

Broadening the Scope of Engaged Philosophy of Science: An Empirical Analysis  
of Context-Dependent Barriers

by

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A thesis  
presented to the University of Waterloo  
in fulfilment of the  
thesis requirement for the degree of  
Doctor of Philosophy  
in  
Philosophy

Waterloo, Ontario, Canada, 2020

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# **Author's Declaration**

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

# Abstract

Philosophers of science have increasingly been discussing the social and scientific relevance of philosophy over the last decade. These discussions have included philosophy's role in addressing scientific problems, clarifying scientific concepts, contributing to science policy, analyzing the role for social and ethical values in science, and more. I refer to this work as broadly engaged philosophy of science. While attention to this work is growing, scholars continue to point out that philosophy of science is not as connected to science and society as it could (or should) be, and that engaged approaches are undervalued. Philosophers debate about which research methods and areas of research in philosophy of science are legitimately philosophical, which communities philosophers of science should and should not engage with, and just how collaborative philosophers of science ought to be with communities outside of their own.

In this dissertation, I analyze key reasons why socially and scientifically relevant work seems to remain marginalized in philosophy of science. Moreover, I explore how narrow conceptions of philosophy of science limit engagement with scientifically-relevant domains and ultimately harm the discipline. Until now, philosophers have been largely discussing engagement from academic philosophy outward to scientifically relevant domains. Even in cases where philosophers of science are arguing for more engaged relationships between philosophical and scientific communities, philosophers are entrenched in conceptions of philosophy as synonymous with academia. However, in parallel, philosophers of colour have been critiquing traditional methods in philosophy as being hostile to diverse practitioners and limiting philosophy's ability to respond to relevant questions. I challenge this predominant conception by highlighting an approach to engaged philosophy of science wherein philosophers are directly embedded in scientifically relevant domains – i.e., philosophers are employed in government agencies and industry science settings. I also use empirical methods to explore the barriers that prevent broadly engaged philosophy of science from being appropriately valued and rewarded despite its benefits to philosophy, as well as science and society. Then, I argue for the need to develop solutions that are responsive to institutional, departmental, and disciplinary contexts. I offer empirically-informed possibilities for intervening in this historical pattern so that we can recognize the value of this work and support it.

# Acknowledgements

I'd like to start by thanking Katie Plaisance for being a consistently supportive supervisor, mentor, and collaborator. Thank you for reminding me where my strongest arguments were hiding. I'd also like to thank Shannon Dea for her thorough and challenging comments on my work, they truly made my writing better. Thanks also go to Carla Fehr for helping me make my work clearer and sharper. My gratitude goes to the philosophers of science who shared their stories and struggles with us through the interviews. Their insights into the discipline and academic life were essential to my work. I also owe a great deal of my inspiration to the many people I've supported in my job outside of graduate school while I wrote this dissertation. Their stories linger faintly between the lines of my work.

Heartfelt thanks go out to my friends and colleagues over the years for their kindness, support, and welcomed distractions. Profound thanks go to my partner, Brad, for supporting me through the ups, downs, and twists of graduate student life. He joined me on this adventure without question and its radically changed our lives in ways we could have never expected. Last but absolutely not least, I'd like to express my gratitude towards my dog, Jackson, despite his inability to read this. He sat with me while writing nearly every single word in these pages. He reminded me when to take breaks and comforted me when my patience for this process ran thin. The support I received from my canine companion is truly irreplaceable.

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# Chapter 1

## Introduction

### 1.1: Social and Scientific Relevance in Philosophy of Science

Over the last decade, philosophers of science have increasingly been discussing the social and scientific relevance of philosophy. These discussions have included philosophy's role in addressing scientific problems, clarifying scientific concepts, contributing to science policy, analyzing the role for social and ethical values in science, and more. Philosophers of science as early as Neurath, Carnap, and Dewey in the 1930s have argued that philosophy of science ought to connect to social and scientific problems (Richardson 2002, Howard 2009, Douglas 2010). Despite early interest in engagement with science and society from acclaimed philosophers, scholars continue to point out that philosophy of science ought to be more connected to science and society and that it is not sufficiently valued. For example, philosophers of science have debated about whether it is worthwhile and legitimately philosophical to connect with scientists, policy makers, lay publics, and other relevant communities (Douglas 2010).

Unfortunately, current debates show that philosophy of science has not come very far in resolving many of its historically rooted struggles, including its debates about social and scientific relevance, despite progress in the last decade. Philosophers of science continue to debate about which research methods and areas of research in philosophy of science are legitimately philosophical, which communities philosophers of science should and should not engage with while doing philosophy (as opposed to maintaining “critical distance,” and just how collaborative philosophers of science ought to be with communities outside of their own (Kourany 2003a; Kourany 2003b, Giere 2003; Fehr and Plaisance 2010; Cartieri and Potochnik 2014). I will unpack the nuances of these debates in what follows, with a specific focus on this literature in Chapter 2.

Despite the lack of value and reward regarding engagement in mainstream philosophy of science, the last decade has seen growing attention to philosophers who discuss the importance of socially and scientifically relevant philosophy of science, broadly speaking. In 2010, a special issue on “Making Philosophy of Science More Socially Relevant” was published in *Synthese*. I discuss articles from this special issue in detail in future chapters. Shortly afterwards, *The International Consortium for Socially Relevant Philosophy of/in Science and Engineering*

(SRPoiSE) was formed, bringing together philosophers of science who have a shared interest in socially and scientifically relevant work. In 2012, The Joint Caucus of Socially Engaged Philosophers and Historians of Science (JCSEPHS) formed with a similar mandate.<sup>1</sup> As these groups were forming, the literature on socially and scientifically engaged philosophy of science was growing elsewhere as well (Kourany 2010, Cartieri and Potochnick 2014). While the interest in this work seems to be growing, it remains largely marginalized in philosophy of science and philosophy more generally. Traditional methods in philosophy using thought experiments and more abstract theoretical analysis remains the dominant approach to philosophy today (Douglas 2010). While the reward structures in philosophy are conducive to traditional methodology, those structures often cannot accommodate (or may even undermine) philosophical work that engages scientific and lay communities by providing limited support for dissemination and collaboration efforts.

In addition to the efforts coming from philosophers of science, feminist philosophers and philosophers of colour have been questioning the environment and scope of professional philosophy for many years (Lorde 1984; Yancy 1998; Haslanger 2008; Richardson 2010; Sanchez 2011; Dotson 2011, 2013). Kristie Dotson argues that philosophy's focus on a culture of justification is hostile to diverse practitioners because it places limitations on which methodological approaches are seen as legitimately philosophical (2013).<sup>2</sup> As Dotson puts it, the legitimization question common in philosophy is "assessing whether one is doing philosophy according to, presumably, commonly held, univocally relevant norms of conduct" (2013, 8). Instead, Dotson advocates for a culture of praxis in philosophy that addresses live concerns and a multitude of canons and methodologies accepted in the practice of philosophy. The culture of praxis that Dotson argues is important in philosophy, which supports diverse practitioners, is one I aim to advocate for in philosophy of science as well.

In this dissertation, I analyze key reasons why socially and scientifically relevant work remains marginalized in philosophy of science. Moreover, I explore how narrow conceptions of philosophy of science limit engagement with scientifically relevant domains and ultimately harm the discipline. I address the barriers that prevent engaged philosophy of science from being appropriately valued and rewarded despite its benefits to philosophy, as well as science and society. Then, I offer possibilities for intervening in this historical pattern so that we can recognize the value of this work and support it. I argue for the need to develop solutions that are

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<sup>1</sup> As of June 2020, JCSEPHS has disbanded but the Philosophy of Science Association (PSA), which hosted the joint caucus, has said that they remain committed to its purpose.

<sup>2</sup> I discuss Dotson's work in detail in Chapters 2 and 3.

responsive to institutional, departmental, and disciplinary contexts. In order to do so, I use traditional textual analysis and empirical methods to gather data about engaged philosophy of science and philosophers' perceptions of the field. I report findings of these analyses that support my arguments about the barriers to engaged philosophy of science, which also provide an empirical foundation for the necessary interventions to value and support this work (see Section 1.2 for further details about methodology). The empirical findings incorporated in this work help to identify a wider variety of approaches to engaged philosophy of science and provide evidence for the existence of pervasive barriers to this work.

I begin by looking at literature on socially relevant philosophy of science that addresses engagement with scientifically relevant communities, such as scientists, policy makers, legislators, and relevant lay publics. By analyzing this literature, I establish a foundation to build on existing work about the scope, the benefits, and the barriers to *socially relevant philosophy of science* (SRPOS), a term framed in Fehr and Plaisance's work (2010). In this dissertation, I use the term 'engagement' to describe a wide variety of methods in philosophy of science that facilitate a connection with scientific communities, lay publics, and other relevant communities outside of philosophy itself. I intend engagement to be wide ranging and inclusive terminology that fits within the context of socially relevant philosophy of science such that it facilitates connection with relevant communities.

This project provides empirical evidence for the barriers to engaged philosophy of science, recognizing the work that has already been done to address the barriers for academic philosophers. I use surveys and interviews to show that there are significant reward structure, identity-related, and academic-culture barriers to engaged philosophy of science. This project advances the SRPOS literature by providing an empirical foundation for pre-existing arguments about barriers to socially and scientifically engaged work and uses those findings to generate data-driven recommendations for ameliorating the problem.

Furthermore, I argue that the barriers can and often do depend largely on the approach a philosopher of science uses. Based on my analysis, I characterize those approaches by three different aspects: the communities a philosopher engages, the flow of knowledge and communication between those communities, and whether a philosopher is engaging from academic philosophy or from a community outside of academic philosophy. Moreover, I argue that the barriers to engaged philosophy of science are not universal across each approach, and that such barriers require multifaceted solutions. For example, the barriers a philosopher might face when collaborating with academic scientists will likely be different from the barriers they experience when engaging with industry scientists (perhaps because they are engaging in a

different context). Furthermore, barriers can vary across contexts depending on the philosopher's context as well. For instance, if the philosopher is employed in a large research institution or a smaller liberal arts institution with a focus on teaching, the barriers they experience could be quite different. They may also change over time as a philosopher progresses in their research.

As our survey data show, philosophers of science indicated that engaged work should be valued and rewarded more than it currently is (Plaisance et al. 2019). However, supporting engaged work requires addressing the multifaceted barriers to engaged philosophy of science that may affect different philosophers in different ways. Significant barriers, such as undervaluing publications in non-philosophy journals and public venues, are problematic insofar as they inhibit relationships with stakeholder communities that benefit philosophical work. For instance, they inhibit benefits that come from broadening perspectives and opening new philosophical questions, much like Tuana's work has opened new investigations in climate science modelling by identifying ethical values that influence epistemological claims made by climate scientists (2013). Mitigating approach-specific barriers to engagement is important if the sub-field and discipline more generally aims to support engaged philosophy of science, as our survey study shows is desired among a significant portion of philosophers of science.

Although existing work in SRPOS literature advocates for a more socially and scientifically engaged philosophy of science, there is an unstated assumption that: philosophers must be located or employed within academic philosophy (paradigmatically, tenure-track faculty positions). Until now, philosophers have been largely discussing engagement from academic philosophy outward to scientifically relevant domains. Even in cases where philosophers of science are arguing for more engaged relationships between philosophical and scientific communities, philosophers are entrenched in conceptions of philosophy as synonymous with academia. Largely, this assumption seems to come from the underlying culture that prioritizes academic voices in the philosophical community and discourages philosophers who work closely and actively with stakeholder communities outside of educational institutions that have the power to grant tenure. Even those scholars who challenge narrower conceptions of philosophy of science retain narrow conceptions about philosophers as strictly academics. I challenge this predominant conception by highlighting an approach to engaged philosophy of science wherein philosophers are directly embedded in scientifically relevant domains – i.e., philosophers are employed in government agencies, industry science settings, and so on. Expanding on SRPOS literature, I argue that philosophers can contribute to the advancement of philosophy of science in valuable ways from positions outside of academic

philosophy from which they bring their own unique benefits to the field, including supporting more diverse perspectives.

Furthermore, I discuss barriers that undermine engagement from outside of academic philosophy, further limiting relevant perspectives in our work (including philosophers working in governments, not-for-profit organizations, and other spaces or roles outside of academia). I argue that engagement from outside of academic philosophy is marginalized even in the context of socially and scientifically relevant philosophy of science and requires its own solutions and interventions apart from those academic philosophers need. While academic philosophers may face institutional and departmental barriers in tenure evaluations, philosophers of science embedded in government agencies may face very different barriers, such as difficulty publishing in academic journals without an affiliation to a post-secondary institution. Supporting socially and scientifically engaged philosophy of science requires intervention at disciplinary, departmental, and institutional levels that target the norms and policies that underlie the barriers in a meaningful way, as I argue in the last chapter of this dissertation.

This project advances the literature in three ways. First, I develop a novel framework that analyzes different approaches to engaged philosophy of science. That framework is informed by two sources of evidence: a literature analysis of socially and scientifically engaged philosophy of science and interviews with philosophers of science (which I discuss below). Second, this dissertation presents new data from a survey on the state of engaged philosophy of science and from interviews on the benefits of and barriers to engagement. The data inform further analysis of the barriers to engaged philosophy of science and provide empirical support for the claim that interventions are needed to mitigate barriers. In particular, I highlight barriers to engagement that arise from disciplinary identity policing that aims to determine who is a legitimate philosopher of science on the basis of methodology. Third, I show that engagement from outside of academic philosophy has distinct benefits and barriers. Those benefits can strengthen relationships with scientifically relevant communities if the barriers are mitigated such that the contributions from outside of academic philosophy are no longer marginalized.

### **1.1.2: Contextualizing This Project**

With this project, I am entering into multiple conversations about socially and scientifically relevant and engaged work, not all of which are closely connected. Although many of the groups and pieces of literature I mention above were forming around the same time, they do not all speak directly to one another. In Chapter 2, I bring those discussions together and analyze their unique arguments in detail. This portion of my project largely builds on the work of those doing

socially relevant philosophy of science (Douglas 2010; Fehr and Plaisance 2010; Kourany 2010; Richardson 2010). Fehr and Plaisance's (2010) argument for a more socially relevant philosophy of science is the most inclusive in its analysis of what socially relevant work can be. Therefore, I use their conceptual framework for SRPOS as a foundation for my project.

My analysis and arguments in this dissertation advocate for a plurality of methods in philosophy of science. In Chapter 3 in particular, I develop a framework that unpacks engaged approaches in philosophy of science. While it is not new for philosophers of science to use a variety of approaches in the context of their research to connect with relevant stakeholder groups, Fehr and Plaisance are among the first to point out in writing that meaningful metaphilosophical discussions about the method of engagement are needed. They identify methods of engagement such as: reading and incorporating scientific work into philosophical research, disseminating research via stakeholder conferences and publications, collaborating with relevant communities on grants, policy work, presentations, educational reform, and publications. The pluralistic approach to engagement that I am adopting includes all of these activities. Any and all efforts to connect with individuals, communities, or research coming from stakeholder groups outside of philosophy can fit somewhere under the umbrella of engagement that I describe here. In Chapter 3 I discuss the nature of engagement in philosophy of science in much more detail.

In the context of my argument supporting a pluralistic notion of engagement in philosophy of science, I discuss the difference between academic philosophy and philosophy that takes place outside of academia. In that pluralism, there is a need to acknowledge valuable contributions from philosophers of science who are not necessarily housed within academic philosophy. In other words, they may be engaging from inside federal governments, policy writing contexts, etc. The institutional system of academia has historically structured philosophy as a knowledge producing community that requires institutional affiliations for acceptance. In Chapters 4 and 5, I analyze these dynamics and the historical patterns that have led to exclusion of philosophers of science who are not also academics employed by post-secondary institutions.

## **1.2: Methodology**

For this project, I use both traditional philosophical methodology and empirical methodology. Chapter 2 begins fairly traditionally with textual analysis largely from literature drawn from the philosophy of science. In order to provide an empirically informed framework in Chapter 3, I supplement common methods of conceptual analysis with discussion of case studies originating

from the interviews discussed below. While I do not introduce and discuss the interview analysis and themes until Chapter 4, I draw upon the interviews to identify detailed examples used in Chapter 3 to show what different approaches can look like in practice. Chapter 4 uses largely mixed methodology from social science, including both survey and interview data which I analyze for common trends and themes (with preliminary analysis). Finally, Chapter 5 invokes heavy normative argumentation, which is common in philosophy and quite uncommon in the social sciences. Below I describe the mixed empirical methodology that I use in this dissertation and a larger collaborative project where those methods originated.

While the empirical methods I use are perhaps rare in a philosophy dissertation (with the exception of experimental philosophy, which often uses empirical methods from cognitive science and psychology), they are commonly employed in social science research.<sup>3</sup> Thus, I provide more details about these methods below for readers who may be less familiar with them, and particularly unfamiliar with the relationship my empirical analyses have to the broader philosophical argument of this dissertation as whole. Though my project is primarily philosophical in nature – and, indeed, examines the state of philosophy itself – I use mixed empirical methods (and particularly interviews) to inform philosophical discussions and debates that have long been relying on anecdotal data and thought experiments. While anecdotal evidence can be very useful, my aims for this project extend beyond anecdotes and normative judgments (although my argument certainly does invoke both at times). A mixed method approach provides me with the tools to represent the current state of engaged philosophy of science and inform solutions I discuss in Chapter 5. My original analyses thus contribute to philosophical debates in a novel way, not only bolstering arguments in favour of socially and scientifically relevant philosophy of science, but contributing new insights about the benefits, barriers, and possible solutions.

### **1.2.1: The Broader Project: Investigating the Relationship Between Philosophy of Science and Scientifically Relevant Domains**

In this dissertation, I discuss relevant findings from a collaborative project providing empirical data on philosophers of science and their engagement with scientifically relevant domains. The research team for our project included the Principal Investigator (PI), Dr. Katie Plaisance, a philosopher of science; a co-PI, Dr. John McLevey, a social scientist; Dr. McLevey's sociology

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<sup>3</sup> See Michaud and Turri (2018) for an example of different empirical methods often employed in experimental philosophy, which also touches on communication in scientifically relevant domains.

PhD student, Sasha Graham; and myself. We employed a mixed-methods approach comprised of three sub-projects: 1) we examined citation patterns of papers written by philosophers of science (McLevey et al. 2018), 2) we surveyed philosophers of science about their attitudes, experiences, and values regarding engaged work (Plaisance et al. 2019), and 3) we extensively interviewed people working in the field to better understand the particular contexts and conditions that are associated with high-impact work (Plaisance et al. 2020). I was primarily involved in the survey and interview components of the project. The PI and I applied for ethics approval for both the survey and interviews. With respect to the survey, the PI and I designed the survey questions with input from our social science collaborators.<sup>4</sup> The social science PhD student and the PI took the lead on the survey analyses. The PI and I took the lead on the qualitative data collection and analysis with input from the co-PI. I co-created the list of codes used to analyze the interview data, I coded the transcripts for all interviews, and identified some key themes. In particular, I identified the barrier related to identity and its relationship to other barriers that we studied. I then conducted in depth analysis on those barriers myself, taking a significant practical and intellectual role in the project (which I discuss in more detail below).

In this dissertation, I discuss the findings from the survey and interview data, focusing on the latter (particularly in Chapters 3 and 4). The interviews provided rich and complex data that I analyzed for common themes, which inform my philosophical arguments in this dissertation. I present data from my own analyses of a large dataset that focuses specifically on philosophers' descriptions of their own engaged work, and the barriers they perceived and experienced with respect to engagement beyond philosophy of science itself. In what follows, I describe the methods in detail.

### **1.2.2: Survey Methods**

As part of the broader collaborative project investigating the relationship between philosophy of science and scientifically relevant domains, our team collected and analyzed survey responses from 299 philosophers of science regarding their attitudes about and engagement with scientists and scientific communities. We conducted the online survey in 2016 and analyzed the data in 2016-17. Participants were recruited using a sampling frame of philosophers of science gathered

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<sup>4</sup> Ethics approval for both the survey and interview projects were granted from the University of Waterloo Office of Research Office, ORE #: 21711/30938.



through three sources.<sup>5</sup> The first came from membership lists from key philosophy of science associations : the Philosophy of Science Association (PSA), the British Society for the Philosophy of Science (BSPS), and the European Philosophy of Science Association (EPSA). For the second source we identified author names from PhD dissertations in philosophy of located in the Proquest Dissertations and Theses database.<sup>6</sup> The third source list came from names and affiliations for everyone who had published two or more articles in any of the following seven core philosophy of science journals: *Philosophy of Science*, *The British Journal for Philosophy of Science*, *Studies in History and Philosophy of Science (Parts A, B, & C)*, *Synthese*, *European Journal for Philosophy of Science*, *Journal for General Philosophy of Science*, and *International Studies in the Philosophy of Science*. In the course of designing our survey, we consulted with several established philosophers of science to create this journal list. Participation in the survey was voluntary and participants were not compensated.

The PI and I designed the survey in consultation with Dr. McLevey. Our aim was to gather data about the current state of philosophers' attitudes, values, and motivations toward engagement with science. We sought to answer questions such as: How common is it for philosophers of science to engage scientific communities? How do philosophers of science engage? To what extent do they value engaged approaches? What barriers do philosophers of science experience to engagement?

The co-PI and graduate researcher analyzed the data using multiple regression for most of the statistical testing. Multiple regression analysis allowed us to examine the strength and significance of the relationships between potential predictors (e.g., gender) and the outcome variable (e.g., reported barriers). We identified five independent variables that might account for variation in responses: gender, career stage, level of scientific training, area of specialization in philosophy of science, and whether or not participants identify as a feminist philosopher of science. While the survey data will not be the primary focus of the data presented in this dissertation, it will serve as a background for the attitudes and perspectives in philosophy of science, and background knowledge to make sense of the interview data. (For more details about the survey methods, please see a detailed description in our paper reporting the key results (Plaisance et al. 2019).) Furthermore, it is important to note that the survey data informed the

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<sup>5</sup> A sampling frame is a source from which a list of items (names, emails, data-points) in a population is gathered, in our case, a list of names of philosophers of science. A sampling frame is popularly used in quantitative methods to find participant information to collect data (Saldaña 2011).

<sup>6</sup> For this my co-authors used the Python package metaknowledge (McLevey and McIlroy-Young 2017).

development of the interview guide and helped us select participants for the interview phase of the project, which I describe below.

### **1.2.3: Interview Methods**

For the qualitative aspect of the project, we interviewed 35 philosophers of science, many of whom also completed our survey. The interviews took place over several stages, mostly targeting communities with high levels of engagement with scientists and science policy makers. First, we conducted 3 pilot interviews with philosophers of science on the University of Waterloo campus. The interviews were led by the PI and observed by the co-PI (who consulted on interview methodology at this stage) and by myself. Second, we interviewed 17 philosophers of science at the 2016 biannual meeting of the Philosophy of Science Association (PSA), the most popular meeting of philosophers of science in North America. The principal investigator and I used purposeful sampling and carefully chose 17 philosophers present at this meeting after reviewing their survey responses and conducting further research on their engagement with scientists and relevant communities.<sup>7</sup>

Again, the principal investigator was the lead interviewer for all but one of the PSA interviews, almost all of which I was present for. My role was to take notes during each interview and develop analytic notes after each interview to reflect on common themes and important points that informed our analysis. In addition, I conducted one interview on my own (there were two participants we were interested in interviewing, each of whom were only available at the same time, so the PI and I each took the lead on one of them). Following the PSA interviews in November 2016, the PI conducted several interviews at nearby universities and via skype in early-to-mid 2017. Although I was not present for these interviews, I took part in coding and analyzing them, as I discuss below.

Each interview was roughly 90 minutes in length, on average. The interviews were recorded with participants' permission, in line with the consent procedures indicated in our research ethics application. Aside from basic questions about participation and recording consent, we also provided participants with several options for identification, including: 1) whether or not they consented to the use of anonymous quotations from their interview, 2) if no

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<sup>7</sup> Purposeful sampling, also known as judgmental or expert sampling, is commonly used in the social sciences in non-probability research when researchers use their familiarity with the community they are interviewing to select a cross-section of the population they aim to represent (Saldaña 2011). Purposeful sampling is used when the goal is not necessarily to be representative but to capture information-rich data of specific phenomena, making it a strong fit for marginalized work.

to 1, if they consented for us to follow-up with them for permission to use specific anonymous quotations, 3) whether or not participants consented to have their names associated with quotations, and 4) whether or not they consented to be in a list of participants without quotation attribution. We used a semi-structured interview method, meaning we asked questions as they were relevant to each participant, using a general order and tailoring to each discussion (Aurini et al. 2016). We focused on establishing rapport with participants and understanding their narrative as it developed in the conversation, while following the general structure and themes or phases, hitting as many of the pre-prepared questions from the interview guide as possible.

We designed the interview guide to use as a template during the interviews, which was broken into 7 main phases. The lead researcher and I co-designed the interview guide with input from the co-investigator and sociologist on the project. As the two philosophers on the project, we designed an interview guide using both our knowledge of the field and the survey responses to develop core questions that would help us answer our research questions. Below is a list of the interview phases we included (not necessarily in order), as well as a sample question for each phase (note that not all sections of the interview guide were applicable to all participants):<sup>8</sup>

Phase 1: Educational Background & Training

- What kind of advice did your supervisor give you (during your PhD)? How did this compare with other students in your program?

Phase 2: Pre-Tenure Career

- What were/are the requirements for tenure and promotion?

Phase 3: Post-Tenure Career

- Were there any changes to your approach to doing philosophy of science after tenure?

Phase 4: Supervising & Mentoring Graduate Students

- What advice do you give to your own graduate students when it comes to engaging scientific communities or disseminating their work more broadly?

Phase 5: Interactions with Science Communities

- How do you identify yourself when you meet scientists (e.g., do you identify as a philosopher)?

Phase 6: Dissemination & Success

- In what ways has your work been given uptake amongst scientists or policy makers?

Phase 7: Collaboration

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<sup>8</sup> A full copy of the interview guide is available on request.

- Have you collaborated with non-philosophers? If so, what were/are the benefits of doing collaborative work?

After the PSA meeting, we had the interviews transcribed and uploaded into Dedoose, a qualitative analysis software that allows for collaborative use. The PI, co-PI, and I began creating our first round of codes (words or short phrases that capture particular ideas, which are used to tag blocks of text from the interview transcripts) shortly after the PSA. The initial set of codes largely matched the themes/phases of the interview guide, breaking the phases down into more specific topics of discussion drawn from the interview notes and analytic memos. For example, excerpts from the transcripts were coded as “barriers to dissemination” or “publishing in science journals”. I began coding the interview transcripts in Dedoose to identify patterns and themes emerging from the data. I performed first-round coding of the transcripts for 20 interviews conducted at the time (those done at the PSA as well as the three pilot interviews), and eventually the rest of the 35 interviews conducted for the study.

After first round coding on the PSA interviews, we created a second round of codes to further explore some emerging themes and identify new connections among the interview discussion (this is typical practice in qualitative research). For example, some second-round codes tagged text for any form of engagement, such as “informal interaction with scientists” and “engaging scientific communities not valued”. At this point, I implemented second and first round codes on all additional interviews, and re-coded the previous interviews using the new codes. After second-round coding, we began analyzing common themes that could each be divided into separate sub-projects. Some examples of general themes were: engagement with scientists, philosophers’ impacts on science, barriers to engagement, identity, and graduate training.

To conduct further analysis for the purposes of this dissertation, I isolated codes that related to the themes relevant to this dissertation, including codes with respect to barriers and norms in philosophy and philosophy of science. I analyzed the excerpts tagged with those codes to find emerging themes. After finding themes in those excerpts, I discussed those themes with the PI and consulted analytic memos taken at the time of interviews.<sup>9</sup>

I touch on many of the themes mentioned above in this dissertation, but I focus on the themes that I identified (e.g., the role of professional identity in creating actual or perceived barriers) or with respect to which I performed a significant role in the analysis (e.g., the broader set of barriers that philosophers of science reported facing when they did more broadly engaged

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<sup>9</sup> These methods are discussed in more detail in Aurini et al. (2016).

work). Furthermore, one of the main themes that I discuss – the role identity plays in boundary policing within philosophy of science - was one that I identified through my own analysis of the data. Inevitably, discussions I had with my collaborators may have (indirectly) informed the identifiable themes and their relationships with one another, as with any highly collaborative project). However, I identified the above themes for this dissertation, and I focus on the results of the analyses I conducted.

In reporting the data below, I identified key themes from the data, analyzed excerpts related to those themes, and chose quotations that represented the patterns I observed from the data use excerpts from the interviews. To maintain confidentiality for our participants, I anonymize all quotations in the following chapters. Where we did not have permission to share the person's identity, I removed potentially identifying information in the content of the quotation as much as possible. Where we did have permission from participants, I did not name them but left identifying information in for context.

#### **1.2.4: Limitations: Demographic Reporting**

While we collected comprehensive demographic information for the participants. Here is an overview of the demographic characteristics of our participants:

- *Gender*: 16 women and non-binary participants; 19 men<sup>10</sup>
- *Career stage*: 3 postdoctoral fellows and individuals with non-academic careers, 3 assistant professors, 9 associate professors, 18 full professors, and 2 professors emeriti
- *Areas of specialization*: 13 philosophy of biology; 10 philosophy of psychology/neuroscience; 7 philosophy of physics, 5 philosophy of medicine; 5 philosophy of the social sciences; 5 science and values (note that some participants identified with more than one area of specialization)
- *Country of residence*: 6 from the UK, Europe, & Australia; 9 from Canada, and 20 from the United States

Later in this dissertation I include quotes from participants as data, however, note that I do not associate demographic information such as gender or race to individual participants' quotes. In many cases, reporting that demographic information could make participants more easily identifiable. Marginalized identity groups are extremely underrepresented in philosophy; as a

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<sup>10</sup> Note that gender was determined based on participants' pronouns at the time of the interview. In cases where a participant uses gender non-binary pronouns or where their pronouns have changed, we asked which category they felt better reflected their gender identity at the time of the interview. We decided not to list the specific number of non-binary individuals that we interviewed in order to protect participants' identities.

result, we were not able to survey (or interview) many people with marginalized identities (e.g., racialized, non-binary, and transgender people are very underrepresented). Reporting their identities could make them more easily identifiable by readers. Therefore, it is important to anonymize quotations and avoid reporting some specific demographics to keep our participants confidential.

It is important note that the methodological decision not to report detailed demographic information about the participants is itself an instantiation of one of the core diversity problems in philosophy, which I discuss in following chapters. Anita Allen (2008) and Kristie Dotson (2013) underscore the impact that the culture of justification in philosophy has on racialized philosophers, particularly Black women. They argue that the culture of justification (i.e., arguments about what is and is not legitimately philosophical), which is so often seen as integral to disciplinary identity, is unwelcoming to diverse practitioners.

Building on this foundational work, Sean Valles provides examples of the adverse impact that the current reward structure has on racialized philosophers (2017). As I discuss in detail in Chapter 3, Valles argues that philosophers of colour need to make careful decisions about what to publish and where to publish their work because they are more likely to face high service and teaching demands that impact their research output, compounding barriers relating to social location. In addition, many scholars outside of philosophy point out similar problems with the nature of academia and intersectional identity barriers, such as limited control over their working conditions, higher likelihood of occupying precarious positions, and challenges with accessing job security.<sup>11</sup> The authors argue that the White neoliberal university structure that operates in Canadian universities today disproportionately forces Black and Indigenous scholars into precarious work that limits their academic freedom in the context of their research, teaching, and service (Giroux 2014; Henry et al. 2017). For instance, participants in a recent study by Henry et al. (2017) discuss a ‘culture of whiteness’ and a ‘culture of homogenization’ that limit scholarship from Black, Indigenous, and people of colour, particularly when that work does not reinforce academic standards of Whiteness, which can include engagement with communities outside of the neoliberal university structure (94-8).

The issues identified above are consistent with the more general point that Carla Fehr makes about situational and epistemic diversity. As she argues, situational diversity does not necessarily lead to epistemic diversity (which I discuss in detail in Chapter 3). Arguments for

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<sup>11</sup> There is a vast literature that extends beyond philosophy on the intersectionality of barriers faced in academia; see Ahmed (2012), Giroux (2014), and Henry et al. (2017) for others who discuss the intersectionality of barriers.

making the discipline more hospitable for diverse practitioners and arguments for more engaged methods in philosophy of science go hand-in-hand; both highlight the need to shift exclusionary policies and practices for the benefit of the philosophical community. Furthermore, as I argue in Chapter 4, identity-related barriers can compound with barriers related to social location.

### **1.3: Outline of Chapters**

Beginning in Chapter 2, I provide an in-depth analysis of relevant philosophical literature that discusses broadly engaged philosophy of science, including the various approaches, barriers, and benefits of socially and scientifically relevant philosophy of science. My analysis covers discussions about what socially relevant philosophy of science is and can be and how best to support it. This includes analyzing discussions about the political responsibilities of philosophy of science, the legitimacy of specific approaches to engaging scientifically relevant communities (such as maintaining critical distance or collaborating directly with scientists), various benefits and barriers to supporting broadly engaged work, identifying values in science, and the role of analyzing and facilitating trust between scientific and lay communities.

I show that literature about socially relevant and broadly engaged philosophy of science has advanced the conversation about legitimate methods in philosophy of science, pointing to the benefits and barriers of engaging with scientifically relevant communities (e.g., Fehr and Plaisance 2010, which I discuss in detail in Chapter 2). But despite significant advancements in metaphilosophical discussions that support social and scientific engagement, this literature has yet to discuss engagement from outside of academic philosophy. (For instance, philosophers of science embedded in governmental agencies, NGOs, or pharmaceutical research companies.) While the literature often assumes that philosophers of science are academics first, meaning they are employed in tenure-stream positions and engage from the context of academic philosophy outward, philosophers of science may also engage by embedding themselves within those communities (e.g., being employed in a pharmaceutical company that does research on new drug therapies). It is that form of engaged philosophy of science that I am particularly attentive to in this dissertation. Furthermore, the current literature lacks a comprehensive analysis of the different approaches to engagement.<sup>12</sup> Moreover, the current literature does not make clear how benefits and barriers can change depending on the way a philosopher chooses to engage with a community (e.g., by disseminating their research to the community or

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<sup>12</sup> For an exception to this, see Plaisance and Elliott (2021) for an analysis that was developed in parallel.

collaborating with them) or who they engage with (academic scientists or lay communities). However, the particular scientific discipline a philosopher engages with (and perhaps even the topic) can strongly influence the approach they use, and which benefits or barriers they experience.

In Chapter 3, I advance work on engaged philosophy of science in a number of ways. First, I unpack and identify different approaches to engagement; this is informed by my analysis in Chapter 2 as well as data gathered from interviews conducted with philosophers of science about their engagement with scientifically relevant communities. Based on my analyses, I highlight three key factors that delineate different approaches to engagement: flow of knowledge and communication (uni-directional and bi-directional), communities philosophers of science engage with (scientific communities and lay communities), and the professional location from which they engage (academic philosophy, other academic disciplines, and relevant communities outside of academia, e.g., philosophers of science employed in government agencies). I use those three factors to lay out four different approaches that exist within a wide spectrum of engaged philosophy of science: uni-directional extra-disciplinary engagement, uni-directional extra-academic engagement, bi-directional extra-disciplinary engagement, and bi-directional extra-academic engagement. In doing so, I also identify types of engaged philosophy of science that relevant literature overlooks, namely, bi-directional extra-academic engagement done by philosophers of science working outside the professoriate. As I argue, this is an important type of engagement that needs to be incorporated into our analyses of the relationships between philosophy of science and scientifically-relevant domains. In particular, it highlights the problematic assumption that philosophy of science is necessarily done by those who hold academic positions (which is not always the case). These four approaches provide important language and terminology that I later use to showcase the diversity found within engaged philosophy of science. The approaches I lay out also highlight key distinctions that inform a context-sensitive analysis of benefits and barriers – one that considers how barriers that philosophers of science face may differ depending on their professional location, their aims, and the communities with which they're engaging. Furthermore, understanding the benefits of each approach is important for motivating interest in addressing these barriers and actively working to implement solutions.

