



HAL
open science

Introduction: Beyond the Production of Ignorance: The Pervasiveness of Industry Influence through the Tools of Chemical Regulation

Emmanuel Henry, Valentin Thomas, Sara Angeli Aguiton, Marc-Olivier Déplaude, Nathalie Jas

► To cite this version:

Emmanuel Henry, Valentin Thomas, Sara Angeli Aguiton, Marc-Olivier Déplaude, Nathalie Jas. Introduction: Beyond the Production of Ignorance: The Pervasiveness of Industry Influence through the Tools of Chemical Regulation. *Science, Technology, and Human Values*, 2021, 46 (5), pp.911-924. 10.1177/01622439211026749 . hal-03348611

HAL Id: hal-03348611

<https://hal.science/hal-03348611>

Submitted on 7 Dec 2021

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Introduction: Beyond the Production of Ignorance: The Pervasiveness of Industry Influence through the Tools of Chemical Regulation

Emmanuel Henry, Valentin Thomas, Sara Angeli Aguiton, Marc-Olivier Deplaude, and Nathalie Jas

Henry, E., Thomas, V., Aguiton, S. A., Déplaude, M.-O., & Jas, N. (2021). Introduction: Beyond the Production of Ignorance: The Pervasiveness of Industry Influence through the Tools of Chemical Regulation. *Science, Technology, & Human Values*, 46(5), 911–924. <https://doi.org/10.1177/01622439211026749>

Abstract

Research on the influence of industry on chemical regulation has mostly been conducted within the framework of the production of ignorance. This special issue extends this research by looking at how industry asserts its interests—not just in the scientific sphere but also at other stages of policy-making and regulatory process—with a specific focus on the types of tools or instruments industry has used. Bringing together sociologists and historians specialized in Science and Technology Studies (STS), the articles of the special issue study the arenas in which instruments and practical guidelines for public policy are negotiated or used. The aim is to observe the devices in the making or in action, from the selection of actors to the production of thresholds, criteria, and other technical regulations. The introduction highlights how industry influence on expertise and regulation is undoubtedly far more pervasive and multifarious than has been conceptualized to date by social scientists. Putting this issue back at the heart of both the STS and social sciences research agendas is increasingly urgent and could lead to new inquiries able to highlight these logics even more widely, using fresh empirical examples.

Keywords

politics, power, governance, chemical regulation, expertise, industry and economic actors, public health

For several years, scholars have been framing the influence of industry on the scientific sphere and the regulation of chemicals in terms of ignorance (Proctor and Schiebinger 2008; Gross and McGoey 2015). This research has highlighted how economic actors steer scientific research in a direction that is in line with their own interests. Above all, it has shown how industry attempts to avert the production or publication of knowledge that could potentially pose legal or regulatory problems, as in the case of the tobacco industry threatened by scientific confirmation of a link between smoking and lung cancer (Glantz 1998; Proctor 2011). A number of authors have extended this analysis to the realm of chemicals, documenting how effective regulation is subverted both through the lack of critical health or safety information and by casting doubt on available knowledge (Markowitz and Rosner 2002; Michaels 2008, 2020). Thus, some substances do not appear to be problematic simply because the data that could be used to determine their toxicity (or safety) do not exist (Grandjean et al. 2011; Hess 2016). Scholars have investigated the transmission of distorted data to regulatory agencies (McGarity and Wagner 2008) and, in some cases, have shown that regulatory agencies and administrative bodies are limited by specific forms of ignorance (as opposed to knowledge) on chemicals (McGoey 2012; Richter, Cordner, and Brown 2020). In other cases, the role of industry has been to participate in the production of a regulatory framework that tends to favor their interests, since it is based on scientific knowledge produced within an epistemic form that shapes the production of

knowledge and ignorance in a certain way (Suryanarayanan and Kleinman 2017). Some researchers have even shown how the very functioning of regulatory agencies, sometimes independently of industrial intervention, could generate organized forms of ignorance (Frickel and Edwards 2014).

