

Three Challenges for the Cosmopolitan Governance of Technoscience

Matthew Sample

Professor for Responsible Research and Innovation

Centre for Ethics and Law in the Life Sciences

Leibniz Universität Hannover

ORCID: 0000-0001-5290-1458

Abstract

Promising new solutions or risking unprecedented harms, science and its technological affordances are increasingly portrayed as matters of global concern, requiring in-kind responses. In a wide range of recent discourses and global initiatives, from the International Summits on Human Gene Editing to the Intergovernmental Panel on Climate Change, experts and policymakers routinely invoke cosmopolitan aims. The common rhetoric of a shared human future or of one humanity, however, does not always correspond to practice. Global inequality and a lack of accountability within most institutional contexts of international governance render these cosmopolitan proclamations of ‘one human community’ incoherent and even harmful. More generally, there exists no shared normative standard for the cosmopolitan governance of science, with which such global initiatives could be evaluated. Taking a broadly philosophical perspective, the present paper aims to better understand this problem situation, identifying three high-level challenges global governance of technoscience: problematic ideals of technology and science, the unjust formation of “global” concerns, and the limitations of cosmopolitan theory. By holistically engaging these jointly empirical and normative sites of inquiry, scholars can better support humanity’s re-imagination of technoscientific practices within and beyond the nation-state.

Keywords: Global governance, cosmopolitanism, technoscience, genome editing

Introduction

Science is now frequently portrayed as an active force in the world, often as its own agent, with powerful epistemic and technological affordances. Simultaneously, its traditional role as an authoritative and disinterested source of truth seems ever more violently contested, in the face of ongoing privatization and deepening distrust among publics. Within the confines of the nation-state, this tension between the ideal of Science and its diverse instantiations has posed a serious challenge for governance, pushing pluralistic democratic societies to devise solutions with mixed success. On the international level of science and technology policy, however, the prospects for responsible governance appear to be even worse. Although science and technology span the globe, there seems to be little shared history, no common guiding principles, and no practical consensus, regarding the regulation of science on behalf of all people. This gap is evident in the wide and inconsistent range of value-laden rhetorics that are employed by policymakers and expert actors, who are, to varying degrees, trying to respond appropriately to a problem that exceeds any one cultural or geographic context. Humanity, then, is left without a consistent means of understanding, motivating, and implementing responses to science beyond the nation-state. And as science and technology create ambivalent possibilities for human life, this inability to collectively understand and shape science and technology at a global scale becomes ever more dangerous.

In response to this state of affairs, academics and policy-makers alike have returned yet again to “cosmopolitan” frameworks and value-orientations for governance, which weigh problems and solutions according to their impact on “humanity”, “the human family”, or “global human community.” In general, cosmopolitan thinking seems to be a common response to threats that are either perceived to be existential in scope or as problems that cross national borders. Climate change, for instance, evokes responses in the form of international accords, conversations, and institutions or, less frequently, drastic and unpopular attempts to alter the global climate unilaterally. Technoscientific practices, especially, often have a double-edged

character that overdetermines their status as global problems in need of cosmopolitan solutions. Discourses around human genome editing, for example, seem to combine both key elements; editing the genome not only implicates multiple national communities of technoscientific practitioners but also, when the interventions are heritable or widely taken-up, pose a potential threat to the future of the human species. Recently, older discussions of a right to scientific progress has even been restarted in terms of cosmopolitanism, attempting to simultaneously leverage science for global problems like pandemics *and* to govern it more equitably across disparate nations and cultures (Massimi 2022, UNESCO 2009, UN 2020). But beyond mere theory and rhetoric, however, it is not at all clear what technoscientific cosmopolitanism actually entails, given the varied and disorganized attempts to shape science and technology at a global scale.

Lacking a shared normative basis for such activities, can vaguely “cosmopolitan” governance of technoscientific practices succeed? If so, what conceptual and institutional forms should they take? What ways forward are available to concerned citizens of the world who want to coordinate responses to science and technology as they exist (and not merely as they are idealized)? Although these collective problems are perhaps by definition only solvable by affected communities, the present paper will try to more carefully delineate the main challenges facing attempts at international governance of technoscience. Adopting a broadly philosophical perspective, the present paper will examine three: 1) dominant scientific ideals are problematic, 2) global problem selection is not governed solely by reasons, and 3) cosmopolitanism itself may not be fit for purpose, constituting an intellectual obstacle to effective and just governance. Each of these challenges will be discussed in turn. Rather than solve them here, the purpose of the present paper is to better understand humanity’s essential task of re-imagining technoscientific practices beyond the nation-state. At stake here is our collective ability to fulfill the positive promises of science and technology while adequately responding to harms that they enable.

What's Gone Wrong with Governance? A Case Study from Genome Editing

The problem at hand can be quickly, if incompletely, illustrated by surveying some recent responses to the possibility of human genome editing, which exhibit our limited political and technoscientific ideals. As a practice, “human genome editing” is stuck between two competing ideals; it is neither a discovery-oriented science nor a clearly circumscribed technology or technological platform. As such, it defies governance models that would simply restore institutional and professional autonomy to curiosity-driven scientists.

Departing from the ideal of a disinterested search for truth, most researchers want to do *more* than simply explain natural phenomena. In genome editing, traditional epistemic goals like understanding human development are routinely intermingled with medical therapies and the ability to manipulate the human body.