Chapter 4 draws on the framework for engagement I provide in Chapter 3 to examine the barriers to scientifically and socially engaged philosophy of science. One of the key assumptions that shapes my analysis is that philosophy of science is typically seen as a necessarily academic endeavor. To demonstrate this, and examine barriers more broadly, I incorporate and analyze



data from our interviews with philosophers of science, identifying three main themes with respect to barriers to engagement. These include: barriers relating to the reward structure of academic philosophy, identity barriers pertaining to a philosopher's identity qua philosopher of science, and barriers related to the academic culture. I use quotations from the interviews as evidence to demonstrate the ways that each of the barriers operate and how they can hinder engagement.

Finally, in Chapter 5 (the last substantive chapter), I advocate for multifaceted solutions to mitigate barriers to engagement. Understanding context, I argue, is critically important to address barriers of any kind. In particular, the benefits and barriers for each approach to engagement can be different, and effective solutions ought to acknowledge those differences. Each approach requires solutions that are cognizant of the departmental, disciplinary, and institutional contexts affecting their unique barriers, so that solutions to the barriers can be implemented meaningfully. Meaningful solutions, I argue, recognize the importance of different types of policy support for all approaches. I end by pointing to promising next steps for solutions to barriers to engagement that address the unique needs depending on approach.

## **1.4: Conclusion**

With this dissertation I aim to contribute to ongoing discussions in the literature on socially relevant philosophy of science by expanding conceptions of what engagement with scientifically relevant communities can look like. This dissertation advances the literature in several ways by: 1) analyzing SRPOS literature and clarifying disagreements about social and political engagement; 2) uncovering the unstated assumption that philosophers of science engage from within academic philosophy outward, as opposed to being embedded in scientifically relevant communities; 3) providing an empirically-informed framework to clarify different approaches to engaged philosophy of science; 4) providing empirical evidence for the barriers to engagement previously discussed in the literature; 5) uncovering novel identity barriers that mitigate engagement for philosophers of science, and 6) discussing empirically-informed and context-sensitive solutions to alleviate these barriers. My work will advance our shared understanding of engaged philosophy of science and can be used to help other philosophers and decision-makers (such as department chairs, journal editors, and deans) show support for engaged methods. Notably, with this work I hope to open up new pathways for diverse perspectives to not only be

understood as relevant in philosophy of science, but also to be supported and valued in the discipline as a whole.

## Chapter 2

# Engaged Philosophy of Science: Literature Review & Analysis

### 2.1: Introduction

In philosophy of science there have been important and emerging discussions about engagement with scientifically relevant communities, including scientists, policymakers, lay communities, and other relevant stakeholders. In this chapter, I survey that literature in detail and analyze key themes surrounding engagement with scientifically relevant communities. Several articles discussed in this chapter come out of a special issue in *Synthese* on “Making Philosophy of Science More Socially Relevant” (Plaisance and Fehr 2010). In that special issue, Fehr and Plaisance carve out the scope for socially relevant philosophy of science (SRPOS), highlighting the value of philosophical work that is socially relevant and engaged. In addition to the philosophical, scientific, and social benefits of SRPOS, they argue that socially relevant approaches require more support for existing barriers, and an expansion of the philosophical landscape to include more socially relevant work as part of its core. Fehr and Plaisance show significant opportunities for philosophy of science to contribute to social welfare and scientific practice, while showing that in turn SRPOS opens up new areas for philosophical inquiry and new philosophical questions to tackle.

Within the scholarship on socially and scientifically relevant philosophy of science, there are several meaningful discussions about philosophers’ engagement with science and society. In Chapter 1, I refer to this literature as “broadly engaged philosophy of science”, and I also refer to social, scientific, or political engagement as engaged philosophy of science.<sup>13</sup> I analyze literature that fits within this umbrella of broadly engaged philosophy of science which includes SRPOS, socially engaged philosophy of science (SEPOS), values in science, and field philosophy

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<sup>13</sup> Similarly, Plaisance and Elliott use the terminology ‘broadly engaged philosophy of science’ to name the literatures above (2020). Our analyses were developed separately but in parallel, and both aim to distill similar philosophical discussions for analysis. (Notably, Plaisance and Elliott restrict themselves to what they see as the three main accounts of SEPOS: Fehr and Plaisance (2010), Cartieri and Potochnik (2014), and Frodeman and Briggie (2016). While I, too, examine these three accounts, I also analyze related philosophy of science literature in order to highlight the role of key issues – like one’s view on the relationship between science and values – that underlie discussions of engaged approaches).

literatures. While distinct in their own rights, these literatures overlap significantly, and I analyze that overlap below. Though these literatures overlap, I focus largely on SRPOS because my work in this dissertation is intended to be a sympathetic extension of SRPOS, which I discuss in more detail in 2.5.

The social aspects of science are characterized below according to the emerging themes I identify below: epistemic vs. political considerations in philosophy of science, rejecting the value-free ideal of science, guiding ethical scientific practice, philosophy of science and science policy, translating theory into practical application, and facilitating trust between scientists and lay publics. Much like the literatures themselves, these themes overlap significantly and, as I argue in 2.2, they often inform one another. I focus on published debates and discussions in this chapter, however, I recognize that important debates on these and other metaphilosophical topics have routinely taken place in other, less accessible venues, such as conferences and workshops.

My aim is to represent a full spectrum of philosophical views on engagement, broadly speaking. I lay out and examine the diversity of views currently represented in the philosophy of science literature that discusses how philosophers of science can engage science and society in their work. This background will serve as a basis for understanding where the discipline is now with respect to engagement, and how we can advance this discussion. One of my goals in this dissertation is to examine various roles for philosophers of science and explore ways they may be better served outside of the professoriate. In this chapter, I will maintain a pluralist stance regarding different roles, respecting the notion that philosophy and philosophers of science can, at least on a theoretical level, prioritize any of these approaches depending on their research goals. (In Chapter 3, I argue that each of these roles have their own value and benefits.)

Following my analysis of the literature on broadly engaged philosophy of science, I identify a gap in the literature. I show that, even in rare cases where philosophers pay close attention to the roles that philosophers of science can engage in with the aim of producing a more socially responsible science (and philosophy of science), there is little attention being paid to contributions to that end from beyond the professoriate – e.g., philosophers of science employed in a policymaking context.

In section 2.3, I show that even the views representing the strongest forms of engagement with science and society share the same common assumption: philosophical engagement takes place from the academy. The philosophical debates have largely overlooked the contributions philosophers of science can make from outside of academic philosophy. I explain that philosophers of science can play many roles outside of the professoriate that further

the goals and benefits of SRPOS — i.e., facilitating more ethically responsible science, contributing to science policy writing, and involvement in science education.

This chapter will identify the key assumption that even socially relevant and engaged philosophy of science starts from within academic philosophy and moves outwards. This chapter establishes the current state of philosophical discussions, which sets the stage for Chapter 3 where I analyze different approaches to engagement that come from the literature analysis in this chapter as well as the interview data that I collected (see Section 1.2 for an overview of the empirical methods I used). In Chapter 4, I expand on my analysis of engaged philosophy of science by examining academic norms, reward structures, and identity barriers as they pertain to each approach. I argue that engaged philosophy of science is limited by these barriers, which prevent the benefits I discuss below from shaping research. In Chapter 5, I argue that mitigating the barriers to engaged philosophy of science require multifaceted solutions that address the complex nature of experiencing barriers in practice, including the disciplinary, departmental, and institutional contexts of the philosophers experiencing them.

## **2.2: Key Debates and Discussions: Where Are We Now?**

In this section, I identify major themes in the philosophical literature on socially and scientifically engaged philosophy of science. I analyze key discussions and debates that examine how philosophers can do engaged work, which communities philosophers of science can engage with, and how to support engaged philosophy of science at a disciplinary level. It is important to note that the themes I identify are very much interrelated. By teasing them apart, I nonetheless help clarify an underexamined landscape that identifies where discussions align and where they differ in their approach to engaged philosophy of science. I show that in many cases, one's views about values in science drive their metaphilosophical views about who philosophers of science ought to engage with and how. Most importantly, this analysis supports my argument in 2.5, which identifies a common but implicit assumption in the literature: that engaged philosophy of science comes solely out of an academic context – specifically academic philosophy.

### **2.2.1: Epistemic vs. Political and Social Roles for Philosophers of Science**

One common question that has foreshadowed many key discussions in SRPOS has been the question of which political responsibilities philosophy of science has, if any at all. Debates about the political aspects of philosophy of science point to the discipline's relevancy to many different topics (e.g., the realm of scientific policy, values in science, public involvement in

science, etc.) and many different groups (e.g., relevant publics, stakeholders, policymakers). Many of these topics are interrelated and make up a core body of work in SRPOS. As such, I begin with a debate between Ron Giere and Janet Kourany (2003) about whether philosophy of science has any political role to play with respect to science. Over the span of three papers published in *Philosophy of Science*, this debate advances two important positions on the legitimate roles in philosophy of science (on which subsequent philosophical work builds). These positions aim to address and untangle what it means for philosophy of science to be socially and politically relevant. I show that, at bottom, Giere and Kourany disagree about one key issue: that the political and epistemic aspects of science can be conceptually pulled apart from one another and addressed as independent issues. Importantly, this view is still alive and well in philosophy of science today, as philosophers continue to debate this core issue in one form or another.

In Kourany's initial article she argues that philosophy of science has an obligation to examine the political dimensions of science (Kourany 2003a). She shows that feminist philosophy of science has a long history of integrating and valuing social (and what she calls egalitarian) concerns to the same extent as epistemic concerns. Kourany advocates for a significant shift in funding practices within scientific communities such that funding is primarily directed by social concerns rather than solely epistemic concerns, such as funding scientific projects that benefit women.<sup>14</sup> As an embodiment of her own call, Kourany shows that philosophers have the tools to analyze value judgments and ethical issues and not only can but ought to contribute those analyses as part of a program for philosophy of science (2003a). Therefore, according to Kourany, philosophy of science should have as one of its goals to guide scientific research in the direction of research that promotes good social values (such as equality), and veer away from research that will undermine those values.

In response, Giere (2003) argues that philosophy of science has no responsibilities to the political aspects of scientific practice, as politics falls outside of the realm of philosophical enquiry. The feminist values that Kourany highlights as integral to scientific practice may not be reflected in democratic values, Giere argues. Kourany points out, however, that politically- and

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<sup>14</sup> Kourany does not state this specifically, but I take her argument about funding to be applicable to gender identity groups that have been historically marginalized, including non-binary gender identities. Though she does briefly mention that her argument is applicable to other identity factors such as race and age, her argument falls just short of integrating how underrepresentation for all gender identities beyond cisgender men can be addressed by large shifts in equal consideration of social and epistemic values, and extends to intersectional identities of race, socio-economic status, sexual orientation, neurodiversity, physical ability, and so on.

socially-informed work is taking place in other disciplines (e.g., in economics and science studies) and her vision of philosophy of science moving forward is in line with the disciplinarily balanced research already being produced, which pays attention to socially relevant issues (2003b).

In addition, Giere points out that Kourany's vision for socially relevant philosophy of science presupposes an underdetermination problem that he argues is not always going to be an issue in scientific practice (Giere 2003). Scientists, he argues, will often be in positions to make decisions from data for empirically motivated reasons. Giere appeals to historical cases to demonstrate that Kourany's focus on social values is unnecessarily disconnected from the science. (Giere's work related to the underdetermination argument is influenced by Helen Longino (1990, 2002) as she, among others (Hankinson Nelson 1990; Anderson 1995, 2004), played a significant role in developing the underdetermination argument that Giere is responding to via his criticisms of Kourany.) For Kourany, however, it is misguided to try and eliminate or separate social values from epistemic ones, while Giere argues that they often are separate.

At the heart of this debate is an epistemological disagreement about the nature of science and how values ought to play a role in theory and practice, which drive their disagreements about what counts as proper philosophy of science and the scope of what philosophers of science ought to be doing with their work. On Giere's side of this debate, philosophy of science is thought to focus on methodological concerns in science, hidden assumptions, conceptual confusions, and epistemological issues. On Kourany's side, philosophy of science may attend to all of this familiar set of responsibilities, but in addition, ought to also be concerned with the ethical ramifications and social dimensions of scientific practice and knowledge. For Kourany and many others (e.g., Nancy Tuana, whose work I discuss below), the epistemic aspects of science cannot be untangled from the social and political aspects. The epistemic and methodological issues will always be influenced by social and political factors. For example, theory choices can be influenced not only by data, but also by value judgments such as ontological heterogeneity (Kourany 2003a). Therefore, in order to properly attend to epistemological concerns, scientists must weigh the importance of social values.

For Giere and Kourany, the extent to which philosophy of science has any political responsibilities at all, and what exactly those political responsibilities are, is dependent on their epistemological views regarding values in science. For Kourany, the fact that those social values cannot be extracted or considered independently of the epistemological values necessitates our involvement in the political aspects of scientific research. But, since the social and epistemic

values can be pulled apart on Giere's view, he claims that we can carve out those political aspects and leave them for political scientists to study. The key to understanding their view regarding the political nature of philosophy of science thus rests on understanding their views of values in science. As I will show, this is a pattern for many other arguments regarding the responsibilities of philosophy of science as well.

In a similar vein, Nancy Tuana argues that ethical and epistemic issues are inherently coupled, and that coupled ethical-epistemic approaches to values in science produce better, more socially connected and informed, science (2010, 2013, 2015). Tuana claims that in her work with climate scientists, coupled ethical-epistemic analyses have "helped identify new and refined research topics, and informed modeling for multi-objective, robust decision making" (2015, "Communications of the ACM"). She argues that ethical values are often underappreciated despite arising in science in a multitude of ways, such as in the climate science models that can have downstream effects on citizens (2013). Therefore, on Tuana's view, better and more socially responsible science acknowledges and analyses the ethical implications of their theories, models, and practices. Building on that argument, Tuana notes several opportunities for philosophers of science to contribute to policy writing, science education, and interdisciplinary research efforts with scientists (2010, 2013). Philosophers of science are well positioned to identify coupled ethical epistemic values in science policy, they can teach or influence ethical-epistemic analysis in science education and perform ethical-epistemic analyses in a research context directly with scientists open to interdisciplinary research.

For Kourany, Tuana, and many others, epistemic values cannot be separated from political, ethical, or social values in science (Douglas 2000, 2009; Longino 2002, 2013; Kourany 2010; Tuana 2010, 2013; Elliott 2011a, 2011b; Brown 2013a, 2013b; Elliott and McKaughan 2014; Hicks 2014, 2018). Many feminist philosophers of science reject views like Giere's, arguing that epistemic values are insufficient to address practical decision-making within the core of the scientific process (Brown 2012; Tuana 2012; Hicks 2014). Those views can shape larger arguments and disagreements about the political responsibilities of philosophy of science and what it means to do socially responsible science. Furthermore, epistemic views impact the roles philosophers argue that we can play in activities such as policy writing, science education, and interdisciplinary research. Seeing the important role that social and ethical values can play in science, feminist philosophers of science recognize that ethical and political values also play a necessary role in evaluating theory, informing policy and practice, and translate that into additional reasons for philosophers of science to engage with scientific and lay communities. For example, Dan Hicks argues that other constitutive scientific values can include practical



knowledge and socially useful technologies or advancements (2014). I discuss the influence values in science debates have on philosophers' views about political and social responsibilities below.

### **2.2.2: Rejecting the Value-Free Ideal of Science**

In addition to the discussions about the legitimacy of social and political concerns in philosophy of science, debates about the specific role for social values in science have been gaining in popularity. In close connection with the political scope of philosophy of science, philosophers of science are discussing the role(s) philosophers of science have to play in not only understanding what social values are at play, but informing scientific communities about the social values pertaining to their practice. In parallel, philosophers began mounting strong arguments responding to the so-called value-free ideal, which holds that social (including political) values ought to play no role in science. Furthermore, proponents of the value-free ideal are against the separation of social, political, and epistemic values in science (Douglas 2000, 2009; Kourany 2003a, 2003b, 2010; Tuana 2010, 2013, 2015). While these philosophers agree that social values cannot be separated from epistemic ones, many disagree about the particular ways or extent to which they ought to play a legitimate role. As I discuss in more detail below, these disagreements have an impact on the kinds of roles and responsibilities philosophers of science claim they have.

One of the main opponents of the value-free ideal (and rather a proponent of the “value-laden ideal”) is Heather Douglas, who argues that social values play a necessary role in scientific practice; however, she argues, they do not play an equal role in all stages of scientific research. For Douglas, social values can play a direct role in the external parts of scientific reasoning/early stages of the scientific process (e.g., selection of hypotheses, restrictions regarding methodology), but only an indirect role in the internal parts of scientific reasoning/later stages (e.g., decisions about methodology, during data analysis). In other words, social values should not influence how scientists interpret the data but can help shape the kind of data they aim to collect (2000, 2009). From this, Douglas develops a normative framework aiming to help scientists understand when it is and is not appropriate for social value judgments to inform their research. Although Douglas does not explicitly address the role of philosophers of science, her arguments do imply that that philosophers of science are in a good position to help scientists determine when social values are playing an improper role in the scientific process, how that is negatively impacting their research, and perhaps what to do about it. It seems that on Douglas' view, philosophers have a role to play in directing scientific research that promotes a healthy

incorporation of social values, according to her normative framework. However, Douglas does not address potential obligations philosophers, or philosophy of science for that matter, have to do engaged work. She strongly advocates for philosophy of science making room for engaged work alongside traditional methods that facilitate clarity on epistemic issues (2010).

Others, like Kourany, have a stronger view of the role of values in science. She claims that social values often do play a significant or direct role in all stages of the scientific research (Kourany 2010). Not only is it the case that social values cannot be eliminated, but there are cases where we should not even try to reduce or eliminate them. Furthermore, Kourany makes explicit arguments about philosophers of science utility in analyzing the role for social values in scientific practice, determining if and when they are affecting the research in a problematic way. To use one example, philosophers of science can play a critical role in preventing problematic research from gaining traction, such as neuroscientists using fMRI technologies to make binary gender essentialist arguments about brain functions and behaviours (Bluhm 2012). For Kourany, the role for values in science is not divisible on an axis between epistemic and social values; more importantly, social values ought to be driving more decisions in science to avoid problematic science.

While these views represent major poles in the literature on value-laden science, there are additional nuances present in this literature. In several values-in-science debates, many philosophers of science have and continue to discuss the legitimate role for values in science (Douglas 2000, 2009; Kitcher 2003, Kourany 2010; Brown 2012, 2013a, 2013b; Hicks 2014, 2018), and analyze the impact of values in particular areas of science (Elliott 2011b). I will not weigh in on the aforementioned aspects of the many complex and intertwining values in science debates here, nor do I aim to provide a full and detailed account of the values literature in its own right in this dissertation, as the values literature is itself an emerging and expansive area of philosophy of science that deserves more attention than I can give it here. While my arguments below do not rely on the particularities of the values in science literature, it is important to note the relevance of these views of values in science to claims about what is legitimate philosophy of science – and by extension, how and who it is legitimate to engage with as a philosopher of science (which I discuss in more detail in the following section).

### **2.2.3: Guiding Ethical Practice in Science: A Role for Philosophers**

Kourany's (2010) book, *Philosophy of Science After Feminism*, has been at the center of many discussions about the roles and responsibilities of philosophers and philosophy of science. In this book, Kourany builds on the arguments presented in the exchange with Ron Giere. In

particular, she makes two arguments that I will focus on in this chapter: the first is regarding the role of social and ethical value judgments in science, while the second results in a generalized code of ethics as a way of guiding scientists to make appropriate value judgments. I describe these arguments below and then go on to address some criticisms of her arguments that challenge her view for the role(s) of philosophers of science in this process. While I do not argue in favor of a specific view, I ultimately aim to represent an expansive account of philosophy of science's relationship with scientifically relevant communities.

According to Kourany, the answer to the question of which roles for social and ethical values are appropriate is both complex and context-specific. It is not clear that philosophers of science ought to or even could proscribe how social and ethical values impact science without considering the particular context of that research, such as gendered implications of medical research. In other words, social and ethical values can and often do play a strong role in science and the value judgments made throughout the process. Furthermore, it is not feasible or realistic to separate them from scientific practice (Kourany 2010).

Building on this view of the role for values in science, Kourany aims to address the responsibilities of philosophy of science insofar as we help scientific communities to produce more socially responsible scientific knowledge. Kourany advocates for an engaged philosophy of science that works closely with scientific communities to clarify and make transparent the social values embedded in scientific practice. She argues that philosophical tools such as ethical analysis and identifying values in science are valuable to the production of scientific knowledge, and necessary to ensure that science is socially responsible such that it benefits society.

Philosophers of science, therefore, can evaluate scientific practice with respect to the ethical implications and value judgments embedded in the practice, and expose practice that is problematic on these grounds. One way Kourany suggests fulfilling this role is by creating a code of ethics for science that will enable scientists to engage in research with a clearer idea of the ethical issues potentially embedded in the science. She argues that philosophers of science can contribute, with input from scientists, by writing a code of ethics that can expose social values and direct socially responsible scientific research. While Kourany herself does not offer such a code, she argues that it ought to be a highly interdisciplinary endeavor between scientists and philosophers of science (2010).

Several philosophers of science disagree with Kourany's particular vision for a more engaged philosophy of science. Though some agree with her ultimate goal for a more engaged philosophy of science driven by highly entangled epistemic and social values, they disagree with Kourany's on-the-ground suggestions for achieving it. More specifically, several disagree with

the role Kourany thinks philosophers of science ought to play in facilitating a more robust understanding and deliberation of the social values that, according to Kourany, ought to drive decisions throughout the research process, promoting more socially responsible scientific practice (e.g., Dupré 2012; Kourany 2013; Brown 2013; Lacey 2013). The practical contributions that Kourany's argument makes to move engaged philosophy of science forward are a main point of contention, such as her vision for a code of ethics to guide ethical and social decision-making. Now I turn to these criticisms in more detail.

Some critics, like Matt Brown and Elizabeth Potter, specifically take issue with Kourany's code of ethics as a way for philosophy of science to encourage more socially responsible science. Despite Brown's agreement that philosophy of science has a role to play in facilitating scientists' attentiveness to social and political values in their research process, he criticizes Kourany's model. Using Douglas's framework as a model for the role of social values in science (2009), Brown argues that scientists lack the proper training and broader understanding needed to identify social values, making it unlikely that scientists could put themselves in a position to anticipate the social and ethical values related to the science, despite input from relevant stakeholders and social scientists (Kourany 2013; Brown 2013). In other words, scientists will not likely be able to help philosophers of science identify the relevant values when writing a code of ethics, nor should we expect that they could identify the relevant values when using a code of ethics in practice.

Potter, in a similar vein, points out that stakeholders and social scientists may not (or likely will not) all agree on a set of values that impact any given area of science or scientific study (Kourany 2013). Therefore, it will be exceedingly difficult to address which social values scientists ought to consider when conducting research in the first place, making a pre-meditated code of ethics an unreasonable option. As such, the code of ethics model that Kourany proposes is not a feasible option to work toward more socially responsible science according to Brown and Potter, and is a source of contention within her argument despite agreements regarding her larger motivation (Kourany 2013).

Other philosophers of science like John Dupré, critique Kourany's approach not because they think scientists might be unaware of or disagree about the appropriate values, but because they think that philosophers of science should not play "handmaiden" to the sciences. Philosophers of science like Dupré tend to take a more critical approach to engagement, one that calls for philosophers to maintain "critical distance" with the science in order to be able to properly critique it (Dupré 2012). While Dupré agrees that philosophers of science should increase their engagement with science with the aim of promoting more socially responsible

science, he suggests that critical distance is necessary for exposing epistemically and socially problematic scientific practice. Dupré himself demonstrates this approach in his criticisms of much of the work in *Evolutionary Psychology* (Dupré 2001). In addition to calling for critical distance, Dupré argues that scientists need not only be aware of the relevant social values (as Kourany argues), but they must also agree on them (though he does note that this may be idealistic). As he points out, scientists who disagree about the relevant social values have historically engaged in problematic practices, such as those conducting research in human evolutionary psychology (2012). In terms of the appropriate roles for philosophers of science, then, Dupré is advocating for a heavy-handed approach where philosophers ought to identify and clarify relevant social values and how they pertain to the science insofar as he advocates for a stronger critical approach to this work. While Kourany seems to suggest philosophers can work closely with scientists to explore social values, Dupré seems to think we can work critically alongside them without risking the danger of becoming too embedded in their communities. Furthermore, while for Kourany the goal of philosophy of science is to ameliorate problematic practice in order to move science forward, philosophers of science like Dupré aim to eradicate the areas of science that consistently engage in problematic practice (e.g., research in evolutionary psychology as conducted by David Buss, among others).

In response to Dupré, Kourany pushes back against the idea that all scientists must agree on the relevant values, and claims that scientists need not agree on those values, but must be able to anticipate them in a formalized way, which she argues is possible through the codes of ethics she proposes in her book (2012). She argues that having scientists necessarily agree on the relevant values will undermine scientific integrity. Instead, scientists ought to simply be made aware of said values in a systematic and institutionalized manner so they can reasonably anticipate the values as they become relevant to their research. She also reiterated that writing these codes of ethics would be a highly interdisciplinary endeavour with input from philosophers of science, scientists from a variety of relevant sub-disciplines, sociologists of science, and other relevant experts and stakeholders. In short, Kourany clarifies that philosophers of science should be proscribing which values are important for scientists to pay attention to, and that we have the ability to do so in particular cases with the help of relevant experts.

What remains unclear, however, is the extent to which Dupré's and Kourany's disagreement applies to all areas of science, or whether it is domain-specific, given that the examples each of them discusses are drawn from very different scientific fields. Evolutionary psychology, which Dupré targets, differs in significant ways from the biomedical sciences, which

is Kourany's focus. On the surface, it seems as though Kourany and Dupré whole-heartedly disagree. However, Kourany also thinks that there are some research questions that should not be asked, and therefore some research that should not be done (e.g., on innate sex differences in mathematical ability). Furthermore, providing ethical guidelines for scientific practice, research, or policy do not seem inherently uncritical. In fact, being ethically critical of scientific research seems to be common ground for both Dupré and Kourany. They seem to be disagreeing, rather, about the distance between philosopher and scientist, though this relationship is not explicitly addressed in their arguments. Yet that distance is arguably different depending on how critical the philosophy is of the science and to what end. For example, the approach that philosophers take to identify problematic assumptions in evolutionary psychology (see Dupré 2001 and Fehr 2012 for examples) are different from those engaging with climate scientists (Tuana 2013).

In addition to the area of science, the intention or goal(s) can also shape one's approach to engaging with specific scientific communities, even within the same area of science. For instance, Fehr argues that engaging with evolutionary psychologists can take a plurality of forms, including direct collaboration. Furthermore, feminist scholars who aim to impact evolutionary psychology can play the role of 'engaged critics' (Fehr 2012). She explores possibilities such as engaging with allies in the field, such as feminist evolutionary psychologists, who can facilitate stronger connections with other community members. Although Dupré's arguments described above seem to directly oppose this view, Fehr points out that philosophy of science and the scientific disciplines they engage are better served by a philosophy of science that pursues a wider variety of research programs and practices (Fehr 2012).

Close attention to the debates above reveals that philosophical disagreements about the legitimate roles for philosophers of science with respect to science and society are often driven by their views on the role that values play in science. Those who think that values are inseparable from scientific reasoning tend to hold a stronger view of the roles for philosophers (e.g., that we should pay more attention to the social and ethical issues, and perhaps even become more politically active). Those who think values can be reduced, or even eliminated in some cases, tend to think it is inappropriate for philosophers to take a more political role. This is well demonstrated in the debate between Giere and Kourany. By extension, philosophers of science with a narrower view of the proper role for social values in science will also have a more limited view of the potential roles philosophers of science can play in clarifying conceptual and practical issues in science. In turn, philosophers who have broader views about the role for social values discuss different roles for philosophers of science that require more active engagement to make these values transparent to scientists. In other words, I am arguing that

there is a strong connection between epistemic views on values in science and metaphysical views on legitimate philosophy of science. In the next section, I look at debates about a philosophers' roles with respect to science policy (as opposed to scientific research itself).

#### **2.2.4: Philosophy of Science and Science Policy**

Apart from the complex debates about the role of values in science, numerous philosophers of science address the role philosophy and philosophers of science can play regarding science policy. Policy-related research is an area in which many philosophers of science can and do work, with its own history and aims. In this area, philosophers of science make recommendations for policy changes and suggest new policies relating to many areas of science (e.g., Tuana 2010; Shrader-Frechette 2012a, 2012b; Levin et al. 2016). Furthermore, some argue that philosophers of science can take part in writing and analyzing science policy and emphasize the importance of philosophical contributions in the policy realm (Brown et al. 2006; Douglas 2010; Tuana 2010; Shrader-Frechette 2010). In this dissertation, I am focusing on policy-relevant research as it pertains to doing socially relevant philosophy of science and highlight this as an area where philosophers of science can engage beyond the academy and have valuable contributions to make. In Chapter 3, I explore several examples of engaged philosophy of science that make contributions to science policy.

Some philosophers are pushing for more fruitful engagement between philosophers of science and science policy writers and analysts. For instance, Nancy Tuana argues that philosophers of science should engage more directly with science policy and science curriculum through “robust contributions to the science classroom, research collaborations with scientists, and a role for public philosophy through involvement in science policy development” (2010, 471). By engaging and intervening when scientists and others who influence critical policies are being educated, in addition to later stages when policy is being written and implemented, philosophers of science can have a greater impact on science policy. Tuana shows that there is strong precedent for this model of policy integration in bioethics and argues that a similar model can be applied in other scientific and philosophical domains as well. As I mentioned above, Tuana works closely with climate scientists to help them identify the coupled ethical-epistemic issues in their modelling, including collaborating on grants, publications, and other research activities. Through these collaborations, climate scientists are able to articulate the values in their models and make them more explicit for policy makers (Tuana 2013).

There are many areas of scientific research that can benefit from close ethical and epistemic analyses not only for the benefit of the research itself, but also for the science policy

that may follow from that research. Some areas of science are rife with ethical issues that require special attention from scholars who specialize in sorting out these ethical issues as they pertain to practice and policy. For example, Kristin Schrader-Frechette (2010) argues that philosophy of science can engage with policy-relevant research by providing conceptual analyses in special-interest-science cases, where she claims that there's a need for ethical analyses. By providing such analyses of values, she argues that philosophers of science can both improve special-interest-science and open up new avenues for future engagement. She refers not only to new policy research venues, but ones that engage publics affected by the policy work (Schrader-Frechette 2010). According to Schrader-Frechette, philosophers of science have much to contribute to special-interest-science through engagement. For instance, she claims that philosophers can impact public policy and case law, such as her influence on hormone case law (2000, 2008, 2010).

### **2.2.5: Applying Philosophical Theory to Scientific Practice**

There have been several discussions in philosophy of science about the benefits and limitations of applying philosophical theory to scientific practice in order to improve common practices or move them forward. While some argue that philosophical theories are largely not applicable in practice because they are divorced from scientist's needs (Douglas 2010), others have argued that specific philosophical theories have had significant impact on scientific knowledge (Haslanger 2008). While I agree that when philosophy of science is closely connecting with scientific practice it is often more relevant and potentially more impactful, that is not to deny the relevance of some philosophical theories to science. Both approaches can bring social, philosophical, and scientific benefits, assuming efforts are made to engage with scientist in a broad sense. (I will return to the idea that there are multiple ways to engage with scientist in Chapter 3.)

Douglas's work calls for more direct involvement on the part of philosophy of science with scientists (including science policy makers) and the users of science. She argues that while philosophy of science was once an engaged endeavour with philosophers of science paying close attention to the genuine concerns of scientists, the discipline has since moved toward an "off-the-shelf" approach where we apply abstract philosophical theories to practical problems (Douglas 2010). She notes that this has largely taken us away from an engaged practice and pressing concerns, making philosophy of science a discipline that bears little relevance on current scientific practice. To return to more meaningful modes of engagement with science, Douglas argues that philosophers of science ought to adopt an "on-the-ground" approach



wherein philosophers of science continuously engage with scientific communities and relevant publics to do work that attends to the timely concerns of those communities. Douglas claims that this will require philosophers of science to do work outside of the typical purview of philosophy of science and look to the political and social dimensions of science (e.g., policy, science education) as well (2010). She claims that “science is not just an epistemic enterprise. It is also a moral, social, and political enterprise. A philosophy of science that can grapple with only the epistemic aspects is impoverished and anemic” (331-2).

However, many philosophers have historically aimed to make contributions to science by importing key philosophical theories “off the shelf” into scientific practice in order to shed light on conceptual issues that negatively impact scientific practice. While Douglas is pushing against the idea that valuable theories can be created in isolation from the practice that they are intended to target, this is traditionally accepted methodology in philosophy of science. Although I agree with Douglas’ claim that philosophers of science who engage directly with scientists are more likely to produce relevant work that in turn is more likely to receive uptake from scientists, there may also be value in bringing philosophical theories to bear on science.

One relevant example of work that points to value of philosophical theory to scientific practice is Sandra Harding’s argument claiming that there are important insights to be gained by porting some philosophical theories to the realm of scientific practice (2004). In particular, Harding argues that standpoint theory can help philosophers of science better understand the social and political aspects of scientific practice. In line with Kourany, Harding points out that science, and therefore philosophy of science, are political endeavors (Harding 2004). Furthermore, she argues that standpoint theory can help philosophers of science understand this relationship by providing: 1) “the conceptual resources to recognize a full array of ways in which the sciences, including their cognitive, technical cores, participate in social relations,” and 2) “resources to recognize how it, too, is fully participant in the social relations of the day” (39). Harding uses standpoint theory as an example to show that philosophers of science can play an important role from the philosophical armchair.

Although Douglas and Harding’s accounts seem to be in conflict with one another, Douglas does not specifically address Harding’s earlier argument. Despite not being in direct conversation, Douglas and Harding represent two ends of a spectrum that do seem in tension with one another. Douglas takes a strong stance on the importance of direct involvement with scientists to apply philosophical skills in practice such that a philosopher’s connection to the science is both stronger and more immediate. Harding also provide a compelling argument for the importance of feminist values and theory that is already well established in philosophy that

can inform scientists recognition of social values and implications related to their work. It is not clear whether or not Douglas would disagree with Harding's application of standpoint theory; more importantly, both approaches can be useful for different ends. As I argue in Chapter 3, both approaches can be valuable; however, engagement with scientifically relevant communities can lead to greater social, scientific, and epistemic benefits.

### **2.2.6: Facilitating Trust Between Scientists and Lay Publics**

Many philosophers also discuss the role(s) that philosophy of science can play in analyzing trust relations between scientific communities and lay communities (Whyte and Crease 2010; Grasswick 2010). In the cases I examine below, there is agreement that philosophers of science can play a role in facilitating trust and communication between lay communities and scientific communities. Building trust between those communities is a key part of philosophers' contributions, as well as working to spread scientific knowledge and understanding.

Whyte and Crease (2010) argue that philosophers of science have an important role to play in facilitating trust between scientific communities and communities with local knowledge (e.g., Indigenous communities or local farmers). Communities with local knowledge often distrust scientific communities for deeply rooted historical reasons, such as overlooking the relevance of their knowledge and values.<sup>15</sup> For instance, Whyte and Crease explore the popular sheep farming case wherein UK scientists overlooked relevant knowledge from sheep farmers that shed light on sheep grazing and drinking habits (Wynne 1989, 1992). They identify three types of cases relevant for philosophers of science: 1) unrecognized contributor cases where credibility can be established with redefined expertise, 2) poison well cases where lay communities distrust science due to social reasons or values clashes, and 3) trusted mediators cases for scientific research that requires input from non-expert communities. They argue that in these cases philosophers of science can conceptually address relationships of distrust between lay and scientific communities by analyzing how trust has been undermined. They briefly address how philosophers of science can intervene to repair broken trust in situations where scientists are genuinely seeking knowledge that local communities possess, improving scientific knowledge not only for the scientists, but those local communities as well. Therefore, both

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<sup>15</sup> I do not explore the complex histories between Indigenous communities and science rooted in colonial histories here. However, I acknowledge that this distrust is complex and intertwined with harmful colonial histories on Turtle Island (also known as North America) in which Indigenous peoples were and continue to be subject to expulsion, assimilation, and genocide carried out by settlers.

communities will benefit from repairing trust and working together to enhance knowledge production.