In this special issue, we extend this work on ignorance by looking at how industry asserts its interests, not just in the scientific sphere but also at other stages of policy-making and regulatory process. We do so with a specific focus on the types of tools or instruments industry uses to weigh in on those policies (Lascoumes and Le Gales 2007). In so doing, we highlight the pervasive nature of industry power as it can be observed in various areas of chemicals regulation.¹ This raises questions that have not yet been adequately addressed in the literature on regulatory policies for commercial chemicals. Though some scholars have studied the use of standards and regulatory tools in the governance of toxic substances, the proliferation of these policy tools, and their propensity to create transnational economic markets, there remains a lack of work focusing on how these tools are built and used, and the role of industry in those processes.

“Safe until proven guilty” often appears to be the principle governing chemical compound markets, although the European regulation of chemicals (namely Registration, Evaluation, Authorisation and Restriction of Chemicals [REACH]) was meant to change this model (Boullier 2019). As a consequence, the commercialization and use of many (potentially) toxic substances continue to be authorized at national and international levels (Boudia 2014; Casper 2003; Ross and Amter 2010). The various studies stressing the increasingly toxic nature of our societies and environment thus highlight the ineffectiveness of these different devices in their aims of protecting public health and the environment (Liboiron, Tironi,

and Calvillo 2018; Boudia and Jas 2014; Davies and Mah 2020). At the same time (though more discreetly), the proliferation of such regulatory devices has allowed the creation of markets and structured rules to regulate and facilitate the circulation of chemicals on a global scale, especially for the dominant players on the market. Policies regulating toxic substances through a wide range of administrative and technical tools are perceived primarily as protecting people and environments, yet their main effect is actually the creation, harmonization, and protection of markets (Djelic and Sahlin-Andersson 2006). For corporations (and multinationals in particular), national and international regulatory bodies offer another avenue through which to further their interests within their market. Far from being ordinary or neutral, government tools and health standards for toxic substances actually support specific economic interests through technical devices, as is attested to by bilateral or multilateral free trade agreement negotiations. Yet, while we know what these standards actually do, we don't know how they are crafted. Social science research on regulatory science and the relationship between the scientific and commercial spheres has seldom opened the black box containing health and environmental standards (for exceptions, Abraham and Ballinger 2012; Boullier, Demortain, and Zeeman 2019).

A number of scholars have hypothesized how neoliberal thinking has shaped regulatory policies in various sectors (Moore et al. 2011). Certain authors, heirs to a considerable literature on the spread of neoliberal ideology and policies (Dardot, Laval, and Elliott 2014; Crouch 2011; Harvey 2005), have therefore urged other scholars “to undertake detailed exploration of exactly how the external political-economic forces of neoliberalism are transforming technoscience” (Lave,

Mirowski, and Randalls 2010, p. 1). For example, Abraham and Ballinger (2012) have pointed to the “ideological penetration” of the technical apparatus for regulating toxic substances by showing how commercial interests have shaped the validation of new tests for carcinogenicity. Despite the value of such an approach, neoliberal thinking is heterogeneous, rather than monolithic (Plehwe, Walpen, and Neunhoffer 2006, 1-24), and how it is assimilated depends primarily on the balance of power within the social arenas in which it is disseminated (Chorev 2013). The explicitly externalist approach to changes in technoscience arising from an overly automatic application of the notion of “neoliberalization” should serve as a deterrent against “pushing [its use] too far,” as was proposed in the case of urban sociology (Le Gal`es 2016).

