

Main questions from the literature:

- As a researcher, if an idea makes you upset or defensive, why is that so? Are you holding on to biases or values that do not coincide with reality?
- How does science benefit citizens whose tax payments ultimately pay for much of the research conducted in the US? Are those benefits guaranteed? Who will make the most money off of innovation and at whose expense?
- Who has the right and obligation to participate in decision making regarding scientific agenda setting and ethical decisions? Are groups of experts effective at deciding what is best for members of society? Should scientists look for diverse opinions before making decisions? Are scientists obligated to establish trust and understanding before helping communities?
- Is science always a tool for good? Can interest groups use science to push their agendas? Can science be used to slow down decision-making processes?
- Does objective thinking exist? Is an objective point-of-view really an extension of one's own biases? Should we be wary of people or institutions that use objectivity as a distraction from their own agendas?

Bozeman, B., & Sarewitz, D. R. (2005). Public values and public failure in US science policy. *Science and Public Policy*, 32(2), 119–136.
<https://doi.org/10.3152/147154305781779588>

This article questions the conventional framing used to motivate scientific research in the US. Bozeman and Sarewitz argue that scientific research would serve the taxpayers – who fund much of the research – better if it was thought of as a means of solving public failures rather than as a means of generating patents and economic activity. This article is interesting because it shows that the way we think of the purpose of scientific research affects our expectations from it.

Frickel, S., Gibbon, S., Howard, J., Kempner, J., Ottinger, G., & Hess, D. J. (2010). Undone science: Charting social movement and civil society challenges to research agenda setting. *Science, Technology, & Human Values*, 35(4), 444–473.
<https://doi.org/10.1177/0162243909345836>

This article explains the concept of *undone science*. This is research that remains to be done, despite a clear need or want for answers. Frickel et al. go on to offer examples of why undone science persists through a political lens (for instance, excessive cost, excessive complexity, intervention from interest groups). This article is interesting because it casts a light on the gap between what science claims to offer society and what it is ultimately able to deliver.

Jasanoff, S., Hurlbut, J. B., & Saha, K. (2019). Democratic governance of human germline genome editing. *The CRISPR Journal*, 2(5), 266–271.
<https://doi.org/10.1089/crispr.2019.0047>

This article argues that for complex ethical issues in science – they use human genome editing via CRISPR as an example – trusting a group of scientists appointed by scientists is not sufficient and may cause harm. Jasanoff et al. argue that a better way to negotiate ethical dilemmas in science is to create democratic governance groups that represent citizens from all political, religious, and social backgrounds. I think this article is interesting because it highlights the need for diverse thinking in policy decision making – not just the thinking of self-appointed experts.

Kleinman, D. L., & Suryanarayanan, S. (2013). Dying bees and the social production of ignorance. *Science, Technology, & Human Values*, 38(4), 492–517.
<https://doi.org/10.1177/0162243912442575>

Suryanarayanan, S., & Kleinman, D. L. (2013). Be(e)coming experts: The controversy over insecticides in the honey bee colony collapse disorder. *Social Studies of Science*, 43(2), 215–240. <https://doi.org/10.1177/0306312712466186>

These articles ask the question, are people that work with bees for a living experts on why bees are dying off? Kleinman and Suryanarayanan explore different accounts of the recent increase in bee deaths. For beekeepers, the deaths are explained by recent uses of systemic insecticides that coincide with the increase of deaths. For EPA toxicologists, their methods do not show a causal relationship between systemic insecticides and bee deaths. Kleinman and Suryanarayanan explore how the complex action of systemic insecticides elude simple causal theories, rendering EPA methods insufficient. Additionally, the EPA is lobbied by agrochemical companies that are against regulation of systemic insecticides. These articles are interesting because they show how institutions, such as the EPA, can use science as an excuse for ignoring major problems that can be clearly demonstrated in the field. Rigid adherence to traditional scientific methods may obstruct the pursuit of more robust methods that could definitively explain the death of bees seen by lived-experience experts.

Kleinman, D. L., Powell, M., Grice, J., Adrian, J., & Lobes, C. (2007). A toolkit for democratizing science and technology policy: The practical mechanics of organizing a consensus conference. *Bulletin of Science, Technology & Society*, 27(2), 154–169.
<https://doi.org/10.1177/0270467606298331>

This article is a guide to conducting consensus conferences. Consensus conferences are fora that allow citizens to input their ideas about a policy decision. Although consensus conferences are a great way of engaging the public in democratic discourse, there are many things to consider to

allow for a successful forum. This article explains how to better include citizen voices in decision making for those interested in including a diverse array of opinions.

Kline, R., & Pinch, T. (1996). Users as agents of technological change: The social construction of the automobile in the rural United States. *Technology and Culture*, 37(4), 763–795. JSTOR. <https://doi.org/10.2307/3107097>

This article explores the history of the automobile in the US. Specifically, Kline and Pinch are interested in how rural Americans affected the development of the automobile in the early 20th century. They emphasize that technology is not merely created by engineers and scientists and deployed into the world, but that the technology itself evolves amidst political and social actions. This article is interesting because it shows a clear example of how technology is often out of the control of its inventors and how development is not linear – it is an ever-changing shifting that progresses and regresses from constant feedback loops between users and designers.

Pauli, B. J. (2019). The water is (not) safe: Expertise, citizen science, and the science wars. In *Flint fights back: Environmental justice and democracy in the Flint water crisis*. The MIT Press.