Relatedly, Heidi Grasswick characterizes this reciprocal flow of knowledge as knowledge sharing. She uses climate science as an example, arguing that it is necessary for scientific communities to earn the epistemic trust of lay communities. Grasswick claims that uptake from lay communities is a constitutive goal of climate science, insofar as climate science is imbued with social ramifications when the public distrusts scientists (2014). She looks specifically at cases where scientific communities have historically failed lay communities (especially marginalized communities) and broken that trust (2010). Furthermore, she argues that in the case of climate change science, different lay communities and lay persons assign trust differently, as their social context affects how they know and how they trust knowledge producers. Therefore, philosophers of science have a critical role to play in understanding those different ways of knowing and how they impact trust between the scientific and lay communities as potential facilitators of critical reflexive analysis of privilege and trust.

In their article on interactional expertise as an approach to increase diversity in scientific communities, Plaisance and Kennedy point out that philosophers of science can take on the role of interactional experts within a scientific community. Interactional experts do not have educational expertise in a specific area but do have functional expertise insofar as they are familiar with enough language and norms of the community in question. As a result, interactional experts are able to pass as experts in conversation with community experts, despite a lack of full integration in the community (Collins and Evans 2007). Plaisance and Kennedy point out that, as a result, interactional experts can play an important role in facilitating knowledge sharing between scientific and lay communities. As interactional experts, philosophers can capture relevant expertise that extends beyond the traditional sense of expertise (i.e., communities with local knowledge), and increase the diversity of perspectives accounted for in the scientific decision-making process (2014). For instance, philosophers can play a translational role in clarifying scientific concepts and help bring perspectives from those outside of scientific communities because of their functional relationship in scientific communities. Therefore, interactional experts can help facilitate trusting relationships between lay and scientific communities, and bridge credibility deficits between the two communities (Whyte and Crease 2010; Plaisance and Kennedy 2014).

In these three cases, there seems to be a shared understanding that philosophers of science have facilitative roles to play in relationships between scientists and scientifically relevant lay communities. While Whyte and Crease focus on analyzing and repairing trust,

Grasswick focuses on building public trust in science, and Plaisance and Kennedy focus on knowledge sharing between communities, the fundamental argument that philosophers of science occupy a potential relationship-building role to bridge gaps between experts and (e.g., climate scientists), and relevant publics (e.g., people who distrust climate science findings). In Chapter 3, I build a framework that acknowledges the relevance and benefits of each of these approaches to facilitating trust.

### **2.2.7: Support for Socially Relevant and Engaged Philosophy of Science**

Socially and scientifically relevant philosophy of science touches on many important topics that bridge philosophical, scientific, and relevant social communities. Despite this, several philosophers have argued that socially relevant work is often marginalized in the discipline. As discussed in 2.1, Fehr and Plaisance do not only define the scope of SRPOS, but also argue that philosophers require support during tenure and promotion to facilitate socially relevant and engaged work (2010). Similarly, Cartieri and Potochnick argue for more inclusion of engagement with scientific communities rooted in social responsibility (2014). Finally, proponents of field philosophy argue that philosophy as a whole ought to be dismantling barriers to social engagement by making a historical appeal to the beginnings of philosophy which they argue are heavily intertwined with communities outside of philosophy (Frodeman 2013, Frodeman and Briggie 2016, Briggie and Frodeman 2016).

According to Fehr and Plaisance (2010), there is significant work to be done in philosophy of science to support socially and scientifically relevant work (which includes the myriad of work discussed above). Though there have been incremental changes (e.g., more thoughtful weighting of co-authored papers by select departments and institutions), more needs to be done to provide sufficient institutional and disciplinary support for such work. Philosophers of science who engage with scientists, policy makers, lay publics, and other communities as part of their work lack much of the necessary support to have that work properly credited and valued by scholars in the field and those responsible for decisions about hiring, tenure, and promotion (Fehr and Plaisance 2010; Plaisance et al. 2019). To take advantage of the benefits that SRPOS brings, however, Fehr and Plaisance explore the need to address several barriers in the reward structures that govern philosophy of science (2010).

Relatedly, philosophy of science as a whole has a history of marginalizing SRPOS work, which at its root is an issue with the norms of the sub-discipline. At some juncture, academic philosophy seems hesitant to acknowledge the legitimacy and seriousness of this work. For instance, feminist philosophy of science (which in its methods and contributions is a type of

socially relevant philosophy of science, and in fact laid the groundwork for much of the more recent work in SRPOS) has been historically marginalized within philosophy, overlooking the historical influences on philosophy of science (Richardson 2010). Feminist philosophy of science and its practitioners have faced many barriers and challenges, from lower publication rates of this work despite the growing numbers of philosophers who engage in it, to oversimplification of the complex philosophical views put forth by feminist philosophers of science that undermine the significant impacts this work has had within the discipline and beyond it (Haslanger 2008; Richardson 2010). The labour of feminist philosophers challenged traditional or dominant views in philosophy of science, which paved the way for broadly engaged philosophy of science. Their discussion of the barriers to feminist philosophy and necessary systemic changes in philosophy informed similar discussions in SRPOS.

In the following chapters, I expand on discussions from SRPOS by arguing that changes must occur at disciplinary, departmental, and institutional levels to support engaged work. Publication venues in particular ought to develop new or updated practices that will recognize the legitimacy of the contributions made by SRPOS literature. This might include avoiding gatekeeping (e.g., editors and reviewers who “police” the boundaries of the discipline by labeling work as “not real philosophy”) and instead forming a strong network of scholars that are capable of fairly reviewing engaged work and acknowledging its merits (Fehr and Plaisance 2010).<sup>16</sup> At the same time, philosophy departments themselves have the distinct responsibility of hiring and promoting philosophers of science, and thus ought to make changes to hiring practices that reflect a broad range of methods, venues, and contributions, and find ways to evaluate the philosophical content of this work regardless of methods used or venues of publication (Fehr and Plaisance 2010; Plaisance et al. 2019).

In a similar vein, Cartieri and Potochnick (2014) advance a more socially engaged philosophy of science, with the emphasis on direct engagement with individuals and communities outside philosophy. They take a very similar approach to Douglas’ (2010) article on socially relevant philosophy of science by sketching a historical analysis of philosophy of science and the broader socio-political responsibilities the sub-discipline was once so attuned to. While Cartieri and Potochnick discuss relevant topics in philosophy of science and explicitly use the term ‘engagement’ (indeed, that is how they distinguish their account from that of Fehr and Plaisance (2010)), they do not explicitly discuss the nature of engagement in philosophy of science. Rather, their article, and the special issue that their article introduces, focuses on providing some examples of how philosophers of science can engage (e.g., as mediators,

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<sup>16</sup> See SRPoiSE for an example of such a community organization: <http://srpoise.org/>.

educators, and advocates), and on philosophers' motivations for engagement with science and society. Unfortunately, this comes at the expense of an analysis of the methodological approaches behind engaged work. Their argument highlights their preference for socially motivated philosophy of science and underestimates the importance of what it means to engage, the ways philosophers of science have engaged in the past, and what engagement can look like. In Chapter 3, I develop a framework that lays out four different approaches to engagement to fill this gap, using several examples to demonstrate key distinctions among these approaches.

Outside of philosophy of science, other philosophers have briefly discussed contributions from philosophers who are located outside of academic philosophy. In their book *Socrates Tenured*, Frodeman and Briggle introduce the concept of field philosophy. Field philosophy captures engagement from philosophy of science with communities outside of academic philosophy (Frodeman 2013, Frodeman and Briggle 2016, Briggle and Frodeman 2016). Largely, field philosophers are those who engage with communities beyond academia altogether, connecting with community groups out of shared interest in a topic or goal (Frodeman and Briggle 2016). Frodeman and Briggle mention two types of engaged philosophers: 1) field philosophers who are "housed in the university (thus afforded the free speech and protections of tenure), but doing much of their thinking (like Socrates) with people out and about in the world," and 2) the philosopher bureaucrat who "has a philosophical education but has left the academy to permanently work in the public or private sector" (Frodeman and Briggle 2016, 123). They use their argument in favor of field philosophy as a vehicle to shift philosophy away from academic structures and integrate philosophy into other communities.

While I echo Frodeman and Briggle's challenge toward many existing norms and practices in academic philosophy that constrain engaged approaches, I am not arguing for a complete "de-disciplining" of philosophy, as Frodeman and Briggle do. Rather, I am arguing that academic philosophy and the overlap between academic communities and other communities is more complex than Frodeman and Briggle give them credit for in their book. For instance, the field philosopher and the philosopher bureaucrat describes where philosophers of science can engage from - either from academic philosophy outward, or from outside of academic philosophy. However, Frodeman and Briggle's brief discussion and description does little to explore complex cases, such as philosophers of science engaging communities that exist on the border of academia. (For example, pharmacists and chemists who conduct research on new drug therapies for pharmaceutical companies.) Nor do they capture the varying degrees of communication and knowledge flow. Supporting engagement within and beyond academic philosophy is complex and requires a context-sensitive analysis of the overlap and intersections

among different approaches to engagement (particularly if we intend to shift norms), which I provide in this dissertation.

### **2.3: Taking Stock of the Discussions**

In Section 2.2, I analyzed numerous individual and disciplinary roles and responsibilities that philosophers of science have advanced. In the context of these debates, philosophers of science have argued about what these roles and responsibilities ought to be. In this chapter, I maintain a pluralist stance regarding these roles, respecting the notion that philosophy and philosophers of science can, at least on a theoretical level, prioritize any of these approaches. While I argue in subsequent chapters that philosophy of science has a role to play in political and social aspects of science (unlike Giere) I recognize that many of the approaches discussed above facilitate involvement of philosophy in relevant scientific practice and policy. In the following section of this chapter, I argue that one approach has been largely overlooked.

Thus far, we have seen that many philosophers of science agree that they have important roles to play with respect to science (and of particular relevance here, to promote and improve socially relevant science). I have highlighted a number of potential ways that philosophers of science can fulfill these roles above. Though the views I have discussed in this chapter are all in some way or another promoting engaged or socially relevant philosophy of science, they differ on what exactly engagement and relevance mean. For some, engaging with science (particularly socially relevant science) through critical analysis is the ideal for philosophy of science (Giere 2003). For others, the political aspects of science are so deeply embedded in the practice and core concepts that philosophy of science can (and sometimes should) play a much more embedded role (Douglas 2010; Kourany 2010; Tuana 2010). Even when there is agreement about the need for a closer or embedded role for philosophers, there are still specific theoretical and practical disagreements about the appropriate level or type of engagement. Primarily, there is significant disagreement about *how* to engage -- i.e., the methods and pathways of engagement with scientifically relevant communities.

One pathway is via early intervention into the scientific communities at the point of education and training, where philosophers can infuse education about value judgements and impacts (Tuana 2010). Others argue that there is opportunity to engage meaningfully downstream by writing codes of ethics for scientists to consult when conducting research (Kourany 2010). Philosophers like Douglas or Plaisance and Kennedy discuss the need to engage on the ground and in the midst of scientific practice itself (Douglas 2010; Plaisance and

Kennedy 2014). While several of these modes and pathways of engagement are commensurable with one another, some are mutually exclusive (e.g., Giere's and Kourany's disagreements about the political aspects of philosophy of science). Furthermore, some philosophers argue for more direct engagement through practice while others advocate for a consultation model that informs practice downstream. For instance, Douglas' on-the-ground approach seems to yield more direct engagement than Kourany's code of ethics does.

Despite the differences among pathways of engagement, each of the views discussed here share one feature which impacts resulting views about the roles philosophers of science can play, or the responsibilities they consider our discipline to have. In the following section, I argue that current scholarship assumes that philosophers of science engage from academia. In other words, they assume that philosophers are working from an academic context. (However, as I point out in Chapter 4, this is largely due to significant identity norms and barriers that limit contributions from philosophers who are not also academics. These norms are deeply woven into the fabric of philosopher and philosophy, leading to inadvertent assumptions that ultimately, I do not think these scholars would endorse.) I discuss this assumption in more detail below, arguing that it unnecessarily limits the roles for philosophers of science, even in ways that would fit the basic goals of our discipline.

## **2.4: A Common Assumption**

I am very sympathetic to many of the approaches to and discussions of socially and scientifically relevant philosophy of science addressed earlier in this chapter, particularly SRPOS. However, these discussions have not gone quite far enough. In particular, these arguments overlook a specific approach that philosophers may take to engage with many scientifically relevant communities: engagement wherein philosophers are embedded directly in those communities as members.

Despite the wide methodological range, the literature I review above is focused solely on ways that *academic* philosophers can engage with scientists, scientific practice, policy, or publics (while embedded in the reward structure in the academy). Regardless of the pathways for engagement that are identified (e.g., through science education, policy, or practice), philosophers of science assume that philosophers in academic positions will play these roles to further the goals of philosophy of science regarding the social, ethical, and political implications of scientific practice. Even some of the most forward-thinking philosophers of science who advocate for a more socially relevant philosophy of science overlook the possibilities for



philosophers of science to engage with science or science policymakers from outside of the academy. While Fehr and Plaisance (2010) consider a plurality of ways that philosophers of science can do socially relevant work, their examples are of work being done in the academy, and the barriers they consider are often specific to those seeking tenure-stream jobs.

Fehr and Plaisance lay out four themes within the SRPOS they analyze: 1) collaboration with scientists, 2) addressing policy, regulation, and institutional structure, 3) investigating intercommunity relations, and 4) changing philosophical practice. In each case, they offer examples of this work from philosophers of science who are employed in academic (usually tenure-stream) positions. While their examples are somehow engaging *with* scientifically relevant communities, none of them are engaging *from* those communities (in other words, embedded within them). There is no reason to believe this assumption is intentional. In fact, Fehr and Plaisance emphasize that they intend their view to be pluralistic in its representation of SRPOS and argue strongly in favor of engaging closely with scientific communities (2010). As I will argue in later chapters, this assumption limits the means of attaining many of the goals they intend for the discipline (e.g., to have an impact on scientific practice and/or knowledge), since many of these goals may also be met through roles outside of academic philosophy (e.g., policy roles within government). For those reasons, I view my work as a sympathetic extension of their argument.

Cartieri and Potochnik also draw on similar examples, often pointing to the very same prominent philosophers of science as examples that Fehr and Plaisance discuss, such as Kristin Shrader-Frechette's work. Cartieri and Potochnik's desiderata for SEPOS – public motive, specificity, and accessibility – which overlaps significantly with Fehr and Plaisance's definition of social relevance, are again rooted in the assumption that philosophers are academics who clarify and ameliorate science for non-expert communities (2014). While none of these authors explicitly endorse this limitation, it is nevertheless implicit in their arguments and their examples. Our shared understanding of a philosopher is so synonymous with academic, that this distinction is difficult to recognize.

A notable exception to focusing on academic philosophers can be found in adjacent scholarship by Kristie Dotson. Dotson (2013) points out that philosophical work can be meaningfully done outside of academia in a rare and insightful metaphilosophical paper questioning the bounds and norms of the discipline of philosophy. As she points out, academic norms bind our discipline in a way that makes it inaccessible to diverse practitioners, thus undermining key normative views in philosophy of science which hold that diversity creates better knowledge (e.g., Longino 1990; 2001). Dotson argues that academic norms are not what

define philosophy — and as I take it, philosophers themselves — but rather the questions and outputs that drive the work are what define it (2013). Furthermore, to impose such limits on philosophical work (i.e., that it is required to remain within said academic norms) is an exercise of privilege that rules out the involvement of diverse practitioners, unless of course they find ways to change themselves and their practice that meets these norms, compromising their diverse perspectives, their identities, and the uniqueness of their contributions to philosophy (Dotson 2013).

Similarly, I argue in Chapter 3 that philosophers of science who engage with science and society in unique ways can do the philosophical work needed while not remaining within the norms and structures of academic philosophy. For example, working directly in governmental policy environments can enable direct involvement with science policy writing and does not require that practitioners publish in specific philosophy journals (as I will discuss again in Chapter 4). In many ways, stepping outside of academic philosophy can give philosophers of science the freedom to meet the goals of the sub-discipline without being hindered by the barriers of doing this work within philosophy. (However, as I will argue in Chapter 4, this can come with significant costs to a philosopher of science's identity and ability to bring that work back into the philosophical community. That is, unless the norms within academic philosophy shift to support philosophical work that extends beyond the academy — a shift that I will advocate for in this dissertation.)

Even looking at these important and relatively novel critiques that push the boundaries of what philosophy of science is and how it is relevant to the broader context of science and society, there is one common opportunity being overlooked: the multitude of ways that philosophy and philosophers of science can engage from outside of the academy. Considering such options lends itself well to meeting the goals of SRPOS. A primary goal of SRPOS is to enhance the engagement of philosophy of science with science and society. As Fehr and Plaisance point out, SRPOS (and properly valuing and rewarding this work) will have at least three kinds of benefits: 1) social benefits, 2) scientific benefits, and 3) philosophical benefits. Doing socially and scientifically engaged work can benefit society by addressing ethical concerns relevant to society and making science more accessible, benefit science by increasing the uptake of science and clarifying conceptual and ethical issues, and can benefit philosophy as a discipline by opening new avenues for questions and research that may form connections beyond the discipline (Fehr and Plaisance 2010). In Chapter 3, I argue that these benefits are not lost by widening the scope of philosophy and philosophers of science to include venues and roles beyond the professoriate and the academy; in fact, these benefits are *advanced* by doing so. In

fact, my extension of their work explores the context-sensitive nature of the benefits and barriers they discuss. Furthermore, returning to Dotson's point about philosophy's lack of diverse practitioners, I show how identifying and encouraging non-academic opportunities for SRPOS work can enhance the diversity of practitioners, thus leading to epistemic benefits that a purely academic enterprise is unlikely to manifest.

## **2.5: Conclusion**

Before we can even begin to consider moving away from this assumption that engagement must happen from within academic philosophy, and consider the benefits of doing so, we need to better understand the structures that allowed that assumption to go unchecked for so long. I begin this analysis in Chapter 3, where I develop a framework for broadly engaged philosophy of science that identifies different approaches to engagement and identify key benefits to those approaches. In Chapter 4, I will discuss a number of barriers that make it difficult to do engaged work, particularly from outside academic philosophy. Many of these barriers surround the culture of academia, the reward structure both from a disciplinary perspective and from an institutional perspective, and identity issues for philosophers of science. I will present survey and interview data that help illuminate the landscape of philosophy of science and engagement with science and society, and the issues that arise for philosophers of science doing engaged work. This data enables me to lay out the barriers and relevant issues in an effort to move past the assumption that philosophy of science must be academic and broaden the scope of how and who philosophers of science can engage. I develop my analysis further in Chapter 5 by exploring the complexity of mitigating the barriers to engagement. I will argue that mitigating barriers requires disciplinary, departmental, and institutional changes to support engaged philosophy of science.

In Chapters 3 and 4, I build on Fehr and Plaisance's discussion of the benefits and barriers to SRPOS, both by exploring these issues in more detail and drawing on empirical data that I helped to collect to inform my analysis. In this dissertation, I echo their call to broaden philosophy of science and support socially relevant and engaged work. I expand on Fehr and Plaisance's arguments to show that engaged work brings specific benefits to philosophy of science and philosophy as a whole; in addition, I further analyze the barriers they identify by incorporating new data that highlights existing barriers and how they function to stifle socially engaged work. As I demonstrate, not only do these barriers function via academic reward structures, as Fehr and Plaisance themselves suggest, but issues of professional identity also

play a significant role in the decisions philosophers of science make regarding what scholarship to pursue.

Adding to this opportunity, to achieve the three types of benefits from Fehr and Plaisance, philosophers of science ought to be supported to engage on some level with communities their work is aiming to impact. For instance, philosophers of science whose work aims to impact evolutionary biology ought to be supported to engage with evolutionary biologists to meet research goals when that engagement is beneficial. Philosophers of science who wish to have an impact on health policy can engage with policy writers in order for the policy itself to be impacted by that philosophical work. While there are opportunities for academic philosophers to contribute to scientific practice, science policy, science education, etc., the academy is not necessarily structured in a way that actively supports that level of engagement. As I argue in Chapters 3 and 4, the culture of academic philosophy reinforces traditional methods that make it difficult to engage across disciplines and communities. In Chapter 5, I discuss what barriers this methodological limitation creates, and what active steps can be taken to minimize them.

# Chapter 3

## Mapping Engagement: Approaches and Benefits

### 3.1: Introduction

Currently, there is a gap in our collective understanding of socially and scientifically engaged philosophy of science. In Chapter 2, I analyzed philosophers' arguments about the social and scientific relevance of their work, describing the relationship between philosophy of science and popular perceptions of science, and the relationship between science and the ethical and epistemic issues that philosophy of science addresses (Fehr and Plaisance 2010). I argued that, despite a growing collective of philosophers who advocate for the importance of socially and scientifically relevant work, we are lacking a comprehensive understanding of methodologies used to engage science and society. The term 'engagement' has been used to describe many disparate activities, from using scientific literature in philosophical research, to collaborating with scientific communities, to consulting on science policy. I explore many examples in Chapter 2 which detail a range of activities and approaches to engaged philosophy of science. This chapter fills that gap in existing philosophical discussions by providing a framework for understanding engagement as a method within philosophy of science, which represents a plurality of approaches along a spectrum of engaged work.

In addition to laying the foundation for a framework of engaged philosophy of science, I add one nuance to current understanding of engagement with stakeholder communities. I identify an approach to engagement that has been largely overlooked in the literature: engagement with communities outside of academic philosophy, specifically where the philosophers of science themselves are embedded in communities outside of academic philosophy. For example, philosophers of science who work as policy advisors employed within federal governments who are engaging with communities from that policy context (i.e., outside of academic philosophy) utilizing their philosophical skills to identify ethical values in science policy. In identifying this approach and teasing it apart from approaches where philosophers of science engage with policy communities from academic philosophy, I argue that philosophy of science can broaden the scope of accepted approaches to engagement and that doing so will require specific changes to mitigate barriers and actively support a wider array of contributions from outside of academic philosophy. The framework I develop below challenges widely held

dichotomies of who is and is not considered a legitimate philosopher of science that center academia as the locus of power and community membership. I argue that this affects our perceptions of who is engaging within and contributing to philosophy of science.

Understanding the complexities of engaged philosophy of science in its broadest sense is crucial to a context-sensitive analysis of the various benefits and barriers to engagement. My earlier analysis shows a pluralistic scope of engagement that I aim to broaden in my work. I characterize similarities and differences among three notable features of engagement: 1) direction of communication and knowledge flow, 2) individuals and communities philosophers of science engage with, and 3) where philosophers of science themselves are engaging from. I argue that analyzing engagement with attentiveness to these three factors enables me to isolate different approaches along a continuum.

In particular, my framework breaks engaged philosophy of science down into four approaches. The terminology I assign to these approaches, while useful to highlight differences that influence benefits and barriers, represent two ends in a continuum rather than definitive categories. In my analysis of each approach, I use interview data to provide examples, which allows me to identify common themes in the ways that philosophers of science describe their engagement with scientific communities. The analysis highlights the spectrum of knowledge flow between engaged communities and emphasizes the range of scientifically relevant communities philosophers of science engage inside the academy and outside the academy which I discuss in Section 3.3, both of which are crucial to understanding the barriers to engagement I will analyze in Chapter 4.

As discussed in Chapter 1, we collected this data through 35 interviews with philosophers of science working inside and outside of the academy, representing a wide array of areas in philosophy of science. The interviews included philosophers of science who were pre- and post-tenure, mostly targeting philosophers with high levels of engagement. Though our data is skewed largely toward philosophers working in the academy at the post-tenure stage, we did involve academic philosophers who engage with a wide variety of communities, such as academic scientists working in several disciplines, legislators, policy makers, and publics. I coded and analyzed the data for themes about topics such as engagement and barriers.

Building on my analysis, I argue that bi-directional extra-academic engagement is the specific approach to engagement that is largely missing from the SRPOS literature. Bi-directional extra-academic engagement requires careful analysis as it can help support inclusivity in academic philosophy, open new areas for inquiry, and offer different solutions for philosophical issues in science (I discuss each of these in more detail in section 3.4), yet many

barriers currently exist for philosophers of science who engage with scientific communities beyond the professoriate.

With this framework in place and a fuller understanding of engagement, I can identify possible barriers to the various forms of engagement. Furthermore, this framework can be used to start to differentiate which barriers can be associated with which approaches to provide a context-sensitive analysis. In Chapter 5, I address possible solutions to those barriers by examining their complex roots and show that concrete support for engagement, including a more flexible reward structure, will support the addition of currently marginalized perspectives in our epistemic community.

The utility in isolating approaches even when I aim to represent the plurality of engagement lies in exploring when and how barriers to engagement impede certain type(s) of work in philosophy of science – typically work that is relevant to and embedded in social concerns. A framework for engagement can advance our current discourse such that we have a more complete understanding of the barriers to socially relevant philosophy of science and how they differ depending on the approach being utilized (the flow of communication and knowledge, the communities involved, and the context). Perhaps more importantly to my goal(s) with this dissertation, the framework can also help us understand the mechanisms behind the continued marginalization of socially relevant within philosophy of science so that we may intervene to mitigate the barriers, allowing social concerns to become a stronger driving force in the philosophical context.

Furthermore, this chapter advances another one of the main goals for this dissertation: a pathway for broadening the opportunities for philosophy of science to include a wider array of epistemic perspectives in its knowledge-producing practices. More specifically, I argue in Section 3.4 that one way to support diversity and inclusivity in philosophy of science is to expand the methodological scope of philosophy and support a larger range of contributions from philosophers. Furthermore, active support of engagement can facilitate inclusion of a wider array of epistemic perspectives in its knowledge producing practices, ultimately providing epistemic benefits to philosophy of science. In other words, one way to be more inclusive of social diversity in philosophy of science is to widen the scope of engagement with communities beyond academia and support that engagement in practical ways (e.g., through policy).

Adopting broadly engaged approaches including contributions from outside academic philosophy provides epistemic and social benefits to philosophy of science by opening up new opportunities, new methods, and new questions by expanding community connections for philosophy of science (Fehr and Plaisance 2010). Extra-academic engagement specifically

provides opportunities to expand community connections such that philosophy of science can support diversity and inclusivity in new ways. Specifically, I argue that bi-directional extra-academic approaches can facilitate inclusion via a deeper connection (and sometimes directly embedded connections) with extra-academic communities. Diverse practitioners will benefit from active support in the form of changes to existing structures that undermine social, epistemic, and methodological diversity (Dotson 2013).<sup>17</sup>

## **Section 3.2: Mapping Engagement**

Having a clear understanding of engaged philosophy of science is certainly important in its own right as a relevant metaphilosophical topic. More importantly, articulating the variety of ways philosophers can engage with science and society is a particularly important step for identifying possible barriers to engagement. Furthermore, understanding what the barriers are and how to mitigate them is yet another crucial step in reaping the benefits of engaging with communities outside of philosophy. I am advocating for engaged philosophy of science in this dissertation, yet that advocacy can be partial without unpacking the barriers that inhibit engagement with scientifically relevant communities. In addition, more fine-grained definitions may help resolve disagreements within the philosophical community about what counts as legitimate philosophy of science. As I showed in Chapter 2, many disagreements stem from miscommunications about what engagement can be in philosophy of science.

Unfortunately, very few philosophers have been explicit about different methods philosophers of science can use to engage with scientifically relevant communities. As I show in Chapter 2, philosophers of science have been engaging with scientific communities as a means of conducting research, and few have openly reflected on or articulated reasons why engagement is beneficial, explained their method of engagement, or made note of significant barriers (with the handful of exceptions I previously discussed). Even in cases where philosophers of science are arguing in defense of scientifically and socially engaged research, philosophers do not articulate exactly how they are connecting with these communities is in the context of their argument, often leading to miscommunications (Kourany 2003a, Kourany 2003b, Giere 2003). Giere and Kourany seem to be disagreeing about whether engagement with policy makers is legitimate within the scope of philosophy of science, yet they have not articulated where the

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<sup>17</sup> I take the term ‘diverse practitioner’ from Kristie Dotson’s work, which broadly highlights social as well as methodological diversity (2012). I unpack the term in Section 3.4.



methodological lines are for legitimate philosophy involving science policy and non-legitimate methodology. Surely, Giere does not intend for all policy-relevant discussions to be outside of the scope of philosophy. Without differentiating what methods are or are not legitimate, philosophers leave their respective arguments up to interpretation about what engagement with science policy can look like. The framework I develop below provides clarity to the term ‘engagement’ to not only shed light on similar disagreements but also inform further analysis.

Developing a framework accomplishes two things: 1) provides a map to understand the landscape of methods philosophers use to engaged with scientifically relevant communities, which is inherently pluralistic insofar as it captures a full range of connections, and 2) assigns terminology to differentiate between different approaches to those connections to highlight relevant differences among them, which I use to differentiate benefits and barriers that vary by approach in Chapters 4 and 5.

### **3.3: An Empirically Informed Framework for Engaged Philosophy of Science**

Developing a framework of engaged philosophy of science establishes a high-level conceptual picture of engaged philosophy of science. The framework I develop below is pluralistic insofar as the aim is to represent all methods for engaging with scientifically relevant communities rather than privilege a specific approach. I describe and assign terminology to possible methods for connecting with those communities and highlight the range of differences in approaches represented in philosophy of science. The framework below is informed by three main sources: 1) relevant philosophical literature analyzed in Chapter 2, 2) survey data about philosophers’ attitudes and experiences with engagement, and 3) interview data with philosophers of science. The framework allows me to map what engagement can look like and lays the foundation for an analysis of the benefits (Section 3.4) and barriers (Chapter 4) of engagement.

With this framework, I mainly aim to capture the *approaches* for engagement in philosophy of science – i.e., the *how* of engagement. Insofar as the communities a philosopher of science engages with can affect the approach, I also aim to capture the *who* – i.e., who makes up those communities and where they are situated with respect to academic philosophy. Both of these factors can and often do affect what kind of engagement is possible for philosophers of science. As such, it is important to examine both factors and how they impact the overall approach.

The philosophical literature discussed in Chapter 2 explores different instances of engagement with scientists, policy makers, educators, and other relevant communities. Furthermore, I discuss several instances of engagement between and across disciplines; specifically, I am concerned with engagement that goes beyond academic disciplines. The focus is largely on engagement that is rooted in a disciplinary and academic context – meaning engagement either among disciplines or from disciplines to communities beyond academia. However, my analysis of the interview data broadened our team’s discussion of engagement and paved the way for me to conduct a more complex analysis of academic and stakeholder communities. Interviews revealed the fluidity between academic philosophy, academic science, and relevant scientific communities beyond academia. The diverse set of perspectives represented in that data led to a more nuanced understanding of engagement in philosophy of science and enabled me to isolate the differences in engaged approaches within and beyond the academy. The framework provided below aims to capture that fluidity by acknowledging differences in communities.

To capture the communities involved in engaged work, I identify the proximity of those communities to academic philosophy. I define **extra-disciplinary** as work happening outside a particular discipline (such as philosophy) but still largely within the academic sphere. An example of extra-disciplinary engagement is Nancy Tuana’s work with climate scientists, using her philosophical tools to untangle coupled ethical-epistemic issues inherent in risk management in handling and interpreting climate change data (e.g., Goes et al. 2011, Tschakert et al. 2017, Tuana 2015). In another paper, my collaborators and I use this term to refer to philosophical work that extends beyond philosophy, encompassing both research that engages with other academic disciplines and research that engages beyond disciplines, such as with policy makers (Plaisance et al. 2019). However, for the view that I am defending in this dissertation, it is crucial to clarify and differentiate between philosophical research that engages beyond the discipline yet stays within academia, and research that extends beyond academia, regardless of discipline. As our research shows, the barriers vary quite a bit depending on the communities one engages with. Academic communities share similar incentive structures (e.g., generally shared requirements to publish), while stakeholder communities may not share the same structures or understanding the barriers academic philosophers face.

For the latter type of research, I use the term **extra-academic** to identify work that goes beyond the boundaries of academia to encompass relevant communities that may impact and/or may be impacted by philosophical work. Extra-academic communities include lay publics, and can also include policy makers, legislators, and stakeholders. The lines between

relevant publics and stakeholder communities can get blurred, such as in the case of citizen scientists. However, as I noted above, this distinction only matters insofar as the incentive structures and barriers may be different among these communities. An example of such work can be found in Sabina Leonelli's work on open science frameworks, through which she collaborates with policy makers, in Jane Maienschein's work about cloning and embryonic stem cell research wherein she has worked with legislatures, in Kyle Whyte's work with Indigenous communities and climate change, and in Adam Briggles work with local communities on fracking (Maienschein 2007, Whyte and Crease 2010, 2013a, 2013b, Briggles 2015).<sup>18</sup>

In addition to the context of engagement (i.e., who one is engaging with) it is important to consider the direction of knowledge flow that occurs. In particular, some forms of engagement include knowledge flow from one community to another, while other forms include a reciprocal exchange of ideas or information. In **uni-directional engagement**, communication and knowledge flow between philosophers and other individuals or communities flow in one direction. For instance, they flow either to philosophy of science, such an effort to learn the scientific practices and bring that understanding back to the philosophical community to better analyze those practices. Similarly, communication and knowledge can flow from philosophers of science outward, as it does when giving a talk at a scientific conference sharing a philosophical analysis. Knowledge flow and communication emerges from one community to the other, such as from philosophy of science to scientific disciplines. For example, Paul Griffiths' work with the Australian government helping to guide genetics-related policy development by clarifying concepts for policy writers.<sup>19</sup> In the latter, the relationship is reciprocal. **Bi-directional engagement** between a philosopher and other individuals or communities involves two-way communication between both groups. Engagement is organized such that communities exchange knowledge and ideas. Other communities can benefit from a philosophical perspective of their practices and methods, while the philosopher may benefit by using this engagement as an opportunity to conduct their research. In addition, knowledge can flow in either direction: from philosopher to community, or from community to philosopher.<sup>20</sup>

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<sup>18</sup> A description of Leonelli's policy work can be found here: <https://socialsciences.exeter.ac.uk/sociology/staff/leonelli/>

<sup>19</sup> Griffiths discusses this work in his interview.

<sup>20</sup> Similar models of communication have been discussed in the public understanding of science literature, namely the deficit model and the contextualist model of science communication. The deficit model has faced a significant amount of criticism for its lack of understanding of the role that relevant publics can play in scientific knowledge production and its uni-directional approach to knowledge formation. While

Bi-directional as opposed to uni-directional engagement refers to reciprocity and flow of knowledge; it doesn't specify the number of communities or groups involved in a collaboration. Philosophers may be engaging with multiple communities at any given time. What differentiates a uni-directional approach from a bi-directional approach is how reciprocal communication, and therefore knowledge flow, is between those communities while they are engaging.

