

A JOURNAL OF NATURE, CULTURE, HUMAN AND SOCIETY id#: m&s.2310.02201

ARTICLE

# The Dialectics of Engagement: Some Critical Remarks on Contemporary Participatory Research Program in STS

# Kulyash Zhumadilova

ABSTRACT: This paper will offer a Marxist critique of a recent turn in participatory research within STS tradition. Although in this work, I will focus on examples from the STS community, it is worth mentioning that such a vision of engagement is prevalent in social sciences. STS scholars have been involved in various theoretical and practical attempts which challenge the traditional boundary between academia and the rest of society since the field's inception in the second part of the twentieth century. At first, such practices were informal, but soon became a scholarly topic on their own and gave rise to various participatory, action-based methodologies. Some of them involve activism and search for alternatives, while others call for reflexivity or increased ethical deliberations. Theory and political commitments of these approaches differ greatly. For example, the theory behind contemporary interventions is intentionally apolitical and focuses on processes and accounts of action rather than a certain goal. In this paper I will look closely at the origin of the participatory research program in the North American context and will analyze from a Marxist perspective its recent move towards rejecting normativity and objectivism. I will highlight friction points and possible additions of new methodologies to Marxist scholarship.

KEYWORDS: History of STS, science studies, Marxism, Situated Interventions, Engagement, Participatory research, Engaged STS, dialectics, emancipatory approach.

Philosophers have hitherto only interpreted the world in various ways, the point is to change it. —Karl Marx

#### Introduction

Although this famous quote by Karl Marx seems simple and direct, it has been interpreted differently on how the world can be changed and what that change is supposed to realize. The relations between "theory and practice," "science and society" are among the basic subjects of Science and Technology Studies

Zhumadilova, Kulyash. 2023. "The Dialectics of Engagement: Some Critical Remarks on Contemporary Participatory Research Program in STS." *Marxism & Sciences* 2(2): 1–12. https://doi.org/10.56063/MS.2310.02201

<sup>•</sup> Correspondence: Kulyash Zhumadilova, Department of Science, Technology, and Society Virginia Tech, Virginia.

<sup>•</sup> e-mail: kulash[at]vt.edu

<sup>•</sup> DOI: 10.56063/MS.2310.02201

<sup>•</sup> Received: 03.04.2023; Revised: 14.07.2023; Accepted: 22.07.2023

<sup>•</sup> Available online: 05.11.2023

(STS). Since its inception STS has launched and formalized an interdisciplinary critique of scientism and objectivism. Although STS is known for its empirical studies and philosophical debates on the nature of science, there is a less known research strand that is concerned with the position of the scholar and her relation to the object of study and knowledge. That reflexive scholarship of STS tried to theorize its own position and practices with a hope to answer the bigger question: "how to do scholarship?" Since skepticism about objectivism became a norm in STS, several turns took place within the discipline. And although some of the principles I will discuss below might apply to science at large, I will mostly focus on changes within STS and related social sciences. But it should be clear that the issues of STS pertain to other fields too, not the least because the same logic finds its way through STS practices into scholarship beyond disciplinary boundaries. That is why it is interesting to investigate the history of STS, since its scholarly consciousness, if you will, entails a kind of skepticism about its own actions.<sup>1</sup>

### Background

The social consciousness of the political movements of the 1960s influenced scholars well into the 1970s, when many former student activists assumed new roles in institutions and realized that a value-free ideal of science is not only theoretically impossible but also enacts a politics of compliance that helps to preserve the status quo (Burawoy 2021, ix). Such a realization prompted some scholars in the social sciences to formulate research programs that make theoretical and political assumptions explicit. Various critical and emancipatory approaches gained attention and influence in the following decades.<sup>2</sup> According to sociologist Erik Olin Wright emancipatory social science has three components: systematic diagnosis and critique, envisioning of alternatives and formulating theories of social transformation (Wright 2010). Despite their appeal to individual scholars, emancipatory programs uphold a common normative framework that aims to liberate historically oppressed groups and reconfigure our understanding of the society, such as anticapitalist ethos in Wright's own work. The "engaged" program is somewhat similar, as it also aims for transformation, but not by revising theories and methods, but by engaging with various actors outside of academia. Hence