Simultaneously, as an experimental and lab-based practice, human genome editing also cannot be feasibly and proactively managed through the existing regulatory mechanisms that apply to medical and consumer technologies. This hybrid character leads to dysfunctional analysis, as when the scientific community was quick to publicly censure and condemn He Jiankui as a “rogue scientist” (and not a rogue technologist) who violated implicit ethical norms of research, despite the fact that their *own* community lacked the institutional or cultural means to prevent such violations. As Jiankui himself stated, the path to editing humans is commonly seen by researchers not as an impermissible violation but as a global race, an inevitability. These dual refrains of “inevitability” and the “rogue” have been criticized for naturalizing particular technoscientific futures and distracting from the institutional conditions that make such scandals in the first place (Hurlbut 2020). But in any case, the problem situation is only poorly described as “a scientific practice dedicated to explanatory truths about the natural world.” As long as discussions of these complex technoscientific practices reinscribe outdated ideals of science, or perpetuate arbitrary

separations between science and technology, we cannot hope to intervene in these practices effectively.

The dominant ideals of governance in this domain are unfortunately just as inconsistent.

When the World Health Organization convened their expert advisory panel on human genome editing in 2019, the stated aim was to create a template for the global governance of emerging technologies (WHO-RUSH 2019). The group was given the ambitious title: WHO Advisory Committee on Developing Global Standards for Governance and Oversight of Human Genome Editing. Yet even at their very first press conference, multiple conflicting normative frameworks were invoked. One WHO representative (Dr. Vasee Moorthy) framed their mandate in straightforwardly utilitarian terms: “maximizing benefit and reducing risk for populations around the world.” Moments later, the panel co-chair (Dr. Margaret Hamburg, former US FDA commissioner) explained further, but cited different values. Dr. Hamburg promised a “scalable” framework for “responsible stewardship of science” that will embody principles of inclusivity, transparency, and respect for local forms of government. It is not at all clear how these two idealized approaches to governance, each with their own particular histories, could be made compatible. The political ideals available in this context seem underdeveloped and ill-suited for the task.

More broadly, many activities centered on the governance of genome editing have been accompanied by a wave of empty cosmopolitan proclamations, that is, appeals to a global human community, grand in sentiment but typically unrealized in practice. This impassioned framing is not surprising, given the deep symbolic significance of the genome as constitutive of our membership in humanity. For instance, the organizing committee for the 2015 International Summit on Human Gene Editing (currently paused at its third iteration) argued on this basis that only an *international* forum for governance will suffice: “While each nation ultimately has the authority to regulate activities under its jurisdiction, the human genome is shared among all nations” (NASEM 2015). But missing in this short statement is an

explanation of how the Summits, co-hosted by the US National Academy of Sciences, the UK Royal Society, and the Chinese Academy of Sciences, can serve as the foundation for genuinely international convening and not merely as an exclusive meeting of a select group of scientific and biomedical experts. Minimally, it would seem that the range of communities represented in the organization and activity of the Summits would have to be broadened dramatically, but this and other parameters have yet to be carefully considered.

The above shortcomings in governance attempts have not gone entirely unnoticed. Critiquing the WHO panel and the International Summits, some researchers in the humanities and social sciences have taken it upon themselves to develop new institutional structures and concepts of inclusive international governance for genome editing. Dryzek et. al. (2020), for example, lament that the WHO panel and similar efforts do not actually answer the question of how “legitimate and effective governance” will be made possible across contexts. Political legitimacy, they stress, requires that broader publics can endorse social policy because they have elected a trusted decision-maker or have participated in the decision-making process. The former, however, is unavailable outside of the nation-state. To that end, authors propose a global citizens assembly, citing prior successful deliberations at the national level.

Participants would be recruited from around the world and tasked with deliberating upon “universal principles for the regulation of genome editing”, to be implemented nationally. They note that although an assembly brings benefits of wider diversity of participants and greater trust among represented publics, the process would not be legislative in nature. The responsibility to enact formal regulations would remain with existing international bodies, such as the United Nations. The authors’ ideal of global deliberative democracy, thus, links current configurations of international order with a particular means to build political legitimacy across borders and communities.

The fear of illegitimate or context-specific values driving governance has, in parallel, also motivated calls for a “Global Observatory for Genome Editing” by Hurlbut et. al (2018) and

Saha et. al. (2018). The proposal, now launched as a multi-year project at Harvard Program on Science, Technology and Society argues for the creation of “a center for international, interdisciplinary, and cosmopolitan reflection.” They assert that narrow “parochial convictions”, whether disciplinary, political, or cultural in nature, are no longer acceptable grounds for governance. Rather than enact a particular ideal of global deliberative democracy – to do so would assume what needs to be analyzed – the Observatory design follows what the authors refer to as a “cosmopolitan ethic.” Contrasted with simple “scientific globalism”, they specify that the Observatory should bring a wide range of cultural understandings and intellectual traditions into conversation, with an emphasis on previously excluded voices (Saha et. al. 2018). Despite these promising ambitions, however, the new Observatory still has to show how it will identify and fulfill the high demands of a truly cosmopolitan ethic. It is notable in this respect that the current Observatory leadership, staff, and members of the advisory board still represent only a few nations and cultures, and inhabit primarily academic spaces. Most university-based cosmopolitan initiatives must avoid the common critique that cosmopolitanism represents little more than the entrenchment of elite networks, privileged globetrotters, and colonial power dynamics (Calhoun 2008, Rao 2010).