This chapter explores the effects the experts had on the Flint water. Pauli argues that experts can potentially make problems worse by forcing the conversation to turn to their own interests or by confusing and betraying citizens. Ultimately, Pauli wants the reader to understand that experts must establish trust in the communities they aim to help by listening and spending time with those people. Expert scientists are people; they are driven by their own research agendas, business incentives, and personal quarrels. Pauli argues that when experts do not control these problems and communities do not acknowledge expert hubris, trust falls, and outcomes are grim.

Powell, M., & Kleinman, D. L. (2008). Building citizen capacities for participation in nanotechnology decision-making: The democratic virtues of the consensus conference model. *Public Understanding of Science*, 17(3), 329–348. <https://doi.org/10.1177/0963662506068000>

This article studies the effects that democratic consensus conferences have on citizens and their political participation. Powell and Kleinman interview participants in consensus conferences to see how they responded to the meetings. They find that even if policymakers are unresponsive to requests by democratic consensus conferences, the action of participating in them engages citizens and empowers their ability to change science for the benefit of society. This article is interesting because it shows the individual effect that democratic consensus conferences has on individuals – a view often overlooked in planning these events.

Sarewitz, D. R. (1996a). The end of the age of physics. In *Frontiers of illusion: Science, technology, and the politics of progress*. Temple University Press.

This is the introductory chapter from Sarewitz's book about the history of scientific research in the US and how powerful interest groups have shaped this development. Sarewitz describes five myths that interest groups, such as universities, have used to persuade policymakers to fund scientific research. These myths are (1) "more science and more technology will lead to more public good," (2) "any scientifically reasonable line of research into fundamental natural processes is as likely to yield societal benefits as any other," (3) peer review, reproducibility of results, and other controls on the quality of scientific research embody the principal ethical responsibilities of the research system," (4) "scientific information provides an objective basis for resolving political disputes," and (5) "knowledge generated at the frontiers of science is autonomous from its moral and practical consequences in society." Ultimately, Sarewitz argues for more socially conscious science that aims to help taxpayers who fund research.

Sarewitz, D. R. (1996b). The myth of unfettered research. In *Frontiers of illusion: Science, technology, and the politics of progress*. Temple University Press.

This is another chapter from Sarewitz's book – see above – that goes into the myth of unfettered research, that "any scientifically reasonable line of research into fundamental natural processes is as likely to yield societal benefit as any other." Sarewitz argues that the belief that putting money and resources into basic science without carefully considering what the research is exploring is inefficient and ineffective. Although basic science is necessary, overinvestment here will lead to underinvestment in research that could better serve society. This chapter is interesting because it goes against the belief that any piece of knowledge will eventually be useful and makes us question what we as scientists should be exploring and how institutions can incentivize this work.

Simis, M. J., Madden, H., Cacciatore, M. A., & Yeo, S. K. (2016). The lure of rationality: Why does the deficit model persist in science communication? *Public Understanding of Science*, 25(4), 400–414. <https://doi.org/10.1177/0963662516629749>

This article explains the knowledge deficit model ultimately hurts science communication. The knowledge deficit model is the idea that science communication is stymied by the public's lack of education about science and argues that citizens should be better educated to engage in scientific discourse. Simis et al. argue that this model is wrong and that scientists should work harder to translate their research into messages that most people can understand. This article is interesting because it shows how highly educated scientists are resistant to learning about effective communication and excuse this resistance by blaming the less educated.

Smith, N. (2006). There's no such thing as a natural disaster. *Social Science Research Council*.

This article is a case study of how framing affects the way we think about events, in this case, natural disasters. Smith argues that natural disasters are just one way of thinking about events like hurricanes or earthquakes. These events are only disasters when people and governments are poorly prepared or do not respond well to these events. Smith warns that framing poor responses to natural events as “disasters” is a means of excusing poor policymaking and allowing exploitation of affected people.

Tyrnauer, M. (2016, September 9). *Citizen Jane: Battle for the city* [Documentary, Biography, History]. IFC Independent Film.

This is a documentary about Jane Jacobs, a journalist and urban studies influencer, who started a grassroots movement against city planning in New York City during the mid-20th century. Jacobs criticized the male-dominated field of urban planning and their unrealistic interests in utopian ideals in planning living spaces. Jacobs understood that urban planners were not interested in engaging with the people who were living in cities and fought to change that. This documentary is streaming on Hulu.

Winner, L. (1980). Do artifacts have politics? *Daedalus*, 109(1), 121–136.
<https://www.jstor.org/stable/20024652>

In this article, Winner argues that all technology – sociologists call technology “artifacts” – are created in the context of political thinking or are designed directly by political motives. Winner cites an instance where Robert Moses, a New York City urban planner in the early to mid-20th century, designed bridges to beaches on Long Island so that the clearance was too low for buses to pass under. Winner argues that this bizarre design decision was motivated by Moses’s desire that low-SES and racial minorities – people who rode buses – not use the beaches. This article is interesting because it destabilizes the idea that technology exists to benefit everyone equally. Rather, technology can be used to push political agendas or is designed with the biases of the designer.

Wynne, B. (1992). Misunderstood misunderstanding: Social identities and public uptake of science. *Public Understanding of Science*, 1(3), 281–304. <https://doi.org/10.1088/0963-6625/1/3/004>

This article shows a case study of how public trust in scientists and government institutions can erode when the what the public observes is contradicted. Wynne cites the case of sheep farmers in Northern England who could not sell their good after radioactive isotopes were found in

sheep's wool. The government claimed that this radiation came from wind that carried contaminants from the Chernobyl incident in Ukraine. Ultimately, the radioactive contamination was from industrial spills from a local nuclear processing plant. The government used the Chernobyl incident to cover up this spill. When news came out, the farmers lost trust in the government. This article is interesting because it shows a clear example of how governmental negligence can harm citizens and the ramifications that these dynamics have on trust.