

Society for Philosophy of Science in Practice

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# NEWSLETTER #18



December 2022

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## From the editor

After a long time without conferences due to the Covid-19 pandemic, the SPSP-meeting in Ghent in July was a much needed and wonderfully organized reunion. It was great to see so many familiar faces and welcome new members to the SPSP family! The SPSP newsletter team has also grown - welcome to Hérnan Bobadilla, Thomas Bonnin, Stefano Canali, and Max Dresow!

We hope that the pictures and selected highlights from the SPSP-meeting will bring back fond memories for those who attended the SPSP meeting, and that the articles will be informative for those that couldn't make it this time. In this volume, we report on the pre-SPSP workshop on empirical methods in philosophy of science, as well as a great session on philosophy of technology, organized by Federica Russo and Emma Tobin.

Just before the SPSP, a Copenhagen-Cambridge workshop was held to celebrate Hasok Chang's pragmatic philosophy of science, on the occasion of his new book *Realism for Realistic People*. We report on the event and then turn our attention to another topic that Hasok and other founders of SPSP and its members care deeply about: how to facilitate and support open access to publications in philosophy of science. We have talked to David Teira, Sabina Leonelli, and Rachel Ankeny about how they view the challenges and future of open access in our field.

Philosophy of Science in Practice is constantly evolving, and new subfields emerge. We here present a joint interview with Alisa Bokulich and Maarten Kleinhan, who make it very clear that the Philosophy of the Geosciences has arrived! Fittingly, Julia Bursten next reports on the very well-attended SPSP cognate society session at the PSA-meeting in Pittsburgh, where speakers and participants talked about fossil data. Check it out if you missed it!

The Proust Questionnaire is this time answered by Hanne Andersen. If you go to the last page of the newsletter, you will find the dates and location of the SPSP24 meeting. We hope that you will enjoy reading the newsletter and wish you happy holidays.

On behalf of the SPSP newsletter team,  
Sara Green

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# SPSP2022 Conference Highlights

Rose Trappes talks to the organisers, panelists and graduate student participants about the SPSP2022 Pre-conference Workshop, *Methods Matter: Empirical Research in Philosophy of Science in Practice*

Stefano Canali talks Federica Russo and Emma Tobin, organizers of the SPSP2022 session follow-up *Where is Technology in the Philosophy of Science in Practice?*

# Methods Matter: Empirical Research in Philosophy of Science in Practice

## Introduction by workshop organizers

by Sabina Leonelli and Rachel Ankeny

Witnessing the gorgeous hall of the Ghent Academy of Science overfilling with dozens of SPSP delegates, all effectively shepherded in by our brilliant local host Erik Weber and his colleagues, was a true highlight of 2022, and a welcome sign that in-person meetings may well be making a comeback after two long years of lockdowns. Holding a workshop before SPSP biennial conferences, preferably centered on philosophical concerns of interest to early career researchers and deserving of open debate among SPSP participants, is now a time-honored tradition, and we were delighted to be given the task of organizing the 2022 edition.

Focusing on empirical methods in philosophy of science in practice was a natural choice for us for at least four reasons. First, we are in a moment of real methodological transformation. Digital tools are fostering new opportunities for PSP scholars and the pandemic is spurring reliance on such methods and infrastructures, ranging from digital access to historical archives to data-intensive analysis and online forms of fieldwork and engagement. We were keen to swap experiences and debate such changes with our colleagues. Second, and at a more personal level, we have been using, debating and teaching empirical research skills to philosophers for at least two decades, which left us with a strong awareness of the risks and opportunities involved, and the importance of efforts to tailor both qualitative and quantitative methods to philosophers' needs. Third, we are now preparing to write a book on empirical methods in philosophy of science, a project long spurred by our own research and central involvement in SPSP. And last but not least, we are currently engaged in a large project on "[A Philosophy of Open Science for Diverse Research Environments](#)", generously funded by the European Research Council. In this project we are investigating notions of 'best practice' - including what it means to develop and share reliable findings - both in scientific research and in the parts of philosophy that use scientific methods to foster philosophical understanding.