Together these examples highlight a pressing challenge for researchers, policymakers, and indeed global communities that is not limited to the particular case of genome editing. Specifically, science and its affordances are heralded as a matter of urgent global concern, deserving in-kind responses. But existing responses frequently do not live up to this heightened rhetoric, along two important dimensions. First, because of the lack of diverse representation within most institutional and sociological contexts of international governance, cosmopolitan proclamations of ‘one human community’ risk incoherence and even injustice. As the initiatives above show, it is too easy to speak on behalf of all people while falling back on existing institutional networks and exclusionary norms. Second, even though it may seem simple to criticize existing initiatives and point out their democratic flaws, there exists no

clear normative standard on which we can base such judgments. Neither is there a consensus on what success should even look like in governing science and technology globally. As long as policymakers, expert actors, and publics rely on an inconsistent mix of political frameworks and conflicting ideals of (techno)science – in turns technocratic and democratic, cosmopolitan and unilateral – the resulting attempts to govern science can never be rigorously structured much less evaluated.

Thinking beyond the case of genome editing to our general inability to govern technoscience globally, how did we find ourselves in this situation? What came before such that global governance of various technosciences is now seen as a problem worth solving and that cosmopolitanism is a potential panacea? While the themes invoked here – ideals of governance, international policy, science, technology, and global justice – have been productively studied within traditional academic disciplines, there is much work to do in synthesizing existing empirical and normative insights into a coherent picture that can make sense of the present, supply a vocabulary for public sphere deliberation, and eventually inform policy. To this end, there are (at least) three relevant societal dynamics, equally philosophical and practical in import, that must be addressed.

Problematic Ideals of (Techno)Science

The first challenge concerns the history of science and technology and how that history impacts our present-day ideals. From the earliest days of natural philosophy and the “gentleman” scientist, expert knowledge practices have maintained close relationships to state power. In their landmark study of epistemology and politics in Restoration England, Shapin and Schaffer (1985) propose that experimental-empiricist knowledge-making (as championed by Robert Boyle) was aligned with a particular vision of social order. That is, the beliefs of the English public were to be managed by publicly performed experimental and sensory demonstrations, creating a shared material reality to which governing actors could respond. It is tempting for present-day readers to dismiss this possibility as obvious. In

context, however, experimentalist empiricism was only one of several possible sources of legitimation for state action, including for example monarch's decrees and rationalist deductions. Hobbes can be seen as rival for Boyle, one who fails to find an equally persuasive mode of politics for his non-experimental, reason-based epistemology. As Shapin and Schaffer conclude, "solutions to the problem of knowledge are solutions to the problem of social order" (p332).

Far from a mere historical trivia, Boyle's vision for natural philosophy ultimately became a powerful epistemic paradigm that can be traced to 20th century liberal democracies and into the present. Ezrahi (1990) notices that science comes to serve a crucial "visual attestive" function in society. Citizens in a democracy must, ideally, consent to be governed and expect state action to represent their interests. As a corollary, governments and political elites must base their actions and authority on publicly-accepted knowledge about the world and about the state(s) of affairs to which they are responding. Without this epistemic source of legitimacy, state action appears illegitimate, capricious, personal, or oppressive. Science, therefore, can function as an invaluable political resource in democracies. And to the extent that scientific practice reveals the world "out there", it serves as the dominant if not the only source of legitimacy for state action. It is thus understandable that Polanyi (1962) chose political metaphors to refer to the scientific community – "the republic of science" – arguing that it should be treated as an autonomous political body, complementary to but separate from the state. By the mid-20th century, scientists advocating for their practice were joined by philosophers and sociologists alike in proclaiming that the freedom of science and a free society are deeply connected (Merton 1942, Popper 1945). As Visvanathan (1997) summarizes that cultural moment, "the Republic of Science was deemed an open society, sustaining a creative tension between individual initiative and collective truth. [...] The scientific method was substituted for the invisible hand and Popper and Polanyi became the Adam Smiths of this new regime" (p146).

State management of science, in this model, is then a relatively simple matter of maintaining ample resources for the scientific community such that in their freedom, they uphold the democratic state and indirectly cater to its needs. Sadly in retrospect, this utopic vision and its brief phase of mainstream popularity were never truly fulfilled. Vannevar Bush (1945) and like-minded advocates struggled to articulate a new social contract for science, promising increased societal well-being, but science's role as a mainstay in democratic social orders had already begun to fade. Even though state patronage of a "free" science was largely maintained and has even increased in some democracies (Greenberg 2001), this dominant mode of science governance was faced with increasingly serious challenges at the national and global scales. In the aftermath of the second World War, it became evident that even as means to truth, the logics of science and scientific detachment were readily applicable to building concentration camps, designing atomic bombs, and enabling many other projects in support of despotism (Visvanathan 1997). In closed door committee meetings and in international publications, scientists from Europe and North America posed disturbing questions about the likelihood of nuclear apocalypse and ruminated on whether even a small nuclear test could cause it (e.g. Bethe's 1946 "Can Air or Water Be Exploded?").

