

COMMENTARY



Curating disaster: a way to turn science into action in times of the Corona pandemic

Julius Kob

Department of Sociology, School of Social and Political Science, The University of Edinburgh, Edinburgh, UK

ABSTRACT

To cure Covid-19 on a medical, political, economic, and societal level, there is a need to 'curate' between science and politics in such a way that decision-makers and societies can address the practical requirements at hand. This commentary introduces and discusses 'curating' as a socio-material practice mediating between science and decision-making. It reflects on the current Covid-19 pandemic and compares 'curatorial' aspects here to the field of natural catastrophe risk finance. As both areas try to manage disasters, the space between scientific knowledge and economic and/or political decision-making becomes a particularly important node. By employing a focus on catastrophe simulation modelling, this essay looks at several issues of the natural catastrophe field that may yield ways to deal with epidemic crises such as the Covid-19 pandemic. This commentary suggests putting greater emphasis on (and encourages a research focus on) the 'curation' between science and politics to improve decision-making for socio-material disasters.

ARTICLE HISTORY

Received 30 April 2020
Accepted 29 May 2020

KEYWORDS

Covid-19; disasters; socio-material practice; curating; catastrophe modelling; knowledge

To cure Covid-19 on a medical, political, economic, and societal level, there is a need to 'curate' between science and politics in such a way that decision-makers and societies can address the practical requirements at hand. Although 'curating' as a term may be an esoteric choice, it very much addresses what seems to be needed in these times of crisis. By looking at examples from disaster risk markets, we can learn that adequate curation is essential for creating a bridge between science and decision-making. Especially in the world of scientific modelling, we need to put greater emphasis on appropriate curatorial practices for the current pandemic, and maybe even more so for the next one.

The term 'curating' is most commonly used in the world of art; however, it has also found application in the social sciences, especially in anthropology, sociology, media studies, and ethnology. Patrick Wilcken has likened Claude Lévi-Strauss's concept of 'bricolage' to what is today understood as curating: the bricoleur as curator is 'a tinkerer, an improviser working with what was to hand, cobbling together solutions to both practical and aesthetic problems' (Wilcken 2011, p. 249, Balzer 2015, p. 29). This practice of creative mediation between different objects and objectives to give meaning in specific or new contexts applies to numerous fields, even though it is most prominent in the art world. In an attempt to provoke a discussion about curating during the 2013 Art Basel Miami Beach Fair, the Canadian artist Bill Burns had a plane fly over the fair's neighbourhood, with a banner reading 'Hans Ulrich Obrist Hear Us' (Figure 1, Balzer 2013).

Obrist counts among the most acclaimed contemporary art curators and, although intended as mockery, this call for Obrist's attention might also be interpreted as a cry for help, a cry for intervention during an art fair that some have included at the top of the list among the 'eight worst things

CONTACT Julius Kob  julius.j.kob@gmx.de

This article was originally published with errors, which have now been corrected in the online version. Please see Correction (10.1080/17530350.2020.1804656)



Figure 1. Hans Ulrich Obrist Hear Us, 2013, Bill Burns. Courtesy of Bill Burns, <http://billburnsprojects.com>.

about the art world' (Doonan 2013), a mayhem 'devoid of gravitas and thematic order,' and a space where curators 'are conspicuously absent' (Balzer 2015, p. 14). Burns and his banner ambiguously pointed to the tension between the sometimes problematic power that curators have in the art world, on the one hand, and the need for curation as mediating between pieces of art and specific contexts, on the other. Simon Doonan has criticised the Art Basel Miami Beach as a space of investment-driven shopping that lacks conceptual and meaningful virtuosity; an arena where the wealthy and the flamboyant seek cultural legitimisation by 'trendy posing' and acquiring cultural trophies (Doonan 2013). Turning a fair into a meaningful and more virtuous exhibition by way of curatorial practice might assuage Doonan's despair, while highlighting the power, responsibility, and accountability of curators might address Burns' call for attention.