<sup>1.</sup> Although there are different origin stories of STS that disagree about where and when the field started, for the purposes of this paper, I will only focus on the Anglophone STS that took place mostly in the USA in the second part of the twentieth century. As has been pointed out by one of the anonymous reviewers, this is important because the field will reflect the ideological nature of the society it is placed in. Also, it reflects my own positionality as graduate student at Virginia Tech.

<sup>2.</sup> Paolo Freire's "Pedagogy of the Oppressed" (1968), Ivan Illich's work, etc.

diferent names that this approach takes. Douglas Hartman lists these options under a "community-engaged research" umbrella: community-based scholarship, participatory action research, research-practice partnership and collaborative social justice research (Hartmann 2022). The nature of these mutually beneficial engagements varies, as do the normative and policy goals. From the outset, it was recognized that such engagements would not only disseminate knowledge but would also "renew and revitalize" sociology itself (Hartmann 2017). The rise of the "engaged" research program is linked to its institutional recognition in the mid 2000s, as the presidential address of Douglass Hartman and the accounts of Virginia Eubanks show (Hartmann 2017, Eubanks 2009). Various existing and new methodologies have been integrated into these programs: decolonizing and feminist methodologies, legal action, advocacy, militant research, mutual aid, narratives, Participatory Action Research (PAR), Participatory Development, etc. (Action-Based Research Methods 2016). The engaged program in STS found itself in good company with the public understanding of science (PUS) (Wynne 1995), "citizen science," and issues broadly construed under "science and democracy" (Jasanoff 2007). From the earliest attempts to articulate what "engaged STS" is, we see a similar tendency toward utility for the field itself. Sergio Sismondo saw the engaged program in STS as a bridge between theoretical works and action-oriented critique (what Steven Fuller called "High Church and Low Church") (Sismondo 2008). Thus, a close connection of engaged STS and activism can be observed early on. To this day, one of the most popular sites of research (in terms of topic and action) is environmental justice and related public/community health, social justice, and social movements. As the engaged program has become more prevalent, various theories of engaged STS have emerged, such as "embodiment of knowledge," "critical participation," STS sensibilities, reflexive learning, etc. The widespread acceptance of participatory research both within and outside of academia has left some scholars concerned about its misappropriation. Virginia Eubanks, a political scientist whose research has provided important insights into contemporary inequalities, argues that participatory research displaced macrosocial analysis in favor of "personal responsibility" which was also reflected in the acceptance of neoliberal policies in the 1980s (Eubanks 2009). In her attempt to revive critical participatory research, she states:

This situation leaves reflective practitioners double bound. How do we acknowledge the selective uptake, and internal flaws, of participatory methods without abandoning their liberatory potential? How do we acknowledge the irreducible power relationships embedded in our collaborative work without abandoning hope for solidarity and alliance? How do we develop "good enough" knowledge to move on issues-of-the-moment without succumbing to epistemological relativism? And finally, how do we do collaborative work in institutions that

#### Kulyash Zhumadilova

neither encourage nor reward developing the skills that make participatory methods practicable? The personal and professional impact of facing these dilemmas, in combination with the co-optation of participatory practice by repressive government agencies and NGOs and the professionalization of the interdisciplines (Women's Studies, Science and Technology Studies, etc.), has resulted in a recent retraction from participatory practices in academia. (Eubanks 2009, 109)