These interests and experiences, fueled by countless discussions on such methodological issues at past SPSP conferences, grounded our choice of four main topics for discussion at the workshop. The first topic, "What to Pick? Choosing Cases and Informants", considered how philosophers choose which parts of research practice to investigate (e.g., which domains, methods, theoretical background, technologies, communities), which specific examples to consider (e.g., specific cases, institutions, historical episodes) and who to pick as main informants (e.g., individual researchers, technicians, administrators, students). The panelists Simon Lohse, Maria Serban, Julie Mennes and Julia Bursten reflected on their own experiences in negotiating these choices while also discussing

what may make PSP different from comparable research in other parts of science studies, such as STS, HPS and other social sciences. The second topic, “How to Interact? Methods and Ethics”, focused on the conditions under which research can and should be carried out, ranging from the methods employed (ethnographic, experimental, participatory) to the ethical considerations underpinning research on research (such as the meaning of informed consent and constructive critique, particularly when part of a collaboration between PSP researchers and scientists). Here we benefited from the help of colleagues with anthropological training, Hugh Williamson and Carlos Andrés Barragán, as well as philosophers Rachel Ankeny, Abigail Nieves Delgado and Manuela Fernández Pinto, who have considerable understanding of the ethical and methodological complexities involved in researching human subjects (which scientists definitely are!).

The third session, “What Comes of Interactions? Part 1: Managing and Using Data”, zoomed into the challenges associated with managing a key - if somewhat underestimated - output of PSP research. Ariane Hanemaayer, Stephanie Meirmans, Kirsten Walsh, and Miles MacLeod, reflected on what counts as data for PSP; how and where such data are stored, and with which access requirements; what constitutes an acceptable form of data use, and whether data can and should be shared across research projects; and what obligations do we have vis-à-vis our data - and to whom. The fourth and final session, “What comes of interactions? Part 2:



Diversifying outputs and best practices”, considered the variety of outputs that can be generated from PSP research, including not only research articles but also policy briefs (Sabina Leonelli), web-based resources (Alan Love), social media engagement (Sophie Veigl), podcasts (James McElvenny) and blogs (Emily Sullivan). We discussed the advantages and disadvantages of diversifying the type of output emerging from our research, and the challenges posed by different platforms and publics in communicating the results of our work.



## Perspectives from the Panelists

The pre-conference workshop was a fantastic experience. It was an excellent concept: to trace research practice through all the stages of conceiving a study, carrying it out, managing and using the results, and disseminating findings beyond our immediate colleagues to broader audiences. The selection of participants from many different subfields, institutions and countries gave us a broad range of perspectives on the topics discussed, which was enhanced by the interactive format that allowed everyone present to contribute to the discussion.

- James McElvenny, Universität Siegen

I was pleasantly surprised that there were so many of us interested in this workshop. It was a great pre-kick-off event for the SPSP conference! I found the workshop extremely rewarding. It did not only touch on methodological questions regarding empirical philosophy of science, but went deeper to also address questions of everyday research practice – and challenges for doing empirical work as a philosopher. A key thing that I took away from this is that we should get more acquainted with the vast literature on social research to modify existing best practice instead of re-inventing the wheel.

- Simon Lohse, Radboud University

I was delighted to participate in the panel on managing and using data. As a historian of philosophy, my 'data' (historical texts) is of a rather different kind to the other panellists. I found the panel discussion extremely helpful because it gave me the opportunity to reflect on my own data management practices within a broader research context. Bringing my own practices into dialogue with those of the other panellists highlighted the fact that the challenges faced in the history of philosophy—getting access to texts, having the right expertise to transcribe and translate them, having the right digital platform to share them—have analogues in other data-focussed areas of philosophy.

- Kirsten Walsh, University of Exeter

As philosophers of science we have long known that establishing new methodological approaches in a field is not the work of individuals, but takes a community. This community should not just be willing to try new approaches and communicate their results, but actually to think about the shared standards, institutions and infrastructure required for such methods to work repeatedly and effectively. This was the first time it felt to me as though there really was a community out there in philosophy of science doing this kind of basic groundwork for empirical methods in philosophy of science; including the basic business of discussing subject choice, managing data and establishing ethical guidance, as well as outreach. I think this workshop helped greatly to take the next step in normalizing and giving credibility to many of the things I and others have been doing. As a result I think I heard and participated in some of the most unique conversations I've had around philosophy of science. And I hope in turn we piqued the interest in doing empirical work of some of the workshop's many curious and interested attendees.

- Miles MacLeod, University of Twente

## Student reflections

I enjoyed and appreciated the open discussion throughout the workshop, especially regarding the practical and ethical concerns that arise from interactions with collaborators and participants/informants. As a young researcher and a new SPSP member, I value the opportunity to learn from experienced colleagues, get familiar with challenges I might encounter in future research (and how to possibly avoid some of them), and know that there is a forum to consult on these issues when needed. My main takeaways include thoughts about the settings of collaborative in-practice research, for example, regarding informed consent of using conversations as information resources and access and storage of data. The workshop also raised my awareness of different ethical conflicts that may occur between our obligations to the research participants and collaborators and our commitment as philosophers to hold a critical outlook on the research subject matter.

