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The politics of care in technoscience

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Abstract

Care is a slippery word. Any attempt to define it will be exceeded by its multivocality in everyday and scholarly use. In its enactment, care is both necessary to the fabric of biological and social existence and notorious for the problems that it raises when it is defined, legislated, measured, and evaluated. What care looks and feels like is both context-specific and perspective-dependent. Yet, this elusiveness does not mean that it lacks importance. In our engagements with the worlds that we study, construct, and inhabit, we cannot but care: care is an essential part of being a researcher and a citizen. To properly invite you into this Special Issue, then, we need to say something about what we mean when we write about care.

Keywords

care, care practices, critical care, feminist technoscience, politics

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context-specific and perspective-dependent. Yet, this elusiveness does not mean that it lacks importance. In our engagements with the worlds that we study, construct, and inhabit, we cannot but care: care is an essential part of being a researcher and a citizen. To properly invite you into this Special Issue, then, we need to say something about what we mean when we write about care.

This Special Issue is an outcome of a scholarly workshop – 'The Politics of Care in Technoscience' – that we, the three authors of this introduction, co-organized at York University, Toronto, in April 2012. Our stated goal was 'to examine [the] topologies, entanglements, and ambivalences of a feminist politics of care'. The impetus for the workshop was, most proximally, an invitation from Maria Puig de la Bellacasa (2011) in an earlier volume of this journal to *think with care in Science and Technology Studies* (STS). Our preliminary definition of what care might mean, then, comes from her proposal that care 'signifies: an affective state, a material vital doing, and an ethico-political obligation' (Puig de la Bellacasa, 2011: 90). While care-ful feelings, doings, and obligations could loosely characterize the topics that came up during the workshop, in this volume we seek to make more targeted contributions to the flourishing discourse around care in STS (see, for example, Fortun, 2014; Friese, 2013; López Gómez et al., 2014; Mol, 2008; Mol et al., 2010; Müller and Kenney, 2014).

By foregrounding 'politics' in our title and call for papers, we have taken a guided approach to the myriad of ways in which we might configure theories and enactments of care. Where Annemarie Mol et al. (2010) are attentive to tinkering practices and technologies as a way into theorizing care, our lens privileges themes of power in specific on-the-ground sites of care that entangle both humans and more-than-human others. Explicitly invoking pioneer feminist STS scholar Susan Leigh Star to help us examine sites of care in technoscience, our call for papers asked, '*cui bono*?' (Star, 1991: 43). Thinking with Star, we wanted to understand not only who benefits and who does not in the entangled relations of technoscience, but also to imagine how technoscience might be 'otherwise' (p. 38). Puig de la Bellacasa's (2011) work helped us see that Star's question of *cui bono* was an invitation to ask not just 'for whom?' but also '"Who cares?" "What for?" "Why do 'we' care?", and mostly, "How to care?"' (p. 96). Our intent, reflected in discussions over the course of the workshop and in these curated papers, was to move back and forth between two layers of care: that which we, as STS scholars, teachers, and feminists enact in *our relations with* the worlds we study, and that which *circulates among the actors* in the technoscientific worlds we encounter through our studies. While the line between these layers is always blurry, one could organize the five pieces that follow into those that foreground the reflexive dimension of care among STS researchers (Atkinson-Graham et al., 2015; Schrader, 2015; Viseu, 2015) and those more concerned with specific enactments or appropriations of care in distinct field sites (Murphy, 2015; Puig de la Bellacasa, 2015).

The sampling of papers in this issue represents a small slice of the conference materials and of the empirical worlds that we encountered in our discussions. Without explicitly bracketing them, we were cognizant of expanding the scope of theorizing care beyond sites like health care and domestic labor, while gathering up these more traditional modes of affective engagement and embodied labor to deepen how we think about care in other sites. Because of the ever-inventive incursions of

STS research into far-reaching places, we ended up with a remarkable variety of worlds to think with, including the inhuman voids of quantum field theory (Barad, 2012a, 2012b); contexts of altruism and care in stem cell donation (Thompson, 2012, 2013);[1] flows of leachate in garbage dumps (Hird, 2012, 2013); robots, drones, and action at a distance in war zones (Suchman, 2012, 2015); advocacy efforts around the criminalization of HIV (Mykhalovskiy, 2012, in press); the tribulations of medical ethicists in courtrooms (Code, 2015); technologies for documenting patient experience in breast cancer clinics (Burfoot, 2012); the delivery of health through 'e-care' in remote Aboriginal communities in Canada (Adelson, 2012); and a feminist intervention into neo-Darwinian accounts of plant/insect ecologies (Hustak and Myers, 2012).

