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Biocircularities

New Formations of Embodied Time

Poleykett, B.; Jent, K.

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Biocircularities: New Formations of Embodied Time

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journals.sagepub.com/home/bod**Branwyn Poleykett** 

University of Amsterdam

Karen Jent 

Independent Scholar

Abstract

In this introduction to the special section ‘Biocircularities: New Formations of Embodied Time’, we introduce the concept of ‘biocircularity’. Drawing on case studies from Senegal, Australia and the United States, we argue that (bio) circularities provides a new tool to understand transformations of embodiment and embodied time in response to rapid technoscientific, social and environmental change. We situate the potential of biocircularity by distinguishing the approach from cycles and ‘looping’. We lay out why we think biocircularity is an important concept *now*, when we stand on the brink of ecological crisis and reproductive futures appear deeply precarious and uncertain. Biocircularity, we argue, offers new ways of understanding how people live out embodiment and understand biological time. The concept offers new possibilities for theorising and realising scientific practice and public health interventions.

Keywords

circularity, epigenetics, nutrition, time

This special section engages with new visions of the life course across the natural and social sciences to better understand how life-times

Corresponding author: Branwyn Poleykett. Email: b.poleykett@uva.nl

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and technologies come together to disrupt, reverse, interrupt, re-tool and re-tell our lived biographies. How do shifting social and economic relations between the generations, the extensive biomedicalisation of the body, and technoscientific innovations in epigenetics, bio-banking and regenerative medicine reshape and redefine how we understand and experience health and vitality over the life course? What temporalities do our lives come to express, as new economic, ecological and technological challenges and possibilities extend the horizon of bioethical responsibility beyond individual lifetimes, while epigenetic studies of heritability reach back into our own lived biographies and beyond to those of our kin? When scholars across the humanities and social sciences work increasingly at critical scales that exceed bodies, lifetimes, and single places (Davies, 2018; Krieger, 2021; Rose, 2012; Szerszynski, 2017; Weston, 2022), comprehending how life is understood and human health is determined within frameworks of system, ecology and epoch, what is the continued salience, if any, of the life-time as a unit of narration and experience? If people continue to make meaning with linear life-times, what does this tell us about how scientific and biosocial knowledge mingles with meanings embedded and lived in the everyday? How are transformations in lived time changing the ways people in different locations experience embodiment? How do these analyses account for the ongoing abstraction, extraction and instrumentalisation of life-times, in the form of body capacity, bio-value and labour? How do these new processes shape the complex and situated ways that the past, present and future meet and mingle in the stories we tell about our lives? And, how are scientific narratives of ‘slowing down’, ‘banking’, ‘buying’ and ‘reversing’ biological time specifically involved in the imagination and creation of new desires, often at the expense of comprehensive political solutions to poor health, ecological crisis and intergenerational justice?

Based on a series of papers presented at the conference ‘Biocircularities: Lives, Times and Technologies’, held in 2017 at the Centre for Research in Arts, Social Sciences and Humanities at the University of Cambridge, the papers focus on how the temporalities embedded in a number of bioscientific fields (reproductive biology, epigenetics, the Developmental Origins of Health and Disease (DOHaD), and global nutrition) encounter other temporal forms: other ways of knowing, embodying, figuring, materialising and

anticipating. Rather than seeing lifetimes as cultural objects – narratives grafted onto implacable and ‘objective’ biological time – contributors to this special section draw upon ethnographic research in laboratories, clinics, cities and homes to explore the deeply co-constructed nature of social and biological time. In this introduction to the special section we contextualise the new concept of biocircularity within the interdisciplinary study of the lifetime in technoscience (Adams et al., 2009; Blackman, 2016; Gibbons and Mathers, 2021; Greco and Graber, 2022; Lamoreaux, 2022; Lappé and Landecker, 2015; Lock, 2013; Mansfield, 2017; Murphy, 2017; Warin et al., 2016). We argue that biocircularities offer a new possibility of understanding, systematising and comparing the multiple and uneven temporalities the body enfolds. In this introduction, we draw attention to how these new forms of embodied temporality are emerging at a moment when the reengineering of bodily time offers a standard means of intervention into societal, economic and ecological concerns; a process that is particularly salient to reproductive and ‘female life’ (Hopwood et al., 2021). Biocircularity, we argue, is a timely concept; it helps us to theorise the new non-linear narrative frames that are increasingly employed to understand urgent contemporary phenomena, such as epigenetics, regenerative medicine, cryobanking, chronic disease and ecological crises. However, we also consider in this introduction the question of *why* (bio)circularity *now*, at a moment when we stand on the threshold of unimaginable biodiversity loss. Why circularity, in a moment when the capacity of our planet, and our societies, to renew and replenish resources necessary for sustaining life appears radically uncertain?