In contrast to those scientific works dealing with industry’s influence on regulation policies, other studies have examined regulatory spaces, though without identifying any specific role played by economic actors. Significantly, the authors of *Controlling Chemicals*, a classic book in the field, devoted only one of the twelve chapters to the “Chemical Industry” (Brickman, Jasanoff, and Ilgen 1985). Drawing on a comparative method, they identified different national models of the relationship between private companies in the chemical industry and public administration. While this type of approach does provide comprehensive synthesis and strong comparison between dominant legal–political complexes, it remains overly general in its analysis of power relations (Brickman 1984; Carpenter 2014; Rushefsky 1986; Vogel 2012). However, by studying the accumulation of technical details, we can grasp how regulatory systems that are structurally favorable to the circulation and use of toxic goods have taken shape (Richter, Corder, and Brown 2018, 2020). When the literature on

regulatory science narrows its empirical focus, it has generally done so without really questioning the role of economic interests. Many studies rely on the internal logics of scientific rationales (Demortain 2017, 2020) to explain the construction of regulatory tools and knowledge and their “regimes of objectivity” (Jasanoff 2011, 1990). Moreover, when this literature examines the changes in scientific paradigms that have punctuated regulatory science, it does so without specifically investigating the role played by market actors (Shostak 2013, 48-70). While these authors clearly highlight the different policies contained in regulatory tools, they pay little attention to the economic interests that have governed their elaboration and therefore fail to investigate the “economic policy” embedded in them (Cranor 1997).

All this research thus overlooks some very important questions that STS is equipped to address, particularly when grounded in a political sociology of science approach (Frickel and Moore 2006). What are the mechanisms through which the voices of certain economic actors get prioritized over others? How are these actors’ economic interests framed in technical terms and rendered invisible through technical vocabulary or scientific instruments? How are alternatives less favorable to the economic actors involved ruled out, while other kinds of organizations (nongovernmental organizations and environmental associations) are marginalized?

To answer these questions, we narrow the empirical focus to capture the micro-political power struggles at play in the making of regulatory tools and/or in the ways they are used. Since 1945, the number of devices regulating chemical-related health risks has grown exponentially, and this trend can be observed at both national and international levels. It intertwines a set of health standards, expert groups, and institutions, along with agreements that are more or less legally binding (Selin

2010). “Inextricable webs of [technical] devices” (Jas 2014) have thus come to envelop a range of chemical-related health issues by categorizing them on the basis of modes of exposure or types of product use: occupational exposure (Henry 2017; Hansson 1998), food consumption (Lindner 2008; Ansell and Vogel 2006), medicine regulation (Hauray 2006; Carpenter 2010), or pesticide marketing authorizations (Jas 2013). It is therefore very difficult to assess the extent of the issue, as we have to build new categories to simultaneously capture every dimension of the problem, as some of us proposed elsewhere through the analysis of “residues” (Boudia et al. 2021).

Each of those devices has a backstory involving specific actors, stakes, and unrealized potential that can be identified through focused investigation. Every toxicity threshold and marketing authorization bears the trace of negotiations articulating scientific rationales for the determination of certain hazards and defending particular economic interests. Bringing together sociologists and historians specialized in the social studies of science, all of whom work on expertise and regulatory organizations in different fields of inquiry (and diverse empirical points of entry), this special issue endeavors to open up new areas of research and develop new analytical pathways. The articles study the arenas in which instruments and practical guidelines for public policy are negotiated, while also focusing on these devices themselves—that is, the instruments that are negotiated and used to regulate potentially dangerous activities. The aim is to observe the devices in the making or in action, from the selection of actors to the production of thresholds, criteria, and technical forms. This approach presents two major challenges that have been successfully overcome by the authors of the various articles: the confidential and closed nature of the arenas of regulation, and the technical barrenness of the tools produced there.

