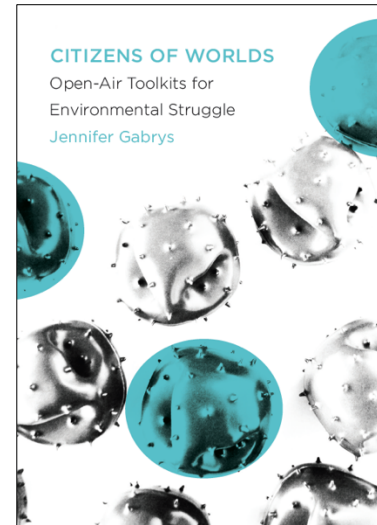


Jennifer Gabrys, **Citizens of Worlds: Open-Air Toolkits for Environmental Struggle**, Minneapolis: University of Minnesota Press, 2022, 360 pp., \$29.95 (paperback).

Reviewed by  
Yasuhito Abe<sup>1</sup>  
Doshisha University

Scholars have rigorously crafted diverse concepts by appending descriptive adjectives to the terms “citizens” or “citizenship” (e.g., Petryna, 2013). These notions have served as insightful expositions of civic societal practices and the nature of participation, making them readily comprehensible for a broad readership. Jennifer Gabrys, the chair in Media, Culture, and Environment in the Department of Sociology at the University of Cambridge at the time of publication, continues this tradition in her work ***Citizens of Worlds: Open-Air Toolkits for Environmental Struggle***. This book is a profound explanation of the relationships between citizens, sensors, and environmental pollution.



Drawing on extensive research from the Citizen Sense project, Gabrys delves into the ways in which residents and communities in the United States and the United Kingdom have been involved in monitoring air pollution for building more breathable worlds. Launched in 2013, the research group developed participatory practice-based research to examine how sensing technologies activate and operationalize citizens and citizenships. Gabrys breaks new ground, first by concentrating on various forms of air pollution in different—both rural and urban—environments (e.g., Northeastern Pennsylvania, South East London, and London’s financial center) and second by elaborating on multiple and useful notions of citizens and citizenships in the making, such as atmospheric citizens, instrumental citizens, speculative citizens, data citizens, multiple citizens, and sensing citizens.

In the Introduction, Gabrys puts forth the idea of “citizens of worlds” as a crucial framework for understanding how citizens and worlds are coconstituted. By redefining the citizen of the world (or a citizen of one world) as *citizens of worlds*, the author not only places emphasis on pluralistic and incommensurable citizenship practices but also underlines that they involve multiple worlds that generate different and complex political affiliations and exchanges that form the sites of struggle. Gabrys introduces the notion of atmospheric citizens as those “who monitor air pollution as a practice of building more breathable worlds” (p. 5), remarking:

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Citizen-sensing practices and technologies could seem to outline a straightforward way to document, communicate, and act on the problem of environmental pollution and destruction and for individuals to avoid exposure to pollution by monitoring their everyday air space. Yet practices for monitoring air pollution also show how atmospheres are unevenly experienced, sensed, and acted upon through bodies, sensors, and environments. The atmospheric exchanges that sensors and sensing practices mobilize then inform the conditions and possibilities of citizenship. (p. 13)

Such theorization of citizens and worlds enriches our understanding of sensing technologies as a mere tool for environmental data collection. Instead, Gabrys shifts our attention to “a more inventive and open set of engagements” (p. 21) with sensing and digital technologies. With the mutual constitutions of citizens and worlds as a concept, the rest of the book explores different modes of citizens and citizenships, discussing how citizens, their sensing practices, and worlds materialize.

Chapter 1 overlaps significantly with the author’s previous work (Gabrys, 2019) and is pivotal within the context of this book. This chapter discusses the significance of investigating the format of how-to guides to understand citizen sensors, citizens, and worlds in the making, providing crucial insights for the three case studies developed in subsequent chapters. Gabrys introduces the idea of cosmology to elaborate on the notions of instruments and instrumentality and develops the concept of open-air instrumentalisms. The author emphasizes that a how-to-guide inevitably involves multiple and varied contingencies rather than providing guaranteed results in concrete situations. Gabrys, therefore, underscores that neither instruments nor citizens have ever been so instrumental in realizing citizens’ political impact and suggests the notion of instrumental citizens as those “who would undertake sensing projects” (p. 63), noting that they are “not rationalized actors completing a designated task,” but rather “contingent subjects involved in making and remaking—tooling and retooling—political life” (p. 70).