- **Yael Friedman, University of Oslo**

I found session 4 of the pre-conference workshop especially interesting, which focused on diversifying outputs. James McElvenny shared his experience of organizing a podcast, such as how useful it is for improving skills of public speaking, developing thoughts and ideas, and asking guest speakers tricky questions. This made me interested in exploring possible forms of outputs, including podcasts. Overall, the workshop provided me with an opportunity to learn and think about aspects of research that are important but not discussed in regular conference sessions.

- **Yoshinari Yoshida, University of Minnesota**

The pre-conference workshop was highly valuable to this early career researcher because the conversational nature that the panels worked through allowed for a lot of dialogue and method questions from the audience. I enjoyed hearing the diverse voices of philosophy of science researchers and the many career paths and opportunities that have arisen from their experiences. I was particularly moved with the panelists' acceptance and willingness to engage with challenging topics posed by the audience including intersectional methods, decolonization, and participating with marginalised communities and groups seeking to empower themselves through advocacy. As a first time conference attendee, I hope the pre-conference session continues into the future of SPSP.

- **Robyn Allen, Brandon University**

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## Where is Technology in the Philosophy of Science in Practice?

Stefano Canali talks Federica Russo and Emma Tobin, organizers of the SPSP2022 session follow-up Where is Technology in the Philosophy of Science in Practice?



*[Federica Russo](#) is a philosopher of science, technology, and information. She's Honorary Professor at University College London (Department of Science and Technology Studies), and Assistant Professor at the University of Amsterdam (Department of Philosophy and Institute for Interdisciplinary Studies). Her research concerns epistemological, methodological, and normative aspects as they arise in the health and social sciences, with special attention to policy contexts and to the highly technologized character of these fields.*



*[Emma Tobin](#) is a Professor of Philosophy of Science and co-Head of Department of Science and Technology Studies at University College London. Emma's work has focused primarily on metaphysics of science and philosophy of science in practice. One topic of particular interest is the philosophy of classification. More recently Emma has become interested in the epistemology of classification and in particular how big data and technology changes our classificatory practices.*



**Your session wanted to start a conversation on existing gaps between philosophy of science and philosophy of technology. What motivated you to organise a session on this topic?**

**Emma:** I have been in the Phil Sci community for over 15 years. My work has focused on classification and more recently my work has been more focused on the epistemology of classification. I have observed how important technology is in classificatory practice, particularly in the context of data-intensive science and this has led me to reflect more on technology itself. It is striking how little attention technology gets in comparison to science in philosophy. This has led to conversations between Federica and I and the idea for the session was born.

**Federica:** I have been trained in Phil Sci and active in the field for +15 years. I have been studying Phil Tech for +10 years now. It has been my personal intellectual struggle to get these two fields in conversation, and explain why we need to bridge them, and explore new conceptual spaces where these two fields, in isolation, cannot get to. I often felt between a rock and a hard place, when with Phil Sci I could talk about the nature and role of theories, but not about instruments, and with Phil Tech I could talk a lot about instruments, but not in the context of theory building. Of course there are scholars that escape this coarse grained division of labour and intellectual spaces between (Phil) Science – Technology, but the fact remains: our scholarship (in terms of publications, conferences, jobs) is still divided.



Introduction to the session (photo credit: Alex Mussgnug)

**During the session, you presented philosophical work that lies at the intersection of science and philosophy of technology. What do you see as the possible contributions of philosophers of science to philosophy of technology, and vice versa?**

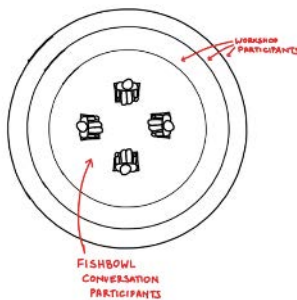
**Emma:** I certainly think we should be doing both Phil Sci *and* Phil technology. Equally, I think both disciplines should be in dialogue with each other. Philosophy of technology can bring new perspectives to philosophy of science and *vice versa*.

**Federica:** Scholars in either field can contribute to highlighting topics and approaches that the other (sometimes for very good reasons) misses out or does not pay sufficient attention to. But for me it

should not be *either* Phil Tech *or* Phil Sci. We need to get used to the idea that there are multiple interesting and legitimate perspectives on a topic, and so we need to dialogue more, to learn from each other, to understand whether synergies are possible, and if not why. So, to remain with ‘theory vs instruments’, we need to be prepared to give instruments a more prominent role than what they currently have in standard debates on ‘theory’, and conversely the reflection on instruments has to consider them also in contexts such as theory building, which is admittedly a relatively underexplored topics in Philosophy of Technology. For me, a key move to make this dialogue happen is to take *practices* as a meaningful unit of analysis, in which at times agents are prominent, sometimes instruments, sometimes socio-political contexts, sometimes historical context. And so no wonder that our biennial conference of SPSP is a natural place to have this conversation.

