

## Quantum Black creative geographies

Noxolo, Patricia

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# Quantum Black creative geographies: embodiment, coherence and transcendence in a time of climate crisis†

Patricia Noxolo 

School of Geography, Earth and Environmental Sciences, University of Birmingham, Birmingham, UK

Correspondence: Patricia Noxolo (email: [p.e.p.noxolo@bham.ac.uk](mailto:p.e.p.noxolo@bham.ac.uk))

This paper brings together three parallel strands of work—Black Geographies, geographies of Caribbean creative practice, and quantum geographies. The paper begins by considering static linear spacetimes as colonial spacetimes, and draws on Michelle Wright's critique of Middle Passage epistemologies, from Black Studies, to elaborate on this. It then moves through a number of ways in which, over the last couple of decades, I have drawn together insights from Wilson Harris and Karen Barad to explore how quantum mechanics can facilitate a conversation about uncertainty, connectedness, entanglement and the liveliness of always already climate-changed landscapes in relation to Black embodiment. In pushing briefly into string theory, the paper ends with the possibility of connecting spirituality with materialities, to push towards more politically attuned forms of emancipation.

**Keywords:** Black Geographies, quantum geographies, Caribbean creative practice, creative practice, colonial spacetimes, entanglement

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## Introduction

As Smith (2016) notes, for some years now there has been an ongoing and often disrupted conversation in Geography about quantum mechanics. Nonetheless, and particularly now that it has a range of practical applications, quantum mechanics is used in a range of ways across the social sciences and humanities—for example, in philosophy of science, including metaphysics; in debates within feminist Science and Technology Studies (STS) (Hollin *et al.*, 2017); as well as for understanding complexity in the social sciences (Byrne & Callaghan, 2014); and, as I will discuss below, in the humanities and arts.

Karen Barad (2018) recognizes that the awe-inspiring destruction of the atomic bomb, detonated for the first time in 1945 New Mexico, is one of the forces behind global fascination with the quantum. The fact that it was deemed acceptable to test this new weapon within range of 'Turtle Island's original inhabitants, the Indigenous people of the Southwest' (Tanya H. Lee, cited in Barad, 2018: 208) fuses the atomic into US environmental racism right from the start (see also Seamster & Purifoy, 2021). Nonetheless, by the turn of the twentieth century, at the height of the expansion of European imperialism that had invented and cemented racialized and other 'natural'

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hierarchies, the dizzying but strategic disembedding and re-embedding of peoples, plants and pathogens that were mobilized across a wide range of colonized territories was already destabilizing the very divides upon which those hierarchies were based, and was laying the foundations for the climate catastrophe that we now face (DeLoughrey, 2007). As I will argue later, part of the importance of quantum mechanics for Black Geographies is in the interconnectedness, indeterminacy and shape-shifting that it models. Can we engage with the entanglements of the quantum world, whilst leaving behind the racio-imperialist violences within which it first came to light?

A quarter of a century ago, Doreen Massey (1999: 269) noted that ‘physics envy’ was an issue in the ways in which geographers engage with scientific literatures on space-time and matter, including quantum mechanics: however, this paper is not founded in a claim that quantum mechanics has an ‘unimpugnable authority’.<sup>1</sup> Instead, this paper seeks to reclaim quantum mechanics as a means of reimagining an entangled spacetime. The main argument of this paper is that addressing the climate crisis requires a renewed spacetime imagination, one that is nonetheless not dissimilar to the worldviews held by many Black (and Indigenous, Asian and other) peoples for centuries before European imperialism. We need this renewed spacetime imagination, connected with Black Geographies, precisely because the current climate crisis is not the first existential crisis faced by (formerly) colonized people. Yusoff’s (2018) ‘A Billion Black Anthropocenes or None’ argues, through a critique of the construction of geological time, that peoples who have been repeatedly subjected to cataclysmic racisms have had many historical experiences of the kind of destruction that those who have not had these experiences before are now summing up as the one and only Anthropocene. Quantum mechanics can be a bridge that frees up global conversations around connections, ripples, entanglements that are much more complex than more static colonial spacetimes can handle. The bottom line is that we do not live separately, you in your small corner and I in mine. What happens in one place and time has either direct or indirect consequences for each of us and for every place. We (and here I’m talking about humanity) can no longer afford to ignore our complex entanglements or dismiss them as too difficult. As O’Brien (2016) argues, the mind-bending, ‘head-hurting’ (Brodber, 2012) shift away from classical (or, I argue, colonial) views of static space and layered time is a helpful tool for freeing up our minds to address and embrace the complexity that climate change has always already been bringing to Black and brown people.

