3. Controversing Datafication through Media Architectures

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Abstract

In this chapter, we discuss a speculative and participatory "media architecture" installation that engages people with the potential impacts of data through speculative future images of the datafied city. The installation was originally conceived as a physical combination of digital media technologies and architectural form—a "media architecture"—that was to be situated in a particular urban setting. Due to the COVID-19 pandemic, however, it was produced and tested for an online workshop. It is centered on "design frictions" (Forlano and Mathew, 2014) and processes of controversing (Baibarac-Duignan and de Lange, 2021). Instead of smoothing out tensions through "neutral" data visualizations, controversing centers on opening avenues for meaningful participation around frictions and controversies that arise from the datafication of urban life. The installation represents an instance of how processes of controversing may unfold through digital interfaces. Here, we explore its performative potential to "interface" abstract dimensions of datafication, "translate" them into collective issues of concern, and spark imagination around (un)desirable datafied urban futures.

Keywords: datafication, controversing, public engagement, urban futures, smart city, media architecture

Imagine yourself walking on the street in a city sometime in the near future. In fact, make it today. Surveillance cameras are likely installed on every corner. How would you feel about this? Do these cameras make you feel safe in a public space, or do they make you feel spied on? Maybe you are

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wondering why no one seems to have asked you anything about installing surveillance cameras, what happens with the data that is captured, or who has access to the data and for how long. Or perhaps you simply try to ignore their presence altogether. The omnipresence of "smart technologies" in cities today, where media technologies are part and parcel of urban architecture, is controversial. The ongoing datafication of cities leads to a variety of contestations, for instance about how new forms of knowledge production coincide with new kinds of in- and exclusion, about the agency of citizens in such developments, and about societal friction regarding public values. We believe that one of the things hampering the discussion of these questions is that the datafication of cities happens largely under the radar. In other words, there are little to no opportunities for people to engage in issues and debates about datafied smart cities. Another hindrance is that the datafication of urban life is often presented as a neutral and efficient technological solution to complex urban problems. This effectively sweeps any potential normative discussions about what kind of urban futures we find acceptable or desirable under the rug, as well as the frictions and contestations that come along with it.

By contrast, we feel that it is imperative to develop ways for teasing out those discussions and engaging a multiplicity of voices in the debates about the futures of our datafied cities. As our cities today have become hybrids of architectural form and media interfaces, we must find ways to debate this through critical "media architectures." In this chapter, we discuss such a media architecture, a research-by-design installation called *Future Frictions* that is meant to do exactly that. The question raised is how a media architecture installation can contribute to fostering civic engagement in datafied smart city futures through a deliberate strategy of "controversing" (a strategy for making controversies publicly debatable). We analyze how this controversing strategy, explained in more detail below, can help to generate public discussions about datafied urban futures and public values.

Datafied Smart City Futures, Value Frictions, and Controversies

Smart technologies and big data have taken a central role in efforts to curtail the impacts of cities on wider contemporary societal challenges like climate change, resource depletion, and increased green-house-gas emissions. Datafication is presented as delivering much-needed seamless solutions by addressing alleged inefficiencies in the urban system in frictionless ways (Powell 2021). Aims of streamlining and optimizing urban infrastructures

and services underpin the "smart city" as a predominant urban imaginary, centered on homogenizing visions of quantified and techno-oriented urban futures (Sadowski and Bendor 2019). Moreover, most smart city visions portray media technologies in general—and data in particular—as means to solve the problems of the city *as is*, rather than creating opportunities for radically re-imagining and transforming our urban futures by the people who inhabit these cities (Miller 2020). After all, using data for optimization always departs from what is already available. Ironically, institutional approaches to engage citizens in smart city developments are often intended to smoothen out and overcome tensions that may arise from the implementation of technologies themselves.