Addressing the subject of the Organisation for Economic Co-operation and Development (OECD) policies regulating toxic substances, Colleen Lanier-Christensen puts this issue of resources at the center of her analysis, showing that this technical knowledge was constructed against a backdrop of an uneven distribution of resources and institutional access among the actors involved in shaping regulatory tools. She specifically discusses an international agreement on Minimum Pre-Marketing Data. This administrative tool specifies the minimum package or “base set” of data required for regulators to assess the safety of a chemical before it enters the marketplace. Approved by 24 OECD countries in 1980, it was effectively undermined in 1981 after US chemical industry associations convinced the United States to reverse its support for this international standard. The micro-political contests Lanier-Christensen examined demonstrate how industrial and environmental organizations mobilized resources and expertise to shape the knowledge standards of harmonized regulatory frameworks. US industry groups successfully shaped the outcomes of these struggles by taking advantage of swings in national regulatory politics to disrupt international consensus.

This idea of an asymmetry of resources that separates industries from other types of actors involved in risk regulations (whether trade unions or national or international public administrations) is also one of the areas studied by Emmanuel Henry. His article uses the example of occupational exposure limits (OELs) for toxic substances, emphasizing the problem presented by the very nature of regulatory tools, which frame fundamentally social and political issues in scientific and technical terms. This way of defining the problem allows industrial actors both to position themselves on terrain that is richer in terms of available resources and to benefit from the slowness with which decisions of a highly technical and

scientific nature are taken. In the case of asbestos and its substitutes, Henry shows how the implementation timescales of these regulations allow industries to adapt ahead of their enactment, limiting the economic loss that might have been inflicted by other methods of control.

The dragging out of negotiations is, incidentally, a weapon expertly wielded by industries in other circumstances. This is shown by Angela Creager in the case of the Toxic Substances Control Act (TSCA), passed by the US Congress in 1976 after five years of debate. The TSCA was initially conceived as a means of specifying the toxicity tests that should be done before chemical substances enter the market, yet the final text included no generic requirements for testing, for either old or new chemicals. The long process of implementing the law, with its conflicting mandates, provided further opportunity for industry to shape what data the Environmental Protection Agency could request for commercial chemicals. While the deregulatory trend of the 1980s contributed to the weakening of government oversight of chemicals through the TSCA, industrial actors were able to use procedural requirements of US law to their own advantage throughout this period.

Public administrations and regulatory bodies are not monolithic entities; it is unrealistic to think that, were it not for the involvement of industrial companies, these institutions would naturally lead to “neutral” policies or policies aligned with a certain “public interest”—the definition of which is always, in reality, historically and socially contextualized. This is what Valentin Thomas shows by focusing on the scientific and regulatory history of a biochemistry concept that was to turn out to be favorable to industry, by making it more difficult to confirm the carcinogenicity of a given chemical. Having used this concept as a weapon with which to defend their economic interests, some dominant actors in the chemical market made

successive attempts to establish it within a number of American and international regulatory and scientific institutions, notably the International Agency for Research on Cancer. Thomas shows that the success or failure of these attempts was dependent on the power dynamics within these institutions, in which different kinds of interests (institutional, scientific) were engaged.

This special issue therefore shifts the perspective on how several questions are addressed in the existing literature. First, studying these tools in the making or in action can shed light on their different rationales. While most studies on regulatory science examine technical standards from a cross-cutting perspective, granting much importance to the principles applied in legal rules, these articles focus on the making and implementation of regulatory tools, and they do so by trying to get as close as possible to the arenas in which they are negotiated and implemented and the actors involved. This makes it possible to highlight how the relations between industry and regulators adjust to each other. The nature of the relations between industrial and public actors is never totally predictable, and both alliance and resistance mechanisms can exist. Creager reveals, for example, that the industry courted certain segments of the Nixon administration, while other segments were much less receptive. It is also present in Lanier-Christensen's article, which shows that the OECD has been proactive in garnering the participation of industry, though the latter's influence depended on alignment with dominant interests. While the US delegation sought to balance industry perspectives with those of environmental groups, the shift between the Carter and Reagan administrations created new opportunities for industry associations to further their regulatory agenda.