Thus far I have isolated two key factors in identifying different approaches to engagement: one is the target community that a philosopher is engaging with, the second is the direction that knowledge flows between philosophical and scientifically-relevant domains. While the target community and direction of knowledge flow are the main considerations of identifying different approaches to engagement that are important to consider in this dissertation, there are two other factors to consider. First, there is the possibility of null knowledge flow instead of uni- or bi-directional knowledge flow (which I discuss below). Second, there is the question of where the philosopher themselves is located in addition to the target community. The philosopher could be located in academic philosophy, or they could be located in a community outside of academic philosophy, such as another academic discipline like science and technology studies (STS) or history of science, or even outside of academia altogether, such as with an NGO. The possibility of philosophers being located outside of academic philosophy is an important part of my analysis and is indeed the approach I argue is largely missing from the literature in Chapter 2. However, in Chapter 4 I largely focus on barriers for philosophers working within academic philosophy. I have chosen to do this because our empirical research suggests that the most significant barriers to engaged philosophy of science are located within academic philosophy itself. In Chapter 5 I return to this issue of the philosopher situated outside of academic philosophy and argue that the barriers for philosophers situated outside are likely very different.

Although uni-directional and bi-directional knowledge flow are the two primary directional considerations relevant for my purposes, there is also the possibility that knowledge does not flow to either community. In other words, engagement may not lead to knowledge flow from philosophy to scientific domains or vice versa, and theories or practices may remain unchanged despite interactions between individuals from different communities. For instance, a philosopher could attend a climate change research conference and talk to scientists, yet not

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the deficit model assumes that publics are the receivers of scientific knowledge and play no or little role in knowledge production, the contextualist model acknowledges that publics can and do influence scientific knowledge and understand it (Logan 2001; Weigold 2001). As a result, the contextualist model strives to account for bi-directional knowledge flow between scientific communities and relevant publics.

change their philosophical theory or scientists thinking or practice in light of their discussions. Certainly, this category of knowledge flow is relevant for conceptual and analytical purposes, as it is possible for there to be null knowledge flow despite efforts to engage. However, in what follows I focus on instances where some knowledge flow occurs, insofar as my arguments in Chapters 4 and 5 rely on the differing barriers when knowledge flow occurs uni-directionally or bi-directionally.

Based on these considerations, there are six different approaches to engagement that I explore in this dissertation: uni-directional extra-disciplinary engagement (flowing outward), uni-directional extra-disciplinary engagement (flowing inward), bi-directional extra-disciplinary engagement, uni-directional extra-academic engagement (flowing outward), uni-directional extra-academic engagement (flowing inward), and bi-directional extra-academic engagement. This framework is intended to map different approaches based on two general features of engagement: which communities are engaged by philosophers of science, and the flow of communication and knowledge between the communities. In what follows, I provide excerpts from the interviews I conducted with my collaborators that serve as examples of each type of engagement, highlighting the differences among each approach. While there are salient differences between each approach, these categories of engagement exist on a spectrum and may overlap in certain cases, which I discuss below. Real-world engagement is not neatly placed into static categories. Engagement can and often does morph over time as the relationship among communities grows. The point is not to identify discrete categories, but to better understand the landscape of engagement in philosophy of science.

I am most concerned with bi-directional engagement. I analyze some examples of both extra-disciplinary and extra-academic uni-directional engagement below but focus on bi-directional forms. As I discuss below, it seems as though bi-directional engagement is often accompanied by an additional set of barriers that make it more difficult for philosophers, which I will unpack in greater detail in Chapter 4. Uni-directional engagement, requiring less integration and exchange of ideas, does not seem to share the same barriers, therefore requiring less detailed analysis and solutions to mitigate those barriers.

### **3.3.1: Uni-Directional Extra-Disciplinary Engagement**

To start, uni-directional extra-disciplinary engagement is characterized by philosophical work with academic scientists (e.g., at scientific conferences, in publications, on grants) that engages other academic disciplines with a one-directional flow of knowledge. Again, this knowledge flow could go in one of two directions. Communication could be largely from

philosophers of science to academic scientists (such as at a conference talk), or from scientific communities into philosophical communities, with limited communication between the two groups. For example, Participant Q discusses knowledge flow from philosophy to biology:

*I was in a symposium at the [Scientific Association] this year. I'd say a significant proportion of my presentations are at scientific meetings. So that's how I disseminate my work to scientists, by putting it on posters and standing next to it and explaining it to biochemists and geneticists. And by being roped in to be part of a session, where I'll do a philosophy talk. So, this [Scientific Association] session was really fun, and it was basically about how can we take new and interesting, new and different approaches to the genetics of complex human phenotypes. And that's something I've written a lot about it and I've presented what I've written. I've presented what I've written, and various people ask questions. [...] I don't really feel that giving a talk at a science conference is very different than when I give a talk at a philosophy conference.*

In this excerpt, Participant Q is describing an example of engagement that relies mostly on dissemination, or one-way communication, between philosophers of biology and geneticists. As a philosopher of science, Q is bringing their philosophical arguments and ideas to a scientific community with the (assumed) intention of impacting the field of genetics. Both the context of engagement and the extent of communication between philosophers and scientific communities distinguish this particular example as uni-directional extra-disciplinary engagement.<sup>21</sup>

However, if for instance Q disseminated research to scientists at a conference and maintained conversations with scientists who begin reading Q's research and incorporating it in their understanding of scientific concepts, Q's approach begins moving toward a bi-directional approach. Furthermore, if Q and interested scientists begin partnering on grants, research talks, and papers, they are moving further along the spectrum of bi-directional engagement. In that way, engaged approaches can change over time to involve more or less communication and collaboration.

Again, it is possible for uni-directional engagement to flow from extra-disciplinary (or extra-academic) communities back into philosophy. For example, in Ken Waters' work on the philosophical concept of the gene (1994), he engages with scientists and uses the tacit knowledge he gained to bring a more nuanced understanding of the gene concept into

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<sup>21</sup> Note that later in Q's interview, they talk about specific research projects that use more of a bi-directional approach at different phases of the research process. While Q describes a uni-directional process here, that's particular to a stage of their research process and not necessarily indicative of all research projects or stages. This further demonstrates that the approach is specific to a project and not necessarily representative of every approach they take in their work.

philosophy. Although Waters engaged with molecular biologists to learn more about the scientific practice, he brought that knowledge back into the philosophical community (Plaisance 2020). Waters' efforts were not to change anything within the molecular biology community, but rather to bring new knowledge to bear on philosophical concepts (Plaisance 2020). Interestingly, when knowledge flows from philosophy outward, there is reason to believe that the barriers to engagement are more significant than knowledge flowing inward.<sup>22</sup> (I discuss these barriers in more detail in Chapter 4.)

### **3.3.2: Bi-directional Extra-Disciplinary Engagement**

Next, bi-directional extra-disciplinary engagement involves the same audience – academic scientists and other academics – but involves a greater reciprocity of communication. Ideally, bi-directional extra-disciplinary engagement consists of two-way communication and engagement between, for instance, academic scientists and philosophers of science. Here is an example of bi-directional extra-disciplinary engagement from participant L:

**Participant:** *So then I got the job at [institution], been happy there. I have biologists I work with there, [...] I'm on dissertation committees with biology, but like a lot of philosophers of biology, we have these networks of people, just like in philosophy, and it's sort of cool, as I've been brought in by three different grants - by biologists, one time. Health people like to bring in a philosopher.*

**Interviewer:** *Do you know how this got started?*

**Participant:** *So the most recent one I had was on a [grant] about microbiology and stuff like that. So he brought me in on that. Because he liked the stuff I was doing with species, and so there were issues in microbiology, so he brought me in, I was able to hire a PhD student of mine, [...] they had a big ecology program, and so he was sort of trained at that. But, going to your question, the relationships tended to be, yes, set up earlier.*

**Interviewer:** *And how did they get started? Did you meet these people at conferences?*

**Participant:** *That's a hard question. So in the [name] case, so [name] had been shopping for decades for philosophers to get engaged in his work [...] because he thought that there were questions that he was interested in biology that were, you know... that having philosophical expertise of analysis might be useful. In other words, he saw in some way that there were problems within biology where philosophical*

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<sup>22</sup> See Plaisance (2020) for a more in depth discussion of this difference, also using Waters as an example.

*expertise would be useful. [...] So it was interesting. He brought in people who did systematics in philosophy of biology [...] he was trying to get people engaged [...] and [name] was sort of in the background because it was sort of [name] trying to, bringing in philosophers and biologists together.*

In this excerpt, participant L is referring to an ongoing collaboration between biologists and philosophers of biology involving collaboration on grant proposals, research, and supervision of graduate student work. What is notable about this example and many others described in the interviews is the focus on the academic components of engagement. What makes this example extra-disciplinary is that the collaboration's boundaries are maintained within institutional and academic reward structures. What makes this example bi-directional is the involvement and communication between the philosophers of biology and the biologists aiming for co-development of research and integration of the engagement.

### **3.3.3: Uni-Directional Extra-Academic Engagement**

Uni-directional extra-academic engagement is characterized by philosophical work that engages with individuals and communities beyond the professoriate, with communication and the flow of knowledge going from philosopher to community, or community to philosopher. Philosophers can largely be engaging in one-way communication, such as passing information to communities through channels like op-ed pieces and public talks. Again, philosophers could either be: 1) engaging beyond the professoriate with communities such as policy makers and industry scientists (knowledge flowing outward), or 2) philosophers are learning from communities outside of the professoriate and feeding knowledge back into the philosophical community through conference talks, publications, and other philosophical venues (knowledge flowing inward). For instance, participant P discussed their research with a network of related scientific communities including academic scientists and policy writers:

*I started to get involved as a co-I on some scientific grants, which now has continued in a major way, in fact, it is taking a lot of my time. But it is again another way to...I would call it engagement rather than dissemination because what you're doing there is making sure that you're not just the person that appears every now and then, gets some data, and goes away, but in fact, engaging in the longer term with the kind of work that you're doing with them [...] I do also scientific cafes and I do sort of cities of engagement, that kind of thing. But to be honest, more rarely, I end up doing much more work at the policy level. So, what happened there is that I started to get asked...well, actually it started because I authored that paper which was a bizarre request from the research communities I was working with at the time. They asked me*



*to help them to write a paper on business models for the assisted ability of data infrastructures [...] So, actually I did end up writing a paper that got published in [academic journal] on this kind of thing, which ended up being really important for me because it started me off on a whole way of thinking about epistemology of data. It ended up in a book I just published. [...] The NSF picked it up, and quite a lot of policy organizations picked it up within the UK and the States and in Europe, and they started to call me up as an expert on this kind of thing. Which actually I was really happy with because I would then get to mingle with some of the top scientists that were working on these topics, and of course talk at the top policy level so that I would always know what was coming.*

Participant P's engagement described above is complex in that it involves a set of overlapping scientific communities made up of practicing scientists, academics, policy writers, and government employees. Many of the outputs from the participant's end are academically focused (e.g., journal articles, books). In addition, the engagement described by P is iterative in nature, such that the approach changes over time. The engagement started as uni-directional with extra-academic (and extra-disciplinary) communities and moved to a more bi-directional approach (as described below). (I discuss how approaches can change over time in more detail below.) P's example illustrates another important point I aim to reinforce: the approaches I describe below are not intended to be fixed categories. There are many cases where the lines between approaches can blur together in one case or change over time. While that may happen in practice, distinctions are useful insofar as the barriers and benefits shift depending on specific features of an approach.

In addition to P's example, work on the Toolbox Project can also serve as a good example of uni-directional extra-academic engagement in that it applied philosophical analyses within scientific communities to enhance collaboration and cross-disciplinary communication (O'Rourke and Crowley 2013). The aim of the Toolbox Project is to use philosophical tools to uncover assumptions within scientific communities (largely collaborators) so that communications between and among these communities is more effective and facilitates stronger relationships. While this means that the knowledge flow runs largely from philosophy outward to the scientific communities to which the Toolbox Project instruments are used, these communities can span beyond academic contexts (O'Rourke and Crowley 2013).

### **3.3.4: Bi-directional Extra-Academic Engagement**

Bi-directional extra-academic engagement is also characterized by engagement between philosophers of science and scientific communities that span beyond academic science. Bi-

directional extra-academic engagement involves significant depth of communication between said communities, such as two-way communication and engagement, as well as sustained contributions among both communities and their distinct reward systems. In some cases, this can involve embedded philosophers of science who work primarily in communities outside academic philosophy. Below is an example of bi-directional extra-academic engagement between a philosopher of science and government agencies:

*My first year I was placed in the [federal agency #1] [...] I was hosted by a toxicology research program, using fancy systems biology to try to do toxicology. I got to look at really, really cutting-edge toxicology research. And I had no toxicology going in, so I also got to like learn a lot about toxicology and like how it works in a regulatory context. Specifically, I did a lot of stuff initially with like bibliometric analysis of the program. So, like how the research done under the offices of this program fits into the broader research community. So, I did a big citation network analysis for that project. And then I did some text analysis stuff, like computational text analysis stuff of like social media mentions of the research and relevant trade-press like news coverage, relevant to the research. Then towards the end of the year, once I was understanding the toxicology well enough, I wrote some things that were like applying inductive risk to think about why environmentalists and industry have very different attitudes towards the visiting research. And I have one paper which I will hopefully get back to near the end of the year because I didn't quite finish it during my time there... that paper was like using causal graph theory to analyze: we have this systems biology model, we want to use it for a regulatory purpose but it's probably wrong. Causal graph theory can help us elucidate the ways in which it can go wrong and then help us design inference rules that we can use to still derive regulatory conclusions about this. [...] My host office really hopes that I publish it in a toxicology journal, actually is what I'm hoping for once I get it finished. [...] And I'm doing stuff related to promoting interdisciplinary collaboration and also a little bit on emerging issues with self-driving cars as like a case study here.*

In this case, participant G is a philosopher of science who works for a government agency. They mention working for that agency not just to do bibliometric analysis and other work needed by the agency, but also publishing papers in academic journals connected with that work. In particular, they talk about using philosophical research on inductive risk during their time in the public sector. This suggests a two-way flow of communication for the philosopher of science, but also between philosophy of science and a governmental agency - in this instance, facilitated by

the participant. It also reflects a strong embedded approach from the philosopher of science; they are not simply working closely with specific branches of the government but working within scientifically relevant government agencies. By doing so, they are infusing philosophical work into those agencies by drawing on their background knowledge and analytical skills.

### **3.3.5: Concluding the Framework**

To clarify the similarities and differences among the approaches described in the framework above, I have created a visual representation of the framework (Table 1). This table breaks down key features of different methodological approaches to engaged philosophy of science that I am primarily concerned with for the purposes of my analysis in Chapters 4 and 5. Since null knowledge flow is not relevant to my arguments in the following chapters, it is not included in the table below as I focus on successful engagement that impacts at least one community.

Further, this table does not capture where the philosopher themselves is situated – within or outside of academic philosophy, which is relevant to uni- and bi-directional approaches. As I argued in Chapter 2, there is a significant gap in the philosophical literature in that it largely overlooks philosophers who are situated in communities outside of academic philosophy. As I pointed out, some of these individuals engage with scientifically-relevant domains and either feed knowledge back into the philosophical community, feed philosophical knowledge into scientifically-relevant disciplines or extra-academic communities, or both. Conceptually, this is an important distinction that I return to in Chapter 5 when discussing the complexity of barriers in practice. However, in Chapter 4, where I analyze significant barriers to engaged philosophy of science, I focus on philosophers situated in academic philosophy as the significant barriers come largely from the reward structures and practices in academic philosophy. Philosophers situated in communities outside of academic philosophy, on the other hand, might experience different barriers or experience them to different extents. (I return to these cases in the context of bi-directional extra-academic engagement in communities outside of academic philosophy.) As I argue in Chapter 5, when philosophers are situated in different communities (outside of academic philosophy) they are not subject to the same barriers rooted in academic philosophy. Despite that, the rewards, norms, and practices of academic philosophy are still highly influential in the philosophical community and therefore are prioritized here.

Again, the features below can help to identify meaningful differences such that the approaches deserve analysis independent of one another to identify benefits and barriers that differ across approaches. In other words, the differences are salient enough to warrant distinct

methodologies that achieve different empirical ends – e.g., collaboration and dissemination. However, the approaches also share similarities that in practice often indicate fluidity between approaches – e.g., disseminating research through a conference talk can often lead to a collaboration. The table underscores two things: 1) the distinctive features of each approach, and 2) where there are commonalities among those features that can facilitate movement from one approach to another.

	Uni-directional extra-disciplinary (outward)	Uni-directional extra-disciplinary (inward)	Bi-directional extra-disciplinary	Uni-directional extra-academic (outward)	Uni-directional extra-academic (inward)	Bi-directional extra-academic
Direction of communication & knowledge flow	Communication is largely one-way, and knowledge flows into scientific disciplines	Communication is largely one-way, and knowledge flows into academic philosophy	Communication is two-way between both communities and knowledge flows between	Communication is largely one-way, and knowledge flows into scientific disciplines	Communication is largely one-way, and knowledge flows into academic philosophy	Communication is two-way between both communities and knowledge flows between
Individuals and communities philosophers engage with	Academic scientists in different scientific disciplines	Academic scientists in different scientific disciplines	Academic scientists in different scientific disciplines	Science-related communities outside academia	Science-related communities outside academia	Science-related communities outside academia

*Table 1: Engaged Approaches to Philosophy of Science*

*This table breaks down each approach to engagement by its key features. As noted above, this table only captures instances of engaged philosophy of science where the philosopher is situated in academic philosophy.*

This framework represents six extremes of a wide-ranging spectrum of engaged philosophy of science. Each approach represents extremes on two spectrums: knowledge flow and community proximity to academic philosophy. These two features of engaged approaches can be present to different extents, as P’s example above shows. Communication may not always be bi-directional in practice, even within the same collaboration. A practitioner might engage academic within a scientific discipline, and they might later engage with citizen scientists. Each

approach, however, and the factors that characterize them from one another, are important for my ultimate goal of understanding the barriers to engagement and addressing possible solutions to mitigate those barriers.

### **Section 3.4: Comparing Bi-Directional Extra-Academic Engagement to Relevant Literature**

In Chapter 1, I claimed that bi-directional extra-academic engagement (and particularly the type wherein philosophers engage from communities outside of academic philosophy) is introduced in a novel way through this dissertation. In other words, my work in this chapter leads to the identification of another approach by unpacking engaged philosophy of science through conceptual analysis. While the above framework does clarify several approaches to engaged philosophy of science that have been underexplored in the literature, it is not the first endeavour in exploring what it means to extend research beyond academic institutions and into relevant communities or publics. This section addresses overlap in field philosophy, science studies, and interdisciplinary studies insofar as they are relevant to the framework I develop above.

Exploring this overlap helps to show how my framework differs from other philosophers who discuss broader social engagement. It also maps relevant concepts from other disciplines to show that bi-directional extra-academic engagement is not wholly new conceptually, and that insights from other areas of study can elucidate a clearer understanding of engaged work in our discipline.

Frodeman and Briggles' framework, which I introduced in Chapter 2, breaks down a philosopher's connection with scientifically relevant communities by philosopher 'types'. A field philosopher is closely connected with social and political contexts and "enlarges the range of academic philosophy," while a philosopher bureaucrat will "permanently set up shop within extra-academic institutions across society" (Frodeman and Briggles 2016, 2-3). The bi-directional extra-academic approach to engagement can seemingly fit both a field philosopher and a philosopher bureaucrat insofar as their engagement extends beyond academic communities. However, a bi-directional extra-academic approach can be adopted whether or not a philosopher currently holds an academic appointment.

I am not differentiating between academic philosophers and "non-academic" philosophers in the same way Frodeman and Briggles do. While their definition of the 'philosopher bureaucrat' rests on the assumption that they *must* be located beyond the

professoriate, I acknowledge that both academic philosophers and philosophers beyond the professoriate can use a bi-directional extra-academic approach. Moreover, they can both reap the same benefits of the approach and bring those benefits to philosophy (which I discuss in 3.5). As such, I recognize that engaged philosophy of science can be done differently in different contexts in my framework, and that attaching a methodology to a philosopher's identity can lead to significant barriers (which I unpack in detail in 4.5). Furthermore, I am not developing a framework for the purpose of 'de-disciplining' philosophy, but rather to represent a pluralistic spectrum of approaches.

Participant G's description of their role in the public sector does not negate their role in academic philosophy. While Participant G discusses their employment in the public sector, they also discuss academic involvement in journals (and earlier in the interview G also talks about going to conferences in philosophy and to other interdisciplinary academic conferences). Frodeman and Briggie draw an artificial line in the sand between philosophers in academia and philosophers of the public sector. Many philosophers who engage policy writers or legislators, for instance, do so as part of complex bodies of research. However, Frodeman and Briggie do not address the multitude of ways that engaged work can influence research practice and output; rather, they differentiate between philosophers who either do or do not engage publicly. For instance, philosophers of science as 'field philosophers' may connect directly with policy makers and lay publics, but philosophers of science may also choose to advance similar goals using a uni-directional or bi-directional approach. In other words, they present a dichotomy between academic philosophy on the one hand, and 'the philosopher bureaucrat' on the other, oversimplifying the possibilities in engagement between philosophers and scientific communities. Furthermore, they pay little attention to the complexities possibly involved in single projects with fuzzy boundaries between academic and governmental communities, even though they are arguing in favor of loosening the structures between these communities. (For example, science policy is typically deeply informed by academic scientists, yet written by policy analysts at the governmental level.) To deepen our collective understanding of the facets of engagement, I have developed the framework above to clarify different facets of communication and community involvement, which contributes clarity to current discussions (that in turn leads to a more context-sensitive analysis in Chapters 4 and 5).

The framework I describe above also maps roughly onto Eric Kennedy's nuanced understanding of the motivations of so-called interactional experts, drawing from Collins and Evans' foundational work on interactional expertise. Interactional experts, though not formally trained in the discipline with which they engage, have working knowledge and understanding of

that discipline to the extent that they can communicate with community members in the same ways an expert trained in the discipline can (Collins and Evans 2002, 2007). Since Collins and Evans' introduction of Interactional Expertise as a concept to understand engagement with expert communities, scholars in philosophy, social science, and science studies have contributed to this analysis of interaction and engagement. In particular, Kennedy identifies four profiles of interactional experts, further developing a framework of interactional expertise that is attentive to differing motivations among interactional experts themselves (Kennedy 2019). According to Kennedy, a *learner* engages with an expert community solely for the purpose of learning and understanding a specialist domain. A *challenger* engages with an expert community for the purposes of critique and the intention to change some theory or knowledge coming from that domain. Like a learner, a challenger may seek to understand language and norms, but only insofar as it furthers the purpose of pointing to problems or flaws that need addressing (which can be adopted in adversarial and non-adversarial ways). A *collaborator* engages with an expert community both to learn and to work towards a co-defined goal or outcome with the community. The collaborators gain expertise to further a goal or interest, while a *moderator* gains expertise to facilitate communication and resolve tensions, either inside the group or between multiple expert communities (Kennedy 2019).

Kennedy's framework of interactional expertise is helpful in understanding my framework for engagement described above. Uni-directional engagement, whether extra-disciplinary or extra-academic, can at times map onto Kennedy's concept of a learner or challenger. Learners and challengers often engage communities with predetermined yet self-directed goals, according to Kennedy, which aligns with the idea that philosophers of science engage with communities more so for philosophical ends rather than scientific ones. On the other hand, collaborators and mediators engage with the communities and allow goals to emerge; their purpose is to co-create or facilitate, which aligns best with bi-directional engagement.

Bi-directional extra-academic engagement aligns best with Kennedy's concept of a collaborator. As someone who engages to co-develop goals, views, and research, a philosopher of science acting as a collaborator is engaging with extra-academic communities to produce knowledge that is not strictly philosophical or scientific but shared with relevant communities regardless of their relationship to academia. Notably, Kennedy's framework is focused on the motivations for engagement, rather than which specific communities the engagement is with. While the interactional expert as a collaborator is using a bi-directional approach to engagement, Kennedy is not so concerned about who the engagement is with or their proximity

to academia. My framework, on the other hand, addresses the motivations of the engagers only insofar as those motivations relate to the direction of knowledge flow throughout the engagement.

Much like Kennedy's analysis of the learner and challenger roles, when philosophers of science engage using a uni-directional framework they may also assume that scientific communities are playing little to no role in shaping knowledge in philosophy of science, or vice versa. As Kennedy frames it, that is not the motivation of a uni-directional approach. Rather, scientists are either receivers of the knowledge, such as in cases when philosophers of science are strictly disseminating their research, or the scientific communities are providing knowledge, such as in cases where they provide knowledge for the basis for critique. Uni-directional frameworks are legitimate modes of engagement in philosophy of science. My pluralistic approach is not at odds with uni-directional engagement. However, I am primarily exploring the additional or unique benefits that come with bi-directional engagement, particularly bi-directional extra-academic engagement, which I focus on in Section 3.3.

Despite the broader scope that this dissertation takes to understand interactions between philosophical and scientific communities (i.e., engagement), the cross-disciplinary collaboration literature has informed my framework for engagement in this chapter. Cross-disciplinary collaboration is a term that encompasses multi-, inter-, and transdisciplinary collaboration. Theoretical frameworks of multidisciplinary, interdisciplinary, and transdisciplinary collaboration define different types of collaboration largely by the (often disciplinary) communities they engage, their relationship to academic disciplines, and how to facilitate communication between collaborators (Eigenbrode 2007; Klein 2010; Leavy 2016). Cross-disciplinary approaches to collaboration are legitimate and fruitful forms of engagement between philosophers of science and scientific communities, as I have argued elsewhere (Michaud, under review). As such, they are a helpful comparison to my framework for engagement in philosophy of science.

Multi- and interdisciplinary collaborations engage largely within academia. Multidisciplinary collaborations center largely around disciplinary problems that may benefit from integrating research, methods, or knowledge outside of that discipline. While multidisciplinary collaborations typically involve less communication and integration between collaborators from different disciplines, interdisciplinary collaboration is often a more communicative and integrative form of collaboration from the beginning, aimed at solving academic research problems (Klein 2010). Interdisciplinary collaboration requires a higher level of integration among collaborations, sometimes co-designing research and integrating multiple



disciplinary perspectives to solve problems. Transdisciplinary collaboration, on the other hand, has a stronger problem focus. There are two existing definitions of transdisciplinarity. The first focuses on a deeper level of integration to solve problems and does not specify which communities are involved in the collaboration (Klein 2010; O'Rourke et al. 2016; Frodeman et al. 2017). The second also involves a deeper level of problem-centered integration but transcends beyond the academic context to involve community stakeholders, evolving from larger-scale problems that are not located in specific disciplinary relationships. The second definition evolved out of a strong need to solve large scale social problems that require community involvement and transcends beyond disciplinary structures imposed in academic research (Leavy 2016). The way I am using the term transdisciplinarity aligns with the second definition; this definition is more explicit about the communities a collaborator works with, which is relevant for my discussion of engagement with stakeholder communities.

As a mode of engagement, transdisciplinary collaborative frameworks share many similarities with bi-directional extra-academic engagement. Leavy's analysis of collaboration is informative in clarifying the direction of knowledge flow and communication, as well as the depth of integration between academic communities and other relevant stakeholder communities. In identifying transdisciplinary collaboration as a separate approach in that it 1) engages stakeholder communities beyond academic disciplines and 2) requires integrated communication that is reciprocal, Leavy highlights two key features that change the approach to collaboration. Similarly, I separate approaches based on the community's proximity to academic philosophy and the reciprocity of communication between communities.

However, my framework focuses on which scientific communities a philosopher engages and their proximity to academic philosophy – hence, the use of the term “extra” rather than “inter” to identify proximity. The depth of communication and flow of knowledge is similar to collaboration frameworks previously developed by scholars tracking communication among experts (Klein 2010; Leavy 2016). While the cross-disciplinary collaboration literature certainly brings useful insights to the ideas of engagement in philosophy of science, this literature focuses on one specific aspect of engagement – namely, collaboration. Collaboration is one form of engagement between philosophy of science and scientific communities, but it is not the only way that philosophers of science have engaged beyond the discipline.

Engagement, as a concept, includes collaboration, dissemination, and any other forms of one-way and two-way interactions between philosophical and scientific communities, broadly construed. Engagement takes a broader scope, recognizing that philosophers of science can connect with scientific communities in many different ways that facilitate ends appropriate to

the research. Depending on the intentions and needs philosophers of science have for their work, collaboration may not always be possible or necessary. Despite these differences, I aim to ensure that a framework for engagement in philosophy of science is consistent with scholarship coming from social sciences and interdisciplinary studies, which extensively examines collaborative relationships among scholars inside and outside disciplinary contexts.

In Chapter 4, I analyze several examples of bi-directional extra-disciplinary engagement. In our paper on the impact of philosophy of science on science (Plaisance et al. 2020), we focus largely on bi-directional extra-disciplinary engagement between philosophers of science and scientific communities. Much of the data that I present in this dissertation is about this type of engagement. In this project, I want to take this argument a step further and focus on the benefits (largely epistemic ones) of bi-directional extra-academic engagement for philosophers of science.

In what follows, I focus on the pathways for engagement that allow for bi-directional extra-academic engagement to take place, the epistemic benefits of bi-directional extra-academic engagement for philosophy, and in turn, the barriers rooted in norms and academic structures that currently make it difficult for philosophers of science who want to engage bi-directionally in an extra-academic venue to do so. I want philosophy of science, and philosophy as a whole, to reap the benefits of bi-directional extra-academic engagement, but to do so philosophy of science and the broader discipline need to address the barriers that block this form of engagement from happening. Those barriers affect philosophers from inside the discipline and academy as well as those from the outside. My unique contribution in this dissertation is to analyze and clarify those different types of engaged approaches so that I can identify the epistemic benefits of bi-directional extra-academic engagement and possible barriers, all of which is important insofar as it leads to possible solutions to those barriers by examining their complex roots in Chapter 5.

While I have identified some examples of bi-directional extra-academic engagement from the interview data, these cases of engagement seem rare in philosophy of science — excluding a few individuals and institutional contexts where this work is actively supported, which I will discuss in Chapters 4 and 5. Disciplinary norms and reward structures make it difficult for us to even know when bi-directional extra-academic engagement is happening. Academic philosophers do not get rewarded for this work and those who are not employed as academic philosophers are not always able to access philosophical venues. Without any clear venues, information sources, or resources for examples of bi-directional extra-academic

engagement from outside of academic philosophy, I have few sources to draw on for this type of engaged philosophy of science. Thus, I will start with the examples from the interview data.

Understanding and conceptualizing engagement in a more nuanced way, with the help of the interview data, enables more fine-grained distinctions regarding potential benefits and barriers for the different types of engagement. Each approach can look very different in practice and carry their own benefits and barriers, much like different approaches to interdisciplinary collaboration.<sup>23</sup> For example, transdisciplinary collaboration is well integrated and problem-centered in a way that represents many perspectives, but the approach also takes significantly more time and resources (Klein 2010; Levey 2011). In the next section, I examine the benefits of bi-directional approaches to engagement below, as others have done for interdisciplinary approaches, and then in Chapter 4 I turn my attention to the various barriers to engaged philosophy of science.

### **Section 3.5: Benefits of Engagement**

Fehr and Plaisance (2010) discuss a variety of benefits to engagement with scientific and other communities through SRPOS work. The benefits they discuss are relevant to all types of engagement that I laid out in the framework above. They focus on three kinds of benefits: social, scientific, and philosophical benefits. I am taking their work as a starting point for my discussion on the benefits of engagement in philosophy of science. I summarize these benefits below and then expand their list of benefits by arguing that bi-directional extra-academic engagement in particular can better support diversity and inclusion in academic philosophy. The empirical data I helped to collect and analyze informs the literature on benefits and identifies bi-directional extra-academic engagement as a distinct approach to engaged philosophy of science.

According to Fehr and Plaisance, social benefits of SRPOS, those that extend to communities beyond academic philosophy and science, are met by:

*clarifying key concepts in socially relevant science, identifying questionable methodological assumptions, pointing to epistemic failures and suggesting improvements, or determining epistemic reasons for why potentially useful scientific knowledge is not being given uptake (2010, 308).*

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<sup>23</sup> Interdisciplinary collaboration, whether multi-, inter-, or transdisciplinary in its approach, is a type of broader engagement.

Contributions to scientific benefits include: a more justice-forward approach to scientific research, stronger uptake of scientific knowledge by extra-disciplinary and extra-academic (and scientifically relevant) communities and helping to identify problems with scientific practice and uptake of scientific knowledge. Lastly, Fehr and Plaisance note the benefits to philosophy of science itself. “By collaborating with scientists and other stakeholders, and engaging with social issues, SRPOS can develop new areas of philosophical research, raise questions that are interesting and philosophically relevant, and offer new insights on traditional topics” (Fehr and Plaisance 2010, 309). Although the authors identify the benefits according to the community, they do not intend that the benefits operate in isolation. Much of the philosophical work that they discuss brings multiple benefits to the communities that philosophers engage in.

The benefits that Fehr and Plaisance identify directly apply to all of the approaches in my framework. Varying degrees of these social, philosophical, and scientific benefits are possible no matter which approach a philosopher of science uses. However, there is an important additional benefit to extra-academic engagement, particularly when philosophers themselves are situated outside of the academy, which I argue below in Section 3.4.

The definition of SRPOS from Fehr and Plaisance overlaps significantly with the framework of engagement that I defend in this dissertation, and I am expanding on that definition by clarifying what engagement beyond philosophy of science can encompass. The framework of engagement in philosophy of science accounts for one way of doing SRPOS as Fehr and Plaisance intend it. Much like the literature analyzed in Chapter 2, Fehr and Plaisance’s concept of SRPOS is built on the assumption that philosophers are primarily academics, engaging with scientific communities from their positions as academic philosophers. SRPOS does not require engagement (though it does include it).

While their implicit notion of engagement is quite accepting of different approaches, it rests on the same assumption identified in Chapter 2: philosophy of science happens primarily within the context of academic philosophy and the structures that maintain it. While the disciplinary context is certainly a part of the pluralistic endeavor that is SRPOS, it does not directly address the opportunity for bi-directional extra-academic engagement that can exist at an arm’s length away from the academy. Their account only really discusses that engagement comes from academic philosophy and can connect with extra-disciplinary or extra-academic communities, but not come from extra-academic communities. My goal is to address this gap and broaden the concept of engagement debated in philosophy of science to include bi-directional extra-academic engagement. My argument may also have implications for the definition of SRPOS, which I take as an extension of Fehr and Plaisance’s original definition of the concept rather

than a challenge to it. Bi-directional extra-academic engagement attempts to capture SRPOS that may come from extra-academic communities, extending Fehr and Plaisance's account. As a whole, my framework provides clarity to discussions about the SRPOS and the different approaches to engagement. In particular, my framework clarifies three things: 1) where philosophers can be situated while conducting research under the umbrella of philosophy of science relative to academic philosophy<sup>24</sup>, and 2) the difference between SRPOS that engages across disciplines (extra-disciplinary), as well as beyond academia (extra-academic).

### **Section 3.5.1: Inclusivity in Academic Philosophy**

Philosophers working on race and gender disparities have been pointing out the need address exclusionary practices within the discipline of philosophy. To explore some examples, Paxton et al. point to the low numbers of women faculty in philosophy departments, subsequently affecting the number of women-identified students in philosophy (2012). Valian argues that similar gendered patterns occur across disciplines, showing slow advancement for women across academia (2005). Valles argues that philosophers of colour are forced to think more critically about the research they choose to publish as a result of heavy service and mentorship demands (2017). Dotson argues that those who “disrupt the monochromatic profile of the discipline” are often not supported in the discipline and challenged by those who do (2011b). Kings argues that women and feminist philosophy more generally are marginalized by exclusionary practices coming from a culture of justification in philosophy (2019). Russell shows the hostility and harm Black women faced in philosophy following controversial publications pertaining to race in disciplinary journals 2019.<sup>25</sup> Finally, Ayala-Lopez looks specifically at ‘foreigner’ as a category she argues is paid little attention in academia as a distinct identity that faces particular language and cultural barriers (2018). Philosophers have demonstrated the lack of social diversity (such as gender and racialized identities) within the field in formal and informal ways, including journal articles, conference presentations, and discussions on social media. Together, these examples from the literature show a significant problem supporting diverse practitioners (explained below).