The increased power of technology companies together with corporate and policy visions advocating for the use of "smart" technologies to address urban problems has led to significant concerns in the academic arena with how "big data" may affect public values and create social inequalities (Kitchin 2014). Such concerns have raised critical debates around "smart cities" (Townsend 2013), the "datafied society" (van Es and Schäfer 2017), "platform society" (van Dijck, Poell, and de Waal 2018), and "surveillance capitalism" (Zuboff 2019). In particular, the imaginary of the "smart city" as a generic technology-optimized vision for future cities is often used to justify political choices and trigger new economic paradigms benefiting corporate actors to the detriment of citizens (Sadowski and Bendor 2019; Vanolo 2014). This critique is supported by studies that show how images and expectations of the future structure actual decision-making and social organization (Jasanoff and Sang-Hyun 2015). This effectively *performs* the future in the present and often becomes a self-fulfilling prophecy (Meyer 2019). In other words, the ways in which we imagine the future—our "social imaginaries" (Taylor 2004)—shape how we act in the present. The performative dimension of smart city imaginaries is a theme that our installation attempts to engage with, as will be explained below.

This leads to several questions. First, we inquire who gets to define and articulate controversial issues. All too often, frictions and contestations associated with datafication tend to be framed externally and not by the people interacting with the data (Rettberg 2020). Instead, we ask: what might be the conditions that allow citizens to identify and debate their own issues of concern? Second, we investigate how the datafied city as a predominant urban imaginary instigates a continual renegotiation and redefinition of public values by multiple and diverse "publics" (Latour 2005). Different groups have conflicting viewpoints on the issues involved in datafication and the values they attach to them, as the security camera example shows.

We depart from the idea that "socio-technical controversies" (Jasanoff and Sang-Hyun 2009) can bolster civic engagement. Specifically, we focus on an approach to civic engagement that places friction and ongoing contestations around public values at the center (cf. van Dijck et al. 2019). We propose the notion of *controversing* as a deliberately frictional strategy for civic engagement that addresses the interlinked needs for recontextualizing, meaning making, and agency in debates around datafication (for a detailed discussion, see Baibarac-Duignan and de Lange 2021). This moves away from a singular data-optimized smart urban vision and helps to tease out a plurality of possible futures imagined by very diverse inhabitants. This is in line with other recent pleas to "stay with the trouble" (Haraway 2016) by "undoing optimization" in smart cities (Powell 2021) and valorizing the inherent messiness in interfacing with "smart" urban data (Mattern 2021). Controversing, we argue, has the potential to generate relational and dynamic forms of collective agency in reconfiguring urban futures.

This chapter analyzes how this research-by-design strategy for increasing civic engagement with the datafied smart city works by looking at the immersive installation *Future Frictions*.[1] The installation comprises an interactive digital interface combined with an immersive scenario-based web experience that engages the participants with the potential impacts of datafication through speculative future images of the datafied city. The intervention was developed as part of the NWO-funded project "Designing for Controversies in Responsible Smart Cities," developed by the University of Twente, Utrecht University, and a consortium of public and commercial partners such as the Amersfoort Municipality.[2] It was tested at the Media Architecture Biennale on June 28, 2021 during an online workshop with about 15 participants. Often, future-oriented design methods, such as "techniques of futuring" (Hajer and Pelzer 2018) aim to bring together actors around one or more imagined futures to support certain orientations for action. Our installation aims instead to create and support spaces for participants to imagine and debate desirable smart city futures, formulate potential controversies, and reflect on value clashes.

1 The development of the installation unfolded through an iterative co-creation process in which the research team worked together with a design agency (Design Innovation Group) and a collective of creative coders and programmers to develop the installation (Creative Coding Utrecht/Katpatat). We tested the installation as part of a workshop during the Media Architecture Biennale 2020 (MAB20), held online in June/July 2021 due to the COVID-19 pandemic.

2 The project is developed as a collaboration between University of Twente and Utrecht University, together with a consortium of public and private partners. It is aimed at developing a collaboration platform for envisioning and developing responsible smart cities, including ethical reflection on issues connected to urban datafication. See http://www.responsiblecities.nl.

In what follows, we reflect on the capacity of the installation to make typically abstract socio-technical controversies tangible, to challenge tacit assumptions, and to generate alternative images of desired futures that bring together different perspectives. The installation builds on critical and speculative design and supports diverse participants in visibilizing desirable smart city futures. The notion of "visibilizing" derives from STS (Prasad 2005) and is frequently used in design research for interventions that make tangible something that was abstract and intangible before, like technologies shaping the city (Matos-Castaño, Geenen, and van der Voort 2020). Visibilizing, in Latourian terms, entails "making things public by revealing and stimulating multiple perspectives to be expressed" (Latour 2005). With our approach, we move beyond the logic of solutionism, pervasive in smart city discourses, toward a space for material engagement with datafication, which we see as a precursor to collective imagination and action.