Following Lisa Blackman’s (2016) call for work that considers the role of scientific innovation in reconfiguring the biosocial, these papers draw together ethnographic cases from Senegal, Australia and North America to empirically examine what is at stake as people confront the remaking of the times of life. The papers in this special section bring together perspectives on emerging forms of life and living, drawing attention to how social, historical and ecological change are lived, narrated and transformed through new body tempos and temporalities. Across these situated cases, we argue that biocircularity gives us the theoretical tools to understand how embodiment is being distinctively worked on and reshaped by ongoing technoscientific, social, historical and ecological change. As the papers in this special section

demonstrate, a biocircular lens draws attention to the many ways that bodies re-made provide new material and metaphorical resources for reimagining biological processes and making selves and social identities. Reproductive rhythms, cycles, bodily pace, and novel social relations, all grounded in embodiment and brokered by the bodily, provide opportunities for people to stabilise, objectify and interpret complex convulsions in social and generational time. Nonlinear ways of conceptualising life, whether originating in the lifeworld or emerging from technoscience, can be taken up as tools of antinormativity. Moreover, paying attention to (bio)circular ways of thinking and recursive knowledge encourages a sensitivity to how people experience the force of the past in the present, but a sensitivity that is not rooted in a belief in the possibility of 'return' to a fixed and stable point.

This abandonment of a point of return is also how we differentiate our approach from scholarship on cycles. Cycles are crucial to the natural sciences, they are directional and finite; they may oscillate between poles, or they may be open-ended systemic processes, but they are characterised by 'an ideal of return to an original state' (Hopwood et al., 2021). While cycles thus often refer to larger finite systems whose reproduction they serve, *circles* do not necessarily relate to a pre-determined broader systemic apparatus that determines their meaning. Biocircular times reproduce in more uncertain ways, moving towards entropy, stasis and chronic forms of waiting and wasting-time, as well as towards renewal. Their frame of reference is uncertain; their function is less stable and more insecure. With its more open mode of reproduction, biocircularity has the ability to draw together objects that the natural sciences do not place in any precise or formal pre-existing relationships, thereby reinvigorating and sharpening the work of sociological, anthropological and historical critique. Biocircularity also differs from existing social scientific theories of loops and looping. Loops recall the 'looping effects' of the sciences, the labour that locks together diagnostics, knowledge, therapeutics and experience in the creation of quantified human experiences (Hacking, 1996). More recently, looping has also been associated with anthropological analysis of complex technopolitical arrangements that requires anthropologists to 'turn ethnographic findings back into the system' (Fortun, 2012: 457), regenerating thought through the creation of a 'looped view' on disciplines and intellectual practice.

By foregrounding practices of *circularity*, the papers in this collection move beyond cycles and loops: replacing the cyclical with its long arc of reproduction and its own strenuous claims about life, and the feedback loop, with its intense, scale-jamming circuitry, with a different way of seeing and analysing life-times. Biocircularity builds on Sarah Franklin's notion of recursion: 'a form of attention to the properties of the equipment you are using to determine, or manage, the properties of something else' (Franklin, 2013: 25). Across the cases considered here biocircularity is used to analyse examples of 'analogic return', the process of how analogies rebound upon or 'travel back' to change their objects (Franklin, 2014). *Biocircularities* draws together cases of bodies becoming equipment for knowing and reasoning, through recursive forms of exchange in which placentas conjure and conjugate new times, eating involves 'attunement' (Mol, 2021) to unstable and uncertain environments, and circularity builds common ground and new alliances between Indigenous science and technoscience. In each of the cases, recursive knowing and biocircular reproductions come together to change the bodies they reproduce materially and semiotically. The question of the precise calibration of those material and semiotic transformations, in specific contexts, the evidence that they draw upon, the cultural traces that they leave, the practices and relations that they alter: these transformations are the foci of the papers that follow.