The post-war cultural crisis for science extended into the subsequent decades, as scientists and biomedical researchers were frequently thrust into scandals centered on research misconduct, industry-funded science, and negative press coverage. In the United States, this period is well-illustrated by the creation of the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. Ostensibly a recognition of the violent potentials of science, the Commission came to serve as a model for governance around the world for managing the harms of science; the authority of science was partially preserved by creating ethical experts in every research institution (Hurlbut 2017). Many publics, from that point onwards, no longer saw themselves as passive consumers of the scientific picture of reality; a diverse range of communities, from HIV positive patient groups

to Indigenous sovereignty advocates, have asserted a right to shape research studies concerning them or to decide the direction of technological development (Epstein 1996, Nelkin 1995, Nelkin 2002). In Ezrahi's (1990) account, these events shifted the very foundations of democratic legitimacy and, in the process, the place of science. "Attestive visual cultural norms" declined, as well its associated metaphors of objective sight, machine mechanisms, and the public eye. This amounts to faith lost, doubt towards a decentralized "public gaze", informed by science, that provides a univocal and effective check on state action.

While the effects of this shift are still emerging – Ezrahi (2004) posits ambivalently a new democratic order of narrative and emotion – scholars across academia have grappled with the decline of science, trying to make sense of present-day "technoscientific" practices.

Philosophers and historians have, for instance, remarked upon changes in science at the laboratory bench. Science and engineering, "basic" and "applied", knowledge and its technological application – all seem to have blurred together more than ever before.

Nordmann (2012), for example, notes that much of contemporary laboratory science (i.e. "technoscience") is oriented towards "knowledge of control" and capacity-building, of which both evade the attention of previous philosophical discussions of "the" scientific method.

Bensaude-Vincent et al. (2011) argue further that scientists can now study and publish about artificial material objects (e.g. nanoscale structures or novel bioengineered systems)

explicitly in terms of their potential value to human problems, including the needs of various publics. The authors conclude that much of today's most heralded research actually falls into the category of "technoscience", despite the fact that this label contradicts centuries-old traditions and habits of thinking about science as disinterested truth-seeking or concerned with causal explanation.

Zooming out from the laboratory bench, recent forms of (techno)science have also been studied at the institutional and societal scales. A flurry of high-level social theory since the 1990s has attempted to generate new frameworks and labels for technoscientific research, but with frustrating ambivalence towards it. Gibbons et. al. (1994), for example, argue that scientific research in Europe and the United States has taken a new form, “Mode 2 science”, which is marked by transdisciplinarity as a replacement for traditional disciplines, reconfigurations of peer review and standards of publication, and an overarching goal of applicable knowledge (as opposed to basic science and disinterested truths about nature). Subsequent scholarship building on this framework has more explicitly considered commercialization, citing the rise of the “economic rationality” (Nowotny et. al. 2001), the “entrepreneurial university”, and emerging “triple helix” alliances between universities, industry, and government (Etzkowitz and Leydesdorff 1995, 2000). Funtowicz and Ravetz (1993) have grouped such changes in their own competing framework of “post-normal science,” referring to organized research that does not presume a clear distinction between facts and values and is conducted in contexts of high uncertainty. To varying degrees, all of these frameworks have generated mixed sentiments in the research and policy-making spheres. Due to ambiguity in the texts themselves, they have been read sometimes as proclaiming innovative changes in the structure of science and, at other times, as critiquing the corruption of science by industry or other societal forces.

Other scholars, in contrast, leave no room for positive interpretations of contemporary technoscience, accusing less critical scholars of methodological myopia. Beck (1992, 2007) argues unambiguously that “techno-scientifically produced risks” have become a global problem, creating existential threats never before seen in humanity’s past. He suggests that hybrid, distributed character of technoscientific work jeopardizes our ability to hold any individual or group accountable for the impact of technoscience, a situation he calls “organized irresponsibility”. Focusing on colonial oppression and state violence, Visvanathan

(1997) also insists on seeing science and technology as they are implicated together in harms around the world. Science, in his account, is inseparable from the way its logics and technological affordances enable holocaust, nuclear weapons, unethical industrial farming, and genocidal development projects. For both of them, scholarship on science has purposefully neglected these connections. For Visvanathan, it is a result of artificial problem construction, bracketing off violence to save the traditional ideal of science (1997, p16) and ignoring the complaints of resistance movements in the Global South (e.g. the Chipko ecofeminist movement). For Beck (2007), it is a result of outdated “methodological nationalism” and a general ignorance towards the ongoing “cosmopolitization” of the world.