Second, we propose moving beyond the ignorance/knowledge, decision/nondecision, and action/inaction dichotomies to highlight how the forms of public intervention themselves contribute to favoring the interests of industry at the expense of other categories of actors. As a follow-up to ignorance production studies, these articles highlight the fact that the making and use of some devices facilitate the persistence of ignorance and the unequal distribution of knowledge. They also show that, beyond scientific ignorance, industrial interventions contribute not only to the concealment of scientific knowledge but also and more broadly to the weighing up of nondecision or to the policy goal of making sure that regulation does not interfere with the marketing of chemicals. The articles by Creager and Lanier-Christensen show that regulations aimed at ensuring the safety of products often do not require the submission of health or environmental data, either premarket or postmarket. When information requirements are voluntary, dangers can remain invisible. In other cases that are closer to scientific spaces, the articles by Thomas and Henry show that the goal is not to produce ignorance so much as to constrain the regulatory relevance of knowledge, which can have the same effect. This is clear when Thomas demonstrates that a biochemical concept called “peroxisome proliferation,” initially crafted to identify a new class of human carcinogens by drawing on animal bioassays, eventually changed its status and became a means of avoiding prevention policies, by making animal-to-human extrapolation more difficult. It is also visible when Henry shows how the use of OELs makes it possible to avoid certain extreme exposures of workers, while at the same time legitimizing their long-term exposure to lower doses.

Third, we try to broaden inquiry beyond the scientific sphere and observe the activity of industries in other arenas and

involving other players, such as those in the political and administrative spheres. This allows us to see that the “production of doubt” in the realm of knowledge is only effective if those actors having an interest in it translocate this doubt beyond the academic sphere. In this sense, Thomas observes the transfer of scientific research to regulatory spaces through the case of the “peroxisome proliferation” concept. Lanier-Christensen and Creager show that industries seek to intervene at the very core of negotiation of the rules for the marketing of chemicals—that is, far upstream of both the expertise processes and the production of scientific knowledge on the dangers of products. The example of biochemical tests for the detection of mutagenicity analyzed in Creager’s piece shows how industrialists and their contacts in the American federal administration can use the wording of a statute to avert overly restrictive regulation and to a degree unanticipated even by corporate actors. Once the regulatory rules are shaped, fewer resources need to be deployed in the scientific sphere (Hepler-Smith 2019).

These articles thus show how industry influence on expertise and regulation is undoubtedly far more pervasive and multifarious than has been conceptualized to date by social scientists. Putting this issue back at the heart of both the STS and the social sciences, research agenda is increasingly urgent and could lead to new inquiries able to highlight these logics even more widely, using fresh empirical examples.

Authors’ Note

This special issue stems from the conference “Pervasive Powers: Corporate Authority in the Shaping of Public Policy,” held at the Université Paris-Dauphine, PSL University on June 14–16, 2018 (Paris, France). The organization of this

conference benefited from several funding sources including the Institut de recherche interdisciplinaire en sciences sociales (IRISSO, CNRS, INRAE, Université ParisDauphine), PSL University (Regulrisk and ProPublics Research programs), and the Institut francilien recherche innovation soci'ete' (IFRIS).

Acknowledgments

The editors of the special issue thank Angela Creager and Colleen LanierChristensen for their input to the general framing of this special issue and this introduction. We thank Soraya Boudia, Sophie Dubuisson-Quellier, Nicolas Fortan'e, Scott Frickel, Mathias Girel, Sylvain Laurens, Benjamin Lemoine, Paul Lagneau-Ymonet, Linsey McGoey, and Sezin Topcu for their participation in the preparation and moderation of the conference "Pervasive Powers: Corporate Authority in the Shaping of Public Policy."

Note

1. Most of the articles gathered for this special issue are revised versions of presentations made at the international conference "Pervasive Powers: Corporate Authority in the Shaping of Public Policy," held at Université Paris-Dauphine, PSL University, in June 2018. Other presentations are published in (Aguiton et al. 2021).

