public being able to organize an informed response to an emergency. Newspapers have published regular audits of every county in the nation and their rates of infection and vaccination throughout the recent pandemic. We know from our experience of this circulation of statistics that audits have the potential to accommodate – and perhaps also to activate – *urgent* demands for change.

If we want examples of audits that have been automated, we should look to economics, where scholars have imagined a regular audit of corporations on the basis of text-mining. At Yale, economist Robert Engle has proposed that text mining, applied to climate change news, might provide the basis for the automated “hedging” of stocks: creating trading profiles based on companies' relationship to climate disaster or climate response, which would give stock-traders signals of when a particular sector is about to flourish or collapse.<sup>xx</sup>

Engle's study is part of a volley of new text-mining research about climate change. Almost all of it comes from engineering, economics, and information science. Again, few of these are automated, but they show the potential for automated audits. Scholars have used text

mining to generate just-in-time histories of contemporary conflict over water. A communications scholar has used text mining to analyze the effectiveness of political communication about climate and to analyze global sentiment about climate change and developed a technique to identify “causal chains” in with the intent of modeling how communities understand relationships based on a language of cause-and-effect.<sup>xxi</sup> Such detailed studies support an appreciation of the *content* of how climate information and policies are received in different cultural contexts, offering another level of information for potential institutional audits.

There has been and far less work, perhaps one or two articles, from the digital humanities of a kind that could be classified as an “audit” of climate change discourse, which is a pity, because interdisciplinarity could make much of this work stronger. Contemporary digital humanities work thrives on the study of nuance in how women and men are spoken about – degrees of interpretive finesses that are crucial to bringing detail to an ongoing audit of climate discourse.

#### FIGURE 5

Figure 5 offers a relatively simple model from a student paper showing grammatical constructions -- verbs and their objects – employed by speakers in the U.S. Congress in debates about climate change. As you can see, the evidence is telling; Republicans rarely even mention the “reducing” of “emissions” as a possibility, even to criticize it. A litigation mentality might also contribute a more focused analysis to contemporary text-mining projects about climate, for instance, by naming the Republican representatives in Congress who refused to even mention the “reducing” of “emissions.” By the same token, text mining the debates of the Texas legislature –

which we have in audio back to 1973 – might allow scholars to pinpoint the actors whose actions led to the public utility crisis of February 2021, when 700 Texans came down with carbon monoxide poisoning as a result of trying to heat their houses during a blizzard that was accompanied by the five-day failure of unregulated power companies to deliver electricity to millions of Texans. Automated audits of every legislature, corporation, and newspaper in America could apply Oreskes and Conway’s concern for structured silences to every institution in the country, thus producing the self-knowledge that we urgently require as the basis for collective action.

Despite the promise of audits, there is much that text mining cannot do. There are few studies that would identify long-term trends, such as the responsibility of European colonialism for promulgating modes of production focused on extraction. Nor do audits dispense with the need for litigation-style history. Text-based audits typically examine one database at a time, whereas scholars consulting archives have access to unpublished letters that enhance the record available from newspapers and legislatures. Finally, a text-based audit of what an institution *says* about climate in no way competes with the *material* audits of emissions published on an annual basis by groups such as Science Based Targets, which assesses the efforts of corporations to effect their climate goals.

The promise of automated text-based auditing is instead the creation of something like a ticker for whether my newspaper, my congressional representative, or my city council member has mentioned climate *this week*. Like the sports scores, stock reports, weather maps, and now covid maps published on a weekly or daily basis by most newspapers, automated audits of text can produce knowledge of change up to the moment: a cultural ticker of whether our institutions are still paying attention to our survival. A feature of tickers is that they are read by citizens of

broadly diverse professions and identities to inform them about opportunities for immediate action. Covid maps helped school board members, hospitals, university administrators, and ordinary families to plan their level of exposure.

Measuring who is talking about climate this week – and who is silent – similarly would provide a daily view of which institutions or individuals in our society are willing to tolerate sustained engagement with the climate emergency, and which are failing. That information, in turn, tells citizens where to direct their gaze, talk, efforts, and money – away, perhaps, from institutions and individuals that have regularly failed to address climate; towards those that outpace their peers in terms of sustained attention. Regular auditing can thus contribute something that long-term history and archival history cannot: it can keep climate change in the public eye, rendering the immediate past subject to inspection and appropriate reaction by a broad diversity of citizens.

What does it take to create a textual audit that would activate an urgent climate of attention on the institutions around us? In order to embrace meaningful analysis, investigators need good data. Here, there are enormous strengths in the study of parliaments and congresses. The databases are immense; they're national and urban at scale, and there's plentiful data available for corporations available through news media, quarterly reports, and social media. You're seeing a list of the legislative records currently available; I'm part of the leadership of a mainly European consortium of scholars undertaking the comparative analysis of these debates in aggregate.