So far we have argued that the concept of biocircularity is distinctive and productive. Biocircularity can both help to analyse and diagnose the present, and also illuminate how new futures are brought into being. Before dealing with each paper's argument in detail, we will briefly consider why it is that we see circularity as such a potentially powerful concept *now*. Why (bio)circularity in a moment when stories of life are often unbearable, like the 'extinction stories' that continue relentlessly and inexorably, even when they 'do not deserve to be prolonged' (Rose et al., 2017)? Why turn our attention to circularity at this moment, when reproductive futures appear more precarious than ever before (Clark, 2017)? As a concept, circularity reverberates across different domains of social life and permeates different contemporary practices and forms of problematisation. The circularity of waste, for example, figures in powerful ecomodernist dreams of containment, remediation and repair. The virtuous cycles of recuperation and processing of waste in 'circular economies'

renders circularity a ‘guiding logic’ of ecological modernity (Zhang, 2020). In this mode, circularity constitutes a ‘myth’ that allows toxic and polluting industries to be maintained while their products are reused, repurposed and recirculated (O’Hare, 2021). Circles are deeply implicated in the ‘repair mode’: a form of thinking and acting within which natures are instrumentalised and mobilised to remediate harm (Huff and Brock, 2023). Circles are not innocent images in these evocations; circular imaginaries can serve as warrant or alibi for the reproduction of the status quo.

While dreams of reuse offer solutions within the framework of our current wasteful and harmful economic system, ongoing and intersecting social, economic and ecological crisis make it increasingly difficult for people to imagine and create liveable futures inside of the present. Here, again, circles and circularity become important models and metaphors for capturing and describing qualities of contemporary life. The circular becomes implicated in chronic forms of life, ways of reckoning with bodily vulnerability that escape the clinic and come to describe broader conditions of living. Within biomedicine the explanatory model of chronicity interprets and situates people as ailing patients who must know, manage and become responsible for their health in order to avoid an escalation of symptoms and bodily crisis (Manderson and Smith-Morris, 2010). The chronicity model is a way of making patients and disciplining people into rhythms of bodily and biomedical compliance; it might produce new forms of hopelessness, stand for a pervasive sense of being stuck in the present, or intersect with and amplify structural violence or melancholic ways of being in the world (Carruth and Mendenhall, 2019; Garcia, 2008). In drawing attention to how people ‘strive to be normal’ (Manderson and Smith-Morris, 2010), the study of chronic conditions also surfaces the ‘chronic’ as a category of social practice revealing of the diverse ways that people orient to the future, craft care, manage relations and strategise with time (Green and Lynch, 2022). The emergence of forms of ‘chronic living’ (Manderson and Wahlberg, 2020) draws attention to the experience of time as chronic, that is, repetitious, relentless, expended on mitigation and maintenance and not on progress. Chronic, repetitive and cyclical forms of life are associated with the negativity of barely life-sustaining practices, rather than the imagination of new possibilities that would allow people to break out of cycles of repair (Duclos and Criado, 2020).

Papers in the Special Section

We now turn to the papers to ask what critical possibilities can be found in the biocircular, beyond loops and cycles, and outside of the technofix of the circular economy and the dulling effects of chronic repetitions. The paper by Martine Lappé and Robbin Jeffries Hein examines the temporal politics of epigenetic research on the placenta. The authors argue that ‘epigenetic and Developmental Origins of Health and Disease (DOHaD) models of health have helped recast the human placenta as an agential organ’. In these fields, the placenta is understood as a powerful entity, capable of absorbing, transmitting, indicating, signalling and ‘embodying biological clues’. The authors show that the temporal politics of placenta epigenetics are complex. The placenta both augurs and indicates the potential future wellbeing of children, while offering a ‘way back’: a retrospective insight into the maternal environment. Lappé and Jeffries Hein draw on Sarah Franklin’s accounts of recursion in the anthropological study of the life sciences and deploy the concept of ‘recursive embodiment’. The placenta offers the field of epigenetics a material and representational focus, a passage point through which different kinds of experience are threaded. Body-environment relations, the authors argue, are ‘continually imagined in relation to what occurred in utero’, making the placenta ‘both a lens onto this process and the material through which it takes place’. In drawing attention to the capacity of the placenta to condense, refract and ‘loop back’, they show that ‘relationships between bodies, environment and time have become differently parsed, punctuated and materially rendered’. The scientists that Lappé and Jeffries Hein interviewed saw placenta epigenetics as connected to ‘temporally specific’ interventions. Despite the scientists’ deep understanding of and commitment to a vision of bodies as continually (re)constituted by exchanges with environments, the placenta ‘rooted’ these large scale questions in pregnancy. The placenta captures the complexity of how epistemic claims are made in the field of epigenetics. Biocircularity and recursive embodiment reveal how claims are stabilised, shored up, and how singular narratives and temporalities can become hegemonic, even when scientists remain open to plasticity, contingency and complexity across the life course.