One emergent theme from the workshop – and perhaps a novel contribution to broader conversations about care in STS – is care's darker side: its lack of innocence and the violence committed in its name. We started with an urge to explore care as an analytic, a knowledge-making practice, and to examine its potential as a relational feminist ethic for STS research. In the process of our deliberations, we encountered the fraught politics of care, which foreclosed a romantic or laudatory treatment of the theme. The essays in this Special Issue speak to this complexity, showing how acts of care are always embroiled in complex politics. Care is a selective mode of attention: it circumscribes and cherishes some things, lives, or phenomena as its objects. In the process, it excludes others. Practices of care are always shot through with asymmetrical power relations: who has the power to care? Who has the power to define what counts as care and how it should be administered? Care can render a receiver powerless or otherwise limit their power. It can set up conditions of indebtedness or obligation. It can also sediment these asymmetries by putting recipients in situations where they cannot reciprocate. Care organizes, classifies, and disciplines bodies. Colonial regimes show us precisely how care can become a means of governance. It is in this sense that care makes palpable how justice for some can easily become injustice for others.

How then do we grapple with and 'unsettle' easy assumptions about care (Murphy, 2015)? Our response is in line with the approach of the authors included in this volume: we offer situated critiques of care and its politics. Foucault (2007) wrote that critique is 'the art of not being governed quite so much' (p. 45). Likewise, the four essays and the commentary included here share a commitment to remaining critical and attentive to the situated workings of care in the world. Approaching the politics of care in very different ways and from distinct vantage points, each takes up questions about the practices of care in sites not traditionally associated with care, including a university classroom, soil sciences and agricultural fields, the history of feminist health activism, and government-funded research ethics initiatives. The commentary that closes this volume (Atkinson-Graham et al., 2015), co-authored by five emerging scholars who took part in the 2012 workshop, offers a perspective on care in STS research from other sites, including interviews in integrative oncology clinics and translational medicine laboratories, insights into urban ecologies gained from the reorienting perspective of paddling in a canoe, enactments of care in the context of graduate student mentorship, and care practices in collaborative research on gendered lives in science. Before introducing the papers individually, we provide some theoretical context for thinking with care. We then conclude

the introduction with a modest intervention that aims to reconfigure care as a critical practice articulated within a feminist ethic of response-ability.

Genealogies of care in STS

Historically, care has been relegated to the realm of women – mothers caring for children, nurses for the sick, wives for the house, and the list goes on. It is no surprise then that care has long been part of the vocabulary and toolbox of a range of feminist theories. In the early 1980s, psychological theorist Carol Gilligan (1982) drew attention to the ways in which prevailing 'universal' standards of moral development (Kohlberg, 1981) rendered girls and women as more ethically immature than their male counterparts. Gilligan heard in her female subjects 'a different voice' attuned to relational well-being ('care') rather than abstract rule-following ('justice'); moreover, these moral styles could not be correctly placed on a hierarchical continuum. While often troubling the essentializing tendencies of Gilligan's early work, those taking up her notion of 'an ethic of care'[2] drew attention to the ways in which care was feminized, devalued, overlooked, or rendered invisible by materially and morally privileging mind over body, public over private, reason over emotion, and waged labor over unpaid care work – that long and all-too-familiar list of intersecting and highly gendered dichotomies. Later studies began to recognize deeper stratifications in care work, including, for instance, its profoundly racialized and classed dimensions (Collins, 1990). Contemporaneous works in science studies aimed at recovering the contributions of neglected actors such as women scientists (e.g. Abir-Am and Outram, 1987; Keller, 1985; Rossiter, 1984) or the 'invisible technicians' (Shapin, 1989) who made epistemically significant contributions to science by caring for 'big men of science' as well as their instruments, their specimens, and their data (Cooper, 2008; De Chadarevian, 2002; Pycior et al., 1996).