In the following presentation, I begin by elaborating on what I mean by colonial spacetimes, and I draw on Michelle Wright’s critique of Middle Passage epistemologies to show how fixed, linear spacetimes are problematic, even in Black Studies. Then I move through a number of ways in which, over the last couple of decades, my own writing has combined Karen Barad’s work on quantum mechanics with that of key Caribbean writers, particularly Wilson Harris. My aim here is to indicate a number of ways in which Black and postcolonial geographies have made use of quantum mechanics to facilitate a conversation about uncertainty, connectedness, entanglement and the liveliness of always already climate-changed landscapes in relation to Black embodiment. I conclude by briefly considering how all of this relates to Black academic life and to our particular forms of mattering.

### Colonial spacetimes: slices and separations

I was surprised to learn, only very recently, that the iconic physicist, Albert Einstein, was a committed anti-racist activist in the US (Jerome, 2004). In 1946, he spoke at Lincoln University in Pennsylvania, a Black college, though, at the time, this was reported only in the Black press; the FBI gathered an 1800-page file on his 'subversive' activities; he also attended and spoke at a wide range of anti-racist protests, including National Association for the Advancement of Colored People (NAACP) meetings; and he had a decades-long friendship with Paul Robeson, whose anti-racist work he publicly supported. In 1946, when he had been in the US for 13 years, and been a US citizen for the last six of those, Einstein wrote the following to the predominantly white readership of Pageant Magazine:

Your ancestors dragged these black people from their homes by force; and in the white man's quest for wealth and an easy life they have been ruthlessly suppressed and exploited... [Americans'] sense of equality and human dignity is mainly limited to men of white skins. Even among these there are prejudices of which I as a Jew am clearly conscious; but they are unimportant in comparison with the attitude of "Whites" toward their fellow-citizens of darker complexion, particularly toward Negroes.... The more I feel an American, the more this situation pains me. I can escape the feeling of complicity in it only by speaking out (Einstein, quoted in Jerome, 2004: 635).

This passionately anti-racist, activist Einstein, has been covered up, edited down and selected out (Jerome, 2004) to present him as a harmless wild-haired boffin: pure apolitical intellect.<sup>2</sup> As Massey pointed out 'physics envy' has some pernicious elements—the will to understand physics as neutral and objective, apolitical, the totemic intellectual activity against which all other intellectual activity is judged, makes Einstein's embodied activism (for example his active support for campaigns against deportations, lynchings and unfair convictions against Black people) an unrelatable story, one that could not be told then and is rarely told now. In popular and academic narratives, Einstein's anti-racism simply does not compute.

I find this erasure fascinating, but why does it matter? The history of Black thought, in the Americas in particular, can be defined in part as a sustained refusal of the incommensurability between Black politics and intellectual work, an insistence on recognizing where and how Black intellectual work is erased (for example, in Noxolo, 2022b, I have figured this evident presence of Black spatial theorizing in the context of its constant erasure, as the im/possibility of Black Geographies). Black people have had to *contend* with being formally excluded or erased from many basic aspects of humanity, including from literacy (both functional and critical), from education (especially as critical pedagogy), and in particular from universities and formal knowledge production (Harney & Moten, 2013). This formal (and informal) exclusion and erasure has taken place for centuries, across a wide range of European post-imperial spaces in which the spacetime of intellectual work has been strictly defined as *bounded*, contained within the very university spaces *and* histories of scientific discovery from which we were excluded (Derrida, 1992). I am arguing here that the strict distinction between intellectual life and Black people (as well, of course, as a range of other people)<sup>3</sup> heavily relies on a colonial view of spacetime, in which space and time are divided into 'discrete units of space and time' (DeLoughrey, 2007: 66), distinguishing the 'modern' from the 'traditional', for example, or dividing the world into spatio-temporally segregated racialized hierarchies (Noxolo, 2006). Specifically in relation to intellectual life, each

academic spacetime (university campus, archive, library, discipline, conference) is often understood as an autonomous 'slice through time' (Massey, 1999: 264), a cored glacial or geological sample, in which knowledge can be read as layered or accreted through time, within bounded spaces of knowledge production. The university relies on forays into the rest of the world, to find facts and study the 'field', but by contrast the knowledge itself accretes within the 'big house' or cloistered confines of static spacetime combinations from which Black people have been figured as excluded.