Megan Warin, Jaya Kearney, Emma Kowal and Henrietta Byrne examine the complex circuits of epigenetic discourses in Australia. Specifically, the authors examine how some Indigenous Australians have taken up the Developmental Origins of Health and Disease (DOHaD) approach to draw attention to the impact of historical trauma and legacies of slow violence on their communities. DOHaD models and Indigenous science share ‘circular models of time that disrupt notions of a linear and bounded life course, bringing histories and relational ecologies into the foreground’. This common set of interests and investments in the ‘resonant frames of circular time’ means that DOHaD frameworks can meet Indigenous science in dialogue, as Indigenous scholars and advocates selectively take up and adapt some epigenetic argumentation. Indigenous discourses of post-genomics re- and co-construct the field by bringing it into dialogue with Indigenous frameworks and challenging and expanding understandings of time. Indigenous activists enrich, disrupt and politicise DOHaD temporalities, forms of time that are rooted in a Euro-centric notion of the lifecourse as a series of discrete events constructed around ‘critical windows’ of development. Crucially, the authors do not suggest a direct equivalence between Indigenous and technoscientific forms of time. Indigenous science and DOHaD/epigenetic science are characterised by ‘fundamentally different orientations and ways of being in the world’. The authors argue that an engagement with how Indigenous activists and scholars use and remake DOHaD discourses, metaphors and practices can shift the practice of post-genomic science beyond the times produced by and through the body, and towards a transformative and encompassing understanding of embodiment, violence and intergenerational time.

The papers summarised above both examine developmental time, particularly as it is conceptualised within epigenetics and DOHaD. Branwyn Poleykett’s paper thinks about developmental temporalities from a different angle, examining how people in Senegalese households try to resolve the challenges posed by ‘new’ chronic diseases through dietary self-care practices. For Poleykett, biocircularity offers a way to interpret the ‘novelty’ of chronic forms of sickness that stays close to the everyday experiences of people dealing with the pressures and challenges of chronic ill health. If chronicity is a shared, interpretative framework through which metabolic disorder, bodily

dysfunction and societal maldevelopment can all be integrated and analysed, then how do these narratives rebound upon and reshape the everyday experience of embodiment? Linear accounts of epidemiological and nutritional ‘transition’, explanations that blame modernity and associated dietary practices for the global spread of chronic disease, here encounter complex causalities and biocircular forms of living and responding to interpretative complexity and daily challenge in Dakar. Poleykett shows that bodily temporalities, in the form of embodied tempos such as pulse and breath, can be used to collectively problematise general impairment, or an urban environment perceived as toxic or unhealthy. When breath catches or pulses race, bodies in Dakar might be seen as trapped in an acceleration towards senescence. But bodily time can also be recuperated through local dietary knowledge. Indeed, despite the serious and high stakes nature of knowledge about chronicity in Dakar, there is still room for playful genres of embodied time. Negative beliefs, for example, that the city might be an unhealthy and polluting environment, certainly exist in Dakar, but these beliefs exist alongside open ended and experimental practices with remaking the body’s times; experiments rooted in local embodied understandings of harm and potentiality.

Discussion

Across the cases considered in the three papers a number of themes emerge. These themes signal ways that we might analyse the relationship between the linear life course and emerging embodied forms of biocircular temporality. Below we briefly draw out three salient themes: circularity and chronopolitics, paradoxes of narrativity, and mutations in determinism and responsabilisation.