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<sup>24</sup> Note that I take academic philosophy as a starting point not to privilege it as a situated standpoint from which to conduct research in the discipline, but because this is the assumption coming from the body of literature that I am responding to in this dissertation.

<sup>25</sup> This list of citations is only a few of the many philosophers who underscore the need for more inclusive practices in academic philosophy.

Importantly, philosophers are asking for people in positions of power within the discipline (e.g., department chairs, deans, presidents of associations) to facilitate the implementation of new practices to support inclusivity such as increasing women in faculty roles serving as mentors, implementing feminist publication policies to prevent harmful research from being published in philosophy journals, and better institutional hiring practices to ease the transition for international and foreign scholars (Paxton et al. 2012; Russell 2019; Ayala Lopez 2018).<sup>26</sup> This work shows that actively supporting inclusivity requires specific changes to dismantle barriers that diverse practitioners face in academic spaces (e.g., in philosophy departments).

Diverse practitioners, as Kristie Dotson explains, are socially diverse and methodologically diverse:

*I understand the phrase ‘diverse practitioner of philosophy’ to refer to notoriously under-represented populations within western, academic philosophy. As a result, my use of ‘diversity’ here is meant to include not only racial, ethnic, gendered, sexual, and ability diversity, but to also include diverse approaches to philosophy, Eastern, applied, engaged, fieldwork, field, public, experimental, literary approaches, etc. Though the specific challenges within professional philosophy may differ among these diverse populations, the general challenges presented by the environment of professional philosophy and constrictive definitions of philosophy are similar (2013, 5).*

I take my definition of a diverse practitioner directly from Dotson’s work. In addition, I note that socially diverse practitioners are often those who tend to be more methodologically diverse as well. In a similar vein, Valles claims that philosophers of colour are grappling with philosophical issues in ways that are most often not counted towards tenure and promotions (2017).

My goal is to contribute to this collective effort to support social diversity within the discipline by providing a concrete way to make philosophy less hostile to diverse practitioners (as Dotson argues philosophy currently is), widen perspectives in philosophical research, and minimize exclusionary practices in philosophy of science. Working toward a more inclusive philosophy of science is an important goal in and of itself. This is in part because inclusivity

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<sup>26</sup> The system of collegial governance operating in academia means that, in theory, every (tenure-stream) member of the community can occupy one of these positions of power. However, in practice, there are many factors that may affect the likelihood that an individual has the opportunity to occupy one of those positions, such as social identity.

ought to be supported as a core value in philosophy from a justice lens.<sup>27</sup> Furthermore, several Black and racialized scholars have explained the harms perpetuated by academic systems of justification that require racialized people to enumerate oppression they face while existing in academic spaces (Lorde 1995; Ahmed 2012). However, these claims are rarely appealing to those who are not already motivated by justice. Philosophers in positions of power – those that can influence key decisions in hiring, tenure, and promotion – must be on board with my argument if it has any hope of facilitating change to accepted methodological practices. While the epistemic benefits of diverse perspectives are not a reason to dismantle exclusionary practices that disproportionately affect Black, Indigenous, non-binary, LGBTQ2S+, disabled, and neuroatypical philosophers, there are significant benefits, including epistemic ones, to implementing more inclusive practices.<sup>28</sup> Therefore, I appeal to arguments about epistemic diversity to highlight epistemic benefits of social diversity in philosophy of science.

Philosophers have argued that inclusivity in academic communities and disciplines is important because diversity brings significant epistemic benefits that help to uncover hidden assumptions (Longino 1990, 2002; Solomon 2001). However, Fehr (2011) argues that making communities more diverse is not only achieved by increasing social diversity within that community. She articulates the ‘diversity free rider’ problem, wherein epistemic communities can benefit from existing diversity without making meaningful change to increase diversity in formal community, challenging the idea that social diversity always brings dissenting views. Fehr identifies key differences between effective and ineffective epistemic diversity. She argues that epistemic diversity is only effective when a community member brings a relatively marginal view that challenges predominant assumptions; conversely, ineffective epistemic diversity occurs in a community when social diversity does not bring dissenting views that help uncover assumptions. Further, she argues that effective epistemic diversity requires change in norms and

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<sup>27</sup> For example, social work as a discipline and as a practice takes inclusivity as a core value. Rather than arguing for inclusion, scholars in and around the field have moved to an argument in favor of bringing new inclusive practices into their work, broadening inclusive practices in their academic spaces (e.g., conferences), rather than starting arguments in favor of inclusivity as a basic tenet. In other words, diversity and inclusion are now part of the paradigm of social work, and philosophy is far behind.

<sup>28</sup> Such lists of any and all social identities that aim to capture all identities beyond those most privileged (straight, white, affluent, able-bodied men) are often partial, and inevitably fail to capture the all intersections of identity that might be relevant. However, general terms can often sweep too broadly across identity groups – such as the term ‘racism’ often obfuscating the specific oppressions faced by Black and Indigenous peoples. It is not my intent to create a partial list, but it is my intent to name specific groups often most harmed by exclusionary practices.

practices that support (in this case), women. Fehr concludes that “in order for departments to gain maximal epistemic benefits from increasing diversity, they need cultures that enable women and minorities to effectively develop and express dissenting views” (2011, 137).

I am advocating for an approach that will likely increase effective epistemic diversity in philosophy of science. In advocating for a more engaged philosophy of science (in particular, advocating for more bi-directional extra-academic engagement), my aim is to increase the likelihood that philosophers of science will bring marginal perspectives and views that will challenge predominant assumptions within our own community (much like that assumption I challenge in Chapter 2). In addition to likely bringing more social diversity, mitigating barriers and exclusive practices can enable marginal views to enter the philosophical community through collaborations and other forms of engagement. However, like Fehr, I argue in Chapter 5 that the culture and practices must shift to support this form of effective epistemic diversity.

In addition, I argue that inclusivity is an important goal because epistemic diversity is often a linked benefit coming from social diversity at a community level (Longino 1990, 2002; Fehr 2011; Wylie 2012).<sup>29</sup> Current norms in academic philosophy often shut out social diversity and coupled benefits by supporting a narrow set of methodologies (Richardson 2010). While some approaches to engagement are tolerated, they are often not supported on the ground through policy, meaning that traditional philosophical approaches are privileged. Philosophers with a larger diversity of perspectives can widen the scope of methodologies, use them in new ways, and create new or better opportunities for more perspectives to be represented in philosophy. However, as Fehr point out, those benefits require cultural and practical changes that support dissenting views and alternative approaches. (I return to this point in Chapter 5 when presenting solutions to support engaged philosophy of science).

A more inclusive praxis of philosophy of science like the one I am defending here may also lay the groundwork for or augment the benefits Fehr and Plaisance identify, such as new philosophical questions, new areas of research, and new applications of foundational philosophical arguments. The more philosophy of science as a sub-discipline (and perhaps also philosophy as a discipline more broadly speaking), makes space for inclusive praxis specifically by actively supporting that praxis through a shift in rewarded approaches to engagement, the more likely it is to reap the epistemic and philosophical benefits of engagement. The social, scientific, and philosophical benefits Fehr and Plaisance identify are a result of widening the scope of philosophy of science and how the sub-discipline engages beyond its own boundaries.

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<sup>29</sup> Not to say that *all* epistemic diversity is a result of a diverse representation of social locations.



Furthermore, that engagement rests on the ability of individual practitioners to find ways to connect with the communities relevant to their research, many of which rely on community membership or new methods of interacting with communities beyond the bounds of philosophy. Without the space to connect to relevant communities outside of philosophy, some of the potential benefits of engagement defined by Fehr and Plaisance may not be realized, thus supporting engagement through inclusion is key.

My ultimate aim is to argue for philosophy of science to include a wider array of epistemic perspectives in its knowledge-producing practices. More specifically, I wish to argue that expanding the methodological scope to support a wider array of potential contributions from philosophers of science is one way to support inclusivity in philosophy of science. To do this work, academic philosophy ought to address barriers for practitioners who take part in extra-academic engagement in order to contribute to philosophical scholarship. In Chapter 5, I will come back to the idea that barriers ought to be addressed and argue that barriers precluding practitioners from engaging are ultimately a disservice to philosophy of science as a whole.

The central benefit of bi-directional extra-academic engagement is largely epistemic in nature. Philosophy of science benefits from robust epistemic gains driven by a greater diversity of perspectives among its practitioners. Broadening the approaches, communities, and methods within philosophy of science allow for practitioners to engage differently, with more relevant communities, broadening the notion of who a philosopher of science is and how to do philosophy of science. For instance, this could include philosophers of science who are themselves employed within governments, NGOs, private companies, and any other sector of employment beyond post-secondary educational institutions. In turn, this epistemic diversity influences the outputs of philosophy of science. The greater diversity of perspectives opens the capabilities of philosophical research so that research is more closely connected with scientific communities (both academic and beyond academic communities) and relevant publics. That connection can help support more socially relevant research in philosophy of science, and support inclusion in academic philosophy.

For example, Kyle Whyte's work on justice-forward frameworks for responses to ecological changes due to climate change uses a context and community-sensitive approach to a scientific problem that has, for many years, involved scientists' misunderstanding and misinterpreting the needs of Indigenous communities. Traditional scientific approaches to the issues facing Indigenous communities living through climate change have historically failed to center the needs and traditional knowledges of many Indigenous communities (Whyte 2013b). Using an informed and justice-forward perspective, Whyte's work is not only able to point to the

failings of traditional scientific approaches but recommend a framework that centers the needs of the communities. Whyte's work, which involves engagement with Indigenous communities in a variety of ways, can address a problem not otherwise represented in philosophy of science and propose context-sensitive solutions to that problem that can only result from engagement with those communities (Reo and Whyte 2012; Steel and Whyte 2012; Whyte 2013a, 2013b).

However, supporting social diversity (as Longino puts it) requires action and specific changes to practices that erect barriers to inclusion. A culture shift that acknowledges the legitimacy of traditionally undervalued methods and research is not sufficient. Valuing diversity and inclusion in the abstract is not sufficient to institute inclusive practices that actually support traditionally marginalized topics, methods, and approaches in philosophy of science – let alone the social diversity of its practitioners. Despite seemingly growing abstract value for engagement (Plaisance et al. 2019), there is a gap between value in the abstract and concrete actions and policies that uphold those values (Tiberius 2017).

Environmental geography researchers have introduced this same argument, popularly referred to as the 'value-action gap' to explain the lack of policy changes or individual actions to address specific concerns and effects of climate change (Blake 1999; Kollmuss & Agyeman 2002; Lane and Potter 2007).<sup>30</sup> Broadly speaking, these studies show that although people may strongly identify their environmental concerns, this does not often translate to actions taken or specific behavioral changes typically associated with their stated values. (I will talk about specific actions philosophers of science can take in Chapter 5.)

However, as Dotson has argued, diverse practitioners in philosophy are not well supported. More specifically, the disciplinary construction of philosophy is not built for diverse practitioners and is replete with challenges for the work of diverse practitioners with a range of epistemic perspectives (Dotson 2013). Drawing from Dotson's argument, there are significant barriers to the existence of diverse practitioners in philosophy. Furthermore, the philosophical work coming from a diversity of epistemic perspectives is often blocked by exclusionary disciplinary practices. As Kathryn Gines puts it, such practices raise questions about who has access to the discipline and discourse of philosophy (Gines 2011, 434).

While I recognize that many of the barriers Dotson, Gines, and other philosophers of colour discuss are purely about the existence of diverse practitioners in philosophy, I am not in a position to comment or expand on those barriers. However, I do think Dotson's argument suggests that: 1) there is a need to better support philosophical work from diverse perspectives

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<sup>30</sup> In the environmental geography literature, this explanation has also been referred to as the attitude-behavior gap, the intention-behavior gap, and the belief-behavior gap.

(including methods) with the specific implementation of inclusive practices, and 2) there are barriers for marginalized perspectives and approaches, including philosophical work from diverse practitioners.

### **3.6: Conclusion**

In Chapter 4, I will build on the initial description of barriers above by analyzing three barriers to engaged philosophy of science: 1) barriers in the reward structure of academic philosophy, 2) barriers related to one's identity as a philosopher, and 3) barriers in the academic culture. I focus specifically on the barriers to bi-directional engagement and show that there are additional barriers to bi-directional extra-academic engagement. Notably, barriers to bi-directional extra-academic engagement may block engagement with communities beyond academia, which may narrow the representation of marginalized perspectives in philosophy of science. A practitioner who engages as an academic philosopher with academic scientists by going to a science conference and co-presenting a paper is going to present different barriers than a philosopher who works within an environmental policy organization who is engaging with public stakeholders and ecologists and writes a paper to publish in a science policy journal. Need to understand a fuller scope of engagement at a theoretical level to examine differences across approaches and see where and how barriers can negatively impact philosophical work. In Chapter 5, I come back to the idea of addressing barriers to engagement and recommend some multi-faceted solutions to close the value-action gap for engagement in philosophy of science.

# Chapter 4

## Barriers to Engagement: Data-Driven Hypotheses

### 4.1: Introduction

In Chapter 2 I analyzed several arguments from philosophers of science claiming that philosophy of science is richer, more relevant, and more useful for scientific communities when practitioners engage with scientific communities (including stakeholders, policy makers, etc.) (Douglas, 2010; Fehr and Plaisance, 2010; Kourany, 2010; Tuana, 2010). These authors either explicitly argue or imply that our philosophical work is more likely to get uptake by scientific communities in cases where engagement with those communities has influenced our research in one form or another. However, some also point out that socially and scientifically engaged work comes with particular challenges and that philosophers who do engaged work often face significant barriers (Fehr and Plaisance 2010; Richardson 2010).

In particular, philosophers of science doing engaged work face barriers to having their work recognized and rewarded by academic philosophy. Philosophers often face challenges that make engagement more difficult and, in some cases, prohibit engagement altogether. For instance, collaborative publications and publications in non-philosophy journals often hold less weight in tenure and promotion decisions, and philosophy journals may be less likely to accept papers using empirical methodologies (I discuss these examples in more detail throughout this chapter). As I argued in Chapter 3, there are significant benefits to extra-disciplinary and extra-academic engagement, including expanding the questions and topics that philosophy of science is able to tackle, and increasing the inclusivity and representativeness of philosophy of science. To reap those benefits, philosophers must mitigate or overcome barriers to engagement that prevent philosophers of science from connecting with scientifically relevant communities.

As I pointed out in Chapter 1, there is not a clear distinction between extra-disciplinary and extra-academic engagement. The two approaches to engagement often go together and the boundaries between them can become very unclear, even within the same research project. For instance, a research project might begin with collaboration between philosophers of science and scientists, and may later expand to involve collaboration with policy writers. In practice, it may

not always be necessary to distinguish between the barriers for both approaches to engagement; however, noting their differences for the analysis I conduct in this dissertation allows me to uncover additional barriers to extra-academic engagement.

Exploring barriers to engaged philosophy of science is a necessary step in understanding how the barriers impact engagement and what is needed to mitigate or overcome them. My analysis of the barriers that inhibit extra-disciplinary and extra-academic engagement is primarily rooted in the data collected during the interview study described in Chapter 1. In this chapter, I present findings from interviews with philosophers of science and examine the barriers discussed by participants that inhibit extra-disciplinary and extra-academic engagement. More specifically, I analyze excerpts about the challenges, barriers, and practices surrounding extra-disciplinary and extra-academic engagement. During the interviews, philosophers of science were asked specifically about the perceived and actual barriers they faced in doing their own work, and those barriers they perceived for other philosophers of science doing engaged work. Participants talked about barriers they faced from within academic philosophy, academia more broadly, and some also spoke about additional barriers they faced in doing extra-academic work.

In this chapter, I report interview findings on barriers to broadly engaged philosophy of science. Participants discussed three general categories of barriers which are often interrelated: 1) gaps in the reward structure of academic philosophy that undermine engaged work; 2) identity policing behaviours for philosopher of science who engage; 3) problems in the academic culture that philosophy is embedded in. My description and dissection of the barriers supports analysis of and better understanding of the interactions between barriers and their context, such as disciplinary and institutional structures. Section 4.2 will provide a brief overview of barriers discussed in the philosophical literature. Section 4.3 will address reward structure. Section 4.4 will discuss the complexities of time as a barrier to engagement and argue that time constraints are a consequence of gaps in the reward structure. Sections 4.5 and 4.6 will analyze identity and academic culture barriers. My analysis of the barriers serves as the empirically informed backdrop needed to evaluate how and where solutions can be effective in mitigating barriers and supporting engagement.

As I discussed in Chapter 1, we conducted 35 of interviews with philosophers of science. We interviewed participants with a broad range of specialties in different sub-areas of study including: general philosophy of science, philosophy of biology, philosophy of physics, philosophy of chemistry, and philosophy of medicine. Each interview was roughly 60 to 90 minutes in length, and we asked questions following up on survey responses about engagement

with communities outside of philosophy, their institution's requirements for tenure and promotion, and perceived and actual barriers to engagement. The interviews were conducted by the PI, Katie Plaisance, and I was present for most interviews, taking notes and developing analytic memos for post-interview analysis. After the interviews were transcribed, I also coded all 35 interviews with the codes mentioned above, which I also helped to create along with the rest of the project team. Notably, all of the interview data presented in this dissertation (e.g., regarding the role of professional identity in creating actual and perceived barriers to doing engaged work) was data that I analyzed myself.<sup>31</sup> I used an iterative process to analyze interview data whereby I consulted our analytic memos, analyzed excerpts using relevant codes, and consulted with the PI to maintain consistency with other manuscripts reporting our data. From those analyses, I identified core themes from our data which I present below. Though the data was collected in the context of a collaborative project, the interview data analysis found in this dissertation was conducted entirely by me for the purposes of this dissertation.<sup>32</sup>

Philosophers of science have argued that barriers exist for extra-disciplinary engagement, such as gatekeeping practices from influential philosophers and lack of support for publications in science journals (Fehr and Plaisance 2010). In this chapter and the one that follows, I expand on those arguments. As I argue below, extra-disciplinary and extra-academic engagement share many of the same barriers. This is because both approaches differ methodologically from traditional philosophical approaches, which are not reflected in the current reward structure of academic philosophy. Dissemination and collaborations efforts are not rewarded in the same ways that single authored work is, for instance, insofar as single co-authored publications, publications in scientific journals, and non-academic publications often do not weight equally alongside publications in philosophy journals for hiring, tenure, and promotion decisions.

The difference between extra-disciplinary and extra-academic engagement comes largely in academic culture and identity related barriers. Uncovering barriers and assumptions about engagement is the first step to making academic philosophy more inclusive of different pathways for philosophical contributions and impacts. I will show that extra-academic engagement faces many of the same barriers discussed for extra-disciplinary engagement, particularly those related to the reward structures in philosophy. For instance, both types of

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<sup>31</sup> In contrast, the PI of the project took the lead on other analyses, including reporting on our data about the impact of philosophy of science on scientific domains, which is the focus of one of our co-authored manuscripts currently under review.

<sup>32</sup> A fuller description of the methods and theoretical background can be found in 1.2.

engagement can lead to challenges meeting publication requirements in philosophy journals. Both have many barriers in common as many of the research activities are similarly positioned relative to traditional research methods in philosophy. However, I will discuss some additional barriers faced by extra-academic engagement related largely to academic culture. Regardless of the type of engagement, I address claims that there is little support for engaged research on a disciplinary or institutional level. The benefits of engaged approaches discussed in Chapter 3 indicate that philosophy of science can move in a positive, inclusive, and scientific and socially relevant direction if engagement, particularly extra-academic engagement with and from communities beyond the professoriate, is widely accepted. To that end, I will return to the complexities of this interaction between disciplines and institutions in Chapter 5 and show how that complex landscape lays the foundation for many of the barriers and issues surrounding extra-disciplinary and extra-academic engagement.

## **4.2: Barriers and Challenges: An Overview of the Philosophical Literature**

In the SRPOS literature, philosophers of science identify possible barriers to broadly engaged philosophy of science, mostly drawing attention to the barriers faced by practitioners when they do engaged work at an extra-disciplinary level (such as philosophers of science who collaborate and co-author with scientists). The literature has largely focused on disciplinary barriers such as: a negative impact on employment and career trajectories, lack of support from mentors, gatekeeping practices from influential philosophers of science, and negative perceptions coming from the culture of academic philosophy reflected by its norms, practices, and structures (Douglas 2010; Fehr and Plaisance 2010; Haslanger 2008).

Fehr and Plaisance identify barriers in hiring and mentorship wherein influential members of philosophy departments often disincentivize socially relevant and engaged work. Furthermore, they argue that whether or not such work is actively discouraged in practice, “perceived barriers can become actual barriers because they can influence a wide range of professional practices, including decisions about whether or not to conduct this type of research, as well as the type of mentoring offered to those who are considering conducting this kind of research” (2010, 313). Furthermore, they name these ‘gatekeeping practices’ and claim that these practices are often interrelated pieces of a larger problematic culture affecting norms, structures, and practices. In my analysis below, I point out the interconnected nature of the

barriers discussed by participants which supports this argument. I also return to a larger analysis of the structures that underlie these barriers in Chapter 5.

Sally Haslanger shows that feminist philosophy (and women-identified authors) are largely lacking from many top philosophy journals (2008). Along similar lines, Richardson argues that feminist philosophy of science, including its methodologies and theories, are often marginalized by the current reward structures, which are rooted that privilege traditional philosophy of science (2010). Furthermore, she claims that the culture of academia, and academic philosophy more specifically, disincentivizes feminist research. Haslanger and Richardson's arguments both underscore problems for philosophers who utilize non-traditional approaches, pointing to barriers in the reward structure and culture of academic philosophy, both of which I support below with empirical data from our survey and interviews.

The philosophical literature on the barriers to engagement is limited. With the exception of Fehr and Plaisance (2010), very few philosophers of science discuss such barriers and their potential causes. Fehr and Plaisance's thematic analysis of the papers in the *Synthese* issue on "Making Philosophy of Science More Socially Relevant" identifies key barriers and is the starting point from which I am basing my own analysis here. Apart from their work, in the rare cases when barriers are discussed in the philosophical literature, there is little evidence and analysis. Frodeman and Briggie, though not focused specifically on philosophy of science, aim to offer some data for the challenges of field philosophy (which I discuss in more detail in 2.2.7), their data is solely quantitative and does not account for the contextual issues I discuss in Chapter 5. Our collaborative project fills this gap by using more comprehensive and rigorous methods (both quantitative and qualitative) to collect data about the barriers and analyzing that data for key themes for patterns. With a more empirical and nuanced understanding of the barriers, I am able to move beyond identifying barriers to offering empirically-informed hypotheses about causes, as well as suggesting a few data-driven solutions, in Chapter 5.

Philosophy of science has a history of unfairly limiting the methodological approaches that legitimately fit within the boundaries of the discipline (e.g., as we've seen with feminist approaches). Traditional methods in philosophy of science have historically resulted in missed opportunities to address questions and problems of social relevance. For instance, socially relevant problems in science pertaining to race and gender have been overlooked and misunderstood while using traditional methods in philosophy (Gannett 2010, Richardson 2010). Moreover, practitioners attempting to use engaged methods to address socially relevant questions pertaining to race and gender have faced disciplinary barriers to engagement. In particular, disciplinary debates have sidelined feminist philosophy of science, arguing that



traditional methods have more epistemic power than feminist methods, including engaged approaches to philosophy of science (Richardson 2010).

Engaged methods require acceptance of practices, policies, and perspectives that can support those methods. Gatekeepers in the discipline can often prevent philosophers of science from engaging by discouraging and disincentivizing engagement with scientific communities, particularly at the junior and graduate levels (Fehr and Plaisance 2010). When philosophers of science who actively discourage engagement do so from a position of power, they erect significant barriers for practitioners at a disciplinary level. At a departmental level, philosophy departments themselves are responsible for hiring, tenure, and promotion, which is strongly impacted by philosophical research and the perceptions philosophers have of that research. Furthermore, barriers and gatekeeping practices are influenced by the culture in philosophy of science that dictates what legitimate philosophy of science looks like, often reflected in publications (Fehr and Plaisance 2010).

As discussed in the excerpts below, engagement can reasonably be rewarded in many ways, perhaps even akin to the rewards earned by some philosophers for extra-disciplinary engagement in supportive communities, such as reward for publication in philosophical journals. Extra-disciplinary engagement can possibly open up new avenues for inquiry and channels for communication, specifically with scientific communities (Fehr & Plaisance, 2010). In a similar vein, extra-disciplinary engagement also has the opportunity and benefit of opening up new avenues for inquiry and investigation not yet within the purview of academic philosophy and make for a more inclusive environment. However, philosophy of science needs a clearer understanding of the barriers and how they operate to find ways to mitigate them. The barriers discussed in this chapter can potentially prevent philosophers from engaging in the first place, which may prevent academic philosophy from reaping the epistemic rewards of engaged work.

In order to provide an empirical basis for the claims about barriers discussed above, my collaborators and I conducted a survey that broke down perceived and actual barriers to engagement with scientific communities. We empirically tested philosophers of science perceptions of barriers by asking whether or not they experienced barriers themselves, or perceived that others experiences barriers while disseminating and collaborating with scientific communities. In the survey, we listed the following as possible barriers to dissemination and collaboration: lack of time, lack of interest from scientists, lack of opportunities, lack of recognition, and lack of skills/training (Plaisance et al. 2019). With this research, we established an empirical backdrop to move beyond anecdotal evidence to understand 1) which barriers

philosophers of science have perceived and experienced, and 2) provide data-driven arguments about practical interventions to support philosophers of science engagement with scientists.

Following the survey, we interviewed participants and asked them a series of questions to explore the complexities behind the survey results (Plaisance et al. 2019).<sup>33</sup> We wanted to understand participants' perceptions of the barriers and the potential causes for those barriers and relationships among them. As noted above, there are many potential and actual barriers that can affect academic philosophers' ability to do extra-disciplinary and extra-academically engaged work. In what follows, I use the interview data to explore perceptions among philosophers of science about barriers to engagement. Furthermore, I use the findings to understand how barriers might impede engagement in practice, despite some consensus that engagement is beneficial (though not without its challenges). The findings from these interviews enable me to develop data-driven hypotheses about barriers to engagement that can in turn inform my analysis of the disciplinary, institutional, and departmental contexts that are in need of change.

### **4.3: Reward Structures**

Reward structures in philosophy are built around the main reward (or lack thereof) for research – publication. Much like other disciplines, philosophy (and philosophy of science) rewards philosophers primarily for their research output. Philosophers of science have used the term 'reward structure' in similar ways to identify patterns in scientific disciplines that could explain how and why scientists conduct research, highlighting the importance for speedy publication within reward structures, sometimes leading to socially irresponsible science (Heesen 2018). Furthermore, philosophers of science have drawn attention to the influence publication plays in shaping the content of the research and discipline itself, along with other aspects of the research process such as funding and presentations (Fehr and Plaisance 2010; Kourany 2010).

The reward structures that I explore in this section are relevant for academic philosophers working in post-secondary institutions that govern the conditions of a philosopher's employment. Subsequently, those institutional conditions (including norms, common practices, and policies) influence how and what philosophers of science research. As the vast majority of practitioners publishing in academic philosophy journals are employed at post-secondary educational institutions like universities and colleges, it is fair to assume that academic reward structures currently have a significant impact on philosophical research topics

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<sup>33</sup> See Section 2.2 for a full explanation of the methods of the interview study.

and methods. Therefore, I analyze barriers in the academic reward structures discussed by participants in their interviews, some of which are relevant reward structures to practitioners beyond the professoriate as well. In the context of the reward structures, participants discussed three kinds of rewards that are likely to influence philosophical research: hiring practices, publishing practices, and tenure and promotion practices. Of course, these practices relate to and support one another, as well as relate to other barriers discussed in this chapter.

A prevalent theme among the interviews was the relationship between publication requirements and support for engaged research. This is largely unsurprising as publication connects engaged research to the reward structure in philosophy, the main measure of evaluation for research content and output. This connection was reflected in different perceptions shared by participants coming from different departmental and institutional contexts. Many, if not all, participants talked about the importance of publications and reward for their research, and the complexities this can present for engaged research. Some participants approached publication requirements as a barrier to their engagement insofar as they lacked reward for non-philosophy publications, while others pointed to departmental and institutional contexts that have supported their engagement – both of which point to a possible explanation about how publication expectations have an impact on practitioners' desire and ability to do extra-disciplinary or extra-academically engaged work.

To begin exploring the relationship between publication requirements and support for engaged research I look at those participants who discussed the negative side of the importance of publications and cited publication requirements as a barrier. Those who discussed a negative outlook spoke mainly about publications outside of philosophy or in non-philosophy journals not counting toward tenure and promotion, thus discouraging junior scholars from engaging in extra-disciplinary or extra-academic venues. As noted by participant O, publications in non-philosophy journals will not often count for tenure and promotion in philosophy departments:

*That's quite dependent on the department, obviously. I certainly know of departments including ones that have very public perception as interdisciplinary places who have explicitly told their junior faculty only philosophy publications count. Even though lots of people outside the institution think of that, "That's a really interdisciplinary place" and yet they're telling their junior faculty it's nice if you do interdisciplinary...you won't be penalized for it, but you can just cross those off your CV, they won't matter. They won't hurt you, but they won't help you when time comes for promotion and tenure.*

O is drawing attention to a publication barrier for practitioners that prevents interdisciplinary work from being properly assessed for hiring, tenure, and promotion. Although this publication barrier is dependent on institutional context, many participants highlighted disciplinary patterns with respect to particular publication venues. O notes that only publications in philosophy journals count properly for hiring, tenure, and promotion in many philosophy departments. Publications in science journals, on the other hand, are not recognized to the same extent, if at all. So, while publications outside of philosophy may be needed for engagement, they will likely not be rewarded in a philosophical career. As a result, practitioners who publish in science journals as part of their engagement are required to publish roughly twice as much: once to support their engaged research and again in a philosophy journal to count for hiring, tenure, and promotion purposes. This erects barriers for practitioners far above those experienced by traditional philosophers of science, thereby privileging traditional philosophical methods in philosophy of science.

The perception of non-philosophy publications as “not mattering” for hiring, tenure, or promotion points to a tension discussed by other participants as well. Participant E talks about the same publication barrier, highlighting its pervasiveness in the sub-disciplinary community and its effect on junior faculty:

*I have friends who have reported to me in various places that they've either been interviewed by or know people that work at departments where interdisciplinary work is ignored for tenure. Accomplishments outside of philosophy don't count and I think that for a lot of philosophers, that's a major barrier for them especially when they're junior and they only have so much time and they want tenure.*

E notes the existence of the same publication barrier, commenting on the experiences of other practitioners rather than their own. E goes beyond simply recognizing the existence of the publication barrier and E addresses the pervasiveness of this barrier among philosophers of science. E seems to suggest that publication barriers frequently experienced by practitioners at the junior career level often make it more difficult for practitioners with many engaged experiences to get hired, secure tenure, and get promoted. At the institutional or departmental level, this presents significant barriers for junior faculty members who have yet to secure their place in the disciplinary structure. As a result, junior faculty are more vulnerable to these barriers insofar as the barriers can influence the advancement of their careers to a greater degree.

On the other hand, participants in environments with broader requirements for publication spoke positively about the relationship between publication requirements and

engaged research. In the excerpt below, participant W talks about the importance of publication expectations in supporting their engaged work. In particular, they address the openness to non-philosophy publications as they pertain to the tenure and promotion process in particular, and the importance of departmental culture that supports engaged research.

*At [institution] it was much more secure and nicer, and one thing I liked about the department was that they were not rigid about needing to have publications exclusive to philosophy journals, they were about wanting to foster scholars who could be doing somewhat broader work. It was a great philosophy department to be in, in that regard, and [name] was the chair and partly, with [their] leadership, they have developed these tenure policies so officially they would count publications that were not in philosophy journals.*

W attributes many of the successes of engagement within their own department to the institutional policies and departmental culture that mitigate publication barriers. The policies themselves reflect support for engagement by recognizing academic journals outside of philosophy as a place for legitimate scholarship that counts for hiring, tenure, and promotion purposes. Such policies make it such that philosophers within that context are rewarded for engagement in the same way that they would be rewarded for any other philosophical scholarship.

Publication in non-philosophy journals was mentioned by many participants as an important aspect of engaged work insofar as publication in relevant non-philosophy journals helps to build credibility. Credibility can in turn lead to impact insofar as a philosopher of science's work is more likely to be given uptake by other communities when their work is published in relevant community journals (McLevey et al. 2018). Furthermore, policies that support non-philosophy publications provide concrete support for engagement. Several participants, including participant S, also talked about the broader policy and cultural implications of publication requirements for practitioners:

**Interviewer:** *Given that [my university] is a place that really does focus on engaged philosophy and engaged philosophy of science, do you think there's anything people do here differently than in other philosophy departments or other philosophy of science programs that puts them in a better position to do engaged work?*

**Participant:** *I think the culture is one where you're allowed to publish wherever you want, so there's no limitation on publication. So it's not like people are given a list of six top journals and they're told that their annual review will depend upon*

*the number of papers they publish in those journals. Right, so being open to publication all over the map of knowledge, as long as peer reviewed, is a huge, sort of boost to engaged work, right? You can go out there, you can work with non-philosophers in a way that is going to inform research products, get them published, and get credit for it professionally. I just have a lot of colleagues who are broadly curious and great at networking, and are of a deep passion for public philosophy, for doing philosophical work in ways that address social justice issues, or address issues that relate to redressing harms, or helping people in one way or another, and the culture of the department is congenial to this kind of work. But I also think I have colleagues who are honestly among the very best in the world at this, and I mean, if they weren't here would this place be as congenial as it is to this? I'm not sure. But given that they're here and, you know, we're on the map, I think in part because they are here, I think that's a huge, that that contributes in a very big way to the kind of, to an issue being such a friendly place for engaged philosophy.*

Adding complexity to the previous discussion about publication policies, S acknowledges extra-academic as well as extra-disciplinary forms of engagement as well as extra-academic forms of engagement by mentioning non-philosophers and social justice issues. Although S does not clearly differentiate between the two approaches in the same way that this dissertation does, it is worth noting that institutional and departmental contexts can support extra-disciplinary and extra-academic engagement through policy (which I discuss in Chapter 5).

Furthermore, S makes an interesting connection between the policy support on the one hand, and the cultural support on the other. S specifically states that they are unsure whether the policies are a result of the culture, or the culture a result of the policies. Either way, S is signaling an influential relationship between policy and culture to support engagement. S's observations reflect similar arguments made by SRPOS scholars who draw a connection between cultural contexts within departments and the influence departmental-level decisions have on disciplinary practices (Fehr and Plaisance 2010). Specifically, that cultural support comes in the form of valuing publication in a wider range of academic journals, including non-philosophy journals, related to one's research.

As discussed above, support for engagement (whether extra-disciplinary or extra-academic) may be reflected in publication requirements connected to tenure and promotion that allow for publications in non-philosophy journals. Inversely, a lack of support for engagement is reflected in strict requirements for publications in philosophy journals and little recognition for

non-philosophy publications. The reward for publication in non-philosophy journals is intricately connected to the success of engagement. Moreover, the explicit reward for non-philosophy publications is influenced by the work that practitioners within that departmental and institutional context are doing, which may also indicate a cultural support among colleagues within the same department. A lack of reward for publications in science and other academic journals beyond philosophy journals is a form of boundary policing with negative consequences for philosophers of science doing engaged research (which I discuss in more detail in Chapter 5).

Relatedly, Valerie Tiberius discusses a possible explanation for the lack of support for engagement that many participants referenced above. In her study, Tiberius talks about the gap between values held and actions that support or reinforce those values (Tiberius 2017). She states that “people are (a little bit) more in favor of diversity, interdisciplinarity, and engagement in the abstract than they are in favor of particular strategies for promoting these values” (Tiberius 2017, 73). Her results suggest that philosophers are less likely to value concrete policy changes, such as weighting non-philosophy publications the same as philosophy ones in tenure and promotion decisions, than they are to claim in the abstract that they value engaged or interdisciplinary work (Tiberius 2017). Abstract value does not constitute support for engagement in philosophy of science; rather it is merely a hollow gesture, much like those Sarah Richardson argues are at play for feminist philosophy (Richardson 2010). Concrete support, like the kind that Tiberius talks about and that I call for in this dissertation, may involve changes in policies that shape reward structures so practitioners are rewarded for their work.