In times of the Covid-19 pandemic, with its epistemic as well as political turmoil, it seems that a certain focus on curating is also needed in this respect. Today's 'fair' of pandemic science appears at times confusing; it constitutes an ambiguous space where scientific legitimisation is sought by politics and politically induced pandemic decision-making. Much like with the Art Basel Miami Beach Fair, curatorial practice can provide a solution – a solution, which produces an exhibition space that responsibly contextualises and experiments with what is at hand, so as to mediate between the dynamics and peculiarities of science and its appropriation in pandemic decision-making. This

relationship between science and decision-making is characterised by struggles and power dynamics and, as Burns highlights for the art world, it is a relationship that requires debate about responsibility and accountability.

Giorgio Agamben recently (and repeatedly) commented on the management of the Covid-19 crisis, highlighting that even the Church made itself ‘the handmaid of science, which has now become the true religion of our time’ (Agamben 2020). The critically perceived ‘reign’ of science is nothing new, of course. The climate crisis and its deniers constitute only one (if not the most extreme) of many current examples where the societal, political, and economic roles of science have become both ambiguous and polarised. Yet, discourse and debate are fundamental democratic principles and, at least in the ideal case, also constitute core values of good science. The platform on which the climate crisis is being debated is geographically skewed towards the areas that dominate the global power dynamics; on a temporal level, it has expanded over decades, much to the dismay of those who advocate quick action and of those who already suffer from it.

So far, the Covid-19 pandemic has followed the geographical patterns of global power distribution in a similar manner, expanding along the gravitational pull of business and tourist travel and supply chains; although the peripheries of power are now also feeling the effects. On the temporal level, however, the pandemic has compressed decades into months and even weeks. The urgency to act, although at times also disputed (for example, by Brazil’s Bolsonaro), has gripped impressively large portions of the affected populations. On a practical level, the compressed time span highlights the problems of *ad hoc* research. Science has already been transformed by ever-increasing demands on the frequency and amount of output, famously criticised, for instance, by Isabelle Stengers in her plea for a ‘slow science’ (Stengers 2018). But at a time when science seems to have already been pushed to its extremes, in terms of both social focus and obedience, when it has already been subjected to various forms of political subordination, we need more than ever a curated space that assembles what science has to offer before it can be politically digested. Without a carefully curated exhibition of science, the essence of good academic work – that is, critical debate and transparency – becomes an irritating and impractical feature in this current ‘*ad hoc* science.’ Due to the current transformation and elevation of science, its generic features make it particularly difficult to derive policy from it; without adequate curation, science and decision-making are forced to square the circle of imminently consequential experimentation. This, however, is not necessarily a new phenomenon.

Curating in disaster markets

One area that has long blurred the boundaries between science and ‘real-world’ decision-making is the business of insurance and its specialist branch of catastrophe risk finance. While also engaged in pandemic risks, catastrophe risk markets mainly deal with natural catastrophes, such as hurricanes, earthquakes, floods, or wildfire disasters. In this sector, ‘catastrophe modelling’ has taken the lead when it comes to assessing the risks of low-probability high-severity events, such as Hurricane Sandy or the Tohoku earthquake and tsunami. The dominant specialists in this field are a relatively small number of analytics firms who have professionalised what Stephen Collier (2008) has called ‘acting out’ the most devastating forms of disasters in simulation models. Simulating and quantifying catastrophe before and as it happens has enabled – and partially even created – a whole financial services sector worth about \$625 billion (Aon 2020). This sector deals with significant parts of market societies’ most central risk management after they were initially wrecked in 1992 by Hurricane Andrew. Unlike the coronavirus, Hurricane Andrew spread, via overwhelming disaster loss claims, from the immediate, local victims to the global stage through the balance sheets of both regional and international (re)insurance firms, pushing many of them to the brink of (and some to actual) bankruptcy. Two of the major changes after Hurricane Andrew, which may be thought of as (re)insurance’s ‘coronavirus moment’, were the following: first, increased pressure to share more detailed exposure data (information on the objects at risk); and, second and most important, the advent of

catastrophe modelling practices, which have now become deeply integrated with disaster risk management.