Far from simply recovering and honoring all this care work, while leaving it ancillary to 'real' justice or 'real' science, this feminist ethics of care has underscored the absolute necessity – and therefore value – of relational care work to survival, to politics, and, we would add, to knowledge (see also Code, 1987). It is not just that care helps things get done, but that more or better or different care could be generative of better survival, politics, and knowledge:

> The ethics of care starts from the recognition that care is a moral practice, a disposition, a daily need, and a way of living. In opposition to individualism and neo-liberalism it acknowledges vulnerability, interconnectedness, dependency, embodiment and finitude as basic characteristics of human life. (Sevenhuijsen, n.d.)

Care, in other words, is both a valuable and necessary part of living with and alongside others. We note that while care practices may be more likely to come 'from below' (Haraway, 1988; Harding, 1986, 2008), this is itself the effect of historically contingent (racialized, gendered, and classed) arrangements of power and privilege, and part of our goal here is to explore how these arrangements of care and power might be otherwise. With this brief primer in feminist scholarship on care, we turn to its uneasy career in STS.

In her widely cited article, Puig de la Bellacasa (2011) presents a sustained and eloquent case for reconsidering Bruno Latour's (2004) conception of 'matters of concern' as 'matters of care'. Latour's provocation was itself a variation on STS' familiar engagement with 'matters of fact' (Shapin and Schaffer, 1985), a concept coined to denaturalize the staged accomplishments of experimental science. Latour's concern was that scholars in STS had become so adept at demonstrating the constructedness of 'matters of fact' that they had thoroughly dismantled the achievements of technoscience. Latour's move to 'matters of concern' shifts attention to the heterogeneous 'gatherings' that hold matters of fact together. With Latour (2004) and Isabelle Stengers (2010), Puig de la Bellacasa (2011) imagines a constructive rather than destructive political valence for STS research, one that 'assembles' rather than disarticulates relations:

> The purpose of showing how things are constructed is not to dismantle things, nor undermine the reality of matters of fact with critical suspicion about the powerful (human) interests they might reflect and convey. Instead, to exhibit the concerns that attach and hold together matters of fact is to enrich and affirm their reality by adding further articulations. (p. 89)

While Latour and Puig de la Bellacasa are both concerned about the corrosive effects of criticism, the latter is worried that to eulogize critique – which has allegedly 'run out of steam' – is to participate in the ongoing neglect of marginalized and excluded subjects, both human and non-human. 'In the context of a troubled and strongly stratified world', Puig de la Bellacasa (2011) asks, 'do we not still need critical approaches to play a role in the assembling of concerns?' (p. 89). One of the critical approaches she advocates is an attention to care. Concern, like care, is an affectively charged sensibility characterized by worry, attentiveness, and thoughtfulness. More than a state of mind or an analytic frame, however, Puig de la Bellacasa asserts that care is active: it is a practice, an enactment, a doing (see also Barad, 2007; Mol, 2002). For better or worse, care is part of what engages practitioners in their worlds. An attention to care in STS acknowledges forms of attachment, commitments, and the 'ethico-political obligations' that take shape in research contexts (Puig de la Bellacasa, 2011: 90). The turn to 'matters of care' invites attention not only to how care operates in sociotechnical contexts, but also to the roles that we play in our studies of technoscience and our accountabilities to the worlds that we co-construct.

Matters of concern and matters of care belong to a 21st-century trajectory in STS, sometimes called 'the engaged program' (Sismondo, 2008). This approach grapples with the fruits of constructivist labor after several generations of its life in the academy as well as its modest and sometimes mutated incursions into popular culture. Some in STS worry that the subtleties of our work are lost, or worse, that work is conscripted as anti-science in facile applications aimed to bolster fringe viewpoints on hot-bed issues like climate change, intelligent design, or the vaccine wars (Latour, 2004; Lynch, 2006). Others (e.g. Bijker, 2003; Sismondo, 2008; Stevens, 2008; Webster, 2007) aspire to a more politically relevant role for STS scholarship. Indeed, in 2014, the Society for Social Studies of Science launched a new initiative to highlight these kinds of interventions, posing the question, 'How do STS researchers participate in "making and doing" politics and science?'[3] Importantly, what today gets called 'engaged STS' has a robust

genealogy in early activist science studies (reviewed in Sismondo, 2008) and interventions that took shape, for example, in the work of Marxist and feminist scientists who participated in the Radical Science Movement in the 1970s and 1980s (e.g. Rose, 1983; Rose and Rose, 1976). The tendency to mark action-oriented STS as somewhat of a 'turn' in the field harkens to a past where description reigned over prescription, and those who took up advocacy positions were often accused of normativity.[4]