Tiberius is not the first to point to a gap between values and actions as an explanation for a lack of change despite broad consensus within a community. As mentioned in Chapter 2, environmental geography researchers have identified a similar phenomenon, which they refer to as the value-action gap. The value-action gap identifies the lack of policy changes or individual actions to address specific concerns and effects of climate change (Blake 1999; Kollmuss and Agyeman 2002; Lane and Potter 2007). Broadly speaking, the value-action gap studies show that although people may strongly identify and value environmental concerns, abstract value does not translate to actions taken or specific behavioural changes associated with their stated values (e.g., riding a bicycle to work instead of driving). In other words, the value-action gap research shows that abstract value does not necessarily translate to concrete support and change. Therefore, holding a value in the abstract sense is not enough to ensure that the value is reflected in practice.

The results from both areas of research discussed above align with my interpretation of our findings insofar as reward structures in academic philosophy are concerned. Tiberius’s

conclusions, in line with the value-action gap findings from environmental geography, offer a possible explanation for the lack of disciplinary and institutional support for engagement. While many philosophers of science and philosophers more generally value engagement in the abstract, they may be unwilling or unable to reinforce this value through specific actions, institutional or policy changes, and behaviours. Assuming that the value-action gap concept could explain this discrepancy, it may also explain how gatekeeping practices have persisted to maintain barriers to engagement (Fehr and Plaisance 2010). Despite data showing that a significant number of philosophers of science state that engagement with scientific communities should be valued more than it currently is (with 81.2% saying dissemination to scientific communities should be valued more and 76.1% saying collaboration should be valued more), there has been little institutional change to indicate support beyond abstract value (Plaisance et al. 2019). Provided enough philosophers of science in gatekeeping positions are subject to the value-action explanation, it may be difficult to understand the connection between individual policies and the ways philosophers can either support or create barriers for engaged work.

While philosophers and philosophers of science can occupy positions that allow for disciplinary gatekeeping (e.g., journal reviewing and editing), influential departmental roles (e.g., as department chairs), and even institutional roles that influence policy (e.g., as Deans), policy and gatekeeping practices that enable barriers are influenced by other academics as well. In Chapter 5, I will come back to this discussion about institutional support for engagement and discuss the complexities of implementing change to support extra-academic engagement.

#### **4.4: Time**

In the survey, participants indicated that lack of time was the most significant barrier to doing engaged work, with women and post-tenure participants slightly more likely to say that lack of time was a substantial barrier (Plaisance et al. 2019).<sup>34</sup> In the interviews, we asked participants more detailed follow-up questions about their responses to the barrier-related questions from the survey in order to better understand the nature of those barriers. Interestingly, when we asked about lack of time as a barrier, we often heard complex explanations that went beyond the time philosophers had available to complete research tasks.

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<sup>34</sup> This was a small statistically significant effect for women-identified participants and time as a barrier (for women,  $B: 0.456, p < 0.002$ ; for women post-tenure,  $B: 0.324, p < 0.018$ ). For more information about barriers to engagement indicated in the survey findings, and our analysis of those findings, see Plaisance et al. 2019.



In particular, participants' discussions often made reference to a complex set of barriers and constraints that involved institutional and disciplinary norms that dictate the ways in which philosophers of science are expected to spend their working time. Furthermore, participants sometimes discussed the amount of time needed to collaborate and otherwise engage with scientific communities and the increased difficulties they themselves or others faced when engaging (e.g., collaborating with scientists), all the while balancing their disciplinary and departmental expectations with the expectations of credible collaborators. In this collaboration, I identified the theme that lack of time was a complex barrier, which often relates back to the relationship between the reward structure of academic philosophy and engagement.

There are several layers to the complexity of 'lack of time' as a barrier. When we asked participants why they thought time was a significant barrier, one of the first things many participants mentioned was the length of time needed to make engaged research work effectively. For instance, Participant F identified that collaborations require additional time that conflicts with other professional demands:

*[T]here are faculty members who have found it very risky to put all their time and all of their eggs into this collaborative basket because collaborations take time. Effective collaborations don't happen in a week or two weeks or maybe even a year.*

*Collaborations take time and time is not something you have as a graduate student. It is, so I hear, not something you have as a faculty member pre-tenure. So, in being able to argue that it's an effective use of your time can be challenging, particularly when not everybody buys in to collaboration being helpful.*

F's excerpt addresses not only the additional time required for collaborative research, but also hints at the additional pressures of that time constraint specifically for early career practitioners. Early career barriers, specifically as a factor of time, is a theme that arose several times throughout interviewing.

However, regardless of career stage, most participants eventually discussed the deeper reasons why they experienced a lack of time to do engaged work. Most notably, the participants' reasons seemed closely related to the reward structure of the discipline insofar as they discussed the difficulty of balancing two sets of disciplinary requirements. For instance, when asked what barriers philosophers of science face, participant M said that, in the absence of interdisciplinary reward structures at an institutional level, practitioners are left to juggle the rewards in philosophy with the norms of scientific communities:

**Interviewer:** *What do you think is the biggest barrier to [philosophers and scientists] doing that [working together]?*

**Participant:** *That we all have to get ahead in our careers, that there's no space for that to happen. I think that if you do take up these questions [philosophically relevant questions], some of those questions in science, you're not getting on with the science in the way that is making progress in the science. The idea that maybe the whole system would work better if we had more interdisciplinary [research], genuine in their discipline. Doesn't mean that it's in anybody's interest to do that, and it really requires a lot of systematic support. And I don't see where that's ever going to come from. [...]* So, there's just no structural support for that kind of detailed sitting down and thinking these things through together.

As is noted at the end of this excerpt, the lack of support for interdisciplinary research (or engagement) is placing time constraints on practitioners. M notes that philosophy approaches questions differently than most scientific disciplines do. According to M, practitioners who engage with others outside the discipline often spread themselves thin when it comes to research, teaching, and service duties because they are required to balance approaches from both disciplines. Consequently, practitioners need to balance two different reward systems as well. Without that balance, practitioners may struggle in their own philosophical careers, or may struggle to make an impact in scientific communities. Systemic institutional supports are needed to facilitate engaged research that may not be (at least consistently) present for all practitioners.<sup>35</sup>

Consequently, lack of time is not as straightforward of a barrier as it might seem. Discussions about lack of time repeatedly came back to a broader lack of departmental, institutional, and disciplinary support for engaged research. In other words, lacking time was often a consequence of a lack of clear policies that value engaged approaches. Relatedly, these conversations about time and support connected to some key differences in the ways that philosophers and scientists organize demands on their time.

Further discussion with participants surrounded the difficulties of balancing demands and expectations between philosophy and science with the additional complexity of balancing disciplinary differences with teaching and service demands. In particular, discussions about the difficulties of balancing research and teaching responsibilities put additional time pressure on engaged philosophers, specifically in light of the additional research-related tasks associated with interdisciplinary engagement, as shown here by participant A:

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<sup>35</sup> In Chapter 5, I will analyze how and why practitioners may not have consistency in their experiences of barriers from an institutional perspective.

*Okay so talking about collaborations with scientists I think that that is valued once you get to the point of being able to have research output, be it talks or be it a publication of some sort. But I think what needs to be recognized is how much effort it takes to make a collaboration work right and how much time goes into it and so I don't know whether that side of things is appreciated and valued and if it were, then we'd also have better recognition of what kinds of supports need to be in place to encourage more collaboration between philosophers and physicists. I feel like time is a major barrier for philosophers, and this partly has to do with the way that research expectations and the job is structured for philosophers. Often philosophers of physics like myself do a lot of undergraduate teaching outside of their area of expertise and do a lot of work with grad students which is really valuable, but involves a lot of reading and commenting on drafts of things and it's not something that's directly contributing to your own research program, right. So there's a lot of service expectations as well, so I think that then the time that you have left over at the end of the day to actually do the valuable work of collaborating with physicists, it gets squeezed.*

Again, while time may in some sense be a factor in the conversation above, the foundational issue A refers to is the added research and teaching tasks that take away from larger set of time constraints. Participant A refers to the difficulty managing engaged research, particularly in the early phases of the research process when additional time is needed to engage. A is referring to a difference in time investment up front to facilitate engagement; in contrast, traditional research approaches may not require extra facilitation in the beginning stages. Therefore, A points to additional challenges coordinating engaged research demands with teaching and service tasks. In short, the additional disciplinary differences between philosophy (of science) and science make it more difficult to balance research, teaching, and service tasks compared to practitioners who use more traditional philosophical methods. Again, this indicates a need for more concrete support at the reward level.

An example of a concrete support participants talked about was funding. As a part of the reward structure, funding is able to support engaged research by concretely providing more resources for activities like collaboration. Many participants noted the important role that funding played in facilitating more time for research. As noted here, participant U talks about the importance of financial support in freeing up time for bi-directional engagement:

*For some things, it takes a while to get the resources to do it because collaborations require time and sometimes they require materials or something else. So, some of these things, I couldn't have done it if I hadn't gotten a grant to support the work.*

U specifically isolates time as an important factor in engagement (specifically bi-directional extra-disciplinary engagement) and that time is acquired through funding. On the whole, participants mentioned that funding is able to support the research in two ways: 1) the funds go directly to supporting research activities (such as paying for graduate students and post-docs to conduct analysis), and 2) free up teaching and service commitments so that more time can be dedicated to research activities. I will argue in Chapter 5 that additional funding to support engaged research is one way to help mitigate barriers.

In addition, some participants discussed similar kinds of complexities with time constraints when it came to extra-academic engagement as well. Below, participant H talks about extra-academic engagement as something added onto an already full set of contributions in the discipline, despite that engagement being vital to the success of their research.

*I also think that you know there's just realities of time constraints, like nobody gives you time off of teaching or expects a smaller research output from you if you're going to spend a lot of time doing work in the community or work outside of academia. That's totally seen as extra, which in a way is completely fair, it's not part of our job description, but if you want to do that kind of work then you just have to be willing to like make more time. You know, so there's all sorts of stuff I do that just doesn't count towards anything as far as [institution]'s concerned but that I feel like I need to do both because I think it's important and because it's crucial for my work.*

H is pointing out that extra-academic engagement also requires additional time, which is complicated by the need to balance reward structures in academic philosophy and the norms of engagement beyond the professoriate. Again, these dual demands make it more difficult to find time for teaching and service requirements, again pointing to the need for more support at the policy level. Work that H considers central to their philosophical contributions is counted as extra, and not incorporated in or supported by the reward structure of academic philosophy. Therefore, policies and reward structures that account for the additional barriers for extra-academic forms of engagement are needed and may address the kinds of time constraints that A mentions above.

Whether it is extra-disciplinary or extra-academic engagement, participants talked about a lack of time to do engaged work. That lack of time is related to, or possibly caused, by reward structures imposed (or lacking) at institutional and disciplinary levels. Participants referred to the additional time it takes to make engagements work, associated risks for junior career philosophers, and the difficulty balancing teaching and research tasks. Time, while a significant and major barrier for many, is related to a lack of support at the tenure and promotion policy

level, as participants pointed out. Tenure and promotion policies are complex and exploring if and how policies can change to mitigate barriers requires further exploration. I analyze possible policy-level changes in more detail in Chapter 5 and unpack the complex relationship between tenure and promotion policies, disciplinary and institutional structures, and barriers to engagement. Although additional funding to relieve teaching commitments has improved this constraint for some practitioners, support can also come in the form of disciplinary and institutional reward structure policies that shape demands on practitioners' time.

## **4.5: Identity**

The last major barrier theme that arose in the interviews was the role of one's professional identity – in particular, how other philosophers see engaged philosophers of science – in determining the approach they take in their work, and whether they see themselves as a philosopher at all. Identity is a complex factor important in navigating personal and professional interactions. While there are many possible aspects of a person's identity, I focus on the professional aspects of a philosopher of science's identity in this section. As I demonstrate, professional identity is key to understanding the consequences of boundary policing behaviours in philosophy of science.

Although we did not prompt philosophers to reflect on their own identity, many participants discussed personal experiences and resulting insights navigating issues with their identities as philosophers of science (and as philosophers more broadly) in the context of their engaged work. Identity as a philosopher of science can mean many different things; it can include reference to the kind of philosophy of science that a practitioner works in (e.g., general philosophy of science versus philosophy of the special sciences), the kinds of journals that someone tends to publish their work in or the kinds of conferences that they attend, the department that a practitioner works in or the kind of appointment they have, or it could also be a part of a practitioner's larger identity as a philosopher as per their training. Participants discussed the complex aspects of their identities as philosophers of science, particularly how their identities as engaged scholars in philosophy of science can lead to experiences of barriers.

Identity-related barriers discussed by participants pertain specifically to their identities as practitioners, which communities they engage with and how. In addition, a practitioner's identity impacts the way others may perceive them in light of those identity factors. While some philosophers of science expressed that they experience identity-related barriers as a result of extra-disciplinary collaborations, some also talked about identity-related barriers with respect to

extra-academic engagement or affiliations. For instance, several participants spoke about their experiences within philosophical communities as practitioners who do extra-disciplinarily engaged work. In particular, they referred to instances when their philosophical identities were called into question as a result of extra-disciplinary or extra-academic engagement involved in their philosophical work.

Some participants described occasions when their philosophy colleagues criticized either the topic or the approach the participants were taking in their work. For instance, Participant E talks about experiencing challenges to their identity as a philosopher because of the methodological approach they used in their research:

*Oh yes. I have everything from being advised not to tell some people in the department at [redacted] what was in my dissertation because they might object to a PhD being awarded for some of the things [...] because I had experiments in my dissertation. To once upon a time talking to some people and saying, "So why do you call yourself a philosopher?" And that's kind of difficult when you have a degree in it, when you're in a department like that, you still in many ways identify as a philosopher and to have somebody say, "But come on, you're not really one of us." And it's like wait a second, why are you the person who gets to decide what it means to be a philosopher? I think I just have a different conception of what it is to be a philosopher than perhaps a lot of people do.*

In this case, participant E's identity as a philosopher was challenged as a result of using experimental methods. Participant E goes on to mention that their idea of what it means to be a philosopher is different from that of other philosophers, particularly those who do not consider experimental methods to be within the scope of philosophical practice. In this instance, E is questioning the identity policing behaviour that they experience because of their empirical methodological choices.

Participant R also talks about a case of rejecting empirical methods in philosophy and the tension this sometimes presents:

*I feel like I've come full circle so when I said, when I did my dissertation I was doing empirical research. And when I turned in the first draft of my dissertation it was, whatever it was, reporting on this empirical research and my committee, not my advisor... But the, other philosophers on my committee, the thesis committee said, "well this is very nice, but this is empirical research, we can't give you a philosophy degree for this." So, I had to go off and write a philosophy dissertation. So, I wrote a few chapters on Carnap and then put that together with the empirical research. Okay, this*

*is empirical research, we can't give you a philosophy degree. And then a few years ago, I wrote a paper on the measurement of statistical evidence. So that was just part of my science career and I submitted it to one of these general science journals that doesn't care about the discipline. They'll publish any reasonable science and it's also a journal that, PLOS One, doesn't have editorial gatekeepers. So, they will, basically if it's well written and whatever it looks... They'll publish it. [...] They rejected it without sending it out for review on the grounds that it wasn't science it was philosophy.*

In this excerpt, participant R notes that while philosophy may reject empirical methodology on the grounds that it is not philosophical, and perhaps question whether someone can be called a philosopher when using experimental methods, scientists may also question or reject the scientific merits of the work for being philosophically influenced. R is pointing to identity-related barriers that are reinforced through disciplinary gatekeeping practices, which are often intertwined with reward structure. Moreover, Participant R also noted that the tension between philosophical and scientific expectations made it difficult to understand their academic identity. This could indicate a relationship between research methodology and philosophical identity and shows some of the negative perceptions among philosophers with respect to research methods.

One of my goals in this dissertation is to expand the conception of philosophers of science to include a broad range of methods, practices, and topics, including extra-disciplinary and extra-academic ones. When questioning or challenging a philosopher's identity based on their incorporation of experimental methods, philosophers may be erecting barriers for practitioners that make it difficult to do engaged work or push the boundaries of the discipline.

On the other hand, some participants spoke about the importance of not being too committed to their philosophical identities, and how that enabled them to engage with non-philosophical communities in more meaningful ways. Having an identity that does not relate solely to philosophy as a discipline was seemingly important to the success of extra-disciplinary and extra-academic engagement for some participants. In the excerpt below, participant E talks about the impact a flexible academic identity had on their extra-disciplinary engagement:

*I don't really care what I really am. What I care about is am I presenting in the right way [...] It's presenting in the right way of being able to speak the language of the community I'm in. So being very mindful of how do I present as a member of the community and then not get emotionally caught up in, "Now I have no home, now I have no place I actually belong," right? [...] So it's I think in some ways the advice that's often given to junior scholars is about figure out, make an identity for yourself. In some*

*ways it's actually exactly contrary to what I think was contrary to my own personal success. It was actually because I didn't bother trying to have an identity for myself that I think I was so ... I could walk into another community egoless. It was like, "Okay how do you guys talk? I'll just mimic. I can figure it out." I'm not worried about saying, "No, no, you've got to hear the insights I have from my home."*

As E points out, their flexible identity plays a significant role in building relationships with scientific community members, specifically by adapting to the community needs and communication styles. Furthermore, not being committed solely to philosophy in an identity sense can provide philosophers of science with more freedom in engagement. Philosophers of science can use that freedom and flexibility to connect with scientific communities in a more meaningful way that does not require bringing philosophical aims to the forefront of engagement.

Similarly, participants talked about the importance of a flexible academic identity in facilitating extra-academic engagement:

*So the reason I'm willing to walk away from academia is because my personal identity is not tied up with being an academic, and that might allow me to communicate with people outside of my field in a different way that is really hard for people for whom their identity, their sense of self, is tied up in being an academic. I took a year off in the middle of grad school to work for an NGO for a year and it shaped me in such a deep way and it made me realize that internally I could be a non-academic and it would be totally awesome.*

As the quotation from participant B shows, a flexible identity can also impact extra-academic engagement insofar as B's willingness to adopt an identity that is not solely rooted in *academic* philosophy is connected to their success with extra-academic engagement. This participant's experiences demonstrates a connection between openness to extra-academic engagement beyond academic philosophy and willingness to adapt to the norms of a new community environment. In other words, an identity that is not intricately tied with academic philosophy can facilitate stronger engagement, both in extra-disciplinary and extra-academic contexts.

Although some participants talked about the connection between their flexible identities and the success of their extra-academic engagements, others also talked about the difficulty of maintaining their identity and membership in the philosophical community in cases where their extra-academic engagement is more bi-directional. One participant insightfully pointed to a tension when trying to identify as a philosopher while no longer working in an academic context



that may not exist to the same degree in many other disciplines. They recount a discussion with a colleague from economics here:

*[H]e said “the difference between economics and philosophy is when you quit academia and do economics somewhere else, you’re still an economist, but if you quit academia and do philosophy somewhere else, you don’t get to call yourself a philosopher anymore. So, you stop being a philosopher if you leave academia in a way that you don’t stop being an economist.” And I thought well, that’s incredibly insightful that in our mind the label philosopher is so sutured to the particular academic position, that it’s not just—even the people who are in favor of alternative careers are framing those as careers not in philosophy, we don’t have any idea of what philosophy might be not in academia, right, and when— I mean honestly when people show up and they’re like oh I’m a philosopher but I’m not affiliated with a university, I think even those of us who are super open minded are like “ehhhh” you know, right? Including me, because we don’t have any slot for that, at all, so there’s no way of transition from taking your philosophy identity and moving it gracefully out of academia. [...] But yes, I mean you can be a mathematician or a chemist or a physicist or a geologist or an anthropologist even, I have a friend who’s an archaeologist who’s not an academic, you can do all these things, you can have them as academic identities or not, but not philosophy. Even history, yes— You can be like the museum’s historian or something [...] or art history, or like anything. But we have one of our graduate students who got a job leading the clinical ethics program for a major hospital system [...] but we all talk about her as a success story of somebody who got this philosophy PhD and then moved out of philosophy. I’m like, that’s not really out of philosophy, it’s just that she’s using her philosophical toolbox in another setting, but we just don’t even think of it that way. [...] You can add [the non-academic work on top] — we’re so conservative in this way right—you need that institutional stamp and it has to be really specific, it also has to be tenure-track.*

In this excerpt, the participant H is referring to those who not only take their philosophical work outside of the academy but do so from a role outside of the professoriate. Philosophers, unlike scholars in many other disciplines, cannot easily maintain their philosophical identities beyond the professoriate.<sup>36</sup> While philosophy disincentivizes practitioners to engage beyond the academic discipline, other disciplines have multiple examples of engagement happening in that way. Working outside of the professoriate does not necessitate that philosophers can no longer

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<sup>36</sup> While H specifically uses the term ‘tenure-track’, I interpret H to mean pre-tenure, post-tenure, and temporary positions within the professoriate.

contribute to philosophical research, but the academic reward structures in philosophy are such that there is no clear path for practitioners who aim to contribute without clear institutional affiliations. Even when philosophers attempt to contribute to the field (e.g., attending conferences, publishing), their identities are still called into question because they lack a faculty appointment (including temporary ones). In addition, H notes that there is not much of a precedent for this in philosophy, and that it is more difficult to envision how a philosopher might interact with the discipline from beyond an academic appointment – more so than most other disciplines.

What is unclear is why philosophers (including philosophers of science) lose their identities as philosophers when they engage beyond the academy. Should philosophers of science want to make any impact on scientific communities, it is imperative that they find ways to integrate into those scientific communities. Doing so does not negate philosophical training, nor should it negate membership in the philosophical community. Identity barriers not only make engagement difficult broadly speaking, but they make it particularly difficult to engage beyond the academy. Unfortunately, then, identity barriers make it more difficult for philosophers to integrate into scientific communities, and thus may reduce their ability to have a philosophical impact on scientific research and practice.

Academic culture poses similar challenges to extra-academic engagement. Much like H connects identity barriers to gatekeeping practices in the excerpt above, participants also connected sentiments among philosophers stemming from philosophy's cultural context in academia to several gatekeeping practices that thwart engagement. The cultural contexts of academia, philosophy, and philosophy of science are complex, and the connection between cultural context and identity are fuzzy at best. Despite the complexity, participants drew clear relationships between barriers they experienced and the academic context in which they are embedded.

#### **4.6: Academic Culture and Extra-Academic Engagement**

Academia, as a context for conducting research, can create its own set of barriers that influence and inhibit practitioners' ability to investigate questions and problems. Many scientific and science-related communities are not strictly academic in nature, which in itself adds facets of difficulty to the broader picture of engagement. Even within academia, engaging across disciplines is difficult, with disciplinary differences in terms of methods, reward structure, and motivation influencing the ability to work together on complex problems. However, these

communities often share one substantial thing in common: the academic context in which their work takes place. The shared backdrop that academia provides may be helpful in facilitating the movement of research, but it may also serve to confine philosophers and scientists to a sphere of problems and questions that exist largely within academia.

Several interview participants made reference to academic structures that negatively impacted their research activities. In particular, they discussed academically-situated barriers that can inhibit engagement with scientific communities through gatekeeping practices. Because of gatekeeping in academic philosophy, participants have experienced pushback to engaged research activities outside of academia, making it difficult to engaged using an extra-academic approach. Participants also talked about many interesting philosophical questions and fruitful areas of philosophical research lay at least in part outside of the academic realm.

A noticeable theme in the interviews was repeated discussion about the climate and culture in academic philosophy indicating that extra-academic engagement, especially bi-directional extra-academic engagement, is difficult from within philosophical communities. Participant B2 demonstrates an instance of that below:

*I went into graduate school not particularly, I didn't really have a career plan or even specific aspirations, I just wanted to keep going. But what I found is that once you enter a high ranked philosophy graduate PhD program, you're immersed in that intense culture that says that the only possible job anybody could ever be interested in is an academic job and the higher ranking the better and I mean I remember this sense of having this social, I don't want to call it pressure, it was more like a tsunami.*

The cultural demand B2 talks about begins in graduate school and is intensified in graduate programs under pressure to maintain their high ranking, implicitly teaching junior philosophers that only way to be successful in philosophy is to secure a tenure stream position.

These implicit cultural expectations can discourage engaged work at the graduate level, as explained by Participant F:

**Participant:** *the committee that organized the APA handbook were actually philosophy faculty [...] and they contacted people they knew who left academia. And it's always presented in that way: they left academia, they couldn't get a career. It wasn't like, "I realized that my skillset was really equipped to deal with these other problems. [...] And that's how it's pitched to grad students, "You're not good enough for philosophy so you can have an alt-ac career and if we're preparing our graduate students for alt-ac careers, we're showcasing that we're a failure department who can't place their grad students.*

**Interviewer:** So, it's actually not just a case of the department not knowing how to train students, but actually that there might be disincentives to training students for alt-ac careers?

**Participant:** Yes. Why would you want to showcase to serious philosophers that the only place you're placing your grad students is in alt-ac jobs? [...] It's also frustrating too because I have no idea what the data like this is, but I would not be surprised—I know there are departments that only put placements on their websites for people who go on into academia because they don't want to skew it towards [academia]. [...] it depends who I'm talking to about it, I'll frame it differently. Like some people don't know I've spent all this time looking into these alternative career paths. I mean part of it is because I would like a plan B, but every once in a while, I get really frustrated with the discipline and I'm like, "Maybe this isn't what I want to do. I love teaching. I love that philosophy is equipping people to really engage and think about things. That's a way to help society, but there are some things that are really frustrating that I don't like."

Participant F points out that philosophers often consider those who have not ended up in the professoriate as having left both academia *and* philosophy. As F notes, philosophy does not typically consider engagement beyond the professoriate as a legitimate use of philosophical skills. Furthermore, at the departmental level, there may be a lack of incentives for extra-academic engagement among graduate students, which could impact the extent to which a department is willing to support engaged work. In other words, philosophers who are in tenure stream positions feel that they themselves and their departments will somehow be penalized for supporting extra-academic engagement, particularly from beyond the academy, as it is not legitimate philosophical work or practice. In that way, faculty who are in gatekeeping positions, specifically for graduate students who are being trained in philosophy, are discouraging and even preventing engagement from happening from the very beginning. As a result, cultural expectations in academic philosophy can lead to practical barriers that harm practitioners' ability to engage extra-academically as early as graduate school.

Participant H talks about this cultural pressure persisting even after tenure, and the sense that engagement is often not really considered philosophy:

*Right, you know and when I started doing more applied stuff, even in my own head for a long time I thought of it as like time that I was giving myself to do stuff that I liked that wasn't real philosophy really, you know, and it took me a long time to like sort of integrate sense of self, which is a privilege that I have because I'm tenured, and so on*

*but yes, I don't know how to do that but to me that sort of like trying to intervene on that culture which isn't at the level of policy or curricula is the real issue.*

In this excerpt, H acknowledges the personal impacts of culturally-situated barriers and the professional impact of gatekeeping practices; specifically, gatekeeping practices that seek to undermine engagement by questioning the philosophical legitimacy of engagement beyond the professoriate. Similar to what we saw in Section 4.3, H notes that tenure provides a safeguard from cultural barriers insofar as tenure gives practitioners time and space to mitigate cultural barriers. Additionally, H distinguishes academic culture from policies that impact tenure decisions or curricula that influence graduate training. In other words, they draw a distinction between the broader culture of academia and the ways that the culture may be reflected in or influence specific policies, procedures, or rewards that reinforce cultural norms within academic philosophy.

Overall, the interview data indicates that while reward structures play an essential role in shaping philosophical practice, the larger problem likely originates with the culture itself. It is important to note that the reward structures and their influence on research content is driven not just by norms in philosophy, but also norms in a broader academic context, often referred to as academic culture. In Chapter 5, I will further explore connection between the broader institutional context of academia and the influence larger institutional structures have on disciplinary contexts, both of which have an influence on engagement.

## **4.7: Conclusion**

This dissertation builds on earlier work in philosophy that challenges academic norms. In a 1903 paper, “Ph.D. Octopus,” William James takes a critical stance on the exclusionary nature of academia. He questions the path of academic philosophy and the way that it insulates those without PhD status, or lesser academic appointments, from contributing to our knowledge producing practices. His use of the octopus metaphor points out the absurdity of gatekeeping practices based on rulesets founded in seemingly little other than prestige, leaving philosophical knowledge and inquiry with a less nuanced view of the political, practical, and philosophical underpinnings of science (James, 1903). Like James, I also question and explore the efficacy of maintaining boundaries between academia and other social structures relevant to science. Further, I see a missed opportunity for practitioners to engage beyond the academy; academic gatekeeping practices ensure that the culture, reward structure, and practices of academia do not easily enable contributions beyond predetermined bounds. I am problematizing the

predetermined bounds of philosophy of science, pointing to barriers that undermine engagement and uptake by scientific communities. In doing so, I argue that there are significant epistemic benefits to be gained by widening the scope of philosophical practice.

The interview excerpts presented in this chapter represent perceptions and possible explanations for barriers that inhibit extra-disciplinary and extra-academic engagement. In my analysis, I noted three general themes under which the barriers can be generally grouped despite their overlap: reward structures within the discipline of philosophy, identity-related barriers that impede engagement, and an academic culture that implicitly punishes or disincentivizes engaged research activities. Discussions about the reward structure of philosophy revealed three related types of reward structure barriers: hiring, publication, tenure and promotion. These overlapping categories represent the main areas of potential concern with respect to engagement, and areas where procedures and policies could be changed to incentivize extra-disciplinary and extra-academic engagement in the same ways that traditional philosophical work is incentivized in practice.

This chapter provides evidence that that: 1) barriers to engagement are complex, overlapping, and often shared among extra-disciplinary and extra-academic approaches; 2) many barriers come from both disciplinary and academic or institutional levels; 3) the reward structures of the discipline and of academia are ill-suited to support engagement and challenge the identities of practitioners who do engaged work; and 4) extra-academic engagement presents additional academic and institutional barriers. In Chapter 5, I build on the perceptions and ideas generated by participants and further examine the complexities inherent in the barriers to engagement and how those barriers can be experienced by individual practitioners.

# Chapter 5

## Mitigating Barriers to Engaged Philosophy of Science: The Case for Multifaceted Interventions

### Section 5.1: Introduction

Thus far in the dissertation, I have discussed barriers at a high level, recognizing commonalities among the types of barriers that participants identified while engaging with communities relevant to their philosophical research. In Chapter 4, I analyzed the common themes to better understand what is preventing philosophers of science from increasing their broader engagement, as many participants indicated they were interested in doing in our survey. In Chapter 5, I build on this analysis and discuss how these findings about the barriers to engagement can be interpreted in the context of the disciplinary, departmental, and institutional structures that currently shape philosophy of science.

Throughout my discussion, I argue that barriers are certainly not always experienced the same way by all people.<sup>37</sup> They are experienced at an individual level by philosophers of science who are working with, researching, and publishing in the field. In other words, they can be experienced differently for different individuals. In addition to analyzing themes and common problems using engaged approaches, it is important to understand how individual experiences with barriers can differ, even when practitioners can all be experiencing the same issue or problem.

This chapter makes two main arguments: 1) that barriers can be experienced differently by individuals and can be experienced at different levels (disciplinary, departmental, and institutional), and 2) that we need multifaceted solutions to mitigate barriers to extra-disciplinary and extra-academic engagement that address the multi-level problem areas in the reward structure, norms, and practices that shape philosophy of science. Furthermore, I briefly

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<sup>37</sup> There is a vast body of literature from multiple disciplines that talk about the different experience of barriers at different intersections of identity such as race, gender, socio-economic status, mental health/illness, sexual orientation, ability/disability, etc. In philosophy, see Sean Valles' (2017) paper discussing racialized philosophers' differing experiences with barriers, as well as Sally Haslanger's (2008) paper and Jenny Saul's (2013) chapter about women's differing experiences of barriers in philosophy.

address some possible solutions to overcome or mitigate barriers to broader engagement in philosophy of science. In Section 5.2, I lay out the main types of barriers discussed in Chapter 4 and consider what structures have led to or maintain these barriers. Understanding why these barriers exist is important if we want to successfully mitigate them. Section 5.3 acknowledges the complexities inherent in experiencing barriers, moving the discussion from patterns experienced among participants to individual experiences of barriers to engagement.

In the context of the first argument, I claim that there are three reasons why barriers can be experienced differently for different practitioners: 1) using different approaches to engagement, 2) the context in which engagement takes place for the practitioner, and 3) differences among identities of practitioners. Section 5.4 expands on the point that barriers are affected by context, arguing that mitigating and overcoming barriers will require significant changes at the institutional, departmental, and disciplinary levels of academic structures. In Section 5.5, I suggest some concrete strategies that can possibly help mitigate barriers to engagement, and the challenges associated with the implementation of those strategies. Finally, in 5.6 I explore some possible areas of future research to build on the findings, arguments, and suggestions of this dissertation, including more concrete strategies to implement the kind of changes I recommend.

## **Section 5.2: Barriers in Practice**

In Chapter 4, I discussed several barriers to engagement in philosophy of science that were identified in the interviews pertaining to: the reward structures in philosophy and philosophy of science, time, professional identity, philosophical identity, and academic culture. I identified three core themes from the barriers discussed in our dataset: barriers in the reward structure, barriers related to professional identity, and barriers in the culture of academic philosophy. Participant conversations focused on these three themes that are interrelated and at times may overlap with one another. Despite the close relationship among these barrier groups, there are subtle differences in the ways the barriers operate and how they affect practitioners' ability to do engaged work.

Recognizing what the barriers are that make it difficult for (and in some cases prevent) philosophers of science doing engaged work is important empirical work in and of itself. However, my goal in Chapter 5 is to understand how to mitigate these barriers and make room for engaged work. Insofar as we want engaged philosophy of science to be supported by the



discipline, in institutions and in departments, it is important to explore possible causes for those barriers.

**Reward structure gaps in academic philosophy** was a significant theme that arose from the interviews. Many participants talked about different ways that philosophical reward structures are built to incentivize traditional philosophical work and disadvantage philosophical work that engages outside the discipline. They referenced several gaps in the current reward structure that ought to change if the philosophical community wants to value and incentivize engaged work, as many have indicated that they do (Plaisance et al. 2019, Tiberius 2017). Prominent topics in this group were hiring practices, tenure and promotion, and publication norms. As shown in Chapter 4, participants criticized the reward structure for its lack of attention to engaged approaches to philosophy of science and cited this gap as a prominent source of barriers to engagement for themselves and others. In other words, the interview data provided empirical data and support for the barriers Fehr and Plaisance (2010) suggested were likely playing a role, strengthening evidence that these barriers exist.

**Identity policing behaviours** were also discussed in the interviews, which focused largely on individual actions from in-group members (i.e., other philosophers of science or philosophers more generally). Conversations about identity policing were mostly tied to engagement beyond the professoriate, usually bi-directional extra-academic insofar as they were about how to delineate what is legitimate philosophy or who is a legitimate philosopher. Who is in and who is out of the community seemed to be driven not only by the work a philosopher of science publishes but the location they engage from. A philosopher of science who “leaves the academy” (in other words, finds employment outside of the professoriate), is the defining line that participants pointed to as delineating membership within the philosophical community. I provide concrete examples with excerpts below.

**Academic gatekeeping practices** are different from identity policing practices in that they are structural impediments to community membership rather than individually targeted actions to thwart membership and involvement in the community. They may go beyond disciplinarily influenced reward structures but could be the by-product of gaps in reward structures that lead to significant devaluing or overlooking contributions of philosophical work. These practices may grow from gaps in training and underexamined pathways for impact. For example, might be choosing not to count publications in science journals or substantial policy briefs towards tenure in any capacity. Fehr and Plaisance also draw attention to these gatekeeping practices in their argument for a more socially relevant philosophy of science, arguing that such practices ought to be more flexible to support socially relevant work (2010).