Methodological Inspirations: Speculative Design and Experiential Futures

The development of the *Future Frictions* installation was informed and inspired by previous work on speculative design (Dunne and Raby 2013; Auger 2013) and experiential futures (Candy 2010; Candy and Dunagan 2017). Speculative design revolves around creating artifacts based on future scenarios to materialize future social implications and aims to establish debate about (un)desirable futures and the potential for a plurality of actions. Instead of focusing on developing products or services on the basis of their functionality, speculative design fosters ethical reflection and responsibility. Making plausible futures tangible enables discussion about relevant ethical issues. In the context of smart cities, recent projects have explored the potential of speculative design to address, for instance, the lack of awareness regarding data nudging and its social implications (Park 2020). Speculative design focuses on opening spaces to discuss alternative futured by provoking social, ethical, and emotional questions that are often neglected in top-down smart city debates (Forlano and Matthew 2014).

Recently, speculative design has laid the foundation for experiential futures. Instead of designing objects or artifacts, experiential futures engage people with experiences or immersive situations. Experiential futures revolve around creating experiences that bring the worlds of tomorrow into the present to make futures "richer, more accessible, and immediate" (Candy

2010, 86). By engaging people with an experience, analogue or digital, it is possible to explore concrete manifestations of potential futures to instigate debate and gain insights about current actions that could be taken to avoid or achieve these futures. As opposed to written reports and presentations, experiential futures can make potential futures tangible and concrete (Pelzer and Versteeg 2019). In the words of Kuzmanovic and Gaffney, "[e]xperiential futures are a tool to crack open the door to multiple possibilities for change in the present" (2017, 107).

Although experiential futures rely on physical materiality to engage people in conversations about futures (Hajer and Pelzer 2018), videogames or web experiences can also offer possibilities for civic engagement. For instance, the use of interactive media may shape social imaginaries by providing inspiring alternatives (Bendor 2018). The practical potential of these forms of engagement derives from their scale and accessibility through online applications, as well as multisensory engagement with potential futures (Vervoort 2019). More conceptually, their performative potential lies in the "what if" question by opening up imaginative spaces for thinking about alternative futures. This matters because it helps to steer away from the suggested inevitability of techno-optimized futures that is performed by smart city visions, as discussed above.

Future Frictions: First Prototype

Based on these methodological inspirations, we developed an immersive first prototype. While the initial plan was to create a physical and spatially situated installation, due to COVID-19, we had to resort to a purely online 3D experience. It addresses potential smart city futures participants can easily relate to, in line with Auger (2013), but with the addition of a pinch of uncanniness for the sake of controversing smart and datafied urban futures.

In its first prototype, participants enter a virtual world and go on a quest to explore a neighborhood where a new smart city technology will be implemented. The task is to decide how the technology should be implemented, accomplished by making a choice among three potential outcomes, observing changes in the environment, and listening to what some of the residents have to say about the effects of the technology.

The technology we used for deliberately stirring up the debate following our strategy of controversing is a drone. Upon finding it, participants encounter three options of what should happen with the images that the drone takes and where they should be uploaded. Each of these three options exposes

Fig. 1. Screenshot of the *Future Frictions* interface (created by the authors).