In contemporary science, modelling is one of the primary ways to analyse complex problems. Modelling is not curation itself, but it involves some curatorial practices and, even more importantly, is subject to a larger curatorial context in terms of its application. From a practical viewpoint, curating, therefore, serves at least two purposes: First, the overall architecture of a model dealing with the complex interactions of different factors needs to be put together and managed. Much like pandemic models, catastrophe models employ a range of scientific disciplines to simulate disaster, among them meteorology, earthquake and civil engineering, climatology, hydrology, and computer science. In catastrophe modelling, each aspect of a specific disaster operates on submodules, often organisationally divided into separate specialist teams. Here curation comes into play, since the different submodules and specialist expertises need to be linked together in a sensible and calculated manner – in other words, in the form of a so-called ‘integrated calibration.’ For instance, for earthquakes the submodules include seismic ground motion, soil conditions, geographical localisation, structural building conditions and behaviour, potential damage and repair costs, liabilities accumulation at the portfolio level, and the capital reserves calculations of insuring companies. One may think of this calibration activity as an art exhibition. Many practical and material aspects need to be considered, such as the gallery rooms, the visitors’ paths, lighting, the spatial distribution of the artworks, loan agreements, logistics, funding, and so on.

The second function of curation in catastrophe risk markets is also practical in nature but on a political rather than a managerial level. Because catastrophe models are used in the market to assess and price disaster risks, it is central to consider the impact of model outputs and results in their applied usage. Since scientific devices are at play here as much as decision-making by individuals and organisations, this is a mixture of material and social dynamics: *curating is a socio-material practice*. And it is an important one, as experiences from the catastrophe risk markets can attest, for instance, with what has come to be known in the industry as the ‘Version 11’ incident at the beginning of the last decade. On the heels of a much longer-standing scientific debate, but mainly as a reaction to the devastating 2004 and 2005 North Atlantic hurricane seasons (which included Hurricane Katrina), the market-leading catastrophe modelling firm Risk Management Solutions (RMS) in 2011 introduced with its flagship Hurricane Model (RiskLink HWM Version 11) a different approach to simulating the frequency of hurricanes. Applying the so-called ‘near-term’ view, the firm decided to increase the likelihood of hurricane occurrence with respect to the currently higher sea surface temperatures in the Atlantic.

This decision’s structural impact on the market was significant; it was based on the socio-material context: competition-related considerations, structural and technical power dynamics, and scientific debate. There is a seasonality to the Atlantic Ocean’s temperatures, and the higher the sea surface temperature, the likelier the formation of hurricanes. Apart from climate change’s partial influence, there are decade-long phases during which the sea surface temperature is warmer than in other, colder phases, and these phases alternate within the so-called Atlantic Multidecadal Oscillation. In modelling, the question then is whether one should simulate hurricane risk based on both colder and warmer phases (the long-term view), or only on the basis of the current warmer phase (the short-term view). Calculations based on long-term views average out colder and warmer phases’ influence on hurricane formation, while calculation based on short-term views results in a higher frequency of hurricane formation in the model. Variations in the amplitude of the annual hurricane seasons have many more factors to consider, of which all modellers are most definitely aware, including those working at RMS. Yet, RMS decided to emphasise this specific aspect, not only taking sides in an ongoing scientific debate (cf. Mann and Emanuel 2006), but also using the legitimising power of science-based products (that is, actively moving according to newly developing scientific insights) as a core added-value and brand strategy to benefit its competitive position.

Moreover, as the overall market leader, RMS had grown accustomed to its epistemic power, founded on the fact that their clients and end-users cannot easily switch between model firms

due to technical systems' legacies, infrastructural determinants, and regulatory rules. After Version 11's roll-out, the projected losses (the main output of catastrophe models) skyrocketed by as much as 250 percent when compared to the previous version, mainly because of the change to a short-term view (Lotz and Schmieing 2012). From one day to next, hurricane risk was much higher, and the model users, (re)insurance firms and insurance-linked securities financial companies, had to adjust their capital requirements and their pricing to protect their firms' and their products' ratings. Ultimately, RMS had to walk back some of the aspects of the update, due to market pressure.