Fig. 1. Two Dominant, Competing Sociotechnical Imaginaries of (Techno)Science

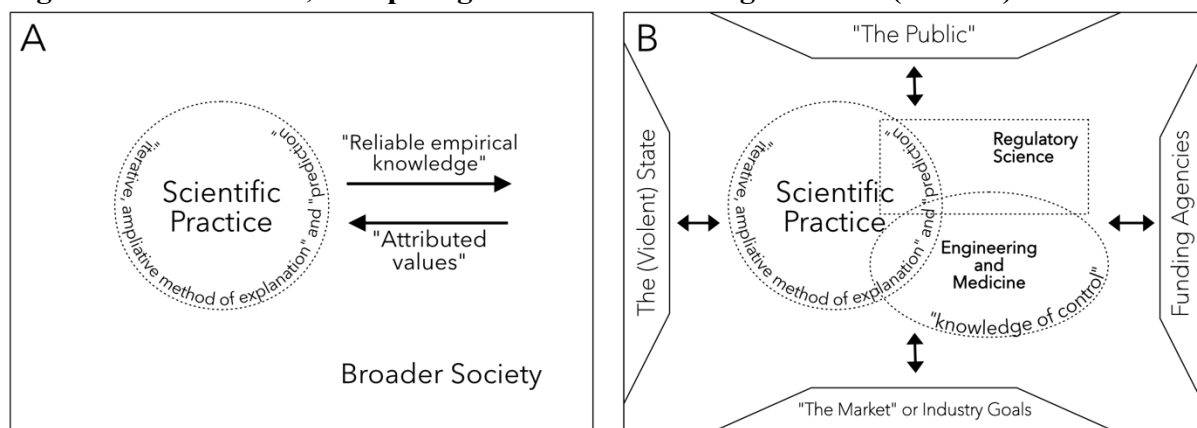


Illustration and quotations adapted from Sample (2022) and Douglas (2014).

Overall, most scholarship in this literature suggests that governance most move beyond anachronistic ideals of autonomous, disinterested science (Figure 1a), because it describes so little about the most pressing and ethically-salient research of our time, from COVID-19 research and genome editing to climate modeling. At the same time, ambivalent evaluations of technoscience and its place in society (Figure 1b), however, create an unresolved normative dilemma for anyone attempting to understand and govern science and technology at the global level. To govern this thing, (techno)science, we must not only choose the idealization that best captures (techno)science as it we see it but also provides a foundation for its re-imagining for better futures.

Global Problem Formation Is Not Reasonable (or Just)

Understanding (techno)science and re-imagining its rightful place in the world is thus a conceptual and deliberative challenge in its own right. However, this challenge is compounded by the fact that it is seldomly even recognized *as a problem*. Science and technology, as they are represented in governance discourses, are often still invoked as separate, self-explanatory ideals. Societal problems are then framed in this fashion.

Politicians around the globe frequently exclaim that governments and publics must “follow the science” to understand our shared problems, referencing older ideals of disinterested truth-seeking. At the same time, digital media outlets publish breathless critiques of harmful technologies and violations of human dignity. Technology, then, and not Science, becomes a proxy for the negative effects of technoscientific practices. The causes and consequences of this failure in problem framing are, sadly, extremely complex. As Appadurai (1990) has famously argued regarding globalization, people now inhabit different “imagined worlds” despite being ever more connected to one another by “technoscapes” and “mediascapes”. In some ways, the chaotic problem space around science and technology could have been predicted, based on recent insights from international relations (IR) research on the making of global problems. Problems do not simply make themselves known, already well-formulated, as they cross a border; they only rise to social awareness as a result of several overlapping social and material processes. These processes can be mapped and studied analytically, but they are not governed predominantly by reason or by reason-based practices (as philosophers might hope).

This insight regarding problem formation can be traced by at least as far back as Dewey’s (1927) *Public and its Problems*, where he theorizes an entangled relationship between publics and problems as a product of purposive social activity. In this account, “public” is the label given to a group of people who foster a group identity on the basis of a shared interest or a shared threat in the world around them; this group identity is then used to demand or carry

out changes to society under the banner of democracy or similar modes of political accountability. More recent work in IR and science and technology studies (STS) provides a much-needed update of this account in light of societal changes since the early 20th century. Neveu and Surdez (2020) propose a “political sociology” of global problems, which I use to understand how some issues (e.g. “following The Science”) are successfully elevated to the level of a global problem while other framings (e.g. “technoscience”) remain unspoken or ignored. They argue that in addition to the basic human interdependency on earth, global problems arise from three “flows”: the material (e.g. commercial goods, viruses, human bodies), “problem/solution definers” (e.g. state representatives, environmental experts, lobbying groups), and the cognitive-symbolic (e.g. images of suffering, social media memes, datasets). In-depth analyses of climate change as a global problem have corroborated the significance of these three factors, suggesting that they are causally interdependent and value-laden (Jasanoff 2001, Aykut 2020). Problem definers, through the use of particular images and discourses, leverage their power to interpret and respond to material reality, while constituents and stakeholders are then expected to trust or at least comply with these actions. Together these sources necessitate closer examination and intervention into the mechanisms by which science and technology come to be seen (or ignored) as objects of global hope or fear, in need of governance. To fully understand this process, the three underlying components (material, cognitive, and problem-definers) to problem formation must first be empirically documented as they contribute to the current forms of cosmopolitan governance and its failures. What such an empirical inquiry would find is an open question, but there is at least one serious ethico-political hypotheses at stake, a problem of justice. Current problem formulations centered on science and technology represent only a narrow subset of global interests, neglecting the interests, experiences, and knowledges of many communities. Jasanoff (2003) has already observed that the ability to frame problems is typically the exclusive purview of a few expert communities, such as economics and risk-benefit

assessment. Accordingly, she stresses the need to develop “technologies of humility” which could correct for this injustice and provide new policy solutions. Revealing the implicit and contingent processes of problem formation can make space for overlooked alternatives. This requires us to facilitate new conversations in which global communities can re-imagine the problem (or problems) of governance more justly and, by not taking outdated ideals of Science for granted, more effectively.