While feminist STS scholars may take exception to the claim that their work is 'normative' – a concept that resonates in a distinctly different register for feminist and queer theorists whose work challenges normalizing discourses and practices – they could never be described as 'disengaged'. Eschewing symmetrical analyses, theirs (and ours) is a practice Donna Haraway (1997) has described as 'casting our lot with some ways of life and not others' (p. 36). This means assembling often-neglected voices, objects, and interests, while staying accountable to the politics, power, and privilege involved in such work. Care, as articulated by Puig de la Bellacasa and as taken up in our workshop and this issue, does not offer closed and teleological solutions; an attention to 'matters of care' remains open-ended and responsive: one does not know in advance where this attention will lead.

The contributions in this Special Issue are thus part of a longer genealogy of care in feminist science studies scholarship that draws attention to how researchers in STS come to care about the lives they study and the worlds in which they intervene. Consider the ways that feminist STS scholars have grappled with, for example: the human and more-than-human lives exposed to the toxic ecologies of late industrialism (Fortun, 2012; Liboiron, 2009; Liboiron and Myers, 2015; Masco, 2004; Murphy, 2006, 2013; Petryna, 2002; Puig de la Bellacasa, 2015; Schrader, 2015; Wylie, 2011); the injustices and inequalities perpetuated by reproductive and genetic technologies of the past and present (e.g. Casper, 1998; Nelson, 2013; Pollock, 2012; Reardon, 2005; TallBear, 2013); the forms of oppression and racisms propagated in the name of colonial and neocolonial science (e.g. Adams, 2002; Anderson, 2002; Verran, 2001); or the artificial intelligence algorithms, drones, wearable computers, and other technologies that shape us and our interactions with the world (e.g. Alač, 2009; Eslami et al., 2015; Forsythe, 2001; Suchman, 2015; Viseu, 2005). Their work not only demonstrates how they care, but also seeks to incite their readers to care. The many and varied contexts these scholars work in remind us that the forms of care STS scholars bring to their research need not be motivated only by warm feelings of love, affection, or nurture. Care is just as often propelled by anxiety, injury, injustice, indignation, or frustration.

Thinking with care, we have learned, requires attention to the ambivalent rhetorics and practices taken up in its name. One popular formulation of care opposes it to knowledge. In the paper she prepared for the Politics of Care Workshop, feminist philosopher Lorraine Code describes the rhetorical move whereby those who take up advocacy positions are disqualified as knowers (in courts, but elsewhere too) for the very reason that they (admit that they) care: to be an advocate is to be partial and thus to compromise or taint knowledge claims. Code (2015) observes that

> [t]he entrenched imaginary of the dispassionate, disconnected knowing subject assumes a curiously implausible image of human subjectivity: a person detached from the world, who

> does not care in the slightest about what he or she knows, whose affectivity is excised from her or his intellectual life. (p. 8)

In contrast, she compellingly argues, knowing *requires* caring about what and how one knows. Carrie Friese (2013) aptly frames the epistemological convergence between caring and knowing through her fieldwork in an animal research laboratory, where compassionate treatment of the rats matters to the *results*: 'it is clear that care (and the lack thereof) is a constitutive practice in experimental systems' (p. S131).

Another salient (if not exactly erudite) rhetoric of caring comes from the playground. 'See if I care!' Or the anachronistic 'Here's a quarter; call someone who cares.' The child who utters such a phrase is speaking from a threatened position and seeks to claim the higher ground by *not caring*. Or seeming not to care. In other words, *being caught caring* on the playground can expose a disputant, leaving him or her vulnerable. For the feminist accused of being 'normative' in early moments of the history of STS and the advocate in Code's story, wearing your cares on your sleeve is not necessarily a promising strategy if caring and knowing, or caring and clout, are opposed.