References

Abraham, John, and Rachel Ballinger. 2012. "The Neoliberal Regulatory State, Industry Interests, and the Ideological Penetration of Scientific Knowledge: Deconstructing the

Redefinition of Carcinogens in Pharmaceuticals.” *Science, Technology, & Human Values* 37 (5): 443-77.

Aguiton, Sara A., Marc-Olivier D’epaalde, Nathalie Jas, Emmanuel Henry, and Valentin Thomas, eds. 2021. *Pervasive Powers: The Politics of Corporate Authority*. Abingdon-on-Thames, UK: Routledge.

Ansell, Christopher K., and David Vogel, eds. 2006. *What’s the Beef? The Contested Governance of European Food Safety. Politics, Science, and the Environment*. Cambridge, MA: MIT Press.

Boudia, Soraya. 2014. “Managing Scientific and Political Uncertainty. Environmental Risk Assessment in a Historical Perspective.” In *Powerless Science? Science and Politics in a Toxic World*, edited by Soraya Boudia and Nathalie Jas, 95-112. Oxford, UK: Berghahn Books.

Boudia, Soraya, Angela N. H. Creager, Scott Frickel, Emmanuel Henry, Nathalie Jas, Carsten Reinhardt, and Jody A. Roberts. 2021. *Residues: Thinking through Chemical Environments*. New Brunswick, NJ: Rutgers University Press.

Boudia, Soraya, and Nathalie Jas. 2014. *Powerless Science? Science and Politics in a Toxic World*. Oxford, UK: Berghahn Books.

Boullier, Henri. 2019. *Toxiques legaux. Comment les firmes chimiques ont mis la main sur le controˆle de leurs produits*. Paris, France: La De’couverte.

Boullier, Henri, David Demortain, and Maurice Zeeman. 2019. “Inventing Prediction for Regulation.” *Science &*

Technology Studies 32 (4): 137-57. doi: 10.23987/sts.65062.

Brickman, Ronald. 1984. "Science and the Politics of Toxic Chemical Regulation: U.S. and European Contrasts." *Science, Technology, & Human Values* 9 (1): 107-11. doi: 10.1177/016224398400900112.

Brickman, Ronald, Sheila Jasanoff, and Thomas L. Ilgen. 1985. *Controlling Chemicals: The Politics of Regulation in Europe and the United States*. Ithaca, NY: Cornell University Press.

Carpenter, Daniel. 2010. *Reputation and Power: Organizational Image and Pharmaceutical Regulation at the FDA*. Princeton, NJ: Princeton University Press.

Carpenter, Daniel. 2014. "Chapter 7. Corrosive Capture? The Dueling Forces of Autonomy and Industry Influence in FDA Pharmaceutical Regulation." In *Preventing Regulatory Capture: Special Interest Influence and How to Limit It*, edited by David A. Moss and Daniel Carpenter, 152-172. New York: Cambridge University Press.

Casper, Monica J., ed. 2003. *Synthetic Planet: Chemical Politics and the Hazards of Modern Life*. New York: Routledge.

Chorev, Nitsan. 2013. "Restructuring Neoliberalism at the World Health Organization." *Review of International Political Economy* 20 (4): 627-66.

Cranor, Carl F. 1997. *Regulating Toxic Substances: A Philosophy of Science and the Law*. New York: Oxford University Press.

Crouch, Colin. 2011. *The Strange Non-death of Neoliberalism*. Cambridge, MA: Polity Press.