In its most widely discussed and popular forms, Black contention with the stubborn colonial distinction between Black people and intellectual life stays within what Massey (1999) calls a static spacetime, or what I am calling a colonial spacetime. The powerful move that Black thought often makes is to shift the boundaries of colonial intellectual spacetime to *include* Black people, to address the erasure of Black thought through its inclusion in existing knowledge production spacetimes (Hooks, 1987; James, 1938; Fanon, 1986). This is a powerful move that, over the years, has been effective in bringing about very many important changes. Above all, I am glad to be writing this as a free Black woman, a tenured professor no less. Inclusion has powerful effects. However, in terms of the quantum moves of the current essay, and in the context of the current climate crisis, the move to inclusion within static colonial spacetimes is limited. Speaking from within US-based Black Studies, Michelle Wright (2015: 46–7) speaks of a 'Middle Passage Epistemology', which she figures as a linear progress narrative from the utterly oppressed and excluded enslaved Black person on the transatlantic slave ship, stripped of every social and intellectual distinction except their bodies, to the anti-oppressive vision of a fully independent Black state that runs on its own scientific genius here on earth (Garvey, [1927] 2017), or, in Afrofuturist visions of an earth irredeemably damaged both by oppression *and* by climate change, Black genius finding new life in the heavens or on other planets (Butler, 1998; Harries, 2015; Kreiss, 2008). According to Wright, this kind of linear progress narrative limits Middle Passage Epistemology in three ways. First, it digs backwards in time, to ever-competing origin stories that push to earlier and earlier examples of Black African writing systems or other signs of intellectual work that are valued in *Western* intellectual traditions. Second, a linear Middle Passage Epistemology reaches upwards, socially and politically, to (often *masculine*) leadership of the race: in its most popular forms, it typically privileges the individual works of mighty Black presidents, kings and emperors, contemporary or historical, over other more collective or expansive forms of agency (Jones & Gumbs, 2021). Third, it is circular in its linearity, returning again and again to transatlantic enslavement as the archetypal moment of *white* oppressive agency, against which Black agency is defined, and against which Black agency repeatedly gathers its rebounding energy: in other words, 'whiteness always retains the originary agency' (Wright, 2015: 116).

Drawing on quantum theorists, and the indeterminate positioning of quantum particles in space and time, Wright (2015: 5) pushes beyond the linearities of Middle Passage epistemology to highlight what she calls 'epiphenomenal spacetime'. Privileging the time of the now (rather than the linearity of past, present and future), epiphenomenal spacetime highlights the multidimensionality of Blackness. Wright illustrates this by setting up what I would call im/possible dialogic relationships between, for example, James Baldwin, Ama Ata Aidoo, Maryse Condé and Bernard Dadié, as Black writers who encounter Paris and theorize the city's racialization from very different postcolonial positionalities (African-American, Ghanaian, Guadeloupean and Ivorian, respectively). Eschewing rigid space and time containers, Wright frees herself up to explore that which cannot conventionally be thought, the connections and

entanglements between different forms of Black experience and relationship that are routinely displaced or forgotten.

### **Quantum Black Geographies: entanglements with/in a climate-changed earth**

As a cultural geographer, embedded in postcolonial literary geographies, my own work has used quantum mechanics to maintain a heavily material focus, in relation to spacetime, language and embodiment. For some years now, I've been combining insights on quantum mechanics from Caribbean literature (in particular the novels and essays of Wilson Harris), with Karen Barad's (2007) work on agential realism. Barad's work meditates on the indeterminacy of fundamental particles—the fact that the position of any one particle is thoroughly indeterminate, because a fundamental particle not only can be, but actually *is*, in a wide range of different positions in time and space. This is called superposition. The well-known experiment for *spatial* superposition involves shooting particles through slits, and observing the diffraction pattern on the destination screen, at which point it becomes clear that an individual particle travels through several slits at the same time. It is not only positioned in space, but is 'superpositioned', in several locations at the same time. Further, when slits are put into rotating disks that move across a particular point at different times, the diffraction patterns make it clear that there is not only spatial superposition, but also *temporal* superposition: the same fundamental particle can coexist in a range of different times and spaces simultaneously (see Barad, 2018: 219).