This incident magnified an already ongoing debate in the catastrophe risk sector: the question of how much science should reign over market decisions and dynamics. 'Science got too real', as one modelling executive involved in the Version 11 update told me during my research: 'We should have made sure that the end result is reasonable.' By 'reasonable' he meant not only scientifically reasonable but primarily reasonable for the environment for which the output presents consequences. *Good curation* was absent at a moment when it was critically needed, very much like today, when pandemic model outputs have enormous effects on how we respond to the actual spread of the coronavirus.

One may think of the process as putting together an art exhibition, but here the focus is less on the immediate material and managerial aspects and more on the overall task. What is the theme? Which audience is to be addressed? With which aesthetic discourse shall it engage? What will the critics say? What legacy will it produce? Hans Ulrich Obrist, the above-mentioned art curator, wrote that 'it isn't necessarily about showing good art to its best advantage. It's about making an exhibition that's really good' (Obrist 2014a). As much as this is the case for art, it is also true for curating for science and decision-making: Curating is about providing a reasonable overview of the information and the discussions at hand in order to serve a particular purpose. Art and science can be ends in themselves, but it is the curation that connects them to the world if they are to serve non-artists and non-scientists at all.

I do not suggest that the market or market mechanisms, as in the commercial catastrophe modelling case, should take on the role of the ultimate curator between science and decision-making. The market, with its specific economic power pressures and knowledge as a key competitive and proprietary asset, is not adept at bringing diverse voices and exhibits to the gallery of the ongoing pandemic. For example, transparency in catastrophe modelling, modelling firms' dominance, or the reluctance to share important exposure and loss data remain extremely problematic issues in this respect. Especially in the context of a global pandemic, then, 'the market' should not be the arena to which we turn for solutions. I should note here that many of today's art curators arguably are active servants or at least powerful participants of the (art) market, too. Yet, it is their practice of curating, a performance in itself, which I would like to highlight here as a vignette, rather than their actual impact on specific art markets with their very own peculiar power dynamics. What we can learn from the catastrophe world, however, is that adequate curation presents an essential requirement for creating a bridge between science and decision-making. Therefore, I suggest placing a greater emphasis on appropriate curating for the current pandemic and even more so for the next one.

Curators in pandemic times?

As complex phenomena and very similar to the case of natural catastrophes, pandemics are often researched and analysed in models. Likewise, various academic disciplines are involved, among them epidemiology, virology, behavioural science, mathematics, and computer science. Managerial and technical curation is necessary, either to calibrate and fit these different aspects together into one overall model, or to weigh the results of several specialised models against each other. Even more so, as we have witnessed over the past few months, a better political curation is needed as politics has struggled to derive action from epidemic models and the sciences surrounding it. The socio-material practice of curation is required on both managerial/technical and political levels so as to turn knowledge into action, but this process is a tedious task. Like in the art world, it is about bringing together

many moving parts: ‘curators must troubleshoot installation needs [...] carefully supervising the mounting of works based on detailed exhibition plans and the (often demanding and persnickety) requests of artists’ (Love quoted in Balzer 2015, p. 108, Love 2010).

Curating is about managing uncertainty, or rather managing *in vivo* experimenting, since outcomes are unknown, change, and are acted upon continuously. Outcomes have to be worked out with whatever is at hand. What is at hand, however, rarely ever involves straightforward solutions and, especially in science, is seldom cohesive. On the managerial and technical level of *ad hoc* science, the Imperial College London, for example, has repurposed an already developed influenza model for the coronavirus case (Ferguson *et al.* 2020). Similar to the case of catastrophe modelling’s so-called ‘exposure data’ (but for different reasons), data availability also poses an issue. In its pandemic model, the commercial modeller AIR Worldwide has, for instance, built in a whole set of assumptions to moderate the effects of under-reporting Covid-19 infection cases and deaths (AIR 2020). Recently, the *Financial Times* used excess mortality rates to indicate that in many countries and regions there were more deaths in addition to the officially reported Covid-19-related deaths, suggesting under-reporting or at least a heavy lag in compiling official numbers (Burn-Murdoch *et al.* 2020).¹ Initially, the Imperial College model did not use UK population data, as the disease had not yet spread widely in the country at that time; instead, it employed data from Italy, where structural conditions were different and needed to be moderated (Ford 2020). Metrics such as the very central fatality rate are aggregates of various factors such as comorbidity, age, or available health care resources (such as ventilators, ICU beds, and staff), which need to be weighed against each other (Koerth 2020).