A successful analysis also requires interdisciplinary analysis of the data, as I suggest above, so as to produce textual analysis that presses past naïve textual analysis and into more formidable measures designed to replicate the best of “legislative” studies that target silence and

assign blame. In theory, interdisciplinarity should be easier than ever before. We have been building interdisciplinary institutes around information science since the MIT Media Lab in 1985. We're living in the golden age of funding for interdisciplinary data science centers and even new departments of "social justice and data." Unfortunately, many of these institutions have failed to invite in the humanists, lawyers, and social scientists whose professional expertise would lend itself to a more nuanced and legislative approach to the analysis of institutions.

For collaborations of this kind to produce meaningful work, the interdisciplinary data science needs more than a few talks like this one enough to make it happen: there have to be permanent positions. Just as Bioinformatics requires faculty with training in biology and data science, so textual audits require faculty with training in text and how to assess responsibility as well as data science. A rigorous computational humanism requires that historical causality and comparative semantics be engaged rigorously. We can't naively import measures of sentiment analysis – given some of the bias enfolded into certain sentiment analysis packages, crowdsourced from predominantly masculine and privileged circles on the internet, one of which, for instance, classifies allusions to both "socialism" and "mother" as a marker of "fear."<sup>xxii</sup> Instead, social scientists and humanists need to collaborate in the *design* of new machine learning strategies designed to answer questions about silence and blame.

I've outlined a pattern for critical and humanistic engagement with quantitative measures in an essay entitled "critical search," where I talk about the iterative practice required to move between historical or interpretive questions and aggregate counts of language.<sup>xxiii</sup> In my essay, I offer examples of the pitfalls that await naïve interpretation, for instance, how three divergence measures produce three different answers to the same question, when did discussions of property change in the nineteenth century? Resolving grand questions about history is possible with



textual data, but only through iterative encounters with the text, secondary sources, and algorithms, where the search for a single “true” artificial intelligence is less important than the quest for historical truth.

The success of a new conversation between any two fields is hardly guaranteed – although it can be galvanized through specialized hackathons designed to target the interstices between two fields. Beginning in 2017, several scholars, including myself and Chicago’s James Evans and Hoyt Long, pioneered a series of hackathons designed to enable interdisciplinary engagement. At Think, Play Hack (and here I want to credit Evans for many of the ideas about activating interdisciplinarity) we invited scholars to “Think” about the conceptual framing of complex problems in the liberal arts, to “Play” with Data, and to Hack solutions that fit data to complex and interdisciplinary solutions; we had three iterations of this conference, out of which came a series of conversations about designing the “fit” between algorithms, data, and questions.

Rolled out in the context of classes and hackathons, interdisciplinarity can strongly benefit *all* students of data – not just those of humanistic bent -- by forcing them to reckon with conceptual models about society at the same time as they crunch their data. In my class on text mining at SMU, teams of CS undergrads work with students from the social sciences to create analyses of data such as the quarterly reports of American corporations. They learn Python as they read historiography. This kind of approach could ideally be paired with courses in environmental studies and political thought for a nuanced analysis that benefits from the disciplinary rigors of the university as a whole.

A final requirement of an auditing practice is the design of an appropriate public-facing infrastructure such that findings about climate discourse can be successfully communicated with the public. Since the 1990s, humanists like those behind the Stanford Encyclopedia of

Philosophy have been contributing portals to the public. More recently, scholars in the social sciences have built data-backed portals for many purposes, for example Matt Desmond's EvictionLab, which tracks eviction rates block-by-block, thus arming advocates and city counselors with the data to make their case.

My lab has also explored the creation of new infrastructures for exploring topic models in British parliamentary debates. In addition to designing portals for tracking parliamentary discourse by topic, we've also theorized that a "legislative" mode of assigning blame requires the ability to break down the records of congressional speech to examine individual speakers and parties, change over time in aggregate, and language tracked by topic, as well as sub-categories and variations in the measurement of each of these fields. By creating data infrastructures where citizens can explore texts for themselves, scholars make it possible for citizens to replicate an argumentative analysis at a detailed level. It becomes possible to multiplying Oreskes' question – where are the silences – through the many levels of policy-making around us. Applied to the problem of climate change, precedents from the world of infrastructure building invite us to imagine how data and discourses about climate change, climate governance, and toxic landscapes can be rendered subject to surveillance from below.

What would happen, were universities to embrace a new role, building infrastructures to support the ongoing community monitoring of polluted landscapes and corrupted institutions?

