

# An enquiry into modes of non-existence

## Abstract

After the many symmetries (subject-object, truth-falsity, etc.) that STS has explored, one symmetry seems unaddressed: the symmetry of explaining non-existence from the same kind of causes as existence. A social-constructivist perspective that articulates the work required to bring about existence cannot uncritically take for granted that the absence of such work simply explains non-existence. Rather, some non-existences are just as much “made,” and these non-existences “could have been otherwise.” In this paper, I attempt to systematize this construction of non-existence under the notion of *stifling*. I first explore how the production of forms of non-existence has been thematized in scholarship in STS. I take non-things, non-knowledge, and non-people as the main classes to organize the arguments. I then propose a systematic approach to the ontological work performed through stifling and, notably, the consequences for what kind of futures this renders thinkable and unthinkable. Stifling then emerges as an important dynamic through which *modal power* is exercised and an indispensable element of ontological politics.

## Keywords

Non-existence, stifling, symmetry, non-things, non-persons, non-knowledge

## 1 Symmetry between existence and non-existence

Science and Technology Studies (STS) has, over decades, developed a constructivist approach to facts, devices, and social categories (Knorr Cetina 1995; Sismondo 1993). Science, technology, and innovation have been addressed as cultural phenomena where human action contributes to the course of affairs just as much as natural phenomena and material configurations do. Various senses in which things are constructed have been explored: the actual making of experiments in laboratories (Latour and Woolgar 1979; Knorr Cetina 1999), the production of categories in which humans think about their world (van Heur, Leydesdorff, and Wyatt 2013), the establishment of natural-scientific and other facts (Latour 1987; Collins 1983), all the work that goes into the making of technologies and technological networks (Callon 1986; Law 2002), and the construction of the objects that people do research (Knorr Cetina 1995, 2001) and politics (De Vries 2007; Marres 2007) on, to mention a few.

In this paper, I explore the counterpart of these constructions: all the work that is done to *prevent* things from reaching existence, truth, or stability. Where is all the obscuring, elimination, denial, undoing, and killing that contributes to the world we live in? I will subsume these actions under the notion of *stifling*, which will be elaborated further in section 2. Stifling serves as a heuristic to identify the counterparts of construction. If “construction” chiefly means construction of the existence of something, we would, in fact, need to pay similar attention to the construction and conditions of production and maintenance of non-existence. These conditions might be social or natural (leaving these categories unproblematized for a minute) in origin, and only by paying attention to them can we begin to glean the politics that possibly go into them.

Symmetries have been pivotal in exploring the various forms of construction (Sismondo 2010): symmetry between true and false claims (Bloor [1976] 1991), between subject and

object as well as between humans and non-humans (Latour 1993 (1991)), between technical (or natural) and social (Latour 2005), between ontology and epistemology (Woolgar and Lezaun 2013), and between observer and observed (Coopmans et al. 2014). Adopting such symmetries as methodological and heuristic principles is a necessary part of constructivist perspectives on the world: if we want to understand any state of affairs—whether we talk of things, factual claims, or social structures—as something that requires a lot of work to become stabilized, then the logical consequence is that the same must hold for any absence of stability, truth or social order. We cannot attribute “truth” to a factual state of affairs being revealed to us and “falsity” to unfortunate or even malignant human work (Bloor [1976] 1991). Instead, both must be explained from the same kind of causes, not least including human work. In this paper, I extend this symmetry toward absence, lapsing, termination, or, in short: all that relates to things moving *away* from existence and stability rather than toward them.

So what has STS made of this symmetry when considering construction and existence themselves? For example, in the realm of the devices central to Latour’s *Science in Action* (Latour 1987), it is a platitude for today’s STS scholars to read that devices require human work to function. But does a non-functioning device point to the absence of human work, to active sabotaging work, or yet something else? Scholarship in the social construction of technology (Bijker 1995) has stipulated that the fact that a device “works” must not be seen as a natural property of the device but as an achievement of sociotechnical ensembles. Similarly, a non-working device cannot be attributed to misunderstood physics only but must equally be seen as contingent on its sociotechnical ensemble. Still, that raises the question of *how* a sociotechnical ensemble achieves the non-working. The non-working or untruth of things has so far mostly been addressed as an absence of successful construction, as further reviewed in section 3. What seems to be missing is a further engagement with the ways in which the non-existence of things is produced or comes

about, and the social qualities of these productions or non-emergences. In the current argument, non-existence is, therefore, necessarily non-existence under a particular perspective. It is not so much an ultimate truth, but a messy and leaky affair that allows for *gradual* notions of existence.

One motivation to focus on construction, in general, is to articulate the politics it involves. Construction suggests multiple possible outcomes, even where only one prevails. The selection of the prevailing outcome involves negotiation and power dynamics, as well as possibly conflict, violence, hegemony, and injustice. It is in the foreclosure of alternative realities, and hence the foreclosure of *possible futures*, that the construction of non-existence becomes fundamentally political. This politics is ontological, as non-existences potentialities are inevitably part of ontologies: an understanding of reality necessarily implies an understanding of what *can or cannot* be part of reality, i.e. an account of how things could have been otherwise. In line with Turska and Ludwig (2023), I distinguish between first-order ontologies, i.e. claims about reality, and second-order ontology, i.e. the philosophical or anthropological study of how such claims are made and justified. Most of the claims in this paper are about first-order ontologies, which I hencewrite about in the plural, as their multiplicity is a natural consequence of approaching them as constructed.

In this article, I generalize from the various symmetries and approach the construction of existence itself symmetrically. Much constructed non-existence has been explored in STS, but mostly as a by-product of constructed existences. My main ambition here is to take stock and further thematize the construction of non-existence itself in center court. First, in section 2, I introduce the notion of *stifling* to capture all the work that produces non-existence. Then, in section 3, I review the literature in three primary themes roughly construed as the antonyms of STS's core research objects: non-things as the antonym of technologies, non-knowledge as the antonym of science, and non-people as the antonym of

social actors. From this vantage point, I identify excellent works in STS where authors have, in fact, attended to various sorts of non-existence: non-users, knowledge deficits and laity, black boxes as the non-existence of history, and invisible work performed by some people and erased from history by others, to mention only a few. This overview will inform a more comprehensive and normative stance in sections 4 and 5, which provide an agenda to articulate such themes in STS research.