We take from Puig de la Bellacasa an orientation to STS research that denies this polemic by changing the premise of the argument. We assert that the politics of knowledge cannot be disarticulated from a politics of care. While for some, care's fraught politics may limit its viability as a practice, an ethic, or an analytic frame for STS and for feminism, we argue that this would be a pre-emptive move that would further obscure a process that is integral to how researchers come to their projects and how their research topics find them. By casting care and its problems aside we might not only lose what is generative in care – what care makes possible – we would also elide the ways that care works to animate and activate inquiry and analysis. To bypass, curtail, or overlook care would work to obscure further the moral and affective economies that shape researchers' entanglements with the phenomena they describe. To disavow care would leave intact binaries that circumscribe realms of legitimate and illegitimate knowledge and the pervasive bifurcations that prioritize the rational over the sensory and affective dimensions of knowledge. It would also evade what actually needs to be examined: the all too latent norms and values that shape all kinds of inquiry. Care and its politics will continue to contour and propel research, and the partialities and limits of care must be made evident, be examined and be taken into account. Foregrounding care and its fraught politics is then one way to 'stay with the trouble' and take situated knowledges seriously (Haraway, 1988, 2008). In sum, our argument, brought to life in the essays included in this issue, is that we cannot ignore care. *What we must do is take better care of how we care.*

Unsettling care in our world(s)

Care is *ambivalent, contextual*, and *relational.* And while contexts of care often require immediate response – that we 'cast our lot' in real time – a privilege that we have as scholars is to reflect, ruminate, and reconsider care's workings so as to foster better politics and encourage situated knowledges. All of the articles contained in this issue attest to this. This point is perhaps most evident in the article by Michelle Murphy that concludes this issue. Murphy offers a critical examination of the history of feminist politics

of care. Starting with a historical analysis of feminist reproductive self-help activism in the 1970s, she examines the politics of second wave feminist interventions into reproductive health and international development projects. With an eye to the ways in which the history of feminism is embroiled with the logics of capitalism, she reminds us of the 'non-innocent histories in which the politics of care *already* circulates, particularly in transnational couplings of feminism and public health' (our emphasis). 'Already' is the key word here. Not only are care, affect, and feminism readily appropriated and mobilized by larger movements, cultural forms, and institutions such as the World Bank or the International Women's Health Coalition, Murphy maintains that 'care is not a new dimension feminists are bringing to technoscience, but rather an already circulating hegemonically entangled axis threading through our worlds'. In other words, to engage care as an innocent, self-evident good often blinds us to the ways in which care is already circulating in capitalism's and colonialism's self-preserving and mutually reinforcing repertoires, discourses, and logics. Drawing on Lorraine Daston's (1995) articulation of 'moral economy' and Sarah Ahmed's (2004) concept of 'affective economy', Murphy argues that, instead of identifying care with 'individual scientists or feminists', we must 'unsettle' the self-evidences of care in technoscience and feminism so as to 'situate affection, attention, attachment, intimacy, feelings, healing, and responsibility as non-innocent circulating orientations within larger non-innocent formations'. She shows how care circulates within systemic and often violent relations of power, such as the racist, colonial, and capitalist formations manifest in international development projects that seek to enfranchise 'third world' women and girls. Murphy suggests that critique itself can be understood as a kind of care. Unsettling care is thus a critical practice, one that she hopes will help foster a politics that might enable better, more livable lives and forms of life.

The problematics of a *strategic deployment of care* highlighted in Murphy's essay is a preoccupation shared and made visible by all of the authors in this volume. It takes center stage in Ana Viseu's article, where she asks what happens when care is deployed as a means for technoscientific governance. Specifically, she frames the growing trend to 'embed' STS researchers in state-funded science as an exercise of caretaking: those trained in the ethical, legal, and social implications (ELSI) are employed to *take care of* science. Drawing on her 3-year experience as the one female, untenured, in-house social scientist at a nanoscale fabrication facility in the United States, Viseu describes her responsibilities in the enactment of the mandated policy of 'integration' that aims to bring the social and natural sciences together to foster 'responsible research and innovation'. Using 'care' as a heuristic, she examines integration as both a type of care practice and as a matter of care, including the multiple and mundane ways in which integration enacts a power-laden politics. Viseu argues that despite its novel branding, this policy of integration reifies old divides and is plagued with asymmetries that are rendered invisible in the policy documents that dictate how integration is to be enacted. Showing how traditional definitions of care are seamlessly co-opted into institutional arrangements, she argues that being a social scientist comes to be defined by caring through learning to 'observe but not disturb', with little to no room for difference or dissent. Thus, she argues, the price to be paid for integration is too high not only at an individual level – where failure to integrate successfully is by definition a shameful, personal shortcoming – but also for the field of STS and the knowledges it can produce. In other

words, within the current sociomaterial orderings of integration, 'disciplinary boundaries, funding arrangements and power asymmetries are not challenged but reified, such that there is little to no room to re-imagine existing practices'. Viseu concludes that while we must continue to work toward fostering a framework where commitments to social and ethical issues are integral to scientific practices, we must also 'take a closer look at the positions we adopt towards, and within, the worlds we study and co-construct'. For STS, she asserts, this may include returning to a position outside the spotlight of funding agencies.