Cosmopolitan Frameworks Not Fit for Purpose

The third challenge is perhaps most fundamental, at least from an academic perspective, for any attempt to govern technoscience beyond the nation-state. Improper problem formation (i.e. the second challenge) can be corrected presumably through institutional reforms, collective action, and advocacy. In the process, inconsistent or outdated ideals of science (i.e. the first challenge) could be critiqued and replaced, perhaps through revision in an inclusive deliberative exercise. But what if cosmopolitan governance itself is simply not a goal worth pursuing? What if there is no legitimate normative basis according to which groups or individuals should govern science and technology globally? With some exceptions, this worry is not corroborated by mainstream theoretical literature in philosophy. Moral philosophers and political theorists have already elaborated many different and provocative visions for how we should convene global ethico-political conversations and cooperate in response to shared problems. In general, philosophy overflows with moral and political frameworks – consider the huge range of utilitarianisms – that demand a “larger loyalty” (Rorty 1998) and discourage any preference or partiality for one’s close peers over other, more distant humans. Such indirect exhortations of cosmopolitanism are less useful, however, when divorced from their overarching comprehensive moral framework. If one is not, for example, a thoroughgoing utilitarian or card-carrying virtue ethicist, then the prescriptions resulting from those frameworks will have little meaning.

There are also theorists (Table 1) who directly investigate our commitments to humanity as a political community, trying to define our roles and responsibilities under the banner of “cosmopolitanism” or “global ethics” (e.g. “of care,” see Held 2006). Across their works, cosmopolitan(ism) is not one type of thing but variously: a multicultural kind of person, an academic method of inquiry, a global social process (Beck’s “cosmopolitization”), a rejection of nationalism, or an ancient ethical framework for right action. It is useful, though these authors might reject such an interpretation, to read across these differences and see their many works as constituting a philosophical possibility space. At first glance, it is a space that has been populated by the thoughts of mostly men, typically under the influence of Kantian philosophy and Western culture generally. These conceptions can, at least hypothetically, be cross-referenced with present-day attempts to govern science internationally, evaluating each theory’s compatibility with existing expert policy discourses and their ability to reveal shortcomings in existing cosmopolitan initiatives.

Author	Monograph / Article Title
Appiah (2006)	Cosmopolitanism: Ethics in a World of Strangers
Beck (2002)	The Cosmopolitan Society and Its Enemies
Benhabib (2008)	Another Cosmopolitanism
Held (2006)	The Ethics of Care: Personal, Political, and Global
Nussbaum (2019)	The Cosmopolitanism Tradition: A Noble But Flawed Ideal
Pogge (1992)	Cosmopolitanism and Sovereignty
Rawls (1999)	The Law of Peoples
Robinson (1997)	Globalizing Care: Ethics, Feminist Theory, and International Relations

Table 1. Some Prominent Cosmopolitan Theories, Post-Kant

From a narrowly philosophical perspective, any of the theories and frameworks in Table 1 could be developed further as theoretical inspiration or even as the stated justification of globally-minded initiatives in science governance. For instance, consider Appiah’s (2006) cosmopolitanism, which prescribes a political stance that recognizes and values connections across inevitable human differences, rejects cultural nationalism, while allowing for partiality towards our close peers. Following this framework, we might justify the existence of new

“global” genome editing governance projects in the name of valuing individual fellow humans around the globe, building connections and fostering welfare across national borders and cultures. Such an approach would contrast with the model of funding national science policy initiatives, like diversity initiatives at the US National Science Foundation, as well as any international ethics summit that makes representatives of various *nations* as the primary participants.

But as evocative it may be, Appiah’s and other prominent theories of cosmopolitanism often read as unfinished political fictions, fleeting sketches of how things might be and very personal constellations of values. Left unanswered is a crucial question: for whom are theorists of cosmopolitanism writing, and in the context of which places, values, institutions, and power imbalances? Given the subject matter and often explicit reference to the particularity of culture, it is ironic that the geographic and cultural context of cosmopolitan theorization is often left aside or answered hastily without further evaluation. Rawls, late in his career, claims mysteriously to write for “you and I”, “here and now.” Appiah alternates between citing admiration for cultures of Ghana, Western political thought, and meditations from his father. Exhibited more or less across this literature, the underanalyzed context of cosmopolitan theorizing poses an obstacle to its application in global initiatives, no matter how heuristic or tentative. Notably, multiple scholars outside of disciplinary philosophy have presented this as a foundational and ineliminable flaw in cosmopolitan frameworks.

Jasanoff (2013) interprets abstract, context-free theorizing as a challenge to efficacy. She observes that theoretical cosmopolitanism hopes – as we might find in Rawls or Appiah – are swiftly impeded by the hard realities of global politics, notably, power differentials between countries and entrenched national modes of public reason. Writing about popular culture, Calhoun (2008) has argued that ultimately the modern imaginary of cosmopolitanism boils down to privileged consumerism and international travel, a far cry from the careful logic of

Kant's *Perpetual Peace*. Finally, Rao (2010) and Valdez (2019) pose an even more serious critique; in their analysis, liberal cosmopolitanism has historically served as thinly-veiled euphemism for Western hegemony. Rather than bring humanity together as a community of equals, alleged concern for distant "others" was only a means to maintain peace between imperial, white-majority nations. Most non-European nations and communities in the global South are, meanwhile, implicitly excluded from this "one human community", not welcomed in spaces of governance, and are subject to ongoing extraction and exploitation. We are thus left at an important juncture for scholars who want to simply apply political theory and political philosophy. Can cosmopolitanism be adapted for our times and still inequitable world? Or, on the other hand, is cosmopolitanism actually preventing progress in fostering global care? Cosmopolitan theory may indeed serve as a normative justification for humanity-minded international governance, but given the obvious shortcomings of present-day governance initiatives, we must further examine its fitness for purpose.