The symptomaticity ratio (how many infected people show symptoms) nearly exclusively hinges on empirical data; thus, the choice of the data is even more consequential for certain models. The Imperial College’s modelling projected around two-thirds of the population (Ferguson *et al.* 2020), while the case of the cruise ship *Diamond Princess* assumed about 50 percent (Koerth 2020, Saey 2020). Another type of model involves so-called ‘event footprint modelling’ built from population, movement, and travel data, which of course also entails various technical assumptions and methods. Not yet peer-reviewed literature is also used (cf. AIR 2020, Klepac *et al.* 2020) and this highlights the strain on science’s otherwise common practices and due diligence. In general, models are run numerous times and their outputs are evaluated until re-analyses and expert opinions lead to an eventually calibrated version.

As in the catastrophe modelling case, this technical and managerial curating has consequences on a higher level. The second, and more political, form of curation draws on *in vivo* experimenting. This is because the action derived from the output feeds back into the conditions under which science has to work on real-time developments. All the different scientific outputs need to be transformed into a range of practical domains. As the curator Obrist said; it is after all about creating a good exhibition. Such an exhibition entails that ‘alterations and augmentations often occur mere seconds before the opening’ (Balzer 2015, p. 108). Curating here is not about tending to science as an end in itself, but about presenting it as an overall dynamic bricolage for a particular purpose. These days, one does not have to search hard to find science-based mediating and advisory bodies of governments. Yet, it seems that these bodies get caught up in the first form of curating and that they themselves are in need of the second form of curation. In contrast to catastrophe’s market, here it is rather the political arena that is forced to serve as curator, even though it does not appear to be equipped much better than the market to do so.

For example, Germany’s flagship institution, the Robert Koch Institute for Disease Control, has over the course of the past few months been joined by a range of other institutions and groups in the context of the science-political discourse. The Virology Department of the Berliner Charité and its chief scientist Christian Drosten, the Leopoldina National Academy of Sciences, or the Institute for Virology and HIV at Bonn University (headed by Hendrik Streeck) are among many such actors. Germany’s federal system produces a political landscape in which science is sometimes employed as a political vehicle for individual state interests; in other cases, science undermines its own

applicability by being too canonical and focusing on only a few specialist disciplines, while ignoring others. Although Germany seems to be managing the crisis relatively well in comparison to other states, there still appears to be missing a more concrete and concerted curatorial practice. Such practice would create a space, which allows for an inclusive scientific discourse that has not yet ingested the power dynamics of the public political and institutional political realm, while at the same time striving for transparency.

In the UK, especially the latter issue, transparency, has recently reared its head. The UK government's Scientific Advisory Group for Emergencies (SAGE) was established to serve something akin to a curatorial purpose amidst this real-time crisis and to manage *ad hoc* science. Set up as an *ad hoc* advisory group following the 2001 foot-and-mouth-disease epidemic in Britain, SAGE has been criticised recently especially for the undisclosed membership of persons involved, not only its scientific personnel, but also political figures (Landler and Castle 2020, Sample 2020). Additionally, there is an impression that SAGE is also dealing in technical and managerial curation and, in doing so, may espouse a much too one-sided focus on, for instance, epidemiology alone (Ford 2020). Furthermore, other epidemic models contradicted the ones used by SAGE (Cookson 2020, Harford 2020); therefore, the Group seems to be taking sides in both epistemic and power struggles within science as well as on the political stage. *Good curation*, however, can make the differences and contrasts visible and a part of the 'exhibition' itself, rather than hiding or dismissing them. It has become clear that the body's subgroups had indeed engaged in scientific debates across disciplines, but only within the Group itself and already considering political stake-holders (Freedman 2020, Landler and Castle 2020). More generally, SAGE's 'proponents claim this system has brought rigour to government decision-making that was sometimes absent in the past, mainly by separating science from politics' (Ford 2020). It is unclear to what extent this separation has in fact been accomplished, given the previous points. More importantly, it seems that the separation of science and politics lacks more active agency, in the sense that the focus should be less on simply separating and more on *actively curating* between these two realms.