- Dardot, Pierre, Christian Laval, and Gregory Elliott. 2014. *The New Way of the World: On Neoliberal Society*. New York: Verso.
- Davies, Thom, and Alice Mah. 2020. *Toxic Truths: Environmental Justice and Citizen Science in a Post-truth Age*. Manchester, UK: Manchester University Press.
- Demortain, David. 2017. "Expertise, Regulatory Science and the Evaluation of Technology and Risk: Introduction to the Special Issue." *Minerva* 55 (2): 139-59. doi: 10.1007/s11024-017-9325-1.
- Demortain, David. 2020. *The Science of Bureaucracy. Risk Decision-making and the US Environmental Protection Agency*. Cambridge, MA: MIT Press.
- Djelic, Marie-Laure, and Kerstin Sahlin-Andersson. 2006. *Transnational Governance: Institutional Dynamics of Regulation*. New York: Cambridge University Press.
- Frickel, Scott, and Michelle Edwards. 2014. "Untangling Ignorance in Environmental Risk Assessment." In *Powerless Science? Science and Politics in a Toxic World*, edited by Soraya Boudia and Nathalie Jas, 215-33. Oxford, UK: Berghahn Books.
- Frickel, Scott, and Kelly Moore. 2006. *The New Political Sociology of Science: Institutions, Networks, and Power*. Madison: University of Wisconsin Press.
- Glantz, Stanton A. 1998. *The Cigarette Papers*. Berkeley: University of California Press.

- Grandjean, Philippe, Mette L. Eriksen, Ole Ellegaard, and Johan A. Wallin. 2011. "The Matthew Effect in Environmental Science Publication: A Bibliometric Analysis of Chemical Substances in Journal Articles." *Environmental Health* 10 (2011): 96. doi: 10.1186/1476-069X-10-96.
- Gross, Matthias, and Linsey McGoey, eds. 2015. *Handbook of Ignorance Studies*. Abingdon, UK: Routledge.
- Hansson, Sven Ove. 1998. *Setting the Limit: Occupational Health Standards and the Limits of Science*. Oxford, UK: Oxford University Press.
- Harvey, David. 2005. *A Brief History of Neoliberalism*. New York: Oxford University Press.
- Hauray, Boris. 2006. *L'Europe du médicament: Politique, expertise, int' ere' ^ts prives'*. Paris, France: Presses de Sciences Po.
- Henry, Emmanuel. 2017. *Ignorance scientifique et inaction publique: Les politiques de sante au travail'*. Paris, France: Presses de Sciences Po.
- Hepler-Smith, Evan. 2019. "Molecular Bureaucracy: Toxicological Information and Environmental Protection." *Environmental History* 24 (3): 534-60. doi: 10.1093/envhis/emy134.
- Hess, David J. 2016. *Undone Science. Social Movements, Mobilized Publics, and Industrial Transitions*. Cambridge, MA: MIT Press.
- Jas, Nathalie. 2013. "Adapting to 'Reality': The Emergence of an International Expertise on Food Additives and Contaminants in the 1950's and Early 1960's." In *Toxicants*,

- Health and Regulation since 1945, edited by Soraya Boudia and Nathalie Jas, 47-69. London, UK: Pickering and Chatto.
- Jas, Nathalie. 2014. "Gouverner les substances chimiques dangereuses dans les espaces internationaux." In *Le gouvernement des technosciences. Gouverner le progrès depuis 1945*, edited by Dominique Pestre, 31-63. Paris, France: La Découverte.
- Jasanoff, Sheila. 1990. *The Fifth Branch: Science Advisers as Policymakers*. Cambridge, MA: Harvard University Press.
- Jasanoff, Sheila. 2011. "The Practices of Objectivity in Regulatory Science." In *Social Knowledge in the Making*, edited by Camie Charles, Gross Neil, Michele Lamont, and Jasanoff Sheila, 307-39. Chicago, IL: The University of Chicago Press.
- Lascoumes, Pierre, and Patrick Le Gales. 2007. "Introduction: Understanding Public Policy through Its Instruments? From the Nature of Instruments to the Sociology of Public Policy Instrumentation." *Governance* 20 (1): 1-21. doi: 10.1111/j.1468-0491.2007.00342.x.
- Lave, Rebecca, Philip Mirowski, and Samuel Randalls. 2010. "Introduction: STS and Neoliberal Science." *Social Studies of Science* 40 (5): 659-75.
- Le Galès, Patrick. 2016. "Neoliberalism and Urban Change: Stretching a Good Idea Too Far?" *Territory, Politics, Governance* 4 (2): 154-72.
- Liboiron, M., M. Tironi, and N. Calvillo. 2018. "Toxic Politics: Acting in a Permanently Polluted World." *Social Studies of Science* 48 (3): 331-49. doi: 10.1177/0306312718783087.