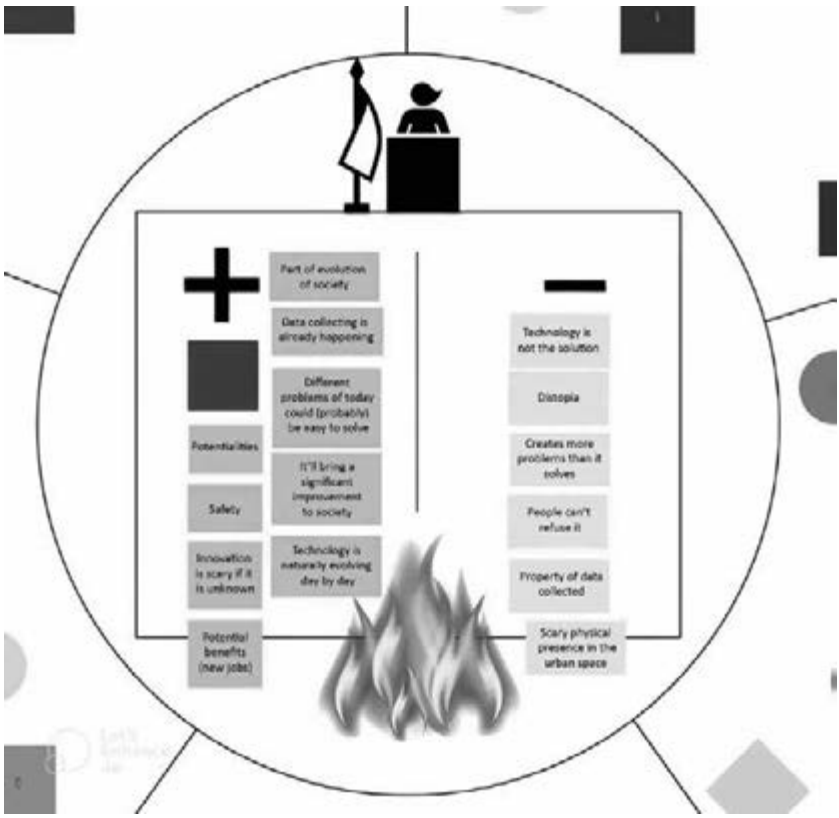
potential tensions: around corporate, community, and government control of the data. While these may initially appear straightforward, participants are sent back into the neighborhood to see how their choice has changed it, as well as the neighbors' experiences. This introduces a level of ambiguity and friction and provokes participants to formulate their own controversy. Toward the end, participants are prompted to reflect on the experience and the controversy by writing a postcard from their future neighborhood to a loved one. The postcard compels users to reflect on how they feel about the technology and the controversy identified and stimulates the imagination of different possible futures.

Identifying Smart City Controversies with *Future Frictions*

The authors tested *Future Frictions* in a participatory workshop to explore its potential for civic engagement during the Media Architecture Biennale 2020. The participants started by individually experiencing *Future Frictions*. This was followed by a collective discussion about smart city controversies, as raised through the individual experiences. To support interaction and debate, we used a digital canvas, Mural.co, and explicitly asked participants to reflect on:

a) *The controversies that surfaced in the web experience.* Examples noted by the participants included: the tension between anonymity and

Fig. 2. Screenshot of the digital canvas (Step 3) (created by workshop participants).



surveillance, sociability and isolation, and the boundary between collective and personal interests.

b) *How technology, as portrayed in Future Frictions, changed the experience of urban life*. Participants highlighted how a current experience of "not being known outside" could change into an experience of pervasive monitoring and less room for anonymity in the city.

c) *The responses and feelings about the impacts of technology on urban life that Future Frictions evoked*. Participants mentioned a wide array of feelings: "powerlessness, playfulness (experiment), fear, uncanniness, and endless possibilities."

d) *Aspects of urban life that were affected in the web experience and should be taken into consideration.* Participants discussed potential impacts on public street life, such as sociability and unexpectedness, and the fact that technology could make citizens more dependent on public authorities and government.

Fig. 3. The collage co-created by participants (Step 4) (created by workshop participants).

Following the discussion on controversies, the participants decided on the implementation of drone technology, in the context of the neighborhood displayed in the installation. We divided them into two groups, one supporting the implementation of the drone and one group against it. Moreover, one participant acted as a mayor to document the debate and make a final decision. The debate had two rounds during which participants switched roles so that those supporting the technology would be against it in the first round, and vice versa (Figure 2). Following the debate, the mayor decided to implement the drone technology, provided that certain conditions were met. In particular, she emphasized the importance of accepting the unavoidable evolution of technology, which demands a constant need for revisiting and reshaping powers to avoid losing control over technology and its impacts. Some of the participants suggested that establishing clear boundaries around the implementation of technology and seeing the city as a space for experimentation could help achieve this outcome.

The last step consisted in co-creating a collage to visibilize how the mayor's decision might shape the future city. Each participant added an element in the collage from an extensive collection of images we provided, and briefly discussed their choice in relation to the mayor's decision and the other participants' items. Moreover, the participants collectively had to suggest a title for their collage (Figure 3).