## 2 Stifling as the onto-politics of non-existence

There are different ways by which non-existence comes about. This is perhaps best exemplified by considering the nuclear fusion reactor and the perpetuum mobile, each of which are non-existent, but in very different ways.<sup>1</sup> The use of nuclear fusion reactors as a source of utilizable power is currently non-existent. Yet, there is nothing in the current state of knowledge in modern physics that would make such a reactor fundamentally impossible. It is conceivable. Actual research achievements continually keep the prospect alive, even though it has so far remained more of a future promise than a shortly expected achievement. Utilizable nuclear fusion is very different from the perpetuum mobile. The latter does not exist either. Yet, not only is it not here today, it is also unthinkable that it will become a reality at any point in the future. It is impossible within modern physics' basic theories of energy and the laws of thermodynamics. Accepting the possibility of a perpetuum mobile would require revising or rejecting an unacceptably large corpus of modern physical knowledge. Thus, while it makes sense to think of an alternative reality where nuclear fusion may emerge in the future, we cannot think of an alternative reality with a perpetuum mobile in a way that makes sense in view of current understandings in physics.

---

<sup>1</sup> The following is not a very strict empirical example tied to concrete actors but rather an abstraction to show the kind of ontological tools needed to make sense of non-existence.

While the distinction between these two different forms of non-existence appears as a dichotomy, it seems safer to assume this list of two is not exhaustive of all possible forms of non-existence and the conditions that define it. Also, the fact that some things are possible yet non-existent raises exactly the fundamental question of this paper: if it is possible, then why is it not there, and what makes it not there? And conversely, if it is impossible, then why is it impossible, and what makes it impossible? Impossibilities are crucial parts of ontologies, and keeping them in place is ontological work.

Variants of non-existence have appeared in the STS literature. As will follow, sometimes non-existence takes the form of mere silencing or rendering irrelevant. In other cases, something is actually destroyed and removed from the face of the planet. In yet other cases, it is about rendering something fundamentally impossible, thus defusing any attempt to bring it about, even if it is, in principle, thinkable and meaningful. What I am interested in is the work that goes into keeping things from realization and placing them into specific modes of non-existence. The constructivist gaze of STS has pointed toward the non-trivialness of both existence and (first and second-order) ontologies, and symmetry demands that we ask such constructive questions about forms of non-existence.

To some extent, the whole project of STS has been to critically approach existence in terms of those things that do not happen to be the case; in short, the “otherwise” in the dictum of “it could be otherwise” (among others Woolgar and Lezaun 2013). This entails that we talk of both the process through which non-existence is achieved and the result of that process. I use *stifling* for the process, and *non-existence* for the outcome (which is, as said, a perspectival attribute, not a realist claim). Both the process and the result are crucial to our understanding of reality.

Even though I discuss a range of constructions of non-existences, it is efficient to use a single term to capture them collectively. In the following, I will, therefore, use the single

verb of *stifling* to refer to the production of invisibility, irrelevance, silence, unthinkability, and other forms of non-existence. As a metaphor, the word *stifling* suffices precisely because of its comprehensive meaning. One of its meanings is to kill by withholding oxygen, which is a literal way of making something or somebody stop existing. Another meaning is to suppress something, especially in the sense of silencing: stifling a burst of laughter or a sneeze. In its symbolic meaning, stifling is done to anything that is not allowed or not empowered to unfold: to stifle initiatives or to stifle debate. People may also see themselves as stifled by bureaucracy, meaning that all their agency is eliminated. Stifling is done to something that should not exist according to a particular normative framework, and so stifling is rooted in such frameworks and dependent on their relative power.

The word *stifling* is thus broad and unsubstantial enough to capture the diverse dynamics discussed in this article, while the various meanings of *stifling* are sufficiently coherent to guide our thinking through non-existence as a constructed category. Thus, the concept primarily serves as a heuristic to direct attention toward relations and interactions that are somehow conducive to non-existences of sorts. It is not meant to be a part of a theory that has explanatory power but rather a meta-theoretical pointer toward something that social theories should aspire to accommodate. Accordingly, it points to the work done *on* ontologies and to the ways ontologies evolve in social situations, more than itself being a concept of any importance within first-order ontologies. It is thus a second-order ontological concept in the sense explained above. In the next section, I will explore how the ontological work of *stifling* appears in existing STS scholarship or can be discerned between the lines.

### 3 Modes of non-existence

The constructions of non-existence appear across STS scholarship, be it often as a by-catch of other arguments. Rather than attempting a systematic classification, I take a heuristic

approach, starting from the main objects of STS: things, facts, and social actors. These together provide an arguably broad collection of inroads into thinking through non-existence.

### 3.1 Non-things

Latour's (1996) *Aramis or the love of technology* provides one example of a thing that fails to come into being. Latour describes all the sociotechnical interactions aimed at producing Aramis, an envisioned autonomous and individualized public transport system in the Paris region. The failure of Aramis to come to fruition is the consequence of adding ever more requirements and constraints to the system, ultimately leading to insurmountable tensions. While Latour's overall diagnosis is that Aramis failed because it was loved too much and hence insufficiently protected against all the wishes it could not fulfill, we could read this in the current analysis as the right sort of construction work failing to be done. Thus, this seems to be the first level of constructing non-existence: just not constructing existence. No evil genius is present in the analysis of Aramis; construction just did not happen in the envisioned ways.<sup>2</sup>

A step further is the active prevention of something from emerging. In her *Politics of Invisibility*, Kuchinskaya (2014) points to the work of articulation needed for radioactive fallout from the Chernobyl accident to become observable and noticeable. Importantly, she points to the work of articulation that is deliberately *not* done, such that the radiation and its consequences remain invisible in places where they would matter. On the one hand, this establishes a deficit model of articulation: the unknownness of things becomes a deficit of articulation work, much like with the failed construction of Aramis. The difference is that

---

<sup>2</sup> An argument could be made that Aramis did see the light of day and hence existed in some form, just not in the way it was envisioned. I am at this point not interested in conclusively settling whether Aramis existed, but rather *in the ways in which it has failed* to exist and how these failed ways have unfolded into forms of non-existence.

here, the non-construction is deliberate rather than an unfortunate consequence. Thus, the analysis highlights the silencing of “things” that might destabilize hegemony and vested interests. It is a hegemony that produces this invisibility, and the invisibility, in turn, serves hegemony.