Curation as a socio-material task

The curator plays a role that is neither innocent nor philistine. Curation has historically functioned to enable or at least serve as an accomplice of political propaganda. Sometimes, it has been criticised for preferring certain strains of artistic culture over others, or, as noted above, as serving commercialism in art markets. Still, its negative effects render curating no less important as a practice; rather, they highlight even more its political importance. Curating science for political decision-making presents an arena that will require much more attention in the months and years to come, for this pandemic and even more so for the next one. Whatever thorough scientific studies on the disease may uncover, curating between science and political decision-making needs to be a part of it. The social sciences – and particularly science and technology studies, organisational studies, sociology, and political science – appear to be best prepared to engage in this field, especially when we acknowledge what Koray Caliskan and Donald MacKenzie have recently suggested: “the social sciences are the only framework we have at our disposal for studying the condition of possibility for *all* sciences” (Caliskan and MacKenzie 2020). If we engage in research on curation of this kind, then the social sciences will need to acknowledge that underlying any aspect of this curatorial practice are the interactions of both humans and non-humans, such as artefacts, viruses, models, hurricanes, and so on. This is why curating in art as well as in science and decision-making is a socio-material task: It involves ‘granting formal and conceptual value’ (Balzer 2015, p. 40) to all things involved, with the ‘curator as a catalyst [... and] bridge builder’ (Obrist 2006).

As one can see, admittedly in a very simplified way, in the case of natural catastrophes and their markets, curating involves the bringing together of many social and material things – storms, soil conditions, calculation devices, financial balance sheets, power struggles, organisations and their structures, market dynamics, and much more – as well as acknowledging their interactional

power and consequences. *The degree of this very acknowledgement determines the level of curatorial success or failure.* Given that this very field has continuously battled with such issues for a relatively long period of time, there might be a few things to learn from catastrophe markets, its practices and problems. Epistemic power asymmetry, lack of transparency, selectiveness of scientific input, and access to important data are among the most crucial problems at the intersection of science and decision-making – much like several of the issues so crucial in the current situation. One provision that has developed in a somewhat limited space consists of regulatory model oversight and certification. Disaster models to be used for Florida need to undergo a review process by a state body, the Florida Commission on Hurricane Loss Projection Methodology (FCHLPM). Another, more market-based intervention can be found in the Oasis Loss Modelling Framework. Oasis is an industry-funded, not-for-profit platform that primarily tries to increase the number of modelling agents and approaches for users. It does so by designing and providing an organisational and technical space to form a bricolage of different models and thereby to bypass some of the technical, infrastructural, and legacy standards set up by the currently most dominant modelling firms. Yet another provision is the business model of Karen Clark & Company, which more proactively facilitates insight into the crucial and otherwise rather inaccessible assumptions and inner workings of their models.

Again, this is not to say that the all-prevailing market dynamics in this field constitute an even remotely ideal form of curation. Still, it is worth acknowledging this space, for two reasons. First, they all take into account that humans (such as market actors) and non-humans (such as wind and even the models themselves) are interacting with one another. This is something that seems to be lacking in the way in which we treat the coronavirus pandemic. Second, the different measures require multiple points of curation. Whether approaches such as those of the FCHLPM, Oasis, or Karen Clark & Company are effective curatorial arenas remains to be seen. Model certification requires considerable resources and, as Jessica Weinkle has noted, also includes a whole lot of ‘politics as usual’ in the background (Weinkle 2019). As an industry-led platform, while also quite involved with public research initiatives, Oasis has mainly brought down costs of modelling for commercial users; thus, it is important to judge goal-setting for its overall curatorial virtues. Of course, providing more transparent models as such does not mean that Karen Clark & Company are not market participants and, therefore, not exposed to commercial pressures. ‘We’re not open-source [...] we don’t make it easy for you to take stuff out of our model – we are building a company’, Karen Clark, the *grande dame* in the world of catastrophe modelling, has told me. These examples highlight that the curatorial struggle is real and, therefore, by no means unique to the Covid-19 pandemic; rather, it remains a problem in any kind of socio-material disaster.