If science is right, climate change will rapidly require new market investments, new structures of engineering, new energy sources, investigations into the technologies of survival, and serious conversations about the status of climate refugees, whose numbers more than treble those of refugees from political conflict.<sup>xxiv</sup> The university, in its interdisciplinarity and its freedom, may be the only sector of production that has the intellectual freedom to transition

rapidly to face these needs, but the scale of transformation required will not happen spontaneously. An education curriculum designed for the present must be designed and organized to train students for the future.

One pattern for encouraging a university to move in the direction of supporting climate resistance would be an intentional movement towards educating the faculty about the climate emergency, for instance through a program of public lectures where the science of climate change, the numbers of ongoing climate refugees, causal issues like the relationship of climate change to industrialization and colonization, and the dimensions of expected agricultural, urban, and other material disruptions, are laid out in plain language. Such a program could then be followed by responses from each program in the university, raising the question: what solutions or complications is the department of Political Science, Civil Engineering, or Women's Studies proposing to these conundrums?

There is plenty of material to work from. Even fields such as Classics and Ottoman history now have an abundance of debates about how contemporary societies conceptualized nature and responded to earlier episodes of systematic environmental disruption in the form of drought and epidemics. As my explanation of an engaged text mining explains, even fields such as computer science have a great deal to contribute to the problem of modeling democratic responses to climate change. A program of public lectures would highlight the fact that most disciplines have long engaged with climate questions in some degree. At the same time, by casting light upon new directions for research and teaching, public lectures could stimulate interdisciplinary opportunities for collaboration.

Another pattern for pursuing such commitments might run through organs of university administration, for instance following the pattern of those diversity officers and departmental

statements of inclusivity created during the latest round of activism by the #MeToo movement and #Blacklivesmatter movements. It is not hard to imagine that the planet also deserves statements and environmental mindset officers.

Some may feel like an abundance of officers and statements increase the burden on departments. Others may feel like incremental administrative change in the form of official statements is too slow and indirect, and likely to only influence the creation of climate-relevant teaching indirectly, if at all. Such objections again underscore the problem of the emergency: if we accept the pronouncements of science, we must expect both markets and governance to change in the coming decade at a rapid pace.

What is needed is a plan for shifting university curricula, rapidly, in directions that are capable of making a difference in the mindset, adaptability, and skills of every student in the university. I submit that the most open-ended and flexible way of pursuing such a goal – for a university seriously committed to adjusting over a rapid time-period to position itself as a university dedicated to collectively pursuing questions of a climate-ready future – would be for the university as a whole to request a voluntary 10-50% commitment to teaching climate issues by each faculty member – where the exact dimensions of climate teaching and response are left open to the imagination of each faculty member, perhaps on a scale that escalates every year as we approach 2030. Why voluntary? Many academics responded to the #Blacklivesmatter and #Metoo movements by voluntarily sharing syllabi and reorienting parts of their courses to reflect on the themes of these movements. In reality, most lectures and seminars in the social sciences and humanities are easily tilted towards contemporary political issues in their great diversity, and this is one aspect of their strength. More trenchant, however, would be departmental, school-based, or university commitments, where the faculty as a whole volunteer to commit their ranks

to what each body deems an appropriate level of climate-relevant teaching – a level that might well reach higher than 50% in the Geological and Earth Sciences, while remaining at 25% in departments like Classics. The virtue of such commitments is that they signal a collective and social shift -- especially where they come from the faculty themselves, rather than from the administration. Commitments of this kind send a signal to future students of a broadcast desire to engage, adapt, and dialogue about the many social, economic, and intellectual adjustments that the climate emergency requires of us.

The numbers 10-50% are in some sense arbitrary, but at the higher end of the scale, they would have the value of sparking unanticipated connections around climate conversations, and thus shifting intellectual and pedagogical cultures in a more profound sense. A 10% commitment is easy to imagine in many fields, where a single week on debates in “climate change” on each class could easily consist of engagement with a single text. At such a small level of commitment, however, shifts in teaching might be too small to make much of a difference in each student’s experience of the university. At the high end of the scale, the shock of requesting a 50% commitment is met by an equal value in the creative approaches that would be required by such a commitment from most faculty members who are not formally trained in environmental studies. For me, for instance, having received no formal training in environmental studies, I would be required to think about ways of educating myself – or of making my formal training relevant to the many dimensions of the problem. Both of these lines of questioning have obvious value in the sense of making new connections that had not previously existed in a formalized way. Nothing like neither of these courses was available at any point during my own training, and both courses would represent a wholly new contribution on virtually any campus today.