To understand that at this fundamental level the universe operates with spatio-temporal indeterminacy, that these fundamental building blocks of the materials of which everything (including embodied human beings) is made are active 'spacetime-matterings' (Barad, 2018: 214) that are in several times and places at once, should make us question all of our fixed understandings of location, of here and there, you and me, person and place. In reading Barad's account of indeterminacy, particularly as she explains the forms of agency involved in processes of materialization (more on this below), I began to see why Wilson Harris, a writer who trained and practised as a surveyor in colonized Guyana, was always so interested in quantum mechanics. The liveliness and indeterminacy that characterizes the subatomic world provides a means for postcolonial readers to grasp and reconnect to the concepts of living landscapes and unconscious connection that Harris insisted were part of Amerindian culture before the conquistadores arrived (Harris, 1999a). Unlost, they continue to be deep in the Caribbean unconscious, played out iteratively in Caribbean cultural practice (novels, as well as dance and artworks) as 'a primordial or deeper function of memory... within the bloodstream of space' (Harris, 1967: 51). Harris's long career might be, at least in part, summarized as a stubborn attempt to find better means for 'conversation' (Noxolo, 2016) or to find 'gateways' (Harris, 1999b: 166) between past and present civilizations that have been brutally separated by colonial spacetimes. His aim was not only to address the bruising sense of 'historylessness' (Harris, 1999b: 166) that plagues Black lives in the Americas (due to the erasures of previous civilizations), but also to find better ways to live together *with* or as part of, not seeing ourselves as separate from, the climate-changed world in which we now live. In discussing how this vision comes out in his experimental and speculative fiction, Harris said this:

The life of the earth is not fixed; it is not a description of fixed mountains or valleys divorced from the characters that move on it. The life of the earth needs to be seen in fiction as

sensitively woven into the characters that move upon it, whose history, may I say, reflects a profound relationship to the earth, so that we may speak of a humanity whose feet are made of mud or land or water or any other element to attune us to our being on an earth that moves as we move upon it (Harris 2005: 263).

I found echoes of this sense of an active earth, in which humans are full participants in quantum movement and superposition, in Barad's description of the phenomenon whereby measuring where and in what position particles are, not only *tells us* where they are (which is what we normally expect from measurement: from a positivist standpoint, measurement gives humans access to a pre-existing world), but actually *determines* where they are. In other words, it is in the moment of measurement itself, or in the material 'intra-action'—what Barad calls 'the cut'—that particles stop being indeterminate and take up a particular position.<sup>4</sup> So 'agential realism' (material action making reality) is fundamental to matter—at the quantum level, matter is not fixed or dead, but is constantly on the move, indeterminately coexisting in a range of times and spaces, but also constantly making and remaking itself through infinite numbers of spatio-temporal intra-actions. Even a void, which we might consider contains nothing, is a 'speaking silence' (Barad, 2018: 231)—the void is an 'infinite plenitude' of self-touching virtual particles, in a fluctuating quantum vacuum that provides 'the condition for the possibility of all structures' (Barad, 2018: 235).