In their essays here, Astrid Schrader and Maria Puig de la Bellacasa continue to examine the epistemic and ontological implications of thinking and doing with care. In particular, both authors explore the possibilities opened by a feminist politics of care and how beginning to care and caring differently can bring about ontological shifts in our conceptions of time and our relationship with others. Schrader offers an account of the politics of care in STS pedagogy, while Puig de la Bellacasa draws us into the histories and practices of soil science.

Schrader introduces us to her classroom where undergraduate students learning about STS were asked to read and respond to distinct accounts of the effects of the Chernobyl disaster: Adriana Petryna's (2002) *Life Exposed* and Hugh Raffles' (2010) story of Cornelia Hesse-Honegger's remarkable drawings of radiation-damaged insects. Shifting our focus from the question of 'how to care well', Schrader brings attention to another problem: 'how do we begin to care' about little insects like leaf-bugs. She recounts the reluctance and discomfort of her students to extend their empathy to bugs, most especially in the face of the human tragedy Petryna documents so well. For Schrader, what is at issue is that the 'distribution of the sensible' (Rancière, 2006) that governs what and how we care is shaped by human exceptionalism and conventionally constrained notions of temporality. Care in such constrained contexts is tied to immediate action and to self-preservation: to care for insects would mean acting now on their behalf. This would not only come at the cost of not caring for others, but also, and importantly for the students, it would seem to erase the ordained order of things and beings. Drawing on Raffles' (2010) analysis of the insect drawings produced by Hesse-Honegger, Schrader suggests that learning about bugs by drawing them can generate a kind of affective and epistemic intimacy. Schrader approaches Hesse-Honegger's art practice as a form of 'passionate detachment' that allows the artist to be with, alongside, and simultaneously outside of that which she is drawing. For Schrader, this opens up the possibility for a new kind of spatial temporality and enables a different kind of care, what she identifies as a form of 'abyssal intimacy' – an intimacy that is 'simultaneously a mode of engagement and a new kind of relationship between humans and other animals, that is neither continuous nor discontinuous, but rather marks a time-out-of joint'. Abyssal intimacy is for Schrader a mode of inquiry mediated by hesitations, questions, and observations: it is a practice of not knowing what to do even as one wants to respond. She develops a Derridean analysis of temporality to argue that such an intimacy 'requires a different logic of time, a different deconstruction of the metaphysics of (humanist) self-presence – different from the privilege of futurity or the teleology of a gathering and its demand for immediate or direct action'. She argues for the pedagogical value of staging encounters for students that require them to struggle with the question of what they do and do not care about,

since they teach us how to begin to care, and how 'practices of knowledge can become practices of care, if we care to listen'.

Puig de la Bellacasa shows how deploying a feminist politics of care in the study of soil can help uncover practices and experiences that foster alternative ontologies and relationalities for humans and non-humans. Examining how current treatments of soil are deeply enmeshed in the logics of economics and productionism, she argues that soils are mostly seen as resources cared for within the market logics of a discourse that seeks to extract maximum value and productivity from soil for humans over linear time. But the time of soil – the time required for regeneration, composting, and nutrient cycling – and the time of capitalism are not in step with one another. The forms of care mobilized in mainstream soil science and policy are in this sense instrumental and exploitative. Puig de la Bellacasa draws attention to the temporalities of prescriptive forms of care, that is, those sustained by a vision of time as future-oriented and linear. Puig de la Bellacasa finds evidence, however, that there are other ways of knowing and caring for soil. She describes a shift toward a new kind of soil ontology, one in which soil is emerging through practice as a 'multispecies world' that includes humans. She finds that alternative articulations of human–soil ecologies shift conceptions of time. The affectively charged ecologies that take shape in these other approaches to soil science also open up space for what she calls 'care time'. Care time is not governed by market temporalities and demands, and it is not synonymous with productivity. It is 'time consecrated to the reproduction, maintenance and repair of ecological life'. With this article, Puig de la Bellacasa puts in evidence the generative power of a politics of care in technoscience and the possibilities it offers for creating 'alternative livable relationalities' within otherwise dominant configurations.