Conclusion: Prospects for a Technoscientific Cosmopolitanism

After waxing and waning in popularity over the last several decades, cosmopolitanism has returned again in the form of international science governance initiatives and well-intentioned interventions by scholars in the humanities and social sciences. For political philosophers and theorists of RRI, this would seem an ideal opportunity to bring much-needed conceptual clarity to the wide range of activities and rhetorics employed by governments, expert summits, and popular media. Simply appending the adjective "global" or "international" to governance activities is not enough. Likewise for philosophers of science, the global impact of science and its technological affordances seems to demand new ways of thinking about "good science" and its rightful place beyond the nation state. In this paper, however, I've tried to take up a slightly broader philosophical vantage point, one which eschews the usual boundaries between politics, science, history, and sociality. The three challenges I identify, although not comprehensive, indicate that the success of cosmopolitan governance of

technoscience is anything but guaranteed. Rather, cosmopolitan initiatives represent deep and unresolved tensions, demanding several lines of further inquiry by both philosophy and philosophically-minded sociological research. Empirically, we need to understand how and on what basis does (techno)science become a matter of international concern, whether as existential threat or as promising global solution. Simultaneously, we need normative inspiration, a source of possibility and critique, for global governance with which existing initiatives can be compared and evaluated. Political and social theory can provide one source of such inspiration, but must be paired an examination of its ability to perpetuate and obscure inequality. Only by bringing these normative and empirical threads together, can scholarship support humanity in re-constructing the values and self-understandings underlying the governance of technoscience, re-imagining its role in an unjust world.

Acknowledgments: Early drafts of this manuscript were prepared during a fellowship at the Harvard Program on Science, Technology and Society, and subsequent research was supported by funding from the Niedersächsisches Ministerium für Wissenschaft und Kultur.

Declaration of Interests: The author has no competing interests to declare.

References

- Appadurai, A. 1990. Disjuncture And Difference in the Global Cultural Economy. *Theory, Culture & Society*, 7(2-3), 295-310.
- Appiah, K.A. 2006. *Cosmopolitanism: Ethics in a World of Strangers*. New York: WW Norton & Company.
- Aykut, S. C. 2020. Global by Nature? Three Dynamics in the Making of “Global Climate Change”. In: *Globalizing Issues* (pp. 277-299). Cham: Palgrave Macmillan.

- Bensaude-Vincent, B., Loeve, S., Nordmann, A., and Schwarz, A. 2011. Matters of Interest: The Objects of Research in Science and Technoscience. *Journal for General Philosophy of Science*, 42(2), 365-383.
- Beck, U. 1992. *Risk Society: Towards a New Modernity*. Translated by Ritter, Mark. London: Sage Publications.
- Beck, U. 2002. The Cosmopolitan Society and Its Enemies. *Theory Culture & Society*, 19(1-2): 17-44
- Beck, U. 2007. The Cosmopolitan Condition: Why Methodological Nationalism Fails. *Theory, Culture & Society*, 24(7-8), 286-290.
- Benhabib, S. 2008. *Another Cosmopolitanism*. Oxford: Oxford University Press.
- Bethe, H. 1946. Can Air or Water be Exploded?, *Bulletin of the Atomic Scientists*, 1:7, 2.
- Biddle, J. B. 2017. Genetically Engineered Crops and Responsible Innovation. *Journal of Responsible Innovation*, 4(1), 24-42.
- Bush, Vannevar. 1945. Science--the Endless Frontier: A Report to the President on a Program for Postwar Scientific Research. National Science Foundation.
- Calhoun, C. 2008. Cosmopolitanism in the Modern Social Imaginary. *Daedalus*, 137(3), 105-114.
- Dewey, J. 1927. *The Public and Its Problems: An Essay in Political Inquiry*. Chicago: Ohio University Press.
- Douglas, H. 2014. The Moral Terrain of Science. *Erkenntnis*, 79(5), 961-979.
- Dryzek, John S., et al. 2020. Global Citizen Deliberation on Genome Editing. *Science* 369(6510): 1435-1437.

- Etzkowitz, H., and Leydesdorff, L. 1995. The Triple Helix--University-Industry-Government Relations: A Laboratory for Knowledge Based Economic Development. *EASST review*, 14(1), 14-19.
- Etzkowitz, H., and Leydesdorff, L. 2000. The Dynamics of Innovation: from National Systems and “Mode 2” to a Triple Helix of University–Industry–Government Relations. *Research Policy*, 29(2), 109-123.
- Epstein, S. 1996. *Impure Science: AIDS, Activism, and the Politics of Knowledge*. Los Angeles: University of California Press.
- Ezrahi, Y. 1990. *The Descent of Icarus: Science and the Transformation of Contemporary Democracy*. Cambridge: Harvard University Press.
- Ezrahi, Y. 2004. Science and the Political Imagination in Contemporary Democracies. In: *States of Knowledge* (pp. 265-284). Chicago: Routledge.
- Funtowicz, S. O., and Ravetz, J. R. 1993. Science for the Post-Normal Age. *Futures*, 25(7), 739-755.
- Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P., and Trow, M. 1994. *The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies*. Thousand Oaks: Sage.
- Greenberg, D. S. 2001. *Science, Money, and Politics: Political Triumph and Ethical Erosion*. Chicago: University of Chicago Press.
- Held, V. 2006. *The Ethics of Care: Personal, Political, and Global*. Oxford: Oxford University Press.
- Hurlbut, B. 2017. *Experiments in Democracy*. New York: Columbia University Press.
- Hurlbut, J.B., Jasanoff, S., Saha, K., Ahmed, A., Appiah, A., Bartholet, E., Baylis, F., Bennett, G., Church, G., Cohen, I.G. and Daley, G. 2018. Building Capacity for a Global