Barad (2018) herself makes a connection to postcolonial thought in recognizing that, where those who carried out nuclear tests in deserts saw emptiness, there were not only other species and forms of matter, but also communities of Indigenous people who not only died but also suffered terrible cancerous legacies. The quantum world alerts us to the fact that, where colonial spacetimes choose to see only void—terra nullius—there is often an 'infinite plenitude' (Barad, 2018: 235) of invaluable materiality that intra-acts with a destructive act both in its own time and in other times. In my own work on local entanglements (Noxolo, 2020), I reflect on how (like many in low-income Black communities worldwide—see for example Seamster & Purifoy, 2021; Kekana *et al.*, 2023) my own upbringing in central Birmingham, UK, entailed constantly inhaling lead from petrol in the cars on the dual carriageway next to my home, and my young lungs and brain were directly impacted by legislative slowness in outlawing lead in petrol.<sup>5</sup> My argument was that Black, migrant and diasporic communities are not just passing through, as we are often represented as doing in political discourse or in relation to sometimes arbitrary juridical change.<sup>6</sup> We are thoroughly entangled with, indeed co-produced by, local environments that can nourish or damage the materiality of our bodies. Further, meditating on both Wilson Harris's and Maryse Conde's novels, Noxolo and Prezioso (2012) consider the intra-actions between the volatile geomorphology of Caribbean landscapes (volcanoes, earthquakes, erosions and accretions) and the indeterminacy of the thoroughly creolized body, shaped not only by centuries of mobilities, but also by the 'happenstance' (Massey, 2005: 39) of active landscapes that throw people together or pull them apart. Understanding this co-active entanglement of person and landscape as indeterminacy, as infinitely open processes of co-materialization, mirroring the quantum agency of the determinative cut, encourages us to keep meaning and identity similarly open, whilst also recognizing the real harms that our own material agency makes possible. Life, and personhood, considered in this way, is an 'infinite rehearsal' (Harris, 1987), or an always unfinished conversation across difference (Hall, 1995; Noxolo, 2016).



Alongside these local entanglements, in which our bodies are co-produced with/in their surrounding environment, there are also non-local entanglements. Experiments have shown that two identical photons emitted from the same light source stay in relationship, affecting each other's polarization instantaneously, no matter how far they are apart. If we reflect on all the centuries of light particles travelling in time and space, their unceasing ubiquity, we can understand Barad's (2010: 251) statement that 'Quantum entanglements are... a calling into question of the very nature of two-ness and ultimately of one-ness as well'. Ultimately, the particles that make up who we are, are so entangled that there is neither you nor me, here nor there—we are matter that is co-created not just locally but also globally.

Another way of representing the superpositioning (or quantum coherence) of particles is as waves, i.e. to draw a line to represent some of the many positions that a particle could or will be or has been in, rather than thinking of a particle as ever being just a dot with a single position. (This superposition is often expressed as potentiality but, as I explained earlier, all of these superpositions in time and space are always already happening). There is 'wave collapse' at the point of measurement, because the intra-action (or cut) itself determines the position of the particle (see my discussion of Barad's agential realism, above). Wendt (2015) discusses human beings as sharing in this quantum coherence at the unconscious level: all the particles that make up our bodies and brains are waves, always superpositioned everywhere and in every time. Memorably, according to Wendt (2015: 3), human beings are 'walking wave functions'. This idea of a ubiquitous coherence, a shared consciousness, is common in many Asian, Indigenous and African worldviews, though colonial spacetimes have often boxed these off in the realm of the 'spiritual', in contradistinction to the scientific. Fierke (2017: 141), for example, notes that Buddhism and Daoism, though not identical to Wendt's elaboration of shared human consciousness at the quantum level, share a 'family resemblance' to it, in terms, for example, of the close association between subjectivity and relationality. Woolombi Walters (2018) and Maybury-Lewis (1992) discuss how quantum mechanics' concepts of indeterminacy and uncertainty bear close similarity to aspects of Aboriginal thought, whilst Nyamnjoh's (2017) elaboration of African concepts of incompleteness and connection resonates clearly with ideas of entanglement. Quantum coherence perhaps only seems strange to monadic western (post)colonialist understandings, in which the policing of separations between individuals, spaces and times shores up both capitalist property and racialized worldviews.