The relation between the existence of something and the non-existence of many other things might be more substantive than a mere play of words. For example, the notion of the *absent present* denotes the possibility of entities existing in one reality but not another (Law 2004), and where the presence of one entity is dependent on the absence of others (Law and Singleton 2005; Leonelli, Rappert, and Davies 2016). A straightforward example is health being understood and enacted as the absence of disease. This is not just a definitional question but a dependency inside the first-order ontology that is constructed here. Paradoxically, the absence is intertwined with presence: the conditions are such that an absent entity exists in a way that is independent of what is made present. Dalibert (2015) explores this further. Pain makes our body more present to our perception; it takes the body out of relative absence, which Dalibert refers to as producing an “absent absence.” In her study, technology is then used to restore the relative absence of the body. This study points to stifling being complex work and continuous with activities of un-stifling. The *fire object* presented by Law and Singleton (2005) pushes this idea even further. Law and Singleton conceive of a fire object as an object that is utterly unstable in its existence and which, by its emergence and disappearance, continually creates difference. In its instability and messiness, the concept thematizes exactly a critique of *actor-network theory*, which arguably takes the stability and existence of the actants in its networks too much for granted as a starting point for analysis. The fire object, in contrast, offers one way to think about hybridity between existence and non-existence. Driving this point back to the central question I started from, the fire object adds further conceptual nuance to whether the

construction of not-something is or is not the same as the non-construction (or destruction) of something, . There can also be an unruliness of things to fit either category. Things may resist being either constructed or destructed—metaphorically equal to the difficulty of extinguishing a bushfire. There are things that not only will not let themselves be stifled but that will actually fight back violently, against any attempts at stifling.

An interesting further example is provided by M'charek, Toom, and Jong (2020), who show how several taxonomies of human beings that each are not racialized, such as the geographic origin or psychological typification of a suspect, together produce a classification scheme that is de facto racialized. While each of the underlying schemes appears to stifle categorization by race, the outcome is rather the contrary. In an attempt to deny certain categories from existence, they emerge in other conceptual and ontological spaces. In the metaphor of the fire object, this is the oil fire that runs out of control after attempts at extinguishing it with water. M'charek et al. argue that the impossibility of stifling race is due to the pervasiveness of the very categories in institutionalized preferences (see Hansen, Parker, and Netherland 2020 for a similar example). Similarly, Lennon (2020) argues that attempts at building climate justice along non-racial lines often fail to confront racial grief and, in consequence, reproduce this grief instead of resolving it. Thus, in specific cases, failure to stifle racist structures makes those structures even more present elsewhere. In these cases, reality resists stifling, which is not to deny that this reality itself might very well be human-made.

This exploration into the stifling of things shows, first, that stifling work can clearly be discerned. However, it also shows that categories of existence and non-existence are fluid, which provides a handle to thinking of the boundary between them as one where power and politics are exercised. Also, things may, in fact, sometimes show too much hardness to have themselves stifled.

### 3.2 Non-knowledge

The construction of scientific knowledge (Collins 1983; Latour 1987) has been a central concern throughout the history of STS. Just as constructivist approaches to things did not deny material reality, so did constructivist approaches to scientific knowledge not primarily intend to relativize scientific knowledge as just another opinion (Lynch 2020; Sismondo 2017). Yet, this work does open the door to considering how (non-)knowledge could be otherwise.

*Agnotology*, or theories of non-knowledge and ignorance, have centered knowledge that is literally done away as their object of analysis (Proctor and Schiebinger 2008). This active production of non-knowledge seems to come in two forms. One is the form where parties work hard to destabilize certain facts. A primary example is the tobacco industry's attempt to cast doubt on any causal relationship between smoking and lung cancer. Proctor (2012) explains how, among many other actions from the tobacco industry, a tobacco propaganda film in 1972 caused the number of people who agreed that "cigarette smoking causes lung cancer" to decline from 74.9 to 57.1 percent. As Proctor reviews, evidence of the causal relation between smoking and lung cancer had been mounting in the first half of the 20<sup>th</sup> century, and this public knowledge was, in a way, done away with by the film.

Another form is where parties render themselves unknowing, and even proudly so, in order to evade certain responsibilities or push certain policies despite evidence of their inefficacy. In such cases, ignorance is, in fact, a facilitating asset rather than the impediment it is often taken to be (McGoey 2012). Prime examples include countless acts of silencing and even institutionally gagging expertise under the Trump administration. In the early days of Donald Trump's presidency, orders were issued in an attempt to restrict and control statements made by state experts (Restuccia, Guillén and Cook 2017; Volcovici 2017). Scientists across the world feared that false information would be put out and the public

would be left confused (Devlin 2017). In these examples, the act of constructing non-knowledge is conducted by the subjects themselves, who benefit from not knowing. It is not that they are themselves stifled, but rather that they stifle others' knowledge by displacing its circulation.

In yet another form, the actual production of knowledge itself can also be hampered. An example is McGoey's (2016) analysis of star economist Thomas Piketty's work. While discussing the (self-reinforcing) consequences of resource inequalities between the rich and the poor, Piketty fails to address the problem of *rent-seeking*, which is defined as the acquisition of profit through the manipulation of political and legal structures rather than any actual contribution to the production of economic surplus. This blind spot is a consequence of how the field of economics has ignored the issue of rent-seeking because mainstream economics has no place for it in its theories. Thus, the field has failed to produce data on it. These blind spots ultimately lead to Piketty inadvertently obstructing the interventions that he actually aims to promote. This example shows that the construction of a certain ignorance might emerge from systemic conditions, not necessarily from human intellects with a pre-conceived agenda.

The fact that hampering knowledge production, as one form of stifling knowledge, can arise from unforeseen systemic effects is not to deny that it can also be a result of deliberate action or a consequence of entrenched social injustices. The conditions for knowing can, for example, be compromised by systematically barring people from education, or through biases in national research agendas that serve some parties better than others. Or it might emerge as a consequence of the knower curtailing their own knowledge so as to comply with what suppressive social structures demand of them (Dotson 2011). Under the notion of *epistemic justice* (Fricker 2007), much of this will be discussed further in section 5.

Whether deliberate or not, the construction of knowledge in general involves important moments of stifling. This is not unlike the potentiality that is eliminated through the process of becoming, as we saw in the discussion of non-things above. One such moment of stifling occurs in scientific practice's efforts to establish objectivity. This construction of objectivity necessitates doing away with human, subject-engendered work, which is accomplished by mechanized methods and pursuing the demonstrability of phenomena independently of the experimenter (Daston and Galison 2007, 1992). A similar abolishment of human work is what happens at the moment of closure in scientific controversies (Collins 1981a, 1981b): facts get to stand on their own, and they are no longer susceptible to human interpretation and hence are no longer the object of epistemic work. This epistemic work is stifled, which de facto makes the knowledge-making subject invisible, as well as the subjective contamination resulting from the knowledge-making process.