**The session adapted a different format to the standard symposium, as a way to elicit discussion and involve the audience more directly. Can you describe it? Why did you decide to use this format? Would you recommend it for future SPSP sessions?**

**Emma:** We wanted to provide the right context for dialogue particularly since we are bringing together two disciplines which have not had enough (in our opinion!) interaction. It was an attempt to do knowledge production as a group-think brainstorming exercise. The fluid interactions also make for a more inclusive discussion format.



**Federica:** We got too used to standard formats, in which one person speaks for 30 minutes or so, and then the audience asks questions. But what if we tried to use this precious time in which we meet in person to foster dialogue, co-construction of ideas, initiate contacts? The standard format is not very conducive to achieving this. Instead, we have much to learn from ‘interdisciplinary studies’, an area where scholars have been experimenting and using (in class and in conferences) multiple

ways to get out our respective comfort zones, out of our chairs and ‘make’ knowledge through exchanges that are not only vernacular but also go through the interactions with and in an environment.

**Federica:** We opted for short talks, or lightning talks, to spark interest and to offer material for discussion, moving away from the standard talk + Q&A. We alternated these types of talks with other activities, such as fishbowl discussion. All participants were sitting in a round or u shape, and we placed 4 chairs in the middle; 3 chairs are always filled and one has to remain empty. As soon as one participant joins the fish bowl, another one has to leave. It is remarkable how physical space and interaction can do good to the dynamics of the conversation, which is much more lively, a kind of conversation instead of standard Q&A. Likewise, we engaged in a dot-voting, proposing at times radical options to make ‘tech’ more visible, as a way to encourage discussion, to think outside the

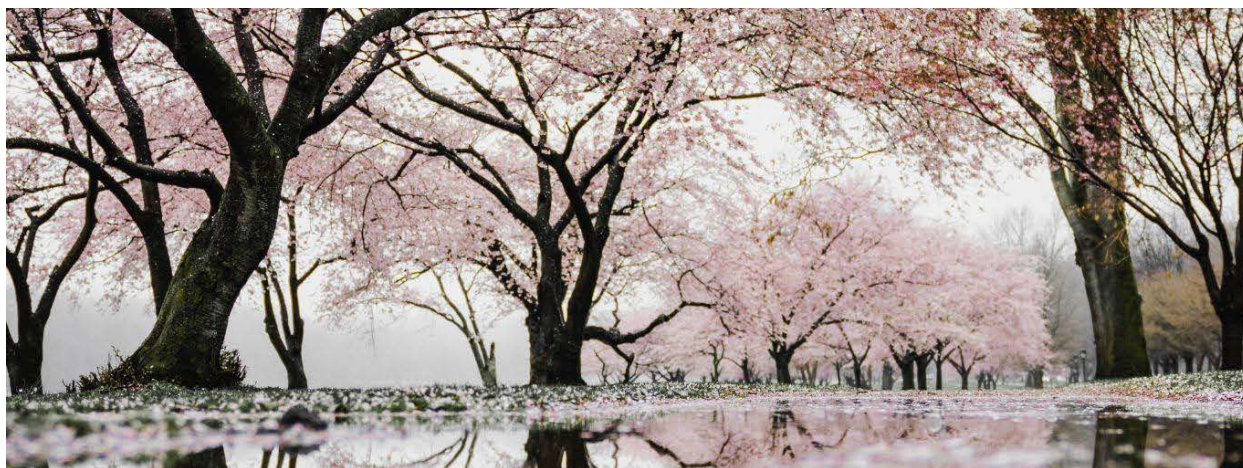
box and to imagine the future. Again, even just the act of getting out of our chairs, moving to the board, and casting our votes showed how much materiality and physical interaction matters!

**Towards the end of the session you collected suggestions from the audience on concrete steps to close gaps between philosophy of science and philosophy of technology. What do you see as the next steps of this project? How do you see the role of PSP in this direction?**

**Emma:** We hope to organise a workshop in the Spring at UCL, which will take the next steps in thinking about Phil Techno-Science. We were delighted that there was a lot of interest in the session of SPSP and it confirmed our suspicion that other SPSP'ers would also be interested in exploring the boundaries between PSP and PSTP (Philosophy of Science-and-Technology in Practice). We are hoping for more fruitful interactions at our workshop and beyond.

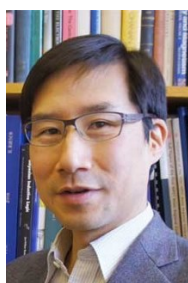
**Federica:** I hope