This frustration with engaged practices also coincides temporally with seemingly increased reflexivity and scrutiny within STS, such as Bruno Latour's rhetorical reframing of critique into "matters of concern" (Latour 2004) followed by Maria Puig de la Bellacasa's call for "matters of care" (de la Bellacasa 2011). By the mid-2010s new theoretical visions of participatory research that equally reject "engagement" and objectivism emerged in STS (Zuiderent-Jerak 2015, 1–38). This move rejects any shared normative assumptions and methods and thus solidarity and alliance. In some ways it tried to reclaim what previous methods did: "... working with the notion of interventionist scholarship is a dual attempt to relieve research practices of the moral weight of 'engagement,' simultaneously reclaiming some of the ideas about 'where the action is' from the practices social scientists deal with" (Zuiderent-Jerak 2015, 22). This approach is also very skeptical about any normative positions:

... but for now it suffices to note that proposing an ethical base for scholarly action has been and is repeated persistently over time, despite the problems of combining ethical strategies with the epistemic authority that sociologists in the 1960s would usually reserve for the top dogs they criticized rather than for the underprivileged they wished to side with. (Zuiderent-Jerak 2015, 13)

It frames participation as "situated intervention" the sole goal of which is the creation of new sociological insights and knowledge rather than practical utility for a community or emancipation at large. Such a preoccupation with itself is not only characteristic of the new method, but also a scholar as such. The scholarly persona is an important site of reflection and action in this approach (Downey and Zuiderent-Jerak 2021). The scholar is asked to reflect on her positionality, situatedness, "attachments" and sensibilities. It is difficult to find a common thread in the resulting menagerie of particularisms. Therefore, I will try to analyze this new turn in participatory research from a Marxist perspective.

### Dialectics of Engaged Research

What we deem important enough to intervene and act upon is conditioned by cultural and social environments. Although certain ideals are kept as desirable and acted upon for many generations (social justice, equality, freedom), the

horizon of expectations changes quite dramatically not only among generations, but within different social groups in one generation. For example, contemporary feminist agendas in the "Global South" are different from dominant feminist agendas in "the West." Furthermore, even within individual categories you will find various versions of feminism. But, hopefully, all these manifestations aim at liberating women and men from constraints of patriarchy or at least give women more agency over their bodies and lives. Thus, the processes that activists and action-oriented scholars will choose to participate in vary drastically within and between different social groups. But these are all dialectical processes, where actors both are acting and being acted upon. The change is brought by a resolution of the existing tension between conflicting sides.

Various views on dialectics also posit the role of actor /agent of action differently. In some deterministic views actors don't quite choose their actions; their attempt to displace dominant views is dictated by the environment they are part of. In reflecting upon accounts of participatory research I came to realize that actions vary and depend on how actors diagnose a problem and what tools they have to tackle it. For example, I would consider that the rather symbolic action against the dominant practice of author-order in scholarly publications is a dialectical sign of the urge to restore balance in a messy and corrupt system (Liboiron 2017). But the proposed solution (group vote and equity-based ordering in this case) cannot be classified in dialectical terms, because what and how they produce cannot be predicted by an initial problem definition. Thus, the urge to act can be theorized as dialectical because actors identified a common problem (crisis in scientific publications), but actions that attempted to solve it most likely will be particularistic. In other words, there are many ways to achieve a goal.

If we agree that to intervene is to enact/embody a dialectical change, then the new participatory movement in STS can be considered as a dialectical turn towards a different understanding of change and critique. Marxist scholars have been criticizing the so-called structuralist paradigm, with its focus on power structures and institutions (Anderson 1983). Many agreed that in such a power-hunt, the role of personal agency is being lost. By blaming an abstract power (in Focauldian sense), we lose sight of actors who produce and reproduce the status quo. When analyzed in this vein, situated interventions do bring agency back to the people as they theorize a personal action as a place

<sup>3.</sup> See Bruno Latour's "Why Has Critique Run out of Steam?: From Matters of Fact to Matters of Concern." Critical Inquiry 30 (2): 225–248; and Terry Eagleton's Literary Theory. Introduction. Miennapolis: University of Minnesota Press, 1996; as well as Stuart Hall's "The work of representation." In Representation. Cultural Representations and Signifying Practices, edited by Stuart Hall. Los Angeles: Sage Publications, 1997.

of intervention. But as Virginia Eubanks warned, personal action may be coopted in neoliberal logic of being "on your own."