The phenomena of reward structure gaps and academic gatekeeping practices regarding engaged work are not new introductions in the literature; Fehr and Plaisance argue that there are many potential barriers relating to the norms, practices, and culture in philosophy that ought to be addressed in order to make philosophy of science more socially relevant. In particular, they discuss the impact that gatekeepers, as influential faculty who serve as journal editors, conference organizers, reviewers that influence the norms of the discipline, the practices that philosophers of science are beholden to, and shaping the culture in philosophy of science (2010). My analysis shows that these issues are supported by data from philosophers of science. This project aims to understand these barriers more fully while providing empirical support for their effects on engaged philosophy of science. Identity barriers, however, are a more novel introduction into the literature. I identified this pattern for the first time through the data and introduced the theme as a group of barriers not yet addressed separately in the literature.

Someone might object that the barriers I identify above, while preventing philosophers of science from doing engaged work, are not inherently negative in practice. While doing engaged work may bring benefits into philosophy, it is important to ensure that philosophers and philosophers of science are contributing to the discipline and philosophical community. An important way of advancing knowledge within the discipline itself is publishing in disciplinary journals, so it is important that philosophers are still doing this. In addition, one of the functions of the tenure process is to ensure that scholars have sufficient competence and expertise in their area of specialty and that they do high quality work. If they do not publish in philosophy journals, it becomes very difficult to assess whether or not they meet the standards of academic philosophy. So, the reward structure and academic gatekeeping practices are ensuring that philosophers of science are contributing to the philosophical community as expected by others within the philosophical community.

I agree that there ought to be a vetting process through which a philosopher of science shows that they are able to do the high-quality work needed to merit tenure, and the academic freedom that comes with it. Furthermore, I agree that it ought to include some work in philosophy venues. However, where we disagree is in requiring that all (or even the majority) of a practitioner's work ought to be in a philosophical venue to be evaluated for merit alongside the work of other philosophers. Instead, I am arguing that a practitioner's work does not need to purely be situated in philosophical journals and venues to assess philosophical merit. Practitioners' work ought to be assessed, using thorough standards, regardless of which academic journal the work is published in. In cases where philosophers' work is highly interdisciplinary, it may be more challenging to assess. However, the Association for

Interdisciplinary Studies (AIS) has published clear guidelines to assess interdisciplinary work, create MOUs, and implement policies that support interdisciplinarity.<sup>38</sup> These guidelines can serve as a framework for assessing philosophical work for tenure and promotion regardless of the academic venues that work is in.

Furthermore, this argument assumes that there is a distinct dichotomy between a philosopher of science who engages scientific communities and one who contributes to the discipline. However, much like the tenure and promotion evaluation strategies, capturing a practitioner's contributions to the discipline does not need to refer solely to philosophy journals. Currently, many common hiring, tenure, and promotion strategies reflect an all or nothing approach to evaluation and assume that philosophers can only contribute through philosophy journals. Yet, their intended audiences may not always be (nor do they need to be) other philosophers. In fact, survey results report that: 62.5% of respondents said it was very important for scientists to read their work and 34.1% said it was somewhat important; 19.6% of respondents said it was very important for policymakers to read their work and 43.5% said it was somewhat important; and 14.2% said it was very important for lay publics to read their work while 62.2% said it was somewhat important (Plaisance et al. 2019). In addition, our citation study shows that philosophers of science who publish in journals outside of philosophy get more uptake from scientific communities (McLevey 2018). Therefore, publishing to some extent in non-philosophy journals appears to align better with the goals of many philosophers of science and contribute more meaningfully to scholarship in other disciplines. At the very least, it is possible to evaluate existing philosophical work for contributions to the discipline, while evaluating scholarship in non-philosophy journals for its quality.

Again, someone might object that evaluating work in non-philosophy journals is too complex. Some may argue that a candidate with work published in non-philosophy venues is not enough to merit hiring, tenure, or promotion in many cases. In those cases, the onus ought to be on those who do not think the work is enough to explain why for any given case. But in fact, currently the onus is currently on those who do think the work does merit hiring, tenure, or promotion to explain why, and most of the time they are not given the opportunity to explain.

Although these three themes were common discussion points during interviews, I am not arguing that these common barriers are necessarily experienced by all practitioners. Nor am I arguing that they are always experienced the same way from person to person. In fact, in the

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<sup>38</sup> See here for a full account of AIS's tenure and promotion guidelines: [https://interdisciplinarystudies.org/wp-content/uploads/2019/06/AIS\\_Tenure\\_Promotion\\_Guidelines.pdf](https://interdisciplinarystudies.org/wp-content/uploads/2019/06/AIS_Tenure_Promotion_Guidelines.pdf)

following section, I argue that we have good reason to think that experiences of barriers, differ based on context and complexities.

### **Section 5.3: Experiencing Barriers: Context and Complexities**

Feminist epistemologists have established that many types of experiences are heavily influenced by facets of a person's identity (e.g., race, gender, socio-economic status). This claim – that social identity is epistemically relevant – is often referred to as situated knowledge (Harraway 1988, Code 1991). In feminist and social epistemology literature, discussions about identity have centered around knowledge and knowledge-producing practices, arguing that knowledge is framed by racial identities, gender identities, socio-economic status, and so on (Longino 2002, Harding 2006, Wylie 2012). Situated knowledge can be affected by more than just one's social identity, however. It can also include other aspects of one's identity or social situation, such as their professional or intellectual identity, or the social networks in which they are embedded. Thus, just as knowledge is not experienced the same universally, neither are barriers and the effects that they have. In this section, I argue that barriers, much like knowledge, are not experienced the same universally. Conversations about barriers and the ways that barriers affect or prevent practitioners from adopting engaged approaches must be attentive to approach and context, in addition to social location.

Approach and context are two overlapping factors that can impact experiences of barriers to engagement. Approach – how a practitioner is engaging with scientific communities – is an important factor that can change one's experience with a barrier. What a practitioner chooses to do (e.g., collaborating on a grant proposal versus observing a lab for three months) will influence which barriers they experience and to what extent. A philosopher of science who collaborates with a marine biologist on a grant proposal for a project, for example, is more susceptible to institutional and departmental barriers come tenure and promotion time than a philosopher of science who spends three months in a wet lab observing experiments and to publish articles in philosophy of science journals which clarify concepts from their now improved understanding of the science practice. The latter type of engagement produces research outputs that are more easily rewarded by the current structure of our disciplinary norms. In what follows, I analyze how both context and approach connect to the three core themes identified in Chapter 4 and briefly discussed above in 5.2: reward structure gaps, identity policing, and academic gatekeeping practices.

Similarly, philosophers of science who are engaging from academia (e.g., philosophers of science who have tenure-stream positions and collaborate with governmentally situated policy writers) are less likely to experience the same barriers than philosophers of science who accept positions in those government organizations and use their philosophical knowledge and skills to influence policy instead. For example, practitioners in academic philosophy may experience fewer or no barriers communicating with academic philosophers, or even academic scientists, and they may experience more barriers related to the legitimacy of their philosophical work. Practitioners outside of academic philosophy may experience fewer or no barriers related to legitimacy or disciplinary relevance but may struggle to engage academic philosophers. In other words, their context can play a significant role in which barriers arise for practitioners and to what extent. Philosophers of science engaging from inside a governmental organization will face far fewer barriers (or maybe none at all) related to publishing in science journals, for example. If they are not working within the reward structure of a tenure-stream position (especially one in philosophy), there may be very different requirements regarding publication that make it much easier to publish in non-philosophy journals.

In each case, barriers to engagement can be experienced differently depending on which approach a practitioner is using at the time (as well as their context, e.g., tenure status in the professoriate or role in federal policy structure). Approaches to engagement can deeply affect the extent to which a practitioner experiences specific barriers because they account for how closely a practitioner is connected to another community and for what purpose or outcome. The approach, dictating who and how a philosopher engages, is central in shaping the research outputs that are evaluated by the philosophical community. The outputs (i.e., journal publications, grants, conference talks) are the basis of evaluating philosophical merit of a practitioner's research.

For example, a uni-directional extra-disciplinary approach can often result in barriers to publishing but the extent to which those barriers are experienced could increase for bi-directional approaches. One example that was discussed in Chapter 3 where participant Q talks about using a more uni-directional approach and disseminating their work at scientific conferences and publishing in philosophy journals and science journals. Q also talks about experiencing very few barriers to engagement in those venues. In contrast, other participants talked about experiencing some difficulty publishing papers in philosophy journals with scientific content, and those conversations largely focused on which core philosophy of science journals were more or less likely to accept that work. Participants who talked about bi-directional approaches were more likely to talk about publication barriers in philosophy of

science journals as a whole, as well as publishing more of their collaborative work with scientists in science or interdisciplinary journals instead.

Similarly, identity barriers are strongly affected by approach. More specifically, some participants talked about experiencing identity barriers in connection with extra-academic approaches to engagement. Participant G, who discussed using a bi-directional extra-academic approach in their research (Chapter 2), also talked about facing identity policing in philosophy of science:

*I went on the market last year with N publications and N years of teaching experience and a solid page of interdisciplinary and public engagement [...] I think what happens is I make the long list no problem because it would be absurd not to put me on the long list. But then to go down to the interview stage things are so tight that because I fall outside of the disciplinary boundaries [...] I don't make it to the shortlist for an interview.*

In this excerpt of the interview, G identifies their collaborative research with scientists and their inclusion of socially relevant topics and methods as a reason why they experience identity policing, which in this case may impact hiring practices as well.<sup>39</sup> Insofar as identity policing is fundamentally connected to a practitioner and the philosophical work that they do, identity policing behavior is often connected to the area of philosophical specialty that practitioners work in, the topics their research addresses, and the methods or approaches that they use.

Identity barriers are also affected by context. Context can refer to a philosopher's relationship and proximity to academia – namely, whether they are engaging from a professorial position or a position outside the tenure-stream. Even within the tenure-stream, it matters whether they are engaging from a research institution with a culture that supports interdisciplinary and transdisciplinary work, at an institution that undermines it, or at a smaller institution that does not have the means to support it (e.g., they lack funding to support interdisciplinary work or are at a small liberal arts college without scientific collaborators to work with). Many participants discussed the importance of the institutional culture and support in either mitigating or overcoming barriers to engagement.

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<sup>39</sup> Technically, this is a perception and speculation on the part of participant G. However, there are two reasons to take this concern seriously. First, as Fehr and Plaisance point out, perceived barriers can become actual barriers, and these types of perceptions are often shared amongst graduate students and other members of the academic community, which can then affect real behavior. Second, during their interviews with us, some of the more senior faculty members shared experiences of having been on hiring committees where colleagues expressed concern about hiring a particular philosopher of science because their work was too collaborative or looked too scientific.

Returning to participant G's excerpts, they talked about using a bi-directional approach to engagement and being situated outside of academic philosophy. Both of those factors could have reasonably affected G's experience of the barriers and the extent to which they impacted G's research. The exact extent to which each barrier was affected, and how reward structure and identity barriers intersected, are not clear. However, G does cite barriers to engagement relevant to their context. Similarly, Participant H talks about their observations of identity barriers faced by their students in an excerpt introduced in Chapter 4 and the expectations within academic philosophy that enable identity policing. For H, engaging from beyond the professoriate could result in a deeper experience of the barriers that are not just about struggling to have one's work recognized as fitting within a department's hiring criteria, but ultimately losing one's identity as a philosopher altogether.

Many participants who identified experiencing fewer barriers to engagement talked about the ways in which their institutional contexts were influential in mitigating or removing the barriers altogether. Practitioners who engage from institutions with explicit policies and organizational structures that support interdisciplinary research talked about the importance of those factors in removing the challenge of a reward structure with gaps to rewarding engagement. For example, the philosophy department at Michigan State University is known for supporting engaged and interdisciplinary work. At Michigan State, philosophers of science are typically offered joint appointments with Lyman Briggs College when they are hired by the philosophy department. At Lyman Briggs, they co-create Memorandums of Understanding (MOUs) with faculty members who are offered joint appointments that specify how their work will be evaluated. Faculty members have the opportunity to advocate for standards of evaluation that support their work.<sup>40</sup> This example clearly shows that it is possible to assess interdisciplinary and engaged work by setting out agreements ahead of time with faculty members. However, in the absence of a clear agreements, evaluation policies do not often include processes to evaluate extra-disciplinary or extra-academic research, allowing barriers to engaged work to persist.

Academic gatekeeping practices in academia are also influential factors that can change which barriers a practitioner experiences or the extent to which they experience them. More specifically, gatekeeping practices that maintain boundaries between academia and "non-academic" communities have the potential to impact engagement in philosophy of science.

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<sup>40</sup> See Simmons's *University Affairs* article for more information about the MOU process at Michigan State University and the reasons why MOUs can support interdisciplinary work: <https://www.insidehighered.com/advice/2011/08/19/making-interdisciplinarity-possible>

Participants referred specifically to extra-academic types of engagement that involve connections beyond the professoriate as culturally located barriers that impacted engagement. As mentioned in the excerpts in Chapter 4, policing and shaming behaviors keep practitioners from engaging in a more embedded way, particularly when they challenge a practitioner's place in philosophy. For instance, engaging beyond the professoriate (e.g., from clinical research facilities) is often viewed as leaving philosophy, as opposed to working as a philosopher from beyond the academy, despite the possibility for philosophers to continue engaging in philosophical venues (e.g., conferences and journals).

Frodeman and Briggie (2016) also point to culturally located barriers to engagement in philosophy. They discuss several possible areas from which barriers might emerge at the institutional, disciplinary, and departmental levels. In addition, they cite a lack of philosophically and sociologically informed studies and analyses like the ones my collaborators and I conducted. As they put it, "One searches in vain for a philosophical and sociological of the discipline, except as a high theory (e.g. Collins 1998). One finds no sustained analysis of whether philosophic academic culture is maladapted to twenty-first-century society" (130). The analysis in this dissertation not only fills the gap that Frodeman and Briggie lament, but it expands on their claims about how disciplinary norms create barriers.

Participants also noted that it was difficult to understand exactly where academic gatekeeping barriers were coming from, though they mentioned several cultural norms that reinforce gatekeeping behaviors, such as the importance of academic professorial positions and constraints on accepted methodological approaches. For instance, empirical work is not always accepted by other philosophers as legitimate philosophy, and it is often not accepted in philosophy journals as topically relevant. It may be difficult to understand how academic gatekeeping practices are reinforcing broader culturally located attitudes in philosophy of science. Although in this case conversations were less likely to touch on specific structural reasons why academic gatekeeping barriers are in place, participants clearly talked about norms in philosophy of science that are culturally-situated insofar as philosophy of science (and philosophy as a whole) has its own set of norms that are represented in academic gatekeeping practices that undermine engagement. In part, participants may also be pointing to a difference in the way cultural gatekeeping practices are experienced differently among practitioners.

Although differences in approaches to engagement account for many of the reasons why barriers might be experienced differently from one practitioner to the next, there is another factor that can influence the experience of barriers: context. Context in this case is about the professional situation a practitioner is in while they are engaging, including their proximity to



academic philosophy and academic culture which also encompasses their institutional, departmental, and disciplinary context. Context can refer to their employment status (i.e., tenure-stream or not), whether they are employed within a philosophy department or another academic department (e.g., History), or whether or not they are employed in academic philosophy at all as opposed to outside of it (e.g., within governments or independent research institutes). Context is important as it can dictate their proximity to scientific communities and the ease or difficulty with which they can move into and around scientific contexts to engage.

While proximity to an academic context (i.e., within an academic department) was of central importance for many of the participants that we interviewed, it was often an implicit part of the interview discussions. This comes back to a limitation discussed in Chapter 4: the vast majority of our participants were deeply embedded in academia and held full or associate professor positions in philosophy departments. The importance of their relationship to academia, while evident in their discussions of engagement with different scientific communities, were not as thoroughly discussed as the importance of institutional, departmental, and disciplinary contexts.

However, academic context is a key factor in changing one's experience of barriers. Our participants who held precarious relationships with academia – e.g., those who were in non-permanent appointments such as post-docs and non-tenured professors – discussed barriers to engagement such as publication barriers, hiring barriers, barriers relating to academic culture and identity barriers. Notably, they talked about the barriers being exacerbated for them while in precarious positions. For example, they discussed the importance of getting publications in top tier philosophy journals.<sup>41</sup> In discussions with associate and full professors, many discussions of barriers often related back to their pre-tenure days, or to colleagues who are not currently tenured. In particular, many observed that tenure provides a shield from several types of barriers, either by enabling practitioners to overcome them completely, experience them to a lesser extent, or just not face severe consequences as a result of doing work that is not rewarded.

More specifically, those with more secure positions in academic philosophy talked about the importance of that security, such as tenure, in dismantling barriers on an individual level. The barriers they identified were typically for early career or precarious academic philosophers. Here is an example from Participant O:

*I've not ever experienced [lack of funding, lack of recognition, lack of opportunities] myself but I have friends who have reported to me in various places that they've either*

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<sup>41</sup> This of course presumes that participants were aiming for tenure-stream positions in philosophy, which many of our participants were.

*been interviewed by or know people that work at departments where interdisciplinary work is ignored for tenure. Accomplishments outside of philosophy don't count and I think that for a lot of philosophers, that's a major barrier for them, especially when they're junior and they only have so much time and they want tenure.*

Notably, O does not admit to experiencing the barriers themselves yet acknowledges that many other philosophers have experienced these barriers, especially as early career academics. In addition, O notes that graduate students need to be especially careful:

*So, I think it's important that the students look more like a philosopher. I have two students [...] in both cases they had papers that lay on the border of a science journal and a philosophy journal and in both cases I said to focus on the philosophy journal and then later, depending on where they get a tenure track job, then decide for the future. For me at [institution], I was told to publish wherever I want; everything got counted, everything gets counted. For me, once I had that job, I just chose whatever I felt was the best venue but not all jobs are going to work like that.*

Our conversations with Participant O also revealed reasons why O believes they did not experience any barriers to engagement, namely, they were employed in an institutional and departmental context that did not fail to reward broader engagement. In Section 5.3, I discuss such contexts in more detail and the role they play in mitigating barriers.

The contrast in the discussions from early and late career practitioners was an interesting depiction of an increasingly likely scenario that tenure, as a measure of job security, often allows for an alleviation of the barriers to engagement. Tenure, however, is not a solution to the barriers; rather, it enables individuals to circumvent barriers rather than dismantle the existence of barriers themselves. Barriers are instituted and supported by the structures that uphold academic philosophy: namely, our institutions, the discipline, and departments, which may help to explain the gap between early and later career practitioners. As I explained above, there is a difference between requiring some work to demonstrate expertise in an area of philosophy and not counting reputable research in non-philosophy journals at all in hiring, tenure, and promotion decisions. This is potentially a grey area and I do not purport to say how many research tasks are required. Assigning numbers is beyond the scope of this dissertation; rather my goal is to open up a discussion about revising practices and policies that create barriers to engaged philosophy of science.

## **Section 5.4: Institutions, Disciplines, and Departments**

Systemic barriers are detrimental to the success of engaged philosophy of science. At an individual level, barriers to engagement can be circumvented by employment conditions such as tenure. Building on my analysis of barriers in Chapter 4, I argue that the barriers come down to three sets of structures that perpetuate the existence of the barriers: disciplinary, institutional, and departmental. Institutions and disciplines were two salient, interconnected, and sometimes conflicting sources of barriers that participants talked about. Of those two sources, participants indirectly talked about the ways in which departments are largely responsible for filtering and applying the rewards and policies that lead to experiences of barriers. Departments are a place where institutional and disciplinary barriers meet; they are where most practitioners experience barriers. Although departments can sometimes influence institutional policies, they typically have to work within institutionally set policies for faculty. Departments also base at least part of their hiring and promotion decisions on disciplinary standards, such as when evaluating the quality or prestige of the journals in which one has (or has not) published.

A cultural shift in philosophy of science that acknowledges the legitimacy of engaged approaches is not enough to address and mitigate barriers to engagement. Mitigating barriers to engagement in a meaningful way means changing disciplinary and institutional structures that uphold the barriers (assuming also that departments will follow suit). Unless we can achieve that, philosophy of science will continue valuing engagement only in sentiment and not in action, as Tiberius's study notes from Chapter 4. As we know, this is not enough to implement actual change that is not privileged by the misleading idea that tenure provides practitioners with freedom. As we argued in Plaisance et al. 2019, philosophers often do not fear losing their jobs because of tenure, which several participants highlighted as a reason why they felt safer doing engaged work post-tenure. However, engaged work may still hurt a philosopher's chances of promotion. In this chapter, I outline changes to practices and policies that will support practitioners' ability to do engaged work regardless of their place in the tenure stream.

Institutional structures can also create or maintain barriers to engagement. Institutions set or at least influence many elements of the reward structure such as promotion and tenure requirements, thereby affecting when and how practitioners experience barriers to engagement. Institutional cultures and norms can, therefore, change how and when practitioners engage with scientific communities. The excerpts above from participant O in the previous section demonstrate the importance of institutional support for engagement, in particular how flexible publishing requirements for tenure and promotion can reduce what would otherwise be strong disincentives to do engaged work. O talks about how their institution's policies differ from

others, offering more flexibility to incorporate different publication venues apart from academic journals, rather than solely in philosophy journals. The flexible requirements for publishing in the context of tenure and promotion allowed O to publish in both scientific and philosophy journals, paving a much smoother road to engagement with scientific communities and enabling them to get credit for that research.

Other participants also discussed the importance of their institutions' culture in mitigating barriers. For instance, participant V notes:

*I think the culture [at my institution] is one where you're allowed to publish wherever you want, so there's no limitation on publication. So, it's not like people are given a list of six top journals and they're told that their annual review will depend upon the number of papers they publish in those journals. Being open to publication all over the map of knowledge, as long as peer reviewed, is a huge, sort of boost to engaged work, right? You can go out there, you can work with non-philosophers in a way that is going to inform research products, get them published, and get credit for it professionally [...] it's very much a part of what we do. And that's why the rewards structure is built in a way to facilitate this kind of philosophical work.*

Participant V explains that their institution is also flexible in their publication requirements. In addition, they explicitly recognize that their institution was instrumental in supporting engagement because engaged research is rewarded appropriately. Furthermore, participant V notes that the shift in institutional culture is largely responsible for supporting an increased amount of engaged work coming from that institution. V points out not only that their institution helps to mitigate barriers, but that institutional context can affect the extent to which a practitioner experiences barriers. In addition to noting the importance of the institutional culture, V hints briefly at the role the departmental culture plays in the broader picture.

Within the institutional structure, departments are the first point of contact for most practitioners. Departments filter the institutional rules and rewards down to practitioners. In addition, departments can have their own norms and environments. While that environment may be influenced by the broader institutional culture, departments themselves are often responsible for implementing the policies in practice that can affect the extent to which practitioners experience barriers. As participant B explains below, departments can differ significantly in terms of what they value and reward. B explains that different departments have different policies, in this case pertaining to publication requirements for tenure, that may be explained to practitioners in different ways and at different times, making it either easier or harder to do engaged work.

*I think one of the things really hard to assess is how idiosyncratic different programs are for their policies on the ground and for how these things work in practice. Different departments have different cultures and it's hard for any one individual who has only been... I've been in three departments, and I still don't have a sense of how stuff works across different departments.*

Specific policies, how they are implemented by departments, and how transparent those policies are can often be dependent on departmental contexts (despite the larger policies being an institutional mandate).

Participant F2 discusses tenure requirements at their institution but focuses more on the ways that they may be interpreted and implemented at the department level. Notably, F2 considers the interactions between institutional-level policies and department-level interactions with practitioners.

**Participant:** *One of my post docs, who got a good job, we wrote a paper and there were, I guess, five coauthors on the paper. And he would always joke, "Well, that's never going to count for anything." And it probably won't. It'll count in some departments, it counts for 20% of a publication. [...] Because there's five coauthors.*

**Interviewer:** *So, it sounds like what you're saying is that it really isn't recognized, but given the position you're in, it doesn't really matter for you. Whereas it does for other people.*

**Participant:** *It doesn't touch me. But yeah, in my department, if I was a junior faculty member, I would be in trouble. I have to say, my grants would carry me a long way because they are recognized. But that's because the dean's office is demanding that humanities departments bring in big grants. Which is an absurd demand. But because I do, I get that kind of...but, if I was a junior faculty member, not bringing in grants, but doing multi coauthored pieces, I think my department head would be sitting me down and saying, "[Name], you're not getting tenure."*

**I:** *Why do you think that is?*

**P:** *Because it's not recognized. I published in [...] scientific journals. And it would be seen as not...we have a list of journals that are the preferred journals to publish in, and none of the science journals are in there for us.*

In this excerpt, F2 highlights the interaction between institutions and departments with respect to tenure requirements and the barriers to engagement in that context. In other words, participants acknowledge that barriers such as tenure and promotion requirements are complex insofar as they may be experienced at the institutional and departmental levels. As I discuss

later, it is not clear that intervening to mitigate these barriers at just one level will be effective enough to mitigate those barriers substantially, specifically for junior faculty and precarious academic philosophers.

Departments are at an important cross-section between institutions and disciplines, providing a context wherein disciplinary norms interact with institutional norms and policies. They incorporate disciplinary norms in a way that institutional-level decisions typically do not. Departments are entrenched in disciplinary norms insofar as they are made up of practitioners who share the same disciplinary training and environment. Disciplinary norms can and often do converge on barriers in the reward structure of academic philosophy. While that intersection is an interesting topic to explore, it is not one we focused on during the interview conversations. However, disciplinary norms are largely responsible for other barriers, particularly identity and boundary policing.

Consider the role that boundary policing plays in hiring, a norm often started at the disciplinary level, and how those norms interact at the departmental level. The excerpts presented in 4.5 discuss the importance of disciplinary identity and the role identity plays in shaping experiences of barriers. Boundary policing can take the form of comments such as “this work is not real philosophy because you are conducting empirical studies” or desk rejecting papers from a journal because they are “too empirical.” Participants talked about experiencing boundary policing in graduate school, during hiring and tenure decisions relating back to their engagement and methodological approaches. For example, the excerpt below, Participant Z talks about boundary policing and identity policing at the disciplinary level, which then also affects hiring decisions for graduate students trained in more engaged methodology.

*Oh, I think there's a lot of barriers. I mean there's the general... so you see this on the job market. There's an assumption that if you know a lot of science, you also don't know a lot of philosophy, right? This often comes out most explicitly in the job market that you have questions of disciplinary identity and I think we like supporting interdisciplinary work and actually a lot of different institutions support interdisciplinary work but then a lot of institutional structures rely on disciplinary identity. We face this with our graduate students and post docs. You want them to really pursue a problem wherever it leads and if you need to learn some cognitive science or some physics to really get into the problem, then go do that, right? You should be open minded and actually our students don't have that sense of disciplinary boundaries, they just pursue things where they lead which is terrific but then when it comes to disciplines, you constantly get this refrain: 'but are you really a philosopher?'*

*I don't think there are positions I mean that really sort of straddle the two. [...] Philosophy as a discipline I don't think is doing that well in making opportunities for people who are reaching outside of philosophy. I think that's different than a lot of other disciplines. Philosophy tends to be more inward looking, I think. [...] So that's something that's well supported here but there are a lot of philosophy departments where I don't think that's the case [...] you get the sense at least that philosophy doesn't necessarily support connections with other disciplines.*

Z is pointing to a connection between identity policing and boundary policing that relates to methods and engagement in scientific community, with downstream effects in hiring decisions. At the disciplinary level, philosophy does not create many opportunities for practitioners to engage with others outside the discipline as many gatekeepers situated in various disciplinary decision-making positions (e.g., department chairs) place limits on what counts as philosophy or philosophy of science. Subsequently, departments make decisions about hiring that reflect those norms and practices, making it difficult for practitioners who engage to stay within the discipline. Even when there is local institutional support, disciplinary support may still be lacking. Furthermore, to stay within the discipline of philosophy, practitioners who engage need to be, at the very least, cautious about how they do so and to what extent, especially during the early career stage before disciplinary-level support is less crucial to the advancement of their careers.

The reward structure may not simply influence how we do our work (such as which journals practitioners publish in or which approach they take to a problem) but the actual philosophy itself. The approaches and methodologies philosophers use can affect the questions and issues we address (Douglas 2010, Tuana 2010). It is also possible that hiring, tenure, and promotion policies drive the research itself and the philosophical content, including questions the disciplinary community is able to address and arguments the community can make. Employment structures such as rewards for one's work may be highly influential, perhaps influencing the discipline and research outputs coming from practitioners. In other words, there may be negative epistemic consequences for philosophy of science if practitioners face barriers to engagement, even if only in the early stages of their careers when practitioners are most at risk, as the interview data suggests. (As I pointed out earlier, this barrier is less salient for tenured philosophers, yet may still play a role in promotion.) Gatekeeping practices, identity policing, and limitations on the reward structure like those I discuss above may seriously impact the philosophical research and content in the field. While barriers to engagement have a fairly evident impact on engagement, they may pose larger epistemic risks for philosophy of science as

a whole, possibly reducing the discipline's ability to be responsive to scientific concerns. If we want to mitigate or overcome these barriers, it is important to take into account the different levels at which these barriers operate and use a multifaceted approach that acknowledges the institutional, disciplinary, and departmental-level decisions that impact engagement.

Before concluding this chapter, it is important to acknowledge there are additional possible sources of barriers that were not directly investigated in our study but could nonetheless play a role: internal barriers that come from oneself, psychological barriers, and cultural barriers. One limitation of our study is that we focused on barriers that seemed to stem from conditions of employment, such as the institutional and disciplinary structures that participants identified as the sources of barriers to engagement. However, there could be psychological motivators to these preferences that influence the extent to which that barrier is experienced by individual practitioner. Furthermore, preference to write alone could also be a learned behaviour connected to other norms within the discipline, for instance. While this might be the case, self-motivated barriers were mentioned during a few interviews, but not the majority of them.

There are a number of reasons why our conversations were focused on external employment factors. Participants themselves spoke largely on the sources they identified as responsible for the limitations placed on their ability to engage. While those were largely about employment structures for philosophers of science, there is certainly more work that can be done to unpack the extent to which those barriers are externally and internally motivated. Institutional, disciplinary, or departmental barriers could also be affected by psychological factors and additional psychological barriers. Nor did the study explore the potential connections between external barriers experienced by participants and the likelihood that those external barriers are also related to psychological barriers or motivations. Further research could be done to understand the following possibilities: 1) which psychological barriers impact research, if any, 2) whether external barriers are also impacted by or intertwined with internal barriers, and 3) the degree to which external are influenced by psychological or self-motivated factors.

External barriers we do not address directly in this project are broader cultural barriers that may change based on the cultural context that institutions and departments are situated in. Although we did interview philosophers of science outside of North America, specifically in the United Kingdom, France, Finland, Australia, and Germany, it is not clear how much cultural barriers may also interact with barriers to engagement. Institutional barriers may, in some



cases, relate back to cultural barriers – for example, institutions in a different cultural context may be more accepting of engagement with policy makers than others.

It is also important to note that the majority of our interview participants were tenured at the time of their interviews. As noted above, many mentioned the importance of tenure in the interviews and acknowledged that tenure provides them with freedom to do engaged work without experiencing as many barriers or experience them to the same degree. However, it is not clear how prevalent these barriers are for pre-tenure academic philosophers, although some participants noted that the perceived barriers were higher for pre-tenure practitioners. Practitioners develop their research competencies and interests long before tenure is secured and philosophers have become inculcated in the norms of disciplinary methods pre-tenure, arguably in graduate school. In other words, practitioners develop their research trajectories during times when they are most at risk of experiencing barriers, and to the highest degree they likely will for their careers. Furthermore, it may increase the chances that participants also perpetuate some barriers, such as identity policing and gatekeeping. The more entrenched those norms become over time, the harder it will arguably be to mitigate them. Therefore, the security of tenure is not enough to genuinely mitigate barriers for practitioners in a consistent way. Barriers require intervention for practitioners at any and all stages of their careers, including pre-tenure career phases.

Precarious academics and philosophers engaging from beyond the professoriate will also continue to face barriers if we do not seriously consider how to mitigate pre-tenure barriers. Practitioners who do not and will not receive tenure as a condition of their employment (e.g., practitioners employed outside of the tenure track) should not face barriers to engagement either -- especially if we intend to reap the benefits of bi-directional extra-academic engagement beyond the professoriate and other benefits of engagement discussed in Chapter 3. Therefore, I will explore possible strategies and solutions to alleviate or mitigate those pre-tenure barriers to engagement below.

## **Section 5.5: Dismantling Barriers & Supporting Engaged Philosophy of Science**

There are many incremental changes and possible strategies to support engagement in philosophy of science. Practitioners may already be employing some strategies in select venues and spaces already, such as organizing conferences surrounding engagement and supporting graduate students who want to engage scientific communities through their research. The

problem with these strategies is that they support practitioners only on an individual level; in addition, they require individuals who are already invested in engagement to implement. Most importantly, smaller scale solutions, while helpful to incrementally changing the predominant views and approaches in philosophy of science, are not targeting the structures that uphold barriers in the first place. The focus of this section will be the structural shifts needed to support engagement with scientific communities in philosophy of science.

It is imperative to start with an understanding that implementing structural changes that will lead to mitigating or dismantling barriers to engagement is a multifaceted endeavour. As argued in 5.3, barriers arise largely from institutional and disciplinary structures, and individual departments are often responsible for filtering and applying institutional and disciplinary norms that lead to experiencing barriers in practice. In addition, the excerpts provided in this dissertation show that barriers to engagement, while separated into themes for analysis, overlap and can be experienced concurrently. In other words, it is not always clear which barrier or barriers cause practitioners to struggle with engaged approaches in philosophy of science at any given time. An intervention or strategy to dismantle barriers will always be partial if it does not intervene on the structures responsible for the existence of the barriers. A multifaceted strategy that intervenes on each of the structural sources may be more effective.

While admittedly more complex, a multifaceted approach can be responsive to barriers coming from multiple directions. Implementing changes at the institutional, disciplinary, and departmental levels will provide a more comprehensive strategy that can alleviate many if not all barriers to engagement over time. Understanding how each area for intervention or change relate to one another will lead to a better understanding of what a multifaceted approach to dismantling barriers can look like in philosophy of science.

In our paper reporting the survey results, we briefly address some strategies for supporting engaged philosophy of science (Plaisance et al. 2019). We summarize recommendations arising from Tiberius's survey of philosophers, which include:

*recognition for philosophical work that has a positive impact on other communities (e.g., through departmental awards), making public declarations about the value of such work (which Tiberius herself did as part of her Presidential Address at the 2017 meeting of the Central Division of the APA), and advocating for concrete ways to support broadly engaged work in tenure and promotion guidelines (Tiberius 2017).*

In addition, we highlight a suggestion from Frodeman and Briggie (2016) to value metaphilosophical scholarship that analyzes philosophical practices just as highly as any other philosophical scholarship, including the work in our survey paper and my own work in this

dissertation. Furthermore, we acknowledge the need for further research to identify empirically-informed and effective strategies that are likely to receive support from the majority of the discipline to facilitate more engaged philosophy of science. (I revisit the types of future research that I think are particularly important in Section 5.6.)

As my research suggests, there are many potential interventions that are promising in terms of mitigating barriers to engaged work. Reward structures are a significant area for effective interventions. Participants highlighted several possible changes to the reward structure in philosophy; many of these conversations tended to surround major rewards in academic philosophy, including publishing, funding, hiring, and promotion and tenure.