It is not only human work that is stifled in knowledge production. Alternative knowledge is also sometimes actively stifled. Collins (1981) shows that establishing the (non)existence of high-flux gravitational waves was a matter of experiments wherein neither the experimental confirmations nor the experimental refutations were watertight. Aware of this, the refuting scientists leveraged further critique of the confirming work rather than, as one may expect, making their own experiments more immune to criticism. Thus, much of the work done to make scientific facts true is actually the work of making competing facts less credible or even untrue.

In a broader sense, this stifling of alternative views happens in dynamics that follow the *deficit model of public knowledge*, which reckons the knowledge of the general public lower in quality and extension than the knowledge of experts and policymakers and mobilizes this idea as an explanation for public attitudes. A clear and recent example was how some governments have wrongly yet persistently assumed that their appeal to scientific expertise

in the abatement of the COVID-19 pandemic would grant the acceptability and acceptance of policy (Prettner et al. 2021). Quite the contrary turned out to be the case, and skepticism and defiance toward policies as well as vaccines were rampant in many countries. Apart from the many reasons to question scientific expertise during the pandemic, it is clear that championing scientific expertise as a means to stifle defiant arguments from the public failed.

This deficit model has indeed long been refuted and mostly served as an anti-position for research into how expertise and laity are constantly negotiated and produced (Wynne 1991). However, pointing out that this knowledge deficit among the public is a mere construct does not take away the fact that it is indeed continually performed in an attempt to stifle unruly publics.

Another way knowledge is constructed as somehow being non-existent is by labeling it *tacit*, as opposed to those knowledges that are codified, spoken, or written. In its early conceptualization, Polanyi (1958, 1966) used the notion of tacit knowledge to articulate all the cognitive effort people make before explaining them in language and that this ability itself builds on tacit skills. Collins and Evans (2007) have identified that the act of rendering knowledge tacit is used as a legitimation for scientists to rule their own practice, as they are the only ones capable of understanding these tacit components of their practice. However, classifying knowledge as tacit is not a neutral move. This may happen as an act of exercising power and suppression, for example, as when colonial powers render traditional Indigenous crafts as tacit knowledge and inferior to modern, Western systems of knowledge validation. The stifling of knowledge along these lines is no less than suppression on behalf of science (Visvanathan 2009), and it stands in the way of knowledge owners actually claiming their ownership. These mechanisms span a field of forms of stifling that consist of silencing knowledge, silencing or eliminating the knowers, or both. These

different forms of non-knowledge altogether make us aware that it should be critically appraised when things appear unthinkable; this might be more politics than an indisputable given.

### 3.3 Non-people

Human invisibilities have been a theme throughout social sciences (see for example Herzog 2017 for an overview, tracing discursive mechanisms of exclusion back to Foucault and communicative ones to Habermas and Luhmann). While the ultimate stifling of a human being is, of course, homicide, important 'softer' forms of stifling exist as exclusion from society, withholding the means to self-respect or development of a sense of self, and exclusion from participation in the governance and collective construction of the life world, for example through participation in politics or processes of innovation. The resulting forms of nonexistence are not so much physical death but rather absences from sites that matter.

In a sociotechnical analysis, Kim (2018) describes how the algorithms that govern social media, such as Twitter, render some people more visible and others less so on questionable grounds. Specifically, she shows how white feminism gets exposure while non-white feminism does not. Further, critiques of white feminism as harmful to non-white feminist causes does not get exposure. Large numbers of trans, women of color, and black feminists are thus made invisible, and some white feminists even go as far as calling these critiques "side conversations hurting the 'actual' work that feminism needs to do" (p. 323). The comparably low attention the critique gets then starts to work as a legitimation in the hands of white feminists to argue why non-white feminists should, for example, receive lower funding.

In another analysis, Dafydd Jones (2012) discusses the social worlds of Muslims in the rural UK. Minorities in this setting are visible and invisible in rather different ways than happens, for example, in urban settings. As a consequence of how premises are owned and

deployed, the visibility of Muslim identities at the street level is much lower in this rural setting than in urban ones. At the same time, the activities developed by the Muslim communities in question, despite being comparably invisible, seem to invite a stronger engagement from the community members. Thus, the sites become highly visible to relevant eyes in other ways. Yet, the communities' invisibility stands in the way for newcomers to find their way into the communities. The study thus shows how visibility is not a binary but a complex negotiation where visibilities and invisibilities are mobilized strategically. Dafydd Jones' notion of *subterranean* provides a handle to discuss practices that are at once existent and known, as well as hidden from plain sight.

Rendering people and groups invisible is a matter not of distinct individual actions but of collective practices, and the invisible or invisibilized subjects might themselves play a deliberate role in it. Self-induced stifling may, in fact, be a strategy for survival or escaping control (Smith et al. 2015; Kim 2018). However, the arguable positive aspects of invisibility are positive only in the light of existing schemes of inequity. In Dafydd Jones (2012), Muslims in the English countryside thrive with their strategic subterraneity, but it leaves one wondering why invisibility is necessary in the first place. In such a case, there is a reason to critically assess the violent structures that necessitate subterraneity for survival.

Another example is the historical stifling of women and the female body in the corpus of medical science. Much of medical research, even today, is grafted on the male body. As Nowogrodzki (2017) discusses, medicine-related adverse events occur significantly more often in women than in men. Also, several drugs have been withdrawn from the market as a consequence of side effects that occur predominantly in women. The effects had been missed in pre-market research where women were heavily underrepresented in. When women are recruited as test subjects, it is often only at a late stage of the medical research pipeline, so-called Phase-III research. Underlying causes include the sexist assumption that

the female body is governed by hormonal shifts, making it too unruly for research—an assumption that is plainly untrue, as the male body is just as much governed by hormones and shows just as much variability, both intra and inter person, on all its parameters. This assumption is topped up with plain laziness among researchers to make an inclusive effort—it is just too convenient to do only males, both human and animal. This is not only dangerous for individual women who potentially receive unfit medicines as a result, but it is also a hazard for science at large to miss out on important research findings (Nowogrodzki 2017). Thus, the stifling of women as research subjects leads to the literal stifling of women as human beings.

The last class of non-people to discuss here are non-users. Non-users have been identified as the residual class of users that often somehow circulate in innovation processes. As Wyatt (2003) points out, non-use and non-users are often positioned as deficient in policy parlance. Things such as the internet, the car-based motorway, or any other modern technology are considered conveniences that we “should” enjoy. Non-use is then seen as a matter of inequality and deprivation. Some policies should be put in place to help people become users. However, such a framing overlooks that perfectly legitimate and voluntary choices may underlie such non-use. Also, the framing effectively provides an uncritical reproduction of the promises of technology and the capitalist relations of its production. This non-use is an interesting addition to the inventory so far: while most previous modes of non-existence took the form of something that is actually there being stifled, the current example is of the form where something is indeed not there, but this non-existence is problematized, disapproved, or shamed. In a way, the absence is articulated and made visible. As a complement to the notion of stifling, it is the very non-existence itself that comes about only as a performance and is then positioned as a deficit.