Chronocracy and the Temporalities of the Life Sciences

All of the papers in the special section analyse biocircular temporal forms and the recursive objects that they (re)produce. The papers draw attention to the operations of multiple forms of time across different fields and the kinds of relations and possibilities that emerge between temporal frameworks, as these ways of calculating and figuring time interact and slide across one another. A prerequisite for this analysis is an understanding that the biosciences play an

extremely powerful role in this process, and that what Becky Mansfield has termed an ‘epigenetic temporality’ (Mansfield, 2017) is reshaping life across fields of political activism, public health policy and intimate and embodied experience. An epigenetic temporality produces a ‘new, folded futurity that brings multiple, future generations into the present’ (Mansfield, 2017: 357). The papers in the special section each examine evocations of futurity embedded in bioscientific cultures. However, each of the cases shows, in different and situated ways, how the expectations of the biosciences can be subverted, and, further, how the ‘chronocracy’ of the biosciences can be challenged. That is, the authors use biocircularity and recursive embodiment to analyse and challenge the dominance of technoscientific temporalities; to show up the limitations of the capacity of scientific knowledge to decisively or definitively ‘shape the temporalities in which people live out their everyday lives’ (Kirtsoglou and Simpson, 2021: 3). An attention to the biocircular makes clear that *alter-*, *para-*, or *counter-*temporalities exist, and that these other forms of temporal experience and reasoning allow people to interpret their bodily existence and to create and value ways of being that might be invisible to or derogated by the biosciences. For example, Poleykett considers how people in Dakar seek to heal ailing bodies that have slipped out of time by creating new forms of eating, a repertoire of alternative and para-eating practices that sit alongside rhythms of collective consumption and that follow circular logics of repair. *Para-*temporalities, the sense of chronicity situating a person ‘in time but out of step with its familiar cadence’ (Meyers, 2016: 353), allowed people to speculate with embodied time and experiment with food on the margins of collective eating.

Narrativity and Paradox

All three papers ask questions about the relationship between the body and its times, or, more precisely, the relationship between rapidly changing experiences and conditions of embodiment and discursive constructions of the life-time. Each of the papers draws attention to the continued power of linear narratives of life’s time. Understanding why, how, and in what forms linear frameworks endure is vital, because the hegemony of linear narrative forms and developmental temporalities can inhibit the emergence of other analyses that might

be more expansive, more fruitful or more politically promising. For example, Janelle Lamoreaux, revisiting Emily Martin's classic text 'The Egg and the Sperm', suggests that the emergence of a 'more relational, contextual, and processual biology [is] limited by broader narratives of reproduction that have largely stayed the same' (Lamoreaux, 2022: 1183). In Lappé and Jeffries Hein's paper, the authors complexify this coexistence argument by demonstrating that discursive constructions of the placenta draw *both* on linear notions of time and reproduction while also reflecting recursive embodiment: the ongoing transformations that take place in the laboratory as the material of the placenta is continually materially re-made and re-invested with meaning. In Poleykett's account of everyday eating in Dakar, people struggle to stabilise meaning and to prolong access to culturally meaningful and valued forms of eating in the face of chronic diseases that threaten to interrupt rhythms and routines of consumption. What on the face of it might appear to be a story about linear evolution and rupture, however, is revealed to be a complex story about how continuity is idealised, narrated, dreamed of, and fought for in its *absence*. An attention to (bio)circularity and recursive embodiment sensitises the authors to changing stories of life, lives and the life-time. A biocircular analysis rejects normative claims about linear narratives of lives 'lived forward' and its normative associations with psychic integrity and social personhood (Woods, 2011). Taken together, the papers in this special section show that the endurance and instrumentalisation of the life-time in the midst of flux should neither be taken for granted nor understood as an artefact of actors' desires for social and bodily goods like 'health', stability, continuity or political recognition. Rather, this survival of life-times, as other possibilities proliferate, requires careful situation and precise analysis.