Given the importance of dance in Black geographies, the iconic and experiential valuing of the skilled Black body moving in space, I want to consider here whether humans might be described as *dancing* wave functions. Patten (2022) has argued that dance is central to spirituality in African and African diasporic traditions. In his discussion of spirituality in Jamaican Reggae Dancehall, Patten (2022: 48) notes that dance, including apparently more secular forms such as dancehall, is often a practice of collective worship, 'causing individuals to transcend to higher levels of consciousness' through movements that put them into relationship with centuries of ancestral movement and spiritual practices. In my own work (Noxolo, 2022a), I connect this insight with Harris's (1999a: 242) quantum materiality, through which he notes that the creoleness of Caribbean writers and dancers, their embodied and highly engaged gathering of a range of traditions, helps them to 'arrive upon unsuspected bridges, bridges of innermost content that have a deeper, stranger luminosity and incandescence than the purely formal appropriation by one culture of another's artefacts'. Seeing the 'family resemblance' (Fierke, 2017: 141) between subatomic particles and what Harris has



elsewhere called embodied ‘fossils’ that connect us to the past and across cultures, I argue, similarly to Wendt, that particles pass *between* bodies, each bringing a tiny aspect of shared consciousness, of which each person is unlikely to be actively conscious. Still, this shared materiality connects us, intra-acting within our bodies and joining us together at the more conscious embodied scale, as dancers perform movement within a spiritual tradition. As is generally the case with spiritual practice, although dancers attest to the transcendence that is available through dance, it is not something that is susceptible to scientific proof. Yet, quantum mechanics perhaps offers an avenue through which conversation becomes possible across different dance and spiritual traditions.

In closing, I want to briefly consider string theory (Howe, 2007), in which the quanta (the smallest discrete units of something) are not conceived as particles or waves, but as vibrating strings. These strings are subject to excitations and perturbations from a range of forces, giving a sense of a world filled with resonances. Where string theory comes into artwork, it alerts the imagination to the low hum of material agency running through and around us: as the poet Susan Rich (2018) puts it: ‘...we are simply/ balls of twine wound around a breath of air’. Wilson Harris (1999a: 186) sees the musicality in a range of matter: ‘a window becomes a medium of transitive density as the chord fires... It is transformed into an eruption of majestic music within the text of reality’. An exciting implication of string theory is that nothing is ever still or in any one position: landscape is all the more throbbingly vibrant when considered this way. Further, entanglement is reimagined as reverberations, shockwaves, resonances of each string through all of time and space. Nothing is not connected.

Njelle Hamilton’s (2019) analysis of Marcia Douglas’s (2016) startling novel ‘The Marvellous Equations of the Dread’ brilliantly unpacks the implications of string theory in relation to the musicality that is so fundamental to Black history and culture. In this novel we see the continued importance of trauma, not just in the past horrors of enslavement, but in present and future brutalities of postcolonial poverty, inequality and thoroughgoing suffering. Rather than considering these realities in purely psychological terms, as the circular return of memory that often typifies trauma, Douglas’s novel hints at a more materialist understanding of trauma. Connections between both physical and spiritual spacetimes and im/possible relationships between people (including Bob Marley, Emperor Haile Selassie and a range of fierce mothers and daughters) take place through constant diffraction or resonance, strumming and vibrating across entangled space-times. I hope to return to this in future work, but I will finish here by saying that Douglas’s book suggests to me that forms of transcendent emancipation that are often seen purely as spiritual can be reimagined as powerfully material, with thrillingly far-reaching political consequences.

## Conclusion

So, in this paper, I began by considering static linear spacetimes as colonial spacetimes, and I drew on Michelle Wright’s critique of Middle Passage epistemologies, from Black Studies, to elaborate on this. Then I moved through a number of ways in which, over the last couple of decades, my own writing has drawn particularly on Wilson Harris’s work, connected with Geography through Karen Barad’s work on quantum mechanics, to demonstrate how quantum mechanics can facilitate a conversation about uncertainty, connectedness, entanglement and the liveliness of always already climate-changed landscapes in relation to Black embodiment. In pushing briefly into string

theory, I have pushed towards a sense of how the forms of transcendence within Black embodiment can link spirituality with materiality, making for more politically attuned forms of emancipation. I want to conclude by very quickly sketching out two instances of how all of this relates to Black academic life.