This exploration of the stifling of human beings shows an important nuance compared to the categories of non-things and non-knowledge. Once the acting subject as such becomes part of the equation, it becomes all the more clear that the verb stifling is appropriately chosen: it can be done to someone, someone can do it to something or someone else, or someone can do it *to themselves*.

## 4 Much ado about nothing

Different modes of non-existence and ways of stifling differ conceptually and have different consequences. It is now time to provide an inventory of these acts of stifling that bring about non-existence. The first clarification needed is that each form of stifling comprises a particular way of relating to both potentiality and reality and the realization of potentialities. Hence, each has particular implications for the first-order ontology at stake. Stifling is an intervention in both reality and ontology, and is thus implicated in the politics and power relations of both. Yet as Lee (2023) points out, producing non-existence is not, by definition, an act of heavy power use. It might also be a coincidence of contingent factors such as gradients of inclusion and attention. Thus, stifling needs to be studied as an empirical question.

In constructing absence in material reality, various stifling moves have been observed. Things can be destroyed in any obvious way. Things can fail to be constructed, as with Aramis. Things can be denied, hidden, and concealed, as with the radioactive fallout in the post-Chornobyl episode. Things can be ignored, as with the absence of the female body in medical research practice, even though it is safe to assume that this “ignoring” is at some points not so involuntary or unintentional and, in fact, closer to the “denial” mode. Things can be hidden from sight and forced into oblivion. These absences are not non-existences in a strict realist sense. But they do correspond to a reduced presence, and ultimately non-existence, in the ontological fabric of life worlds.

Constructing the absence of knowledge also takes different forms. Here, stifling is chiefly discursive. Hegemony is, at its core, the construction and perpetuation of unspeakabilities. The rendering of ideas as madness has been thematized since Foucault's *Orders of Discourse* (Foucault 1971, 9). Ideas can be worked off the charts by rendering them incredible (Collins 1981). Knowledge can be regarded as meaningless because it does not meet dominant validation criteria, as with the deficit model of public knowledge (Wynne 1991). Finally, ideas can be made to drown amid overwhelming other presences, like how the sugar industry attempted to hide the health effects of sugar consumption by sponsoring research into the health effects of fat consumption (Kearns, Schmidt, and Glantz 2016). These non-existent knowledges are deeply unstable: things are known by some and not others, and active work is needed to keep the latter ignorant. "Unknowns"—in *scare quotes* because they are also "known" in other senses—are mobilized to secure resources and evade responsibility (McGoey 2012). These actions directly manipulate people's ontologies while at the same time being part of the realities that these ontologies describe.

Concerning people, in some respects the constructed non-existences are similar to the mechanisms underlying the non-existences of things and knowledges: people are rendered away by other people. The two constructions that set humans apart are those of non-users and chosen subterraneity. Constructing non-users is a way of exerting power over individuals that does not seem to make sense to things and knowledge, as the latter cannot be "shamed" and subjected to social power in the way humans can. The mechanism of chosen subterraneity is the only one where the stifling subject and the stifled object are the same. However, there is, of course, a larger social reality that necessitates the stifling independently of any desire for it in the stifler-stifled. Similar to knowledge and things, the resulting non-existence of the people in question is not non-existence in a realist sense but non-existence in the sense that there is a social reality where these people's existence goes unrecognized and their interests undefended.

The title of this paper is an obvious allusion to Bruno Latour's *An Enquiry into Modes of Existence* (2013). Latour identifies many modes of existence, such as science, fiction, religion, and law, which cannot be reduced to one another. Latour's motivation for building this edifice of modes of existence is that these modes together make up *the social* (De Vries 2017, 175; Latour 2013, 307). All modes make their specific contributions to the fabric of society. My point here is that the social is also importantly shaped by the non-existences that are part of it, or that are *made* part of it. They are enshrined in and enacted through our ontologies. Insofar as these are discussed in *Enquiry*, they only appear as failures-of-existence (p. 184 and p. 208), much like Aramis failed to come into (its particular, envisioned form of) existence because crucial work was not performed. I propose that non-existences are given their place on the spectrum of ontological negotiations. As the ontologies resulting from these negotiations constrain our ways of knowing futures and their (im)possibilities, the importance of non-existences cannot be overestimated.

A final stipulation is due here. The text so far may raise the suggestion of some residual realism that follows from the multiplicity of ontologies. While some ontologies may reckon a certain thing exists and other ontologies may not, it is only at the level of these ontologies that construction can be articulated by the keen observer, not at the actual existence of things. However, the point of this paper is not so much that existence and non-existence are relative to our actions. Rather, the point is that existence and non-existence are the extreme categories of what is, in fact, a gradient of degrees of existence and which are applied to reality by conducting a lot of work. We risk building a single-sided presentation of this work if we only focus on the construction of existence.

All this is only a rudimentary beginning of what could be an empirical program of studying non-existence. What empirical clues might we find of something being stifled, i.e., what are its traces? How can we unearth these traces and follow them? How can we take

responsibility for the non-existences we produce? These questions will receive different answers in different research situations, and it is a matter of experimenting with what works when. In some cases, destructive action will be clearly visible and can be traced. In other cases, speculative ideas of what could have been need to be taken as leads into the empirical material. The forms of stifling mentioned here, of non-things, non-knowledge, and non-people, provide a first indication of where we might start searching.

## 5 The politics of stifling and STS's responsibility for an open future

Stifling is about eliminating things from reality, at least in a certain perspective. This changes the distribution of power, and it is, at its core, a political act. This entails the possibility for injustice to emerge, as we must assume that in any imperfect society, power is likely to reproduce itself. Yet, this is not to say that counteracting stifling by making things visible is always and unequivocally a good and emancipatory thing. Making visible is a potentially violent act, just as is making invisible. The political content of stifling goes well beyond merely making invisible and withholding recognition. Stifling is political insofar as it makes an ontological difference with binding effects on the common world people build. This ontological difference resides both at the first-order and second-order levels. Fraser (2006) points out, with reference to both Latour and Alfred N. Whitehead, that the ethics of world-making is not only in how we make the world but also in positioning *what is possible*, where the process of becoming is understood to come at the cost of driving out alternative potentialities. Therefore, processes of stifling are essential to ontological politics (Mol 1999) or experimental ontology (Marres 2013). That such ontological differences are part of real-life politics is beyond question, as the notion of *prefigurative politics* thematizes (Törnberg 2021; Boggs 1977): how the future is made present in political decision-making is

importantly a question of how the fictional is demarcated from the possible and thinkable, and the more things resemble fiction, the harder they are to address in politics.