Collectively creating the collage consisted of navigating through different meanings and understandings of what the outcome of the visibilization meant. The various titles given to the collage highlighted this. They included: "The human factor," reflecting on the potential dehumanizing effects of technology in the city; "A 'perfect' place," suggesting how technology usually "repairs" seemingly inefficient aspects of the city; "Sweet community," imagining a utopian future for urban communities in control of, and serviced by, technology; and "Sweet troubles," proposing a controversy-fueled future by accepting the inevitability of technological innovations and the frictions these would likely cause.

Assessing the Installation's Potential Based on the Controversing Framework

Let us now analyze how the installation, which was built on the concept of controversing, allows us to analyze civic engagement with smart city issues and allows the debate to center around public values in the responsible "smart city." We do this by addressing the three elements of the controversing framework we developed: recontextualizing, meaning making, and agency (Baibarac-Duignan and de Lange 2021). *Recontextualization* involves the re-urbanizing of delocalized big urban data by situating contestations around datafication in specific spatiotemporal settings. *Meaning making* acknowledges the epistemological necessity to meaningfully "interface" with abstract datafication and to "translate" data into collective issues of concern, which are almost never univocal but instead rife with tensions. *Agency* considers the active role controversies can play in serving as a "glue" for engagement and collective action, where the onus in participatory processes is in on the conditions that enable participation in the shaping of smart city futures.

Future Frictions recontextualizes smart tech in tangible ways by making its implications material and concrete through changes in the actual environment, the characters' experiences, and social interactions between them. As one of the participants in the workshop noticed, the installation "gives body to the technology." The impacts of technology become tangible by visibly modifying the surrounding environment and therefore the user's experience. Moreover, the user is not presented with an un-relatable reality, for instance that of a sleek techno-futuristic environment, which could potentially alienate rather than engage them in the experience. Instead, the installation brings controversies at a "human scale," using images of existing urban environments and inhabitants to shape an imagined future.

Experiential methods such as data walking have highlighted the benefits of walking in raising awareness around datafication (Houston, Gabrys, and Pritchard 2019; Powell 2018; van Zoonen et al. 2017). Walking in the physical environment can have an important role in grounding data as material, situated and embedded in everyday life practices (van Es and de Lange 2020). We propose that our immersive installation presents a similar potential, helping to recontextualize the abstract notion of datafication by bringing it closer to people's everyday urban realities.

Future Frictions fosters meaning making by rendering visible the effects of the drone on the environment and on the characters' experiences; in this way, the installation offers tangible evidence of what tend to be ephemeral datafication processes. The installation does not provide clear-cut answers or pre-defined controversies. Each of the three options presents the user with both positives and negatives. For instance, the fact that public authorities have access to the images recorded by the drone offers a feeling of safety to the teenage girl, but it results in undesired help for the elderly woman and thus a feeling of powerlessness. This ambiguity enables the user to reflect on their values and identify their own controversies as points where the control of technology impacts the imaginary boundaries preserving these values. Moreover, the workshop reinforced ambiguity through an agonistic element when participants changed roles and metaphorically stepped into the shoes of participants with opposing views via the Mural canvas. This process allowed the creation of a shared situation and a common baseline of knowledge (i.e., based on the shared experience of the installation) for participants coming from different backgrounds. In this first iteration, the digital canvas acted as a "meaningful interface" (de Lange 2019) helping to generate group discussions about emerging controversies around datafication and translating them into a shared matter of concern.

As for agency, *Future Frictions* allows participants to formulate their own concerns through collective interactions. While we developed the installation and an overall simple narrative, participants have the freedom to follow their own path, make sense of the technology proposed for debate, and articulate controversies arising from its use. Through this, stories emerge that become the basis for the postcards from the future. From this perspective, participation is not equated with how we as researchers tell *our* story or involve the user in an experiential journey through the speculative neighborhood. Participation emerges from the opportunities that *Future Frictions* affords for interactions and shared reflections through the postcards and the workshop canvas. This strategy is specifically developed to counterbalance power relations between the creator and the user and the

presumed increased participation in initiatives presenting data visualizations that frame the story in particular ways (Rettberg 2020; Söderström, Paasche, and Klauser 2014). The MAB workshop added a further dimension to the individual reflection by providing a space in the digital canvas for collective debate (an agonistic element) and acting on the outcome of the debate through making a collage using a collection of images. The collage represents the outcome of their group debate on the controversies raised by the installation, visibilizing an image of a future city that reflects the participants' diverse values, worries, and hopes. By creating conditions for collective reflection on the mediating roles of technology in the city (Verbeek 2015), the canvas materializes the potential for collective action.