For many years Western Marxism has been divorced from practice (Anderson 1976). And while contemporary times inspire social action, interest in Marxism tends to come from outside of academia. Activists are more likely to check out scholarly work, rather than scholars joining activists' meetings. Perhaps by adding a participatory dimension to their scholarship academics will come closer to the world of political participation.

Richard Levins and Richard Lewontin are good examples of scholars who not only incorporated activism in their later stage of professional lives, but also challenged conceptual underpinnings of the science that they were part of. Their "dialectical approach" does not aim to generate a new research program, but rather to critically examine the existing paradigm to point out errors and suggest ways to supplement the incomplete accounts of current approaches. Their ideological analysis of contemporary biological research reveals that existing approaches misrepresent or only partially account for the observed biological phenomena (Levins and Lewontin 1987). They emphasize that a dialectical approach is not a new research program but rather a way to remedy science from ideological influences and partial perspectives.

Perhaps, STS also should add a "dialectical approach" to its existing practices of reflexivity and critical methodologies. In this way participatory research would not aim to produce new theoretical insights, but rather will aim to challenge and scrutinize existing accounts.

### Critique

The new vision of participatory STS is still a continuation of the fragmentary structure of contemporary academia. Neoliberal rules permeate all structures of society. And STS as a discipline is no exception, despite its critical potential and tendency for reflexivity. In this environment participatory research is another project to write a grant for, or a publication about, or a report of. It will nicely fit into existing work routines, without significantly disrupting them. And although Virginia Eubanks was lamenting the lack of institutional encouragement and reward for participatory research a decade ago, my concern is that since the participatory research program became part of someone's job description it may become a subject to the same institutional pressures as the research it tried to displace in the first place. Although institutionalization of participatory research has a promise of more systematic study of emancipatory social science, as envisioned by Erik Olin Wright. Institutionalization of interventionist scholarship will only add to reductionism and incommensurable paradigms of contemporary academic science.

Although collaborations within and outside of academia are a big part of participatory research, the actions they produce are still very fragmentary. First, not all projects in contemporary participatory STS research are of societal importance or have political goals in mind. As we saw from the quotes above such a move is intentional and frames itself as a reaction to politically motivated research. Scholars who call themselves activists or subscribe to a certain political cause, if not scorned for betraving "objectivism," then encounter a stereotypical criticism of partial perspective. In addition, claiming that your work is political brings a certain degree of responsibility and accountability that many scholars don't want or are not ready to take. So, removing political dimension from participatory STS serves to attract scholars, who may be shy of it otherwise. The negative side of such framing is the impossibility to unite many actors into a social action. Theoretical focus on a process rather than a goal further contributes to this fragmentation. Even if some scholars jointly identify a problem of communal importance (author order in publications, for example), their actions will be out of sync and, in fact, may cancel each other out. To bring an effective change, concerted action may be required. Particularism of topic and method rarely will enact something on a large scale. Although I recognize an impulse to act locally that might bring tangible change rather than another grand "change the world" plan, I still maintain that conserving group solidarity is worth it. When a person from Almaty meets a person from Ithaca or from Kolkata and all three identify as Marxists, they might at least get a rough idea of each other's positionality and views. Of course, the degree of such overlap may vary, as we are all differently situated, but solidarity in views still will hold. I don't know what participants in participatory STS research may have in common. Although such research mobilizes scholar's "matters of care," it inevitably results in relativism. In her ending paragraph in "Matters of Care in Technoscience" Maria Puig de la Bellacasa admits:

The way in which caring matters is not reassuring. It doesn't open the door to a coherent theory, or to the comforting feeling that worries about technoscience would be solved ... if only we would really care. Care eschews easy categorization: a way of caring over here could kill over there. Caring is more about a transformative ethos than an ethical application. We need to ask 'how to care' in each situation. This is attuned to STS's ways of knowing on the ground. It allows approaching the ethicality involved in sociotechnical assemblages in an ordinary and pragmatic way. (de la Bellacasa 2011, 100)

The problem with the formulation of a new ethos is that it's artificial and idealistic. Material relations and conditions have much larger power over decisions and actions of individuals. Can we make people care in an alienated world?