If I considered shifting my coursework towards climate at 50%, I would ask myself: could I manage, atop my current responsibilities to the department, to teach two courses of environmental history? I would begin by considering the material in my field, and whether there was sufficient material in the history of technology to support a course on the technologies of pollution and sustainability, or whether the digital humanities could support a course on text mining public discussions of climate change. Both lines of questioning open up possible research agendas.

Alternatively, I might contemplate how the examples *within* existing lecture might be reoriented. In a world where scholars have long been thinking about refugees, governance, building materials, and discourse, 50% climate-relevant teaching need not mean teaching 50% new material. In a 50-minute class on the nineteenth-century “Great Migration” of freed slaves to Chicago, the professor who finds ten minutes at the beginning of a fifty minute lecture to meditate upon the moral challenge posed by the migrations of refugees from Syria and Bangladesh today, and closes with fifteen minutes of open discussion engaged with student concerns, is well on their way to tilting towards a single lecture towards 50% climate-relevance. A course on steam power and the industrial revolution could similarly reflect on the contributions of the industrial revolution towards creating a civilization where economic growth depended upon carbon emissions, and discussing alternatives to that society, even while the bulk of the lecture engaged more traditional accounts of railroad history. At 50%, each data science class would need to commit to practicing data analytics and studies of algorithms using at least 50% of their material from datasets analyzing the evidence of planetary warming, reviewing the specs of sustainable engineering projects, or analyzing sentiment and argumentations in reddit threads where citizens debate appropriate policy reactions to climate change. In other words, the

request that faculty “tilt” each class towards climate relevance at 10-50% need only open the door towards a conversation where something is said about land use, water, natural disaster, political discourse, and migration with regard to the contemporary questions around climate change – a direction that will find ample stimulating material in almost every field.

Whatever markers of realignment are deemed necessary, precision in the targeting of research, scale of reach, and swiftness in the purveying of research are appropriate at a time when many individuals are asking how we can speed up our collective response to a climate emergency.

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<sup>ii</sup> Mike Hulme, “Is It Too Late (to Stop Dangerous Climate Change)? An Editorial,” *WIREs Climate Change* 11, no. 1 (2020): e619, <https://doi.org/10.1002/wcc.619>.

<sup>iii</sup> Ibid.

<sup>iv</sup> Andreas Malm, *Fossil Capital: The Rise of Steam Power and the Roots of Global Warming* (New York: Verso Books, 2016); Bruno Latour, *Facing Gaia: Eight Lectures on the New Climate Regime* (London: Polity, 2017); Robert Proctor and Lorna Scheibinger, *Agnotology* (Palo Alto: Stanford University Press, 2008).

<sup>v</sup> Stephen M. Gardiner, *A Perfect Moral Storm: The Ethical Tragedy of Climate Change* (Oxford: Oxford University Press, 2014).

<sup>vi</sup> Jem Bendell, “Deep Adaptation: A Map for Navigating Climate Tragedy,” Report, vol. 2 (Ambleside, UK: University of Cumbria, July 27, 2018), <http://www.lifeworth.com/deepadaptation.pdf>.

<sup>vii</sup> Bendell, “Deep Adaptation,” 13.

<sup>viii</sup> Bendell, “Deep Adaptation,” 13.

<sup>ix</sup> Bendell, “Deep Adaptation,” 14.

<sup>x</sup> Bendell, “Deep Adaptation,” 14.

<sup>xi</sup> Dipesh Chakrabarty, *The Climate of History in a Planetary Age* (Chicago: University of Chicago Press, 2021).

<sup>xii</sup> Candis Callison, *How Climate Change Comes to Matter: The Communal Life of Facts* (Durham: Duke University Press, 2015).

<sup>xiii</sup> Naomi Oreskes and Erik M. Conway, *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming* (New York: Bloomsbury Press, 2010); Fuller, *op. cit.*

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<sup>xvi</sup> For examples of DH analysis in *PNAS*, *Nature*, and *Science*: Saatviga Sudhahar Thomas Lansdall-Welfare, Justin Lewis James Thompson, and Nello Cristianini FindMyPast Newspaper Team, “Content Analysis of 150 Years of British Periodicals,” *PNAS (Proceedings of the National Academy of the Sciences)* 114, no. 4 (January 9, 2017): E457–65, <https://doi.org/10.1073/pnas.1606380114>; Jean-Philippe Cointet Alix Rule and Peter S. Bearman,

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<sup>xxiii</sup> Jo Guldi, “Critical Search: A Procedure for Guided Reading in Large-Scale Textual Corpora,” *Journal of Cultural Analytics*, 2018, 1–35, <https://doi.org/10.22148/16.030>.

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