Discussion: Widening Engagement in Shaping Urban Futures

This chapter has shown how *Future Frictions* as a frictional media architectural interface challenges singular visions of techno-oriented futures and serves to increase awareness, debate, and reflection. We analyzed how *Future Frictions* engaged people around otherwise abstract and intangible issues of datafication in today's cities and allowed participants to imagine alternative urban futures through *controversing* as the purposeful use of friction and contestation.

As a first reflection, the *controversing* framework centers on value plurality and controversies. This allows us to move beyond normative and prescriptive futuring techniques aimed at providing pre-defined images of urban futures (Oomen, Hoffman, and Hajer 2021). The goal of *Future Frictions* is to empower people to imagine, shape, and reflect on alternative futures by engaging with controversies. From a methodological perspective, the installation, as addressed in the context of the MAB workshop, offers an element of agonism through role-playing and aspects of critical making through the collage, which allows participants to act on the emerging controversies. Thus, participants do not gather around an externally formulated desirable future (e.g., Hajer and Pelzer 2018) but rather engage around multiple futures as an "issue" (Marres 2007). The web experience supports the participants in identifying their own values and controversial issues and becomes a means to collectively "make" an image of a desirable urban future. This future reflects their diverse values, which materialize in aspects of the city and urban life that they find important.

A second reflection relates to the role of critical and speculative design in making the future accessible. There is a need to widen the debate on our

socio-technical futures, and approaches like speculative design and critical making, together with media architectures as interfaces, offer meaningful and accessible entry points to achieve this. Although speculative design aims to spark debate and reflection by opening alternative futures, it is often perceived as elitist and distant from the realities of a wider audience (Forlano and Matthew 2014; Beattie et al. 2020; Kozubaev et al. 2020). By using accessible language and recognizable urban elements, *Future Frictions* speculates about provocative yet relatable urban futures that trigger reflections on the impacts of technology on everyday life, now and in the long term. Through speculation, *Future Frictions* brings to the surface social interactions and potential power relations that stakeholders may have in potential futures. This way, the installation raises questions not only about a specific technology but also about the socio-technical context in which it exists. These insights are in line with Wong et al. (2020), who acknowledge the potential of infrastructural speculations for civic engagement.

A third reflection relates to the relevance of making abstract phenomena like "controversies" and "datafication" tangible and accessible. Our experience with *Future Frictions* shows the value of material and embodied engagement in involving a wider audience in socio-technical controversies, even if it takes place in the digital realm. The installation supports communicating complex socio-technical theories in a way that allows for a more even relationship between researchers, citizens, and other stakeholders. By *controversing* through speculation, *Future Frictions* highlights the politics existing in smart cities, moving away from homogenous perspectives around technological impacts that focus on utopian or dystopian consequences. This fosters constructive ambiguity to enable participants to reflect on the values they consider important in the city, as well as challenging tacit assumptions to generate images of desired futures that bring together different perspectives. Combined, these three points make up the performative dimension of the *Future Frictions* installation in producing possible alternatives.

We acknowledge the limitations of the purely digital interactions and methods discussed in this paper. Yet we feel there is a need for critical and creative design methods that stimulate the imagination beyond externally formulated urban visions and toward a plurality of potential futures. Visualizing data in meaningful ways or even providing immersive experiences of desirable futures is not sufficient to challenge current practices. *Future Frictions* as presented here is no silver bullet. It brings together participants already willing to debate controversies and values together and to envision alternatives. Actual tenacious controversies rarely spawn from controlled environments. In a next iteration, we hope to bring *Future Frictions* into

public space to explore how tensions emerge as people reflect on technological impacts and express their values on the ground.

Despite its limitations, as a frictional interface, *Future Frictions* offers a glimpse into how media architectures could become mediators in processes of widening participation in imagining futures we desire for our cities. We hope our approach inspires other researchers to become attuned to frictions arising from the datafication of cities, study controversies through experimental and co-creative settings, and create the conditions for people to formulate their own issues, tensions, and values around new technologies and to use their imagination for speculative criticality. Ultimately, it is about challenging privileged positions in our collective imagination and "staying with the trouble" of having other actors at the table. Freeing collective imagination then becomes an act of social emancipation, which might be just the key to building more inclusive urban futures together.

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