Publishing requirements, specifically which kinds of publications (journal articles, white papers, blog posts) and in which venues (peer-reviewed journals, popular books, relevant news outlets, blogs), were mentioned often as barriers to engagement that may benefit from intervention. Participants talked about support for engagement through more flexible publication requirements from institutions and departments when it comes to hiring, tenure, and promotion. Publication requirements came up in conversations about both hiring and tenure and promotion as two of the main ways through which philosophers of science and their research are evaluated and rewarded. The interview data suggest that publication requirements can have effects across barriers and institutions. In particular, participants who felt as though their engaged work was relatively well supported often cited flexible standards for publication, while those who perceived significant barriers to their work typically pointed to a lack of recognition for the types of publications they were interested in producing.” Thus, making a change to publication requirements could lead to far reaching support for engagement in philosophy of science.<sup>42</sup>

To be more specific, participants talked about the benefits of institutions and departments that recognized publications in scientific journals as well as philosophy journals. In other words, taking a broader approach to rewards related to publications to recognize the value in publications in science journals and academic journals outside of philosophy can be a concrete way to support engagement. Moreover, as publication is one of – if not the most – important elements of the reward structure in philosophy (and many other academic disciplines), changing the way publications are valued, can support engagement in philosophy of science to a significant extent. In particular, philosophy departments ought to reconsider

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<sup>42</sup> Again, this would need to be done thoughtfully – I am not suggesting that all publications should have the same weight. As I discuss above, institutions like Michigan State University have been able to create tenure and promotion criteria that credit publications in relevant peer-reviewed journals outside one’s discipline.

publications that fall outside philosophy. However, this change is limited to engagement from within academic philosophy.

Building on this idea, smaller changes to the policies and procedures for top journals in philosophy of science that broaden the scope of those journals to include engaged work is one way to tackle gatekeeping at the disciplinary level. Of course, this will have downstream departmental effects on hiring, tenure, and promotion practices as well. If core journals in philosophy of science recognize the philosophical merits of engaged work insofar as more publications reflect engaged approaches in those journals, departments will also likely recognize the merits of those publications when making crucial decisions that allow practitioners to continue in the field.

As noted earlier in this chapter, precarious and early career practitioners are most at risk for barriers to engagement. As such, early interventions have the potential to be very effective in mitigating barriers, especially at a crucial time during which barriers arguably have the most detrimental effects. Therefore, interventions during graduate training that support engagement, such as close mentorship with other practitioners who engage, changes to the structure of graduate training that involve engagement with scientific communities, and the ability to have engaged work counted towards degree requirements in the same way that traditionally philosophical work will also be counted.

In addition to interventions at the level of graduate training, shifting the norms in philosophy of science, and perhaps philosophy more generally, seems a necessary component of changing the ways that gatekeeping practices and identity policing operate in the discipline. While the importance of this shift cannot be ignored, it is not clear exactly how to make such a shift happen. Incremental changes in institutional and disciplinary structures will likely help the norms shift over time, but that is not a concrete solution to the problem. In addition to structural changes, there may be other ways to shift the norms in philosophy of science over time. For instance, presidents of associations can signal the importance of engaged work and make more space for this research in their programs.<sup>43</sup> Recognizing the existence of gatekeeping practices, how they impact practitioners, and the epistemic downsides of boundary policing in philosophy of science is one step in a series needed to address the specific problems that prevent or hinder engagement in philosophy of science.

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<sup>43</sup> For example, the Philosophy of Science Association has a recent mandate to “increase outreach and engagement in various forms: with the public, with other associations, with scientists, with philosophers of science around the world, and with other fields within philosophy.” For more details, see: <https://philsci.org/inclusion-outreach/outreach-engagement.html>.

## Section 5.6: Future Research

This dissertation provides important distinctions surrounding different approaches to engaged philosophy of science, highlights a variety of barriers that can make it difficult to do engaged work, and begins to offer strategies to mitigate them. While this work advances the philosophical literature pertaining to engaged philosophy of science, there are many potential avenues for further exploration. Below, I discuss two possible areas on which to expand: 1) examining the role of social location in philosophers' experiences of barriers, and 2) empirically investigating concrete solutions and strategies for implementing recommendations in this project.

In the previous section, I argued that multi-faceted solutions are critical for supporting engaged philosophy of science and diverse methodological approaches. I made some suggestions for areas of intervention, including policy changes that target publishing, funding, and hiring. While this chapter does not provide empirical evidence for effective interventions or analyze detailed intervention strategies, as that goes beyond the scope of my empirical research, the analysis I have done is important for the implementation of the research conducted in this dissertation project. Therefore, this project could be extended by further study of possible intervention points to mitigate barriers in the reward structure and culture of academic philosophy. One example might include a study regarding potential changes to departmental criteria related to research requirements for hiring, tenure, and promotion; by instituting more flexible criteria, philosophers of science may be more likely to undertake non-traditional forms of scholarship that have stronger and more lasting impacts in scientific communities. Further, it may reduce demands on philosophers who are currently doing engaged work, such as increased demands for publication requirements.<sup>44</sup> In addition, it would be useful to explore the link between supportive institutional contexts (such as joint appointments or seed funding for engaged research) and increased output of engaged work.

While many of the potential solutions and strategies discussed in this chapter were focused on structural changes needed to mitigate barriers, my analysis in Chapter 4 also demonstrates that identity-related barriers can affect the extent to which philosophers of science

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<sup>44</sup> As mentioned briefly in Chapter 4, some participants talked about the need to publish more when doing engaged work as opposed to more traditional philosophical work. In particular, participants discussed the need to often publish work in philosophical journals while also publishing in scientific ones, leading to a dual CV of sorts. In discussions, we began referring to this as the 'dual CV phenomenon'.

are willing to undertake engaged approaches. Certainly, identity-related barriers can be reflective of structurally imposed priorities (e.g., regarding which types of publications are given more weight), but identity barriers are not necessarily addressed through structural barriers. Identity-related barriers may be connected to individual behaviours and imposed through other individuals (e.g., other philosophers expressing sentiments about legitimate philosophy). However, it is important to acknowledge the extent to which one's social location may affect how a practitioner experiences a particular barrier.

As mentioned in Chapter 2, philosophers of colour have long been arguing that they face significant barriers in academic philosophy that have gone largely unnoticed and unaddressed by white philosophers (Dotson 2011a, 2013; Valles 2017). The barriers experienced by philosophers of colour may add to barriers to engagement, or they may deepen the extent to which philosophers of colour experience barriers to engagement. Philosophers of colour are already facing larger risks when doing non-traditional work and are asked to balance more service tasks, requiring them to be more strategic with their decisions about research (Valles 2017). As such, pursuing engaged work that adds risk on top of risks philosophers of colour are already facing in the discipline could reasonably lead to a different or heightened risk to one's career.

Similarly, as I discuss below, and as many feminist philosophers have pointed out, women and non-binary philosophers may experience additional barriers (Haslanger 2008, Paxton et al. 2012, Saul 2013). Their research shows additional barriers for women and non-binary people in philosophy, which can cause a compounding effect of barriers or a stronger experience of the barriers. In other words, social location may cause a compounding effect of barriers that inevitably impact philosophers' ability to do engaged work (or any kind of research). To put this argument in context, women in philosophy have written about barriers in academic philosophy that relate to their gender identities (Richardson 2010; Paxton et al. 2012). As a woman and a philosopher of science, barriers related to social location (in this case, gender) may be compounded and contribute to further isolation from the field. Women who experience gender-related barriers in addition to identity policing as a result of their professional identities (in this case, engagement outside of academic philosophy) may experience higher levels of professional identity barriers. (Unfortunately, we were not able to test this hypothesis with our dataset but based on prior research, it is not unreasonable to assume that gender can impact other barriers.) Though the reasons for professional identity barriers may come from more than one aspect of a practitioner's identity and the nature of their philosophical work, gender can

make practitioners more susceptible to barriers. In other words, social location can affect experiences of barriers, including professional identity barriers.

While multiple or different aspects of a practitioner's identity can (and often do) intersect, they make the experience of barriers to engagement arguably more severe in that someone is experiencing multiple barriers at once. This concept is not new. Kimberlé Crenshaw coined the term *intersectionality* in a 1989 article about the intersections between race and gender. She showed that aspects of a person's identity interact to create a mounting experience of barriers for women of colour (Crenshaw 1989, 1990). As a concept, intersectionality is certainly relevant here. Philosophy of science is not impervious to barriers related to intersectional social location. Philosophers of colour have discussed how additional professional obligations such as increased mentorship responsibilities and service tasks lead to barriers that make it more difficult to balance teaching and service tasks with research, making it more difficult to do work that presents possible risk to one's career (Valles 2017). For philosophers of colour, and even more so for women, non-binary, and transgender philosophers of colour, the additional labour demands for teaching tasks and service tasks make it exponentially more difficult to do research that pushes outside of what is traditionally accepted in philosophy of science, including engaged work. I have added a new identity barrier to the discussion in this dissertation that may add to the burden of barriers – professional identity.

In Chapter 4, we see how legitimacy as a philosopher and philosopher of science can be questioned when practitioners use engaged approaches in their research; this phenomenon is not impervious to intersecting barriers related to social location either. Therefore, intersecting identities can add to the overall burden philosophers of science experience in their attempts to do engaged work, making it at much more difficult to reap the benefits I discuss in Chapter 3.

Unfortunately, the extent to which experiences of barriers to engagement are affected by social location is not clear from our data. While our survey did look for gender and race differences among participants, we found significant effect sizes only in a small number of cases. To be specific, we found that women were slightly more likely to say that time was a barrier to engagement, specifically to disseminate their work. (See Plaisance et al. 2019 for the full analysis.) Gender variables often were not found to be significant in our analyses (likely as a result of being underpowered to detect such differences).<sup>45</sup> Notably, the data needed to investigate interactions between gender or race and barriers were underpowered in our survey,

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<sup>45</sup> We asked participants for demographic information about gender, race, and LGBTQ+ identity. While we found significant responses for binary gender identities, our data contained so few responses from those with racialized identities, non-binary gender identities, and LGBTQ+ identities, that our study did not have sufficient power to test these variables against any of our results.

so it is important to tread carefully while interpreting what these results can say about gender and barrier interactions. In the interviews, we focused mainly on the intersection between professional identity, institutional context, and reward structure instead.

While we don't yet have much data on which to draw well-founded conclusions about the role of gender and race in experiencing barriers to doing more engaged work, years of research showing the increased experience of barriers for many marginalized populations leaves me confident that this would be a fruitful area for future research. While we have many reasons to believe that social identity plays a role in experiencing barriers to engagement, how exactly that plays out in practice remains understudied. My analysis in this dissertation suggests that professional identity barriers are affecting philosophers' willingness to do engaged work, which aligns with research in feminist philosophy on gender and race. This key finding came to light from the data and was not originally a hypothesis of the larger research project. As such, the study was not designed to test the hypothesis and more research is needed to fully understand the interaction between identity-related barriers to engagement and gender or race related barriers in philosophy of science. However, future research in this area could provide additional evidence for my hypothesis that one's experience of a barrier to socially and scientifically engaged work is also influenced by their experiences existing in philosophy as a diverse practitioner, as is consistent with Dotson's argument (2011a, 2013).

## **Section 5.7: Conclusion**

Barriers to engagement with scientific communities need to be addressed using a multifaceted approach to target each level, institutional, disciplinary, or departmental, where barriers to engagement might operate. Some barriers may come from only one level (such conference program committees), while others might operate on more than one level (e.g., publication barriers are often operational at the departmental and disciplinary levels). Furthermore, the barriers could be experienced in different ways among practitioners or at different times in the course of their career. Therefore, solutions to barriers may need to be more complex and ought to be pervasive through the levels of structures in academic philosophy so that barriers can be mitigated. One of the most promising solutions, involves changing publication requirements in philosophy to include journals beyond the discipline and intervening during early career stages with policies to support dissemination and collaboration to and with communities outside of philosophy.



# Chapter 6

## Conclusion

In order to make philosophy of science more socially and scientifically relevant, SRPOS scholars have used and advocated for engaged methods as a way of connecting with science-related communities within academic and community contexts. As it has progressed, philosophy of science has continued to struggle with the implications of a rigid academic culture and norms that have shaped the sub-discipline over time – especially in the case of key movements whose ideals aligned more with a philosophy of science that is responsive to social problems rather than disciplinarily-situated squabbles (Douglas 2010). In response to this tension between academia’s rigidity and philosophy of science’s responsiveness to social problems, Socially Relevant Philosophy of Science (SRPOS), as an area of scholarship and movement within the sub-discipline, has emerged (Fehr and Plaisance 2010). Although relatively new, SRPOS is quickly gaining traction among philosophers of science for whom connections to socially-situated science are a priority.

Engagement with scientific communities provides philosophers of science with invaluable insights into community structures, practices, norms, assumptions, and values. In other words, engagement is necessary insofar as philosophers of sciences want and need to understand scientifically relevant communities in a way that goes beyond reading scientific research. Engagement, therefore, is a crucial approach within the mandate of socially relevant philosophy of science, if not philosophy of science as a whole. In addition to its evident importance, engagement in philosophy of science is complex.

Philosophers of science engage in different ways as needed to connect with different communities insofar as they pertain to the philosopher’s area of research (or teaching). Philosophers have engaged with scientific communities within academia an extra-disciplinary sense, beyond the academic context in an extra-academic sense, and with varying degrees of integration, from uni-directional to bi-directional communication (as I discuss in Chapter 3). Moreover, philosophers of science can engage using any of these approaches from within an academic context, or beyond academia. Philosophers of science need not be located solely within academia or the professoriate, and can have more complex relationships with academia and more complex appointments that may enable them to engage from different venues – perhaps even more appropriate venues to engage from depending on the goals each practitioner may have with their research and its intended impact. Along with the complexities inherent in

engaged approaches, complexity is also reflected in the benefits and barriers to engagement in philosophy of science.

The benefits of engagement are complex insofar as the specific approach a philosopher of science employs in their research can influence the benefits that arise. Depending on the degree of integration, extra-disciplinary forms of engagement can lead to a whole host of scientific, philosophical, and social benefits, including opening up new questions and avenues for inquiry (Fehr and Plaisance 2010). Extra-academic forms of engagement can evince similar benefits and can also enable a level of diversity and inclusivity in philosophy of science that cannot be achieved with extra-disciplinary engagement alone. Extra-academic engagement can increase the diversity of perspectives reflected in philosophical research and represented in the sub-discipline. However, the benefits that diverse perspectives bring to philosophy of science also require that the sub-disciplinary context support extra-academic engagement.

Engaged work, though valuable in the ways I discussed above, is often met with many barriers that inhibit engagement, as I argued in Chapter 4. Unfortunately, both extra-disciplinary and extra-academic engagement are undermined by an extensive series of barriers experienced by philosophers of science. Philosophers of science themselves, particularly those who have used engaged methods in their research, have drawn attention to many existing barriers that impede engagement and prevent the sub-discipline from reaping those benefits. Barriers that originate from or impact the reward structure in philosophy, academic norms and culture, and identities of philosophers can inhibit engaged philosophy of science. When those barriers exist, philosophers who use engaged approaches in their work may find it difficult to be rewarded and valued for engaging with scientifically relevant communities. These barriers can therefore affect the extent to which philosophers of science are able to do engaged philosophy of science within the current structures of philosophy, without risking their career.

Barriers continue to undermine engagement at least partly, if not solely, because of their complexity on both personal and structural levels. In other words, the existence of barriers to engagement are complicated by the particular context of experiencing those barriers. In addition to the approach one takes, contextual factors like social location can also affect how barriers are experienced. Furthermore, barriers are situated at institutional, disciplinary, and departmental levels, making them extremely difficult to address with simple changes. Mitigating or dismantling barriers requires multifaceted solutions that target barriers at all three levels. Any solutions that attempt to address barriers and do not consider the institutional, disciplinary, and departmental sources for those barriers will likely fall short of successfully mitigating or dismantling them. Therefore, solutions to address barriers to engagement must also be complex

insofar as they account for all levels of the structural problems that enable the existence of the barriers in the first place.

Structural changes can and should be implemented if philosophy as a discipline wishes to claim that it actively supports engagement – not just in sentiment, but in practice. Those structural changes must intervene on the reward structure of academic philosophy to make room for philosophers of science to research and publish in the way that is most effective for the engaged work they are doing. Structural changes also need to address the boundary policing and cultural gatekeeping practices that keep philosophers of science from being recognized within the discipline as doing legitimately philosophical work through engagement. The only way to alleviate the discipline’s retention problems for engaged scholars is to also address the cultural and identity-related problems that lead to sharp distinctions and divisions between philosophers of science who attend to disciplinary norms, and those who bend them to serve philosophical ends (or, worse yet, those who are seen as “not real philosophers”).

Academic philosophy ought to become more flexible and responsive to the different needs of engaged scholars if it is ever going to expand beyond its relatively narrow purview. Supporting engagement cannot be represented merely in sentiment by the gatekeepers of the field; genuine support can only come in the form of structural changes that intervene on barriers at all levels, which is a large and daunting task. Mitigating and dismantling these barriers has the potential to help shift philosophy of science, and perhaps philosophy as a whole, to a more inclusive disciplinary context with the ability to address scientifically and socially relevant problems. Without structural changes that meaningfully shift what it means to do philosophy and get recognized for it, many philosophers of science will continue to struggle in their pursuits to identify and address scientifically and socially relevant concerns, and philosophy of science will continue to suffer for it.

In this dissertation, I have advanced the literature on the barriers to socially and scientifically engaged philosophy of science, and strategies for overcoming them, in a number of ways. Starting with SRPOS literature, I identified a common limitation of discussions about engaged philosophy of science (namely, the implicit assumption that SRPOS work is always done from a particular professional location – within academia). I argued that philosophers should expand their notion of socially relevant and engaged philosophy of science to include work being done from outside the academy. As I argued, this will further increase epistemic diversity, which can benefit SRPOS and philosophy of science itself. Second, I offered a more nuanced, in-depth analysis of the barriers to engaged philosophy of science. This included (1) a rigorous empirical analysis of these barriers (using mixed methods approaches, but focusing on

interviews as they allow for the identification of context-dependent factors); (2) highlighting that such barriers are context-dependent, which demonstrates that there is no one-size-fits-all solution to mitigating these barriers; and (3) a detailed discussion of the various levels at which these barriers occur and interact. As such, I have demonstrated that we need multi-faceted solutions to address these complex barriers (a few of which I have laid out above). Finally, as I pointed out, the next step in this research would be to empirically test various interventions to determine which might be most effective in particular contexts. The detailed analysis I offered in this dissertation has laid the groundwork for this important work. I hope others will continue this line of research so we can transform philosophy of science into a discipline that is not only academically rigorous, but which more thoroughly realizes its potential benefits to science and society.

# References

- Ahmed, S. (2012). *On being included: Racism and diversity in institutional life*. Duke University Press.
- Allen, A., Mann, A. M., Marcano, D. D. L., Moody-Adams, M., & Scott, J. (2008). Situated voices: Black women in/on the profession of philosophy. *Hypatia*, 23(2), 160-189.
- Anderson, E. (1995). Knowledge, human interests, and objectivity in feminist epistemology. *Philosophical Topics*, 23(2), 27-58.
- Anderson, E. (2004). Uses of value judgments in science: A general argument, with lessons from a case study of feminist research on divorce. *Hypatia*, 19(1), 1-24.
- Aurini, J. D., Heath, M., & Howells, S. (2016). *The how to of qualitative research*. SAGE.
- Ayala-López, S. (2018). Foreigners and Inclusion in Academia. *Hypatia*, 33(2), 325-342.
- Blake, J. (1999). Overcoming the 'value-action gap' in environmental policy: Tensions between national policy and local experience. *Local environment*, 4(3), 257-278.
- Bluhm, R. (2012). *Beyond Neurosexism: Is It Possible to Defend the Female Brain?* In R. Bluhm, A. Jaap Jacobson, & H. L. Maibom (Eds.) *Neurofeminism: Issues at the Intersection of Feminist Theory and Cognitive Science* (pp. 230-245). Palgrave Macmillan.
- Briggle, A. (2015). *A field philosopher's guide to fracking: How one Texas town stood up to big oil and gas*. WW Norton & Company.
- Briggle, A., & Frodeman, R. (2016). The institution of philosophy: Escaping disciplinary capture. *Metaphilosophy*, 47(1), 26-38.
- Brown, M. J. (2012). John Dewey's logic of science. *HOPOS: The Journal of the International Society for the History of Philosophy of Science*, 2(2), 258-306.
- Brown, M. J. (2013a). The source and status of values for socially responsible science. *Philosophical Studies*, 163(1), 67-76.
- Brown, M. J. (2013b). Values in science beyond underdetermination and inductive risk. *Philosophy of Science*, 80(5), 829-839.
- Brown, D., Lemons, J., & Tuana, N. (2006). The importance of expressly integrating ethical analyses into climate change policy formation. *Climate Policy*, 5(5), 549-552.
- Cartieri, F., & Potochnik, A. (2014). Toward philosophy of science's social engagement. *Erkenntnis*, 79(5), 901-916.
- Code, L. (1991). *What Can She Know?: Feminist Theory and the Construction of Knowledge*. Cornell University Press.
- Collins, H. M., & Evans, R. (2002). The third wave of science studies: Studies of expertise and experience. *Social studies of science*, 32(2), 235-296.

- Collins, H., Evans, R., & Gorman, M. (2007). Trading zones and interactional expertise. *Studies in History and Philosophy of Science Part A*, 38(4), 657-666.
- Crenshaw, K. (1989). "Demarginalizing the Intersection of Race and Sex: A Black Feminist Critique of Antidiscrimination Doctrine, Feminist Theory and Antiracist Politics." *University of Chicago Legal Forum*, 1(8), 139-167.
- Crenshaw, K. (1990). Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stan. L. Rev.*, 43, 1241.
- Dotson, K. (2011a). Concrete flowers: Contemplating the profession of philosophy. *Hypatia*, 26(2), 403-409.
- Dotson, K. (2011b). Tracking epistemic violence, tracking practices of silencing. *Hypatia*, 26(2), 236-257.
- Dotson, K. (2013). How is this paper philosophy? *Comparative Philosophy*, 3(1), 121-121.
- Douglas, H. (2000). Inductive risk and values in science. *Philosophy of science*, 67(4), 559-579.
- Douglas, H. (2009). *Science, policy, and the value-free ideal*. University of Pittsburgh Press.
- Douglas, H. (2010). Engagement for progress: applied philosophy of science in context. *Synthese*, 177(3), 317-335.
- Dupré, J. (2001). *Human nature and the limits of science*. Oxford University Press.
- Dupré, J. (2012). Comments on Philosophy of Science after Feminism, by Janet Kourany. *Perspectives on Science*, 20(3), 310-319.
- Eigenbrode, S. D., O'Rourke, M., Wulfhorst, J. D., Althoff, D. M., Goldberg, C. S., Merrill, K., & Bosque-Pérez, N. A. (2007). Employing philosophical dialogue in collaborative science. *BioScience*, 57(1), 55-64.
- Elliott, K. C. (2011a). Direct and indirect roles for values in science. *Philosophy of Science*, 78(2), 303-324.
- Elliott, K. C. (2011b). *Is a little pollution good for you?: Incorporating societal values in environmental research*. Oxford University Press.
- Elliott, K. C., & McKaughan, D. J. (2014). Nonepistemic values and the multiple goals of science. *Philosophy of Science*, 81(1), 1-21.
- Fehr, C. (2011). What is in it for me? The benefits of diversity in scientific communities. In H. Grasswick (Ed.) *Feminist epistemology and philosophy of science*. Springer (pp. 133-155).
- Fehr, C. (2012). Feminist engagement with evolutionary psychology. *Hypatia*, 27(1), 50-72.
- Fehr, C., & Plaisance, K. S. (2010). Socially relevant philosophy of science: an introduction. *Synthese*, 177(3), 301-316.
- Frodeman, R. (2013). Philosophy dedisciplined. *Synthese*, 190(11), 1917-1936.

- Frodeman, R., & Briggle, A. (2016). *Socrates tenured: The institutions of 21st-century philosophy*. Rowman & Littlefield Publishers.
- Frodeman, R., Klein, J. T., & Pacheco, R. C. D. S. (Eds.). (2017). *The Oxford handbook of interdisciplinarity*, Second Edition. Oxford University Press.
- Gannett, L. (2010). Questions asked and unasked: how by worrying less about the ‘really real’ philosophers of science might better contribute to debates about genetics and race. *Synthese*, 177(3), 363-385.
- Giere, R. N. (2003). A new program for philosophy of science? *Philosophy of Science*, 70(1), 15-21.
- Gines, K. T. (2011). Being a black woman philosopher: Reflections on founding the Collegium of Black Women Philosophers. *Hypatia*, 26(2), 429-437.
- Giroux, H. A. (2014). *Neoliberalism's war on higher education*. Haymarket Books.
- Goes, M., Tuana, N., & Keller, K. (2011). The economics (or lack thereof) of aerosol geoengineering. *Climatic change*, 109(3-4), 719-744.
- Grasswick, H. E. (2010). Scientific and lay communities: earning epistemic trust through knowledge sharing. *Synthese*, 177(3), 387-409.
- Grasswick, H. (2014). Climate change science and responsible trust: A situated approach. *Hypatia*, 29(3), 541-557.
- Harding, S. (2004). A socially relevant philosophy of science? Resources from standpoint theory's controversiality. *Hypatia*, 19(1), 25-47.
- Harding, S. (2006). *Science and social inequality: Feminist and postcolonial issues*. University of Illinois Press.
- Haraway, D. (1988). Situated knowledges: The science question in feminism and the privilege of partial perspective. *Feminist studies*, 14(3), 575-599.
- Hankinson-Nelson, L. (1990). *Who Knows: From Quine to a Feminist Empiricism*. Temple University Press.
- Haslanger, S. (2008). Changing the ideology and culture of philosophy: Not by reason (alone). *Hypatia*, 23(2), 210-223.
- Heesen, R. (2018). Why the reward structure of science makes reproducibility problems inevitable. *The journal of philosophy*, 115(12), 661-674.
- Henry, F., Dua, E., James, C. E., Kobayashi, A., Li, P., Ramos, H., & Smith, M. S. (2017). *The equity myth: Racialization and indigeneity at Canadian universities*. UBC Press.
- Hicks, D. J. (2014). A new direction for science and values. *Synthese*, 191(14), 3271-3295.
- Hicks, D. J. (2018). Inductive risk and regulatory toxicology: a comment on de Melo-Martín and Intemann. *Philosophy of Science*, 85(1), 164-174.
- Howard, D. (2009). Better red than dead—putting an end to the social irrelevance of postwar philosophy of science. *Science & Education*, 18(2), 199-220.

- James, W. (1903) The Ph.D. Octopus. <http://philip.greenspun.com/careers/octopus.html>
- Kennedy, E. B. (2019). Why they've immersed: A framework for understanding and attending to motivational differences among interactional experts. *The Third Wave in Science and Technology Studies*, 217-234.
- Kings, A. E. (2019). Philosophy's Diversity Problem: Understanding the Underrepresentation of Women and Minorities in Philosophy. *Metaphilosophy*, 50(3), 212-230.
- Kitcher, P. (2003). *Science, truth, and democracy*. Oxford University Press.
- Klein, J. T. (2010). A taxonomy of interdisciplinarity. *The Oxford handbook of interdisciplinarity*, 15, 15-30.
- Kollmuss, A., & Agyeman, J. (2002). Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental education research*, 8(3), 239-260.
- Kourany, J. A. (2003a). A philosophy of science for the twenty-first century. *Philosophy of science*, 70(1), 1-14.
- Kourany, J. A. (2003b). Reply to Giere. *Philosophy of Science*, 70(1), 22-26.
- Kourany, J. A. (2010). *Philosophy of science after feminism*. Oxford University Press.
- Kourany, J. A. (2012). The ideal of socially responsible science: Reply to Dupré, Rolin, Solomon, and Giere. *Perspectives on Science*, 20(3), 344-352.
- Kourany, J. A. (2013). Meeting the challenges to socially responsible science: reply to Brown, Lacey, and Potter. *Philosophical studies*, 163(1), 93-103.
- Lacey, H. (2013). Rehabilitating neutrality. *Philosophical studies*, 163(1), 77-83.
- Lane, B., & Potter, S. (2007). The adoption of cleaner vehicles in the UK: exploring the consumer attitude–action gap. *Journal of cleaner production*, 15(11-12), 1085-1092.
- Levin, N., Leonelli, S., Weckowska, D., Castle, D., & Dupré, J. (2016). How do scientists define openness? Exploring the relationship between open science policies and research practice. *Bulletin of Science, Technology & Society*, 36(2), 128-141.
- Leavy, P. (2016). *Essentials of transdisciplinary research: Using problem-centered methodologies*. Routledge.
- Logan, R. A. (2001). Science mass communication: Its conceptual history. *Science Communication*, 23(2), 135-163.
- Longino, H. E. (1990). *Science as social knowledge: Values and objectivity in scientific inquiry*. Princeton University Press.
- Longino, H. E. (2002). *The fate of knowledge*. Princeton University Press.
- Longino, H. E. (2013). *Studying human behavior: How scientists investigate aggression and sexuality*. University of Chicago Press.
- Lorde, A. (1984). *Sister outsider: Essays and Speeches*. Crossing Press.



- Lorde, A. (1995). Age, Race, Class, and Sex: Women Redefining Difference. In Beverly Guy-Sheftal (ed.), *Words of Fire: An Anthology of African American Feminist Thought*. The New Press (pp. 284-291).
- Maienschein, J. (2007). What is an 'embryo' and how do we know? In D. L. Hull & M. Ruse. (Ed.) *The Cambridge Companion to the Philosophy of Biology*. Cambridge University Press (pp. 324-341).
- McLevey, J., Graham, A. V., McIlroy-Young, R., Browne, P., & Plaisance, K. S. (2018). Interdisciplinarity and insularity in the diffusion of knowledge: an analysis of disciplinary boundaries between philosophy of science and the sciences. *Scientometrics*, *117*(1), 331-349.
- McLevey, J., & McIlroy-Young, R. (2017). Introducing metaknowledge: Software for computational research in information science, network analysis, and science of science. *Journal of Informetrics*, *11*(1), 176-197.
- Michaud, J., & Turri, J. (2018). Values and Credibility in Science Communication. *Logos & Episteme*, *9*(2), 199-214.
- O'Rourke, M., & Crowley, S. J. (2013). Philosophical intervention and cross-disciplinary science: the story of the Toolbox Project. *Synthese*, *190*(11), 1937-1954.
- O'Rourke, M., Crowley, S., & Gonnerman, C. (2016). On the nature of cross-disciplinary integration: A philosophical framework. *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences*, *56*, 62-70.
- Paxton, M., Figdor, C., & Tiberius, V. (2012). Quantifying the gender gap: An empirical study of the underrepresentation of women in philosophy. *Hypatia*, *27*(4), 949-957.
- Plaisance, K. S. (2020). The benefits of acquiring interactional expertise: Why (some) philosophers of science should engage scientific communities. *Studies in History and Philosophy of Science Part A*, *83*, 53-62.
- Plaisance, K., & Elliott, K. C. (2021). A Framework for Analyzing Broadly Engaged Philosophy of Science. *Forthcoming in Philosophy of Science*.
- Plaisance, K. S., Graham, A. V., McLevey, J., & Michaud, J. (2019). Show me the numbers: a quantitative portrait of the attitudes, experiences, and values of philosophers of science regarding broadly engaged work. *Synthese*, 1-31.
- Plaisance, K. S., & Kennedy, E. B. (2014). A pluralistic approach to interactional expertise. *Studies in History and Philosophy of Science Part A*, *47*, 60-68.
- Plaisance, K., Michaud, J., & McLevey, J. (2021). Pathways of Influence: Understanding the Impact of Philosophy of Science on Scientific Domains. *Forthcoming in Synthese*.
- Reo, N. J., & Whyte, K. P. (2012). Hunting and morality as elements of traditional ecological knowledge. *Human Ecology*, *40*(1), 15-27.
- Richardson, S. S. (2010). Feminist philosophy of science: History, contributions, and challenges. *Synthese*, *177*(3), 337-362.

- Russell, C. (2019). On Black Women, “In Defense of Transracialism,” and Imperial Harm. *Hypatia*, 34(2), 176-194.
- Saldaña, J. (2011). *Fundamentals of qualitative research*. Oxford University Press.
- Sánchez, C. A. (2011). Philosophy and the Post-immigrant Fear. *Philosophy in the Contemporary World*, 18(1), 31-42.
- Saul, J. (2013). Implicit bias, stereotype threat, and women in philosophy. In K. Hutchinson & F. Jenkins. (Eds.) *Women in philosophy: What needs to change*. Oxford University Press (pp. 39-60).
- Shrader-Frechette, K. (2000). Radiobiological hormesis, methodological value judgments, and metascience. *Perspectives on Science*, 8(4), 367-379.
- Shrader-Frechette, K. (2008). Ideological toxicology: invalid logic, science, ethics about low-dose pollution. *Human & Experimental Toxicology*, 27(8), 647-657.
- Shrader-Frechette, K. (2010). Conceptual analysis and special-interest science: toxicology and the case of Edward Calabrese. *Synthese*, 177(3), 449-469.
- Shrader-Frechette, K. (2012a). *Nuclear power and public policy: The social and ethical problems of fission technology*. Springer.
- Shrader-Frechette, K. (2012b). *Science policy, ethics, and economic methodology: some problems of technology assessment and environmental-impact analysis*. Springer.
- Solomon, M. (2001). *Social empiricism*. MIT press.
- Steel, D., & Whyte, K. P. (2012). Environmental justice, values, and scientific expertise. *Kennedy Institute of Ethics Journal*, 22(2), 163-182.
- Tiberius, V. (2017). The well-being of philosophy. *Proceedings and Addresses of the American Philosophical Association*, 91, 65-86.
- Tschakert, P., Barnett, J., Ellis, N., Lawrence, C., Tuana, N., New, M., Elrick-Barr, C., Pandit, R. & Pannell, D. (2017). Climate change and loss, as if people mattered: values, places, and experiences. *Wiley Interdisciplinary Reviews: Climate Change*, 8(5), e476.
- Tuana, N. (2010). Leading with ethics, aiming for policy: New opportunities for philosophy of science. *Synthese*, 177(3), 471-492.
- Tuana, N. (2013). Embedding philosophers in the practices of science: Bringing humanities to the sciences. *Synthese*, 190(11), 1955-1973.
- Tuana, N. (2015). Coupled ethical-epistemic analysis in teaching ethics. *Communications of the ACM*, 58(12), 27-29.
- Valian, V. (2005). Beyond gender schemas: Improving the advancement of women in academia. *Hypatia*, 20(3), 198-213.
- Valles, S. A. (2017). Some comments about being a philosopher of color and the reasons I didn't write a (real) paper for this (seemingly) ideal venue for my work. *Kennedy Institute of Ethics Journal*, 27(2).

- Waters, C. K. (1994). Genes made molecular. *Philosophy of Science*, 61(2), 163–185.
- Weigold, M. F. (2001). Communicating science: A review of the literature. *Science communication*, 23(2), 164-193.
- Whyte K.P. (2013a) Justice forward: Tribes, climate adaptation and responsibility. In: Maldonado J.K., Colombi B., Pandya R. (eds.) *Climate Change and Indigenous Peoples in the United States*. Springer, Cham.
- Whyte, K. P. (2013b). On the role of traditional ecological knowledge as a collaborative concept: a philosophical study. *Ecological processes*, 2(1), 7.
- Whyte, K. P., & Crease, R. P. (2010). Trust, expertise, and the philosophy of science. *Synthese*, 177(3), 411-425.
- Wylie, A. (2012). Feminist philosophy of science: Standpoint matters. *Proceedings and Addresses of the American Philosophical Association*, 86(2), 47-76.
- Wynne, B. (1989). Sheepfarming after Chernobyl: A case study in communicating scientific information. *Environment: Science and Policy for Sustainable Development*, 31(2), 10-39.
- Wynne, B. (1992). Misunderstood misunderstanding: social identities and public uptake of science. *Public understanding of science*, 1(3), 281-304.
- Yancy, G. (Ed.). (1998). *African-American philosophers: 17 conversations*. Routledge.