### Personality and Work

Another contentious point in theorizing new participatory practice is its emphasis on the personality of a scholar. To be fair, such a move has been initiated in STS tradition long before contemporary versions. Stories of STS sensibilities in personal life or, vice versa, personal experience of a particular professional situation are interesting experiments in narratives of lived experience.4 In addition, attempts of fusion of life and work have a political promise of ending anomie and alienation, making work meaningful and relevant again. Perhaps it was a dialectical turn from a cold STS neutrality of David Bloor or unapologetic iconoclasm of Bruno Latour towards something with a human face. But from a labor perspective I see this move as problematic. First intervention into "personal" has been made by Donna Haraway with her "situated knowledges" (Haraway 1991). Recognizing your life's trajectory, a standpoint, and telling the reader who you are has been viewed as a fix to the lost objectivist, "God eye" view. Such subtraction of the personal from your work, has been counteracted by a move in the opposite direction, when a personal has been added to work. Personal accounts and autoethnographies are a good example of that. Such stepping beyond "situated knowledges" to an area where personhood fuses with practices until a boundary between "work" and "life" disappears, may be detrimental for several reasons.

Reflexivity is a big part of the new participatory program. In one such exercise a scholar is asked to reflect on her career and biography to see what factors brought her to this position, what are her "matters of care." That personal narrative then serves as a point of departure for subsequent interventions. Although reflexivity is a useful skill, my concern is that such autobiographical vision of scholarly trajectory may obscure factors that we are unable to see due to affective experience of them (even with a sociological training) and thus won't be able to recognize and acknowledge. Introspection might be a useful scholarly tool, but one should be very careful with it and such awareness comes when one seriously thinks about it.

Given the history of STS approaches being co-opted into institutions that they aimed to critique, recognizing what "work" is, for whom and by whom it is done, and being critical towards it is essential for STS scholars. Especially as participatory practices become institutionalized and become a part of routine in a job description. By making "work" a consequence of your personal biography, we neglect to acknowledge power structures that influenced our decisions in the past and therefore accept and normalize them. "... for the eye sees not itself..." Many factors, mostly psychological in nature, will prevent a proper analysis of a personal trajectory. A rich confidential conversation with

<sup>4.</sup> See the special issue of Science as Culture 19, no. 1 (2010)

a personal therapist is not always a version of themselves that many scholars want to publish in peer-reviewed journals. This adds another layer to why the fusion of personal and professional might not only be misleading but also unauthentic. I would argue that it is healthy to maintain a conceptual boundary between "work" and "life" in academic practice of participatory STS. In the end, STS's insight into abuses of scientific practices should prevent it from enacting them in its own community.

That insistence of reflexivity and admittance that your current work is a consequence of your own choices and efforts also has a propensity to put work on an apex of personal trajectory. It is not a coincidence that situated interventions originate and are quite popular in corporate settings as a tool kit of various consultants and quality assessment professionals (Zuiderent-Jerak 2015). Framing work as a center of someone's life is the very thing capitalism wants to do for its workers. A job becomes the only outlet of expression, meaningful life and fulfillment. Such absorption of social obligations to the workplace might neglect responsibilities in civil and personal life. It is dangerous as it has the potential of recreating a "corporate personality," a blind devotion to mechanism. Although Marxism recognizes the importance of creativity and work for self-realization of humans, the assumption is that institutional settings should be different for it to materialize. Is it possible to enjoy your work in a neoliberal paradigm? How does resistance to work and skepticism about its purpose square with interventionist STS?