As ontologies constrain the conceivability of alternative realities, stifling obscures ways in which things could have been otherwise. Hence, stifling is not only a political action in and of itself, but it is also, in a way, meta-political: by moving things out of ontologies, it also moves them out of political space.

Isabelle Stengers has called attention to the distinction between the possible and the probable (Debaise and Stengers [2016] 2017; Stengers 2011b, 2011a). Basing our thinking about futures on what is probable is to mistake the status quo and the statistics (and ontologies) that describe it for the possibilities that inhabit the future. Stengers calls for *speculative philosophy* in the spirit of Whitehead's pragmatic philosophy. The main tenet is to let the thinking be limited only by what we know, not by what we think we can know. This exercise of thinking through futures has been central in Future Studies as well. There, the notion of plausibility has received particular attention (Fischer and Dannenberg 2021; Ramírez and Selin 2014; Urueña 2019), the overall argument being that plausibility serves as a device to select which futures are worth considering and which are not. Also, plausibility does not boil down to a singular meaning but may move between more or less objective ideas of the possibility of occurrence and coherence of the account and more intersubjective aspects, such as the credibility of the speaker (Fischer and Dannenberg 2021). Yet, as Urueña (2019) argues, the point of Future Studies is not to predict those futures but to open them up and to reflect upon how we think about them. The current argument holds that such opening-up is subject to stifling and the hegemonic frameworks that support it, and thus, such hegemonies need to be confronted to achieve a more open way of thinking through futures. The current approach answers this call by further critiquing how the things we do not know are actually made to be unknown. A focus on

stifling helps speculative approaches gain clout against scientific epistemologies that would disavow any speculation.

Stifling is thus where modal power is exercised: the power to determine what actors cognitively and affectively reckon plausible and desirable and ultimately what they reckon possible and thinkable (Fuller 2018; Urueña 2022a). This modal power brings stifling into the realm of what Miranda Fricker (2007) has termed *epistemic injustice*. Epistemic injustice is the case when people are deprived of the possibility to act as a knowledgeable person—either by denying them the possibility to speak up—testimonial injustice—or by robbing them of the cognitive means to make sense of a social situation—hermeneutic injustice. Stifling people’s accounts is potentially a direct form of testimonial injustice. And unjustly driving possibilities out of ontologies might amount to hermeneutic injustice.

If STS manages to engage better with those things that are expelled from ontologies and takes on this second-order ontological work in how it treats first-order ontologies, it can begin to take responsibility for open futures and repoliticize how possible futures are prioritized. This repoliticization is by no means an easy task. Stifling, like construction, is a muddle, not a clearing. Its counteraction is just as muddy, and actors, their tools, their aims, and their potentialities are constantly unstable.

Thus, a general approach to taking responsibility for non-existence would first consist of articulating the mechanisms that bring about the non-existence in question. Second, it would require some form of critical emancipation: if there is reason to question the justice of the stifling, it may somehow be reverted. And finally, it is vital to remain aware that consensus is essentially the silencing of alternatives. Following Mouffe (2000, 2005, 2007), cultivating pluralism, disunity, and contestation would be central to keeping things unsilenced. As Urueña (2022b, 2022a) points out, STS is itself implicated in opening up and

closing down possible futures and, therefore, should take responsibility for articulating and correcting the distribution of modal power.

STS scholars have delivered greatly on articulating the construction work that underlies existing realities. This paper has sketched the contours of extending this constructivist analysis to the opposite of existence itself, namely non-existence. Treating non-existence as constructed through the same means and actions as existence, in a general way, is an extension of the general social-scientific responsibility to assume the perspective of subordinate parties and scrutinize the structures they are subordinated in (Gusterson 1997). Explaining non-existences by reference to the same types of causes as existence is vital to avoid writing a Whig history of existence, where the latter would offer the sole criteria for judging non-existences. STS needs to take responsibility for the ontologies it stages and, by extension, for the ontologies that it allows to fade out of scope.

## Competing interests

None to declare

## Author biography

Govert Valkenburg is a research professor of STS at the Norwegian University of Science and Technology NTNU. His research interest has spanned various empirical fields including energy, infrastructures, security, medical research practices, and innovation systems. The role of knowledge and its justice and politics have been a central concern throughout.

## Acknowledgements

I express my sincere gratitude to Helen Jøsok Gansmo, Vivek S. Oak, Annapurna Mamidipudi, Maja Urbanczyk, Daniela Sant'Ana, Wiebe Bijker, and the 3CIRAN community as well as Circle 2 Cybioses of the Nordic Summer University for their input to earlier stages

of this paper. I am also greatly indebted to the editors and reviewers of ST&HV for their constructive feedback and patience over several cycles of revision.