As we humans are inherent to natural catastrophe – without us, ‘nature’ would not become disastrous – we are integral to the viral world, as Caliskan and MacKenzie remind us: ‘The Earth is not a passive stage [...] We need to also see that actors such as online platforms, cars, guns, computers and phones do things to us, the virus and the planet.’ (Caliskan and MacKenzie 2020). Curating a good exhibition, therefore, is a task that is inclusive rather than exclusive of *all* things involved and one that is borne by the socio-material ‘*practice* of connoisseurship, of thinking *and* arranging’ (Balzer 2015, p. 99; my emphasis). Creating a conversation around the things at hand is something we need to get better at, especially in times of disaster. As Obrist has written: ‘The very idea of an exhibition is that we live in a world with each other, in which it is possible to make arrangements, associations, connections and wordless gestures, and through this *mise en scène*, to speak.’ (Obrist 2014b, p. 33f). Let us find better ways to curate between science and decision-making so as to prepare ourselves better for the next pandemic and maybe even for what remains of this current one.

Note

1. Since submitting the revised version of this paper, the measure of excess deaths has become a widely used indicator of assumed additional, Covid-19-connected deaths. This change highlights the *in vivo* experimentation at play here.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Notes on contributor

Julius Kob is a PhD candidate at Edinburgh University and currently researches catastrophe risk finance and modelling, applying perspectives from sociology, social studies of finance, and science and technology studies to the field. He investigates modes of knowledge production and risk assessment practices and how they shape and are shaped by (re)insurance and capital markets. One of his central research questions concerns the extent to which developments in modelling and finance intersect with the actual socio-material environment of disasters, loss, and the increase in natural hazards in times of growing climate crisis. Julius has been a visiting fellow at the Center on Organizational Innovation, Columbia University, and at the Robert L. Heilbroner Center for Capitalism Studies, The New School. He holds MSc in economic sociology from the London School of Economics and a BA in sociology and psychology from the University of Hamburg.