- Genome Editing Observatory: Conceptual Challenges. *Trends in Biotechnology* 36(7), 639-641.
- Hurlbut, J. B. 2020. Imperatives of governance: human genome editing and the problem of progress. *Perspectives in Biology and Medicine*, 63(1), 177-194.
- Jasanoff, S. 2001. Image and Imagination: The Formation of Global Environmental Consciousness. In: *Changing the Atmosphere: Expert Knowledge and Environmental Governance* (pp.309-339). Cambridge: MIT Press.
- Jasanoff, S. 2003. Technologies of Humility: Citizen Participation in Governing Science. *Minerva*, 41, 223-244.
- Jasanoff, S. 2013. “Epistemic Subsidiarity–Coexistence, Cosmopolitanism, Constitutionalism.” *European Journal of Risk Regulation*, 4(2), 133-141.
- Massimi, M. (2022). Perspectives on scientific progress. *Nature Physics*, 1-3.
- Merton, R. K. 1942. A Note on Science and Democracy. *J. Legal & Pol. Soc.*, 1, 115.
- NASEM US National Academies of Sciences, Engineering, and Medicine. 2015. “On Human Gene Editing: International Summit Statement.” Accessed at: <https://www.nationalacademies.org/news/2015/12/on-human-gene-editing-international-summit-statement>
- Neveu, E., and Surdez, M. (Eds.). 2020. *Globalizing Issues: How Claims, Frames, and Problems Cross Borders*. Cham: Palgrave.
- Nelkin, D. 1995. Science Controversies: The Dynamics of Public Disputes in the United States. In: *Handbook of Science and Technology Studies* (pp.444-456). Thousand Oaks: Sage.
- Nelkin, D. 2002. Brief History of the Political Work of Genetics. *Jurimetrics*, 42(2), 121-132.

- Nordmann, A. 2012. Object Lessons: Towards an Epistemology of Technoscience. *Scientiae Studia*, 10(spe):11–31.
- Nowotny, H., Scott, P., and Gibbons, M. 2001. *Re-Thinking Science: Knowledge and the Public in an Age of Uncertainty*. Cambridge: Polity.
- Nussbaum, M. C. 2019. *The Cosmopolitan Tradition: A Noble but Flawed Ideal*. Cambridge: Cambridge: Harvard University Press.
- Polanyi, M. 1962. The Republic of Science: Its Political and Economic Theory. *Minerva*, 38(1), 1-21.
- Popper, K. 1945. *The Open Society and Its Enemies*. Routledge London.
- Pogge, T. W. 1992. Cosmopolitanism and Sovereignty. *Ethics*, 103(1), 48-75.
- Rawls, J. 1999. *The Law of Peoples: with, the Idea of Public Reason Revisited*. Cambridge: Harvard University Press.
- Rao, R. 2010. *Third World Protest: Between Home and the World*. Oxford: Oxford University Press.
- Robinson, F. 1997. Globalizing Care: Ethics, Feminist Theory, and International Relations. *Alternatives*, 22(1), 113-133.
- Rorty, R. 1998. Justice as Larger Loyalty. In: *Cosmopolitics: Thinking and Feeling Beyond the Nation* (Vol. 14). Minneapolis: University of Minnesota Press.
- Saha, K., Hurlbut, J.B., Jasanoff, S., Ahmed, A., Appiah, A., Bartholet, E., Baylis, F., Bennett, G., Church, G., Cohen, I.G. and Daley, G. 2018. Building Capacity for a Global Genome Editing Observatory: Institutional Design. *Trends in Biotechnology* 36(8), 741-743.
- Sample, M. 2022. Science, responsibility, and the philosophical imagination. *Synthese*, 200(2), 1-19.

- Shapin, S., and Schaffer, S. 1985. *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life*. Princeton: Princeton University Press.
- UNESCO. 2009. The Right to Enjoy the Benefits of Scientific Progress and its Applications. Accessed at: <https://unesdoc.unesco.org/ark:/48223/pf0000185558>
- United Nations Committee on Economic, Social and Cultural Rights (CESCR). 2020. General Comment No. 25 on Science and Economic, Social and Cultural Rights (Article 15 (1)(b),(2),(3) and (4) of the International Covenant on Economic, Social and Cultural Rights).
- Valdez, I. 2019. *Transnational cosmopolitanism: Kant, Du Bois, and justice as a political craft*. Cambridge University Press.
- Visvanathan, S. 1997. *A Carnival for Science: Essays on Science, Technology, and Development*. New Delhi: Oxford University Press.
- WHO-RUSH. 2019. Human Genome Editing 1st Advisory Committee. [transcript] Accessed at: <https://www.who.int/ethics/topics/human-genome-editing/Human-genome-editing-1st-advisory-committee-VPC.pdf>