The first is very proximate to current academic lives: citation practices and the non-linearity of Black academic careers. As I hope to have revealed here, things that I wrote years ago are becoming more relevant now, at a time of changing climate and increasing recognition of Black Geographies. This is not at all sour grapes, and nor is it a call for Black geographers to self-publicize more relentlessly—things don't get picked up until there is an audience for them. 'Nothing never do before the time', as the Jamaican proverb goes. But the pervasive expectation of self-controlled linearity, in which academic impact is judged to be in the control of the academic, holds back many academic careers (Arday & Mirza, 2018; Johnson & Joseph-Salisbury, 2018). This goes above and beyond the well-documented differences, precarities and exclusions that mean that most people's careers simply do not follow the linear expectations of many academic recruitment panels. Algorithmic uncertainty (Kwan, 2016) which in part determines the circulation and citation of all our publications in a digitized publishing world, brings in a new element of indeterminacy around how and why some articles travel and are cited. If, as I have argued (Noxolo, 2022b) Black Geographies rely on the recruitment and retention of Black geographers, recruitment panels will need to become increasingly aware of the uncertainties of the quantum algorithm (see Shabbar, 2018).

My second, concluding point starts with Azeekat Johnson,<sup>7</sup> whose bright life turned out to be so short, but who continues to inspire many of us to work 'towards a world where we do not have to desperately shout that our lives matter' (Johnson, 2020). My argument here is that more of us can appreciate that Black lives really matter when a more widespread understanding of quantum coherence, indeterminacy, entanglement, reverberations, diffractions and resonances has freed us all to fully appreciate the real and constant connections between all people, all species and all matter. We are in the midst of an increasingly complex climate crisis—we can no longer afford to lumber around in colonial spacetimes that separate people into different 'slices' of dead space, each with its own layers of dead time. In response to complex climate emergency, we need to start to act with full awareness that we are all *entangled* with/in a dynamic and complex world.

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### Endnotes

- 1 Equally, this paper does not seek to undermine the materialist epistemologies on which the hard sciences are based. The 1990s Sokal affair might be seen this way—Guillory (2002) rightly places this infamous debacle within a culture wars framing, between a postmodern humanities and a positivist hard sciences. Twenty years later, at a time when scientific evidence for climate change and for environmental racism is the main tool galvanizing action in environmental humanities, such a binary would be particularly counter-productive.

- 2 The iconic juxtaposition between Einstein and Marilyn Monroe, whereas they never actually met each other, gives a distilled instance of the idea of Einstein as pure intellect, whereas Marilyn Monroe (despite her evident complexity and talent, see Barrios, 2023) was reduced to pure embodiment. In a popular joke that most clearly carries the juxtaposition, the dream of an offspring that would have Einstein's brains and Monroe's looks, is undercut by the negative terror of a child with Einstein's looks and Monroe's brains.
- 3 See for example Chatterjee and Barber (2021) on the postcolonial export of exclusionary models of education to Asia, and Padilla (2021), on Indigenous moves to redefine pedagogic spaces, due to the exclusionary knowledges taught in universities.
- 4 The famous Schrodinger's Cat thought experiment is an attempt to make superposition and the cut clear, though it of course also raises further questions. See Gribbin (1996).
- 5 By the 1970s, research was already clear about the deleterious effects of airborne lead in the innercity areas of Birmingham, particularly for children (see Day *et al.*, 1975; Waldron, 1975; Grubert, 1997). But it took until 2000 for leaded petrol to be banned under EU law (*Autocar*, 2017).
- 6 In 2018, the so-called Windrush Scandal broke. It became clear that the UK government was deporting people who had come to the UK as children, not only from the Caribbean as part of the so-called Windrush generation (named after the Empire Windrush, which brought migrants to Tilbury Docks in 1948), but also from a range of other Commonwealth countries. Commonwealth heads of government, who were meeting in London that year, reinforced the extensive campaigning of UK-based MPs, charities and in particular the Guardian newspaper (see Gentleman, 2019), until the government admitted that it owed many people an apology and compensation. However, by June 2023, the Windrush compensation scheme had only paid out to a quarter of applicants (*The Guardian*, 2023).
- 7 There have been many tributes to Dr Azeezat Johnson, an early career geographer who died from cancer at the early age of 32, having left an indelible mark on Black Feminist geographies (see Noxolo, 2023; <https://muslimnews.co.uk/newspaper/obituary/remembering-dr-azeezat-johnson-social-geographer-critical-race-academic/>). However, the most eloquent remembrance is always Azeezat's own strong, clear voice, speaking out against racism, sexism, Islamophobia and every other form of hatred and uncaring (see for example <https://www.ihrc.org.uk/azeezat-johnson/>). She will not be forgotten.

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