Determinism and Responsibility

The political stakes of research and argumentation in the fields of epigenetic, DOHaD and global health nutritionism are extremely high. Research in these fields produces specific kinds of 'knowledge effects' (Pentecost and Ross, 2019), creating new 'determinants' of health, new forecasts of future wellbeing, and new forms of individualisation, biologisation and responsabilisation that hold lives in

their sway. Each of the papers considers how people are made responsible for their own and others' health and wellbeing, each of the papers traces the contours of these responsabilisations, and each of the papers uses biocircularity and recursive embodiment to imagine ways *out* of deterministic interpretations. Elizabeth Roberts has recently argued in the introduction to a special issue on postgenomics that the early promise of the field confronted the 'long standing reductionism of the life-sciences' and that attention to the entangled complexities and contingencies of encounters between bodies and worlds was subject to forms of 'causal enclosure', keeping the determinants of health across the lifecourse 'small': close to the body, tied to the mother-child dyad, and temporally anchored in very early life (Roberts, 2021). The papers in this special section use circularity analytically and empirically to challenge the tendency of the life sciences to 'stay with the small cause' (Roberts, 2021). In Lappé and Jeffries Hein's paper, the placenta comes to act as a passage point between scales and times, and through this process of circular (re) investment, is transformed, opening ways of thinking otherwise. Container of multiple stories and lens onto different kinds of embodiment, the authors imagine future constructions and configurations of bodily material that would produce other narratives, other outcomes. In Warin, Kearney, Kowal and Byrne's paper, collisions between Euro-centric biosciences and Indigenous science produce surprising affinities and show up weaknesses and limitations in technoscientific temporality. Deploying Indigenous logics, allied with theories of slow violence and accounts of historical trauma, allows Indigenous activists to challenge what Lappé and Jeffries Hein have in a recent paper described as the 'temporal embedding of adversity': the location of adversity in pregnancy and early childhood with a number of individualising and biologising effects (Lappé and Jeffries Hein, 2021). As we considered in the introduction to this essay, the circular is a surprising form through which to imagine breaking out of the rigid cage of health 'determinants', the 'small cause' and a politics of health that widens the range of responsibilities that individuals shoulder for the maintenance of their bodies. In our examination of how circles show up in reproductive biology, in popular imaginaries, and in minimal strategies of recuperation and repair, we considered the ways in which circularity might seem

untimely or inappropriate, particularly as a tool for crafting ways of living through novel crises. The papers in this section demonstrate the analytical power of recursive embodiment and biocircularity as conceptual tools for breaking out of deterministic cyclical and looping forms of knowing and making life. Warin, Keaney, Kowal and Byrne's paper demonstrates the relevance of circularity particularly keenly, showing how 'resonant frames of circular time' make more supple interventions. Bringing different forms into dialogue and relief allows Indigenous science to enter into health policy and health care. While circularity is implicated in negative or wasting forms of time, we have argued that biocircularity also clears a path for understanding complex, recursive, reciprocal, challenging, creative and novel ways of living embodiment and working with biological time, opening up possibilities for differently theorised and realised policy and public health interventions.

Conclusion

The circular forms of analysis in these texts are highly recursive. Circles appear in the narratives of interlocutors, they underpin different forms of time: everyday, technoscientific and cosmological. Biocircularity characterises as well as illuminates the diverse forms of knowledge considered by the authors. The analysis of biocircular forms of material endowment and semiotic problematisation provides a focused tool for better understanding how objects cohere and endure across time and space while undergoing all kinds of transformation. A close attention to circles, circularity and recursion illuminates the complex circuits through which scientific knowledge about reproduction, health and wellbeing moves through society and the material, semiotic and discursive changes that follow in its wake. Biocircular analysis lends itself to the study of the mutations and transformations in body-times, in particular to the entanglement of technoscientific temporalities with other ways of being in the world. By tracing the emergence of novel ways of living with chronic conditions that resynchronise bodily rhythms, by closely examining the paradoxical iconicity and mutability of the placenta in epigenetic science, and by analysing the emergence of a decolonial science at the margins of different ways

of knowing, the authors make a compelling case for the urgency of the biocircular analysis of lifetimes.

ORCID iDs

Branwyn Poleykett  <https://orcid.org/0000-0002-5180-9235>

Karen Jent  <https://orcid.org/0000-0002-4095-180X>

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Branwyn Poleykett is an Assistant Professor in the Health, Care and the Body research group at the University of Amsterdam. Her research focuses on the politics of public health in Senegal.

Karen Jent holds a PhD from the University of Cambridge. Her PhD examined the relationship between science, technology and society through an ethnographic analysis of a scientific model called ‘the stem cell niche’. She collaborated in the development of *Dish Life: The Game* (2020), a mobile game about stem cells in society and social justice.