The contributions to this issue thus trouble care by grappling with its temporalities, enactments, commitments, rationales, and failures. They give us tools to navigate care's essential and problematic participation in what we know and how we intervene. Collectively, they inspire new ways of engaging critically with care and imagining a feminist politics of care responsive to hegemonic formations. Building on these contributions, we conclude by offering a proposal for rethinking care as a critical practice. We do this by expanding our attention beyond acts of care to also consider the conditions of possibility of care, that is, by exploring care's potentialities before it has latched onto an object. From this perspective, care is not only a practice and an outward action but also *a willingness to respond*.

Conclusion: critical care and response-ability

One of the findings of this collaboration and of the workshop as a whole is that the very concept of care is not only multifaceted and contextual, but also suggests different political commitments, inspiring a range of different ethics and forms of intervention. This is part of care's productivity. For this reason, there can be no singular vision of what care is or what it might become. One way forward may be to urge that examinations of the enactments of care in technoscientific worlds must never be extricated from the question of their politics or effects and that STS researchers situate how and why they care. Working in this mode we may be able to cultivate an approach that keeps in view how

care shapes what we know and what we do not know, and how its effects are felt in the worlds in which we live and into which we intervene. To achieve this perspective, here we propose paying attention not only to acts of care but also to the very conditions of possibility for care.

Care is an affectively charged and selective mode of attention that directs action, affection, or concern at something, and in effect, it draws attention away from other things.[5] In practice, a person who cares is one who has already chosen an object to care about. Consider, however, that prior to securing a thing to care for, a person must have the capacity or willingness to respond, to be called into action, to be hailed by that object or phenomenon. In short, a person who cares must first be willing and available *to be moved by* this other. If we were to hover in the moments before a researcher secures an object to care about, we would encounter an open field of potentialities-[6]–indeterminate subjects and objects, and expansive possibilities for forms and temporalities of response. To stay in this space is not to refuse to care, but to slow care down, to expose and to question the self-evidences that would otherwise prescribe its proper objects, as well as its seemingly necessary directions, temporalities, intensities, and forms of action.

This attention to the conditions of care's potentiality, in addition to its outward manifestation, is grounded in an already well-articulated feminist ethic of 'response-ability' (Barad, 2007; Haraway, 2008; Schrader, 2010). Response-ability not only underscores a researcher's ethical responsibilities to their worlds but also indexes a researcher's capacity and willingness to be moved, in both the affective and kinesthetic senses of the verb 'to move' (Latour, 2004; Myers, 2015). Response-ability encourages a practice of making oneself available to respond without knowing ahead of time which phenomena will call one's attention or what form the response should take. Crucially, non-response is also a legitimate response. So, while response-ability is grounded in an ethic that acknowledges our inter-implication with others, and in a willingness to be called beyond one's immediate sphere, it is not a prescription to do so. The essays in this issue show us that there are all sorts of ways to make oneself response-able: at times not reacting, not intervening, and not 'casting one's lot' may be the most responsible action. Indeed, the capacity to respond is itself unevenly distributed and enmeshed within complex configurations and logics of power. The lesson here is that an ethic of response-ability, and thus an ethic of care, cannot be institutionalized or standardized.[7]

Combining this attention to the conditions of possibility of care alongside its instantiations and enactments opens up the possibility for a concept of *critical care*. Such a concept might at first appear paradoxical or contradictory. And yet, consider the various meanings of the term 'critical': more than a disapproving or judgmental attitude, it can also be an analytic that is cautious, thoughtful, and considered. Puig de la Bellacasa's 2011 article and Murphy's essay in this issue remind us that holding onto critique as a way of unsettling care, may itself be an expression of care. As Puig de la Bellacasa (2011) and several contributors to this Special Issue remind us, holding onto critique as a way of unsettling care may itself be an expression of care. Given the asymmetrical power relations that care can set in motion, it must be enacted carefully: care's partialities, limits, and effects must be located, situated, and questioned. Moreover, the term 'critical' is often mobilized to invoke the sense of something vital or crucial, and implies a sense of necessity. As the contexts in which we work become seemingly more urgent, that is, more

critical, we must become even more cautious about how we enact our care. Likewise, the greater success we STS scholars have in world-making, the more we have to be accountable to and take responsibility for those whose lives we touch. Too many lessons have been learned from the violences of humanitarian care delivered in states of emergency (Ticktin, 2011) to suggest that such urgencies can be met by quick, unreflective action.