References

- Agamben, G., 2020. A Question. *An und für sich*. Available from: <https://itself.blog/2020/04/15/giorgio-agamben-a-question/> [Accessed 28 April 2020].
- AIR, 2020. *Verisk COVID-19 Projection Tool: methods and assumptions*. 14 April. Boston, MA: AIR Worldwide Corporation.
- Aon, 2020. *Reinsurance market outlook*. Market report, January. New York: Aon Securities Inc. Available from: <http://thoughtleadership.aonbenfield.com/Documents/20200108-re-analytics-reinsurance-market-outlook-jan.pdf> [Accessed 11 May 2020].
- Balzer, D., 2013. *Miami by air: an interview with bill burns*. Available from: <https://canadianart.ca/interviews/bill-burns-miami-art-fair/> [Accessed 28 April 2020].
- Balzer, D., 2015. *Curationism: How curating took over the art world and everything else*. London: Pluto Press.
- Burn-Murdoch, J., Romei, V., and Giles, C., 2020. Global coronavirus death toll could be 60% higher than reported. *Financial Times*, 26 April. London. Available from: <https://www.ft.com/content/6bd88b7d-3386-4543-b2e9-0d5c6fac846c> [Accessed 28 April 2020].
- Caliskan, K., and MacKenzie, D., 2020. Of viruses and men. *Eurozine*. Available from: <https://www.eurozine.com/of-viruses-and-men/> [Accessed 28 April 2020].
- Collier, S.J., 2008. Enacting catastrophe: preparedness, insurance, budgetary rationalization. *Economy and Society*, 37 (2), 224–250.
- Cookson, C., 2020. Coronavirus may have infected half of UK population — Oxford study. *Financial Times*, 24 March. London. Available from: <https://www.ft.com/content/5ff6469a-6dd8-11ea-89df-41bea055720b> [Accessed 28 April 2020].
- Doonan, S., 2013. The eight worst things about the art world. *Slate Magazine*, 17 December. Available from: <https://slate.com/culture/2013/12/art-basel-why-im-not-going-hint-its-because-the-modern-art-world-is-the-worst.html> [Accessed 28 April 2020].
- Ferguson, N., et al., 2020. *Report 9: Impact of non-pharmaceutical interventions (NPIs) to reduce COVID19 mortality and healthcare demand*. 16 March. Imperial College London.
- Ford, J., 2020. The battle at the heart of British science over coronavirus. *Financial Times*, 15 April. Available from: <https://www.ft.com/content/1e390ac6-7e2c-11ea-8fdb-7ec06edeef84> [Accessed 28 April 2020].
- Freedman, L., 2020. The real reason the UK government pursued “herd immunity” – and why it was abandoned. *New Statesman*, 1 April. Available from: <https://www.newstatesman.com/politics/uk/2020/04/real-reason-uk-government-pursued-herd-immunity-and-why-it-was-abandoned> [Accessed 28 April 2020].
- Harford, T., 2020. Why it’s too tempting to believe the Oxford study on coronavirus. *Financial Times*, 27 March. London. Available from: <https://www.ft.com/content/14df8908-6f47-11ea-9bca-bf503995cd6f> [Accessed 28 April 2020].
- Klepac, P., et al., 2020. *Contacts in context: large-scale setting-specific social mixing matrices from the BBC Pandemic project*. Version 2.0, preprint, 5 March 2020. *Epidemiology*. doi:10.1101/2020.02.16.20023754.
- Koerth, M., 2020. Why it’s so freaking hard to make a good COVID-19 Model. *FiveThirtyEight*. Available from: <https://fivethirtyeight.com/features/why-its-so-freaking-hard-to-make-a-good-covid-19-model/> [Accessed 28 April 2020].
- Landler, M., and Castle, S., 2020. The secretive group guiding the U.K. on coronavirus. *The New York Times*, 23 April. Available from: <https://www.nytimes.com/2020/04/23/world/europe/uk-coronavirus-sage-secret.html> [Accessed 28 April 2020].
- Lotz, L., and Schmiesing, Z., 2012. Frequent changes to catastrophe models: The far-reaching impact. *Tower Watson: Emphasis*, 1, 26–29.

- Love, K., 2010. *Curational toolkit: a practical guide for curators*. Vancouver: 2010 Legacies Now. Available from: https://visualarts.net.au/media/uploads/files/Curatorial_Toolkit.pdf.
- Mann, M.E., and Emanuel, K.A., 2006. Atlantic hurricane trends linked to climate change. *Eos, Transactions American Geophysical Union*, 87 (24), 233–241.
- Obrist, H.U., 2006. Hans Ulrich Obrist: Interview. *Time Out London*. Available from: [//www.timeout.com/london/art/hans-ulrich-obrist-interview](http://www.timeout.com/london/art/hans-ulrich-obrist-interview) [Accessed 28 April 2020].
- Obrist, H.U., 2014a. Hans Ulrich Obrist: the art of curation. *The Guardian*, March 23. Available from: <https://www.theguardian.com/artanddesign/2014/mar/23/hans-ulrich-obrist-art-curator> [Accessed 28 April 2020].
- Obrist, H.U., 2014b. *Ways of curating*. London: Penguin UK.
- Saey, T.H., 2020. Cruise ship outbreak helps pin down how deadly the new coronavirus is. *Science News*. Available from: <https://www.sciencenews.org/article/coronavirus-outbreak-diamond-princess-cruise-ship-death-rate> [Accessed 28 April 2020].
- Sample, I., 2020. Who's who on secret scientific group advising UK government? *The Guardian*, April 24. London. Available from: <https://www.theguardian.com/world/2020/apr/24/coronavirus-whos-who-on-secret-scientific-group-advising-uk-government-sage> [Accessed 28 April 2020].
- Stengers, I., 2018. *Another science is possible: A Manifesto for slow science*. Newark: Polity Press.
- Weinkle, J., 2019. Experts, regulatory capture, and the “governor’s dilemma”: The politics of hurricane risk science and insurance. *Regulation and Governance*. doi:10.1111/rego.12255.
- Wilcken, P., 2011. *Claude lévi-Strauss: The Poet in the Laboratory*. London: Bloomsbury.