### Re-reading Ernst Bloch

While I was writing this paper, I also revisited Ernst Bloch's commentary on Marx's eleventh thesis on Feuerbach, which opened my essay (Bloch 1971). Bloch is concerned that Marx's call could evoke "associations with pragmatism." He was cautioning against simplified utilitarian attitude. That is indeed an important point and one that should be taken seriously. Co-optation of STS into structures and institutions who aim at change and interventions but for quite different reasons is a good example of that. Politically neutral contemporary participatory STS has taken its place in corporations, consulting firms and contracting research organizations.

Another interesting point that Ernst Bloch inspired me to think about was his caution against framing a call for action as a mere reaction to unproductive philosophizing, as this may bring about anti-theoretical and anti-intellectual attitudes. When Marx wrote his eleventh thesis he had a very specific philosophy in mind, that of Feuerbach. Of course, he also conceived his statement more generally to include philosophers, who feel very comfortable in abstract

worlds they inhabit, without any commitment to the present.<sup>5</sup> But casting all theory as useless and "unproductive" is dangerous. Anti-intellectualism has been long associated with totalitarianism, fascism and other reactionary movements. It is important to acknowledge and diagnose why such attitudes become prevalent, but it is equally worth remembering historical lessons in order not to justify and perpetuate malicious attitudes. Again, this is a perennial problem of the dialectical relation between practice and theory, hand and head, worker and intellectual. But given the history of STS and how often what was supposed to be benevolent critique was appropriated by interest groups, such emphasis on applied social science and call for action may be interpreted as anti-intellectual argument. Anti-theory combined with particularism is a recipe for an epistemic disaster.

#### Conclusion

In this article I tried to trace the origins of a contemporary interventionist research program within STS and analyze it from a Marxist perspective. Although it seems that the new research program evolved as a reaction to previous research programs in STS, it was in fact largely shaped by institutional installment.6 The underlying fundamental issue is indeed a hard one, the position of scholar and her relation to the object of study is a deep epistemological problem and formulating research programs that aim to resolve it might be an unattainable task because they are rooted in ideological rather than substantive distinctions. I want to conclude by emphasizing the vision of dialectical approach proposed by Richard Levins and Richard Lewontin.<sup>7</sup> For them a dialectical method rather than a separate research program is what can remedy science from partial perspectives. Systematic critique and examination of science in accordance with dialectical principles is what will weed out science of biased accounts. This is an interesting perspective that doesn't chase "new insights," but rather tries to work modestly with what already exists. Perhaps this is what contemporary participatory STS really needs.

## Acknowledgements

This paper was initially written for a seminar course taught by Prof. Garry Downey at Virginia Tech's STS department. I want to thank Prof. Downey and

<sup>5.</sup> Add to that to impenetrable language and writing style

<sup>6. &</sup>quot;Making and Doing" section at the Society for Social Studies of Science (4S) conference has been running annually since 2015.

<sup>7.</sup> Richard Levins and Richard Charles Lewontin, *The Dialectical Biologist* (Cambridge, Mass.: Harvard University Press, 1987).

my fellow students Danielle, Francesca and Tsung-Yen for stimulating discussions and openness to different perspectives. I would also thank anonymous reviewers for their helpful contributions.