What then might count as critical care practices for STS researchers? To care critically is to call into question the often tacit moral economies that contour our research questions and practices and that define some things or phenomena as the proper objects of care while others are cast aside. A critical practice of care would insist on paying attention to the privileged position of the caring subject, wary of who has the power to care, and who or what tends to get designated the proper or improper objects of care. This could take the form, for example, of examining neoliberal formulations that attempt to codify, standardize, prescribe, or commoditize care. This includes contexts when care is outsourced as a form of affective labor in the workplace (e.g. Vora, 2009), such as, for example, when social scientists are hired to take care of the ethical dimensions of scientific enterprise (e.g. Viseu, 2015). With an attention to the positionality of the researcher, critical care is also wary of the various paternalisms that care can set in motion, including colonial formations that can so easily render colonized peoples powerless (e.g. Murphy, 2015), or the rationalist dictates of funding bodies that set the conditions for collaboration and the relationships between the disciplines (Viseu, 2015). A practice of critical care is thus one that is committed to an intersectional feminism that can grapple with the constellations of power manifest in concatenations of capitalism, colonialism, race, class, ability, and gender (see Harding, 2008; Murphy, 2012, 2015; Nelson, 2013; Tsing, 2005).

As the contributors to this issue demonstrate, critical care requires reflecting on the effects of our own care work (Viseu), on the histories of care and care's complex relation to distinct feminisms (Murphy), on the multiple temporalities of the more-than-human worlds in which we live (Puig de la Bellacasa), and on what it is that we come to care about and how we attempt to teach and disseminate our care (Schrader). It is thus our hope that fostering forms of critical care will help STS researchers learn how to pay attention to and respond to shifting topologies of power in our rapidly changing worlds. 'Staying with the trouble' that care sets in motion does not mean that we are left without means to act or intervene; rather, it is by staying in the thick of things, by analyzing care's non-innocent politics that our responses can be slowed down enough to make them more *care-ful*.

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Notes

1. Charis Thompson gave the keynote lecture for the conference titled, 'The Politics of Care: Beyond Altruism and Anonymity in Biomedical Donation' featuring material from her book *Good Science* (Thompson, 2013). The lecture is available to view on the Politics of Care Workshop website: http://pct.apps01.yorku.ca/

2. This scholarship has been especially influential in philosophy and includes works by Nel Noddings (1984), Patricia Hill Collins (1990), Sara Ruddick (1990), Joan Tronto (1993), Selma Sevenhuijsen (2003), and Jennifer Nedelsky (2013).
3. See the Society for Social Studies of Science 2015 Annual Meeting call for contributions to 'making and doing' in Science and Technology Studies (STS):

   The STS Making and Doing initiative aims at encouraging 4S members to share scholarly practices of participation, engagement, and intervention in their fields of study. It highlights scholarly practices for producing and expressing STS knowledge and expertise that extend beyond the academic paper or book. By increasing the extent to which 4S members learn from one another about practices they have developed and enacted, the initiative seeks to improve the effectiveness and influence of STS scholarship beyond the field and/or to expand the modes of STS knowledge production.

   http://www.4sonline.org/meeting/sts_making_and_doing_call_for_submissions

4. This dichotomy, an outgrowth of early Sociology of Scientific Knowledge (SSK), is thematized in Jasanoff (1996), Lynch and Cole (2005), and Zuiderent-Jerak and Bruun Jensen (2007).
5. Thanks to Naisargi Dave for this reminder. See Dave (2014) for an account of animal welfare activists in India and the various modalities of care, including forms of attention, inattention, and becoming that expand and contract the space between life and death for working animals and their people.
6. Taussig et al. (2013) elaborate on the theme of potentiality as an analytic and as an object of study in the (biomedical) worlds they encounter. Their articulation is prescient here: 'A world in a process of becoming cannot be captured in universal formulas' (S6).
7. Practitioners in feminist science studies are experimenting with ways to bring such an ethic of response-ability into practice. For example, the Science & Justice Research Centre (SJRC) at the University of California, Santa Cruz is dedicated to innovating 'experimental civic spaces and collaborative research practices for exploring today's most pressing challenges' (http://scijust.ucsc.edu/). They offer training in feminist science studies to give researchers the tools to be able to 'respond to the full range of epistemic, ethical, and political dimensions of contemporary technoscience' (see Reardon et al., in press).

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