In chapter 2, Gabrys illuminates how the Citizen Sense project, working with residents, developed a citizen-sensing toolkit (“the Frackbox Kit”) to speculatively monitor and evidence air pollution as environmental and bodily harm near fracking sites in Northeastern Pennsylvania. The author conceptualizes these residents as speculative citizens, describing “how different ways of experiencing environments and pollution assemble as propositions for how to sense and build more breathable worlds” (p. 105). Gabrys demonstrates that instead of waiting for environmental and bodily harm to occur, speculative citizen-sensing practices contributed to the formation of speculative citizenships, where citizens create data and evidence on uncertain effects of air pollution through provisional practices to generate responsive and collective practices of care as “a speculative mode of encounter” (p. 145).

In chapter 3, Gabrys describes how the Citizen Sense project collaborated with residents, workers, and volunteers in South East London to develop sensor technologies and engage with multiple data practices. The aim was to materialize rights to breathable worlds, and Gabrys refers to these citizens as data citizens, describing “how technopolitical actors are constituted through data practices” (p. 152). Gabrys documents how they created the Dustbox particulate-matter sensor and monitoring kit, thereby generating a citizen-run air-quality monitoring network. The author aptly demonstrates how citizens, as data citizens, used their data as a potential medium to articulate and mobilize multiple rights, such as the right to breathe clean air,

alongside other forms of data, including official data sets. Gabrys emphasizes how data citizenship was created, activated, and developed through the integration of their data into various data practices. Ultimately, Gabrys highlights citizen data as narratives and experiences, emphasizing that “the data citizen . . . is not an automatically enlightened or empowered political subject. Indeed, it could be an ambiguous position, since data also require environments of relevance to take hold and have effect” (p. 197).

In chapter 4, Gabrys conceptualizes plants as sensors and measurement devices. The author characterizes their sensing practices as “more-than-human air-quality sensing” (p. 207), discussing how such sensing contributes to creating more breathable urban conditions. In doing so, Gabrys documents and analyzes how the Citizen Sense project, working with multiple collaborators, including the Museum of London, contributed to the construction of air-quality demonstrator gardens in traffic-laden London to create more breathable worlds. While bioindicator-based monitoring does not produce real-time environmental data, the Citizen Sense project strategically developed its toolkit (“the Phyto-Sensor Toolkit”) by including air-quality gardens. In documenting the struggles that the Citizen Sense project faced during the process, Gabrys proposes the concept of multiple citizens as those “formed with and through other entities and worlds in the making” (p. 205), noting that “multiple citizens involve not merely the multiplication of worlds but also the expansion of ways of being citizens, engaging in relations, and sensing, exchanging, and breathing together” (p. 239).

In the concluding chapter, Gabrys summarizes the main argument of this participatory and practice-based research, reflecting and elaborating on the notion of citizens of worlds. The author emphasizes the notion as “an approach to citizenship as a register of collective experience” (p. 250). Gabrys defines sensing citizens as those who not only seek to make sense of worlds under environmental threats but also “materialize through practices that attempt to operationalize sensing toolkits to generate less extractive relations—with technology, environments, and other entities” (p. 250).

The significance of these cases and salient findings could be further augmented if explored within non-English-speaking contexts. For example, Gabrys correctly pointed out that “more-than-human organisms do not typically register as ‘citizen sensors’” (p. 205). Yet, there is a compelling history of Japanese scientists and citizens employing *tradescantia* to monitor radiation leaks from Japan’s nuclear power plants (e.g., Takagi, 2015). By juxtaposing these cases, one might attain a more profound understanding of the breadth encompassed by the concept of “multiple citizens,” as articulated in chapter 4.

In *Citizens of Worlds: Open-Air Toolkits for Environmental Struggle*, Gabrys splendidly depicts the multifaceted connections between citizens and their environments via sensors, providing various concepts on citizens and citizenships. Yet, I found myself desiring a deeper exploration of each participant’s engagement in citizen-sensing practices. A richer understanding of each citizen comprising *citizens of worlds* would yield a more nuanced grasp of the realities of citizens and citizenships as constructed by these concepts. However, when delineating citizens or citizenships with qualifying adjectives, it becomes a significant challenge to discern the extent to which scholars can and should portray each citizen. Admittedly, my critique might be seen as demanding an excessive level of detail. This book not only meticulously describes the research process undertaken by the author’s research group, but it also succeeds in presenting these complex findings in terms easily grasped by readers. Without a doubt, this remarkable book offers valuable insights for scholars and practitioners alike on environmental issues, citizen science, and data activism.

### References

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