#### REFERENCES

- Action-Based Research Methods. 2016. "Action-Based Research Methods. A Bibliography." https://activistresearchmethods.wordpress.com/about/. April 30, 2016.
- Anderson, Perry. 1976. Considerations on Western Marxism. London: Verso.
- ——. 1983. In the Tracks of Historical Materialism. London: Verso.
- Bellacasa, Maria Puig de la. 2011. "Matters of Care in Technoscience: Assembling Neglected-Things." Social Studies of Science 41 (1): 85–106. https://doi.org/10.1177/0306312710380301.
- Bloch, Ernst. 1971. "Changing the World. Marx's Theses on Feuerbach." In *On Marx*. New York: Herder and Herder.
- Burawoy, Michael. 2021. Public Sociology: Between Utopia and Anti-Utopia. Cambridge: Polity Press. Downey, Gary Lee and Teun Zuiderent-Jerak. 2021. "Making and Doing: Engagement and Reflexive Learning in Science and Technology Studies." In Making and Doing: Activating STS through Knowledge Expression and Travel, edited by Downey, Gary Lee and Teun Zuiderent-Jerak, 1–36. Cambridge: The MIT Press.
- Eagleton, Terry. 1996. Literary Theory. Minneapolis: University of Minnesota Press.
- Eubanks, Virginia. 2009. "Double-Bound: Putting the Power Back into Participatory Research." Frontiers: A Journal of Women Studies 30 (1): 107–37.
- Hall, Stuart. 1997. "The work of representation." In Representation. Cultural Representations and Signifying Practices, edited by Stuart Hall. Los Angeles: Sage Publications.
- Haraway, Donna. 1991. Simians, Cyborgs and Women: The Reinvention of Nature. New York: Routledge.
- Hartmann, Douglas. 2017. "Sociology and Its Publics: Reframing Engagement and Revitalizing the Field: 2016 Midwest Sociological Society Presidential Address." *The Sociological Quarterly* 58 (1): 3–18. https://doi.org/10.1080/00380253.2016.1248132.
- ——. 2022. "Community-Engaged Research: What It Is and Why It Matters." Footnotes. A Magazine of the American Sociological Association 50 (1). Accessed April 2, 2023. https://www.asanet.org/footnotes-article/community-engaged-research-what-it-and-why-it-matters/.
- Illich, Ivan. 1990 [1968]. "To Hell with Good Intentions." In *Combining Service and Learning*, edited by Kendall, J., 314–320. Raleigh: National Society for Internships and Experiential Education
- Jameson, Frederic. 2009. Valences of the Dialectic. New York: Verso.
- Jasanoff, Sheila. 2007. Designs on Nature: Science and Democracy in Europe and the United States. New Jersey: Princeton University Press.
- Latour, Bruno. 2004. "Why Has Critique Run out of Steam? From Matters of Fact to Matters of Concern." Critical Inquiry 30 (2): 225–48. https://doi.org/10.1086/421123.
- Levins, Richard, and Richard Charles Lewontin. 1987. *The Dialectical Biologist. Cambridge, Mass.* Cambridge: Harvard University Press.
- Liboiron, Max, Emily Simmonds, Edward Allen, Emily Wells, Jess Melvin, Alex Zahara, Charles Mather, and All Our Teachers. 2021. "Doing Ethics with Cod." In *Making and Doing: Activating STS through Knowledge Expression and Travel*, edited by Downey, Gary Lee and Teun Zuiderent-Jerak, 137–154. Cambridge: The MIT Press.

#### 12 • Kulyash Zhumadilova

- Liboiron, Max, Justine Ammendolia, Katharine Winsor, Alex Zahara, Hillary Bradshaw, Jessica Melvin, Charles Mather, et al. 2017. "Equity in Author Order: A Feminist Laboratory's Approach." Catalyst: Feminism, Theory, Technoscience 3 (2): 1–17. https://doi.org/10.28968/cftt.v3i2.28850.
- Norman, Richard and Sayers, Sean. 1980. *Hegel, Marx and Dialectic. A Debate.* New Jersey: Humanities Press Inc.
- Sismondo, Sergio. 2008. "Science and Technology Studies and an Engaged Program." In *The Hand-book of Science and Technology Studies*, edited by Edward J. Hackett, 3rd ed. Cambridge: MIT Press.
- Wright, Erik Olin. 2010. Envisioning Real Utopias. New York: Verso.
- Wynne, Bryan. 1995. "Public Understanding of Science." In Handbook of Science and Technology Studies. Los Angeles: Sage Publications.
- Zuiderent-Jerak, Teun. 2015. Situated Intervention: Sociological Experiment in Health Care. Inside Technology. Cambridge: The MIT Press.