## Funding information

Funding: Research Council of Norway, grant number 302091

## References

- Bijker, Wiebe E. 1995. *Of bicycles, bakelites, and bulbs: Toward a theory of sociotechnical change*. Cambridge MA: MIT Press.
- Bloor, David. [1976] 1991. *Knowledge and social imagery*. 2 ed. *The University of Chicago Press*. Chicago and London.
- Boggs, Carl. 1977. "Marxism, Prefigurative Communism, and the Problem of Workers' Control." *Radical America* 11 (6): 99-122. <https://libcom.org/library/marxism-prefigurative-communism-problem-workers-control-carl-boggs>.
- Callon, Michel. 1986. "Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of Saint Brieuc Bay." In *Power, Action and Belief: A New Sociology of Knowledge?*, edited by John Law, 196–233. London: Routledge and Kegan Paul.
- Collins, Harry M. 1981. "Son of Seven Sexes: The Social Destruction of a Physical Phenomenon." *Social Studies of Science* 11 (1): 33-62.
- . 1983. "The sociology of scientific knowledge: studies of contemporary science." *Annual Review of Sociology* 9 (1): 265–285.
- Collins, Harry M., and Robert Evans. 2007. *Rethinking Expertise*. Chicago: University of Chicago Press.
- Coopmans, Cateljine, Janet Vertesi, Michael E Lynch, and Steve Woolgar. 2014. *Representation in scientific practice revisited*. MIT Press.
- Dafydd Jones, Rhys. 2012. "Negotiating Absence and Presence: Rural Muslims and 'Subterranean' Sacred Spaces." *Space and Polity* 16 (3): 335-350. <https://doi.org/10.1080/13562576.2012.733572>.
- Dalibert, Lucie. 2015. "Living with Spinal Cord Stimulation." *Science, Technology, & Human Values* 41 (4): 635-659. <https://doi.org/10.1177/0162243915617833>.
- Daston, Lorraine, and Peter Galison. 1992. "The Image of Objectivity." *Representations* (40): 81–128.
- . 2007. *Objectivity*. Brooklyn: Zone Books.
- De Vries, Gerard. 2007. "What is Political in Sub-politics?: How Aristotle Might Help STS." *Social Studies of Science* 37 (5): 781–809.
- . 2017. *Bruno Latour. Key Contemporary Thinkers*. Cambridge, UK: Polity Press.
- Debaise, Didier, and Isabelle Stengers. 2017 (2016). "The insistence of possibles: towards speculative pragmatism." *PARSE* (7).
- Devlin, Hannah. 2017. "'Draconian' Trump gag on scientists could affect legislation, experts warn." *The Guardian*. <https://www.theguardian.com/us-news/2017/feb/16/science-advisers-climate-change-trump-gag-rule-john-holdren>.
- Dotson, Kristie. 2011. "Tracking Epistemic Violence, Tracking Practices of Silencing."
- Fischer, Nele, and Sascha Dannenberg. 2021. "The social construction of futures." *Futures* 129. <https://doi.org/10.1016/j.futures.2021.102729>.
- Foucault, Michel. 1971. "Orders of discourse." *Social Science Information* 10 (2): 7–30. <https://doi.org/10.1177/053901847101000201>. <http://ssi.sagepub.com/content/10/2/7.short>.
- Fraser, Mariam. 2006. "The ethics of reality and virtual reality: Latour, facts and values." *History of the Human Sciences* 19 (2): 45–72. <https://doi.org/10.1177/0952695106065128>.
- Fricker, Miranda. 2007. *Epistemic injustice. Power and the ethics of knowing*. Oxford: Oxford University Press.
- Fuller, Steve. 2018. *Post truth. Knowledge as a Power Game*. London: Anthem Press.
- Gusterson, Hugh. 1997. "Studying Up Revisited." *Political and Legal Anthropology Review* 20 (1): 114-119.
- Hansen, Helena, Caroline Parker, and Jules Netherland. 2020. "Race as a Ghost Variable in (White) Opioid Research." *Science, Technology, & Human Values* 45 (5): 848-876. <https://doi.org/10.1177/0162243920912812>.
- Herzog, Benno. 2017. "Invisibilization and Silencing as an Ethical and Sociological Challenge." *Social Epistemology* 32 (1): 13–23. <https://doi.org/10.1080/02691728.2017.1383529>.

- Kearns, Cristin E., Laura A. Schmidt, and Stanton A. Glantz. 2016. "Sugar Industry and Coronary Heart Disease Research." *JAMA Internal Medicine* 176 (11). <https://doi.org/10.1001/jamainternmed.2016.5394>.
- Kim, Eunsong. 2018. "The Politics of Visibility." In *Disrupting the Digital Humanities*, edited by Dorothy Kim and Jesse Stommel. Punctum Books.
- Knorr Cetina, Karin. 1995. "Laboratory Studies: The Cultural Approach to the Study of Science." In *Handbook of Science and Technology Studies*, edited by Sheila Jasanoff, Gerald Markle, James Peterson and Trevor Pinch, 140–166. Thousand Oaks, CA: SAGE.
- . 1999. *Epistemic cultures: How the sciences make knowledge*. Cambridge, Massachusetts: Harvard University Press.
- . 2001. "Objectual practice." In *The Practice Turn in Contemporary Theory*, edited by Theodore R. Schatzki, Karin Knorr Cetina and Eike Von Savigny, 175–188. London: Routledge.
- Kuchinskaya, Olga. 2014. *The politics of invisibility. Public knowledge about radiation health effects after Chernobyl. Infrastructures Series*. Cambridge, MA: The MIT Press.
- Latour, Bruno. 1987. *Science in action: how to follow scientists and engineers through society*. Cambridge MA: Harvard University Press.
- . 1993 (1991). *We have never been modern*. Translated by Harvester Wheatsheaf. Cambridge MA: Harvard University Press. *Nous n'avons jamais été modernes: Essais d'anthropologie symétrique, 1991*, Éditions La Découverte, Paris.
- . 1996. *Aramis or the love of technology*. Translated by Catherine Porter. Cambridge, MA: Harvard University Press. *Aramis, ou l'amour des techniques*; Paris: Editions La Découverte, 1993.
- . 2005. *Reassembling the social - An introduction to actor-network-theory*. Oxford University Press.
- . 2013. *An Inquiry into Modes of Existence. An Anthropology of the Moderns*. Cambridge, MA / London, UK: Harvard University Press.
- Latour, Bruno, and Steve Woolgar. 1979. "Laboratory life: The social construction of scientific facts." *Beverly Hills: Sage*.
- Law, John. 2002. *Aircraft Stories. Decentering the Object in Technoscience*. Edited by Barbara Herrnstein Smith and E. Roy Weintraub. *Science and Cultural Theory*. Durham and London: Duke University Press.
- . 2004. *After Method. Mess in social science research*. London, New York: Routledge.
- Law, John, and Vicky Singleton. 2005. "Object Lessons." *Organization* 12 (3): 331–355. <https://doi.org/10.1177/1350508405051270>.
- Lee, Francis. 2023. "Ontological overflows and the politics of absence: Zika, disease surveillance, and mosquitos." *Science as Culture*: 1-26. <https://doi.org/10.1080/09505431.2023.2291046>.
- Lennon, Myles. 2020. "Postcarbon Amnesia: Toward a Recognition of Racial Grief in Renewable Energy Futures." *Science, Technology, & Human Values* 45 (5): 934-962. <https://doi.org/10.1177/0162243919900556>.
- Leonelli, Sabina, Brian Rappert, and Gail Davies. 2016. "Data Shadows." *Science, Technology, & Human Values* 42 (2): 191-202. <https://doi.org/10.1177/0162243916687039>.
- Lynch, Michael. 2020. "We Have Never Been Anti-Science: Reflections on Science Wars and Post-Truth." *Engaging Science, Technology, and Society* 6: 49-57. <https://doi.org/10.17351/ests2020.309>.
- M'charek, Amade, Victor Toom, and Lisette Jong. 2020. "The Trouble with Race in Forensic Identification." *Science, Technology, & Human Values* 45 (5): 804–828. <https://doi.org/10.1177/0162243919899467>.
- Marres, Noortje. 2007. "The Issues Deserve More Credit: Pragmatist Contributions to the Study of Public Involvement in Controversy." *Social Studies of Science* 37 (5): 759–780.
- . 2013. "Why political ontology must be experimentalized: On eco-show homes as devices of participation." *Social Studies of Science* 43 (3): 417–443. <https://doi.org/10.1177/0306312712475255>.
- McGoey, Linsey. 2012. "The logic of strategic ignorance." *Br J Sociol* 63 (3): 553-76. <https://doi.org/10.1111/j.1468-4446.2012.01424.x>. <https://www.ncbi.nlm.nih.gov/pubmed/22950467>.
- . 2016. "The Elusive Rentier Rich." *Science, Technology, & Human Values* 42 (2): 257-279. <https://doi.org/10.1177/0162243916682598>.
- Mol, Annemarie. 1999. "Ontological politics. A word and some questions." *The Sociological Review* 47 (S1): 74–89.
- Mouffe, Chantal. 2000. *Deliberative democracy or agonistic pluralism*. Vienna: Institut für Höhere Studien (IHS).
- . 2005. *On the political. Thinking in Action*. London: Routledge.
- . 2007. "Artistic agonism and agonistic spaces."
- Nowogrodzki, Anna. 2017. "Inequality in medicine." *Nature* 550: S18-S19.
- Polanyi, Michael. 1958. *Personal Knowledge*. London: Routledge Kegan Paul.
- . 1966. *The tacit dimension*. Chicago: The University of Chicago Press.
- Prettner, Robert, Hedwig te Molder, Maarten A. Hajer, and Rens Vliegthart. 2021. "Staging Expertise in Times of COVID-19: An Analysis of the Science-Policy-Society Interface in the Dutch "Intelligent Lockdown"." *Frontiers in Communication* 6. <https://doi.org/10.3389/fcomm.2021.668862>.
- Proctor, Robert N. 2012. "The history of the discovery of the cigarette-lung cancer link: evidentiary traditions, corporate denial, global toll." *Tob Control* 21 (2): 87-91. <https://doi.org/10.1136/tobaccocontrol-2011-050338>. <https://www.ncbi.nlm.nih.gov/pubmed/22345227>.