- Lindner, Line Friis. 2008. "Regulating Food Safety: The Power of Alignment and Drive towards Convergence." *Innovation: The European Journal of Social Science Research* 21 (2): 133-43. doi: 10.1080/13511610802214487.
- Markowitz, Gerald, and David Rosner. 2002. *Deceit and Denial: The Deadly Politics of Industrial Pollution*. Berkeley: University of California Press.
- McGarity, Thomas O., and Wendy Elizabeth Wagner. 2008. *Bending Science. How Special Interests Corrupt Public Health Research*. London, UK: Harvard University Press.
- McGoey, Linsey. 2012. "The Logic of Strategic Ignorance." *British Journal of Sociology* 63 (3): 553-76.
- Michaels, David. 2008. *Doubt Is Their Product: How Industry's Assault on Science Threatens Your Health*. Oxford, UK: Oxford University Press.
- Michaels, David. 2020. *The Triumph of Doubt: Dark Money and the Science of Deception*. New York: Oxford University Press.
- Moore, Kelly, Daniel Lee Kleinman, David Hess, and Scott Frickel. 2011. "Science and Neoliberal Globalization: A Political Sociological Approach." *Theory and Society* 40 (5): 505-32. doi: 10.1007/s11186-011-9147-3.
- Plehwe, Dieter, Bernhard Walpen, and Gisela Neunhoffer, eds. 2006. *Neoliberal Hegemony: A Global Critique*. Abingdon, UK: Routledge.
- Proctor, Robert N. 2011. *Golden Holocaust: Origins of the Cigarette Catastrophe and the Case for Abolition*. Berkeley: University of California Press.

- Proctor, Robert N., and Londa L. Schiebinger, eds. 2008. *Agnotology: The Making and Unmaking of Ignorance*. Stanford, CA: Stanford University Press.
- Richter, Lauren, Alissa Cordner, and Phil Brown. 2018. "Non-stick Science: Sixty Years of Research and (in)Action on Fluorinated Compounds." *Social Studies of Science* 48 (5): 691-714. doi: 10.1177/0306312718799960.
- Richter, Lauren, Alissa Cordner, and Phil Brown. 2020, October. "Producing Ignorance through Regulatory Structure: The Case of Per- and Polyfluoroalkyl Substances (PFAS)." *Sociological Perspectives*. Epub ahead of print. doi: 10.1177/0731121420964827.
- Ross, Benjamin, and Steven Amter. 2010. *The Polluters: The Making of Our Chemically Altered Environment*. New York: Oxford University Press.
- Rushefsky, Mark E. 1986. *Making Cancer Policy*. Albany: State University of New York Press.
- Selin, Henrik. 2010. *Global Governance of Hazardous Chemicals: Challenges of Multilevel Management*. Cambridge, MA: MIT Press.
- Shostak, Sara. 2013. *Exposed Science. Genes, the Environment, and the Politics of Population Health*. Berkeley: University of California Press.
- Suryanarayanan, Sainath, and Daniel Lee Kleinman. 2017. *Vanishing Bees: Science, Politics, and Honeybee Health. Nature, Society, and Culture*. New Brunswick, CA: Rutgers University Press.

Vogel, David. 2012. *The Politics of Precaution: Regulating Health, Safety, and Environmental Risks in Europe and the United States*. Princeton, NJ: Princeton University Press.