- Proctor, Robert N., and Londa Schiebinger. 2008. *Agnology: The Making and Unmaking of Ignorance*. Stanford: Stanford University Press.
- Ramírez, Rafael, and Cynthia Selin. 2014. "Plausibility and probability in scenario planning." *Foresight* 16 (1): 54-74. <https://doi.org/10.1108/fs-08-2012-0061>.
- Restuccia, Andrew, Alex Guillén, and Nancy Cook. 2017. "Information lockdown hits Trump's federal agencies." *Politico*, 24 January 2017. <https://www.politico.com/story/2017/01/federal-agencies-trump-information-lockdown-234122>.
- Sismondo, Sergio. 1993. "Some Social Constructions." *Social Studies of Science* 23 (3): 515-553.
- . 2010. *An introduction to science and technology studies*. 2nd ed. Chichester: Wiley-Blackwell.
- . 2017. "Post-truth?" *Social Studies of Science* 47 (1): 3-6. <https://doi.org/10.1177/0306312717692076>. <https://www.ncbi.nlm.nih.gov/pubmed/28195024>.
- Smith, Warren, Matthew Higgins, George Kokkinidis, and Martin Parker. 2015. "Becoming invisible: The ethics and politics of imperceptibility." *Culture and Organization* 24 (1): 54-73. <https://doi.org/10.1080/14759551.2015.1110584>.
- Stengers, Isabelle. 2011a. "'Another science is possible!' A plea for slow science."
- . 2011b. *Thinking with Whitehead. A Free and Wild Creation of Concepts*.
- Törnberg, Anton. 2021. "Prefigurative politics and social change: a typology drawing on transition studies." *Distinktion: Journal of Social Theory* 22 (1): 83-107. <https://doi.org/10.1080/1600910x.2020.1856161>.
- Turska, J. J., and D. Ludwig. 2023. "Back by popular demand, ontology: Productive tensions between anthropological and philosophical approaches to ontology." *Synthese* 202 (2): 39. <https://doi.org/10.1007/s11229-023-04243-x>. <https://www.ncbi.nlm.nih.gov/pubmed/37485247>.
- Urueña, Sergio. 2019. "Understanding 'plausibility': A relational approach to the anticipatory heuristics of future scenarios." *Futures* 111: 15-25. <https://doi.org/10.1016/j.futures.2019.05.002>.
- . 2022a. "Anticipation and modal power: Opening up and closing down the momentum of sociotechnical systems." *Soc Stud Sci*: 3063127221111469. <https://doi.org/10.1177/03063127221111469>. <https://www.ncbi.nlm.nih.gov/pubmed/35934971>.
- . 2022b. "Responsibility through Anticipation? The 'Future Talk' and the Quest for Plausibility in the Governance of Emerging Technologies." *NanoEthics* 15 (3): 271-302. <https://doi.org/10.1007/s11569-021-00408-5>.
- van Heur, Bas, Loet Leydesdorff, and Sally Wyatt. 2013. "Turning to Ontology in STS? Turning to STS through 'Ontology'." *Social Studies of Science* 43 (3): 341-362. <https://doi.org/10.1177/0306312712458144>. <http://sss.sagepub.com/content/early/2012/10/12/0306312712458144.abstract>.
- Visvanathan, Shiv. 2009. The search for cognitive justice.
- Volvovici, Valerie. 2017. "Trump administration tells EPA to cut climate page from website: sources." *Reuters*, 25 January 2017. <https://www.reuters.com/article/business/environment/trump-administration-tells-epa-to-cut-climate-page-from-website-sources-idUSKBN15906F/>.
- Woolgar, S., and J. Lezaun. 2013. "The wrong bin bag: A turn to ontology in science and technology studies?" *Social Studies of Science* 43 (3): 321-340. <https://doi.org/10.1177/0306312713488820>.
- Wyatt, Sally. 2003. "Non-Users Also Matter: The Construction of Users and Non-Users of the Internet." In *How users matter. The co-construction of users and technology*, edited by N. Oudshoorn and T. Pinch, 67-79. Cambridge, MA: The MIT Press.
- Wynne, Brian. 1991. "Knowledges in context." *Science, Technology, & Human Values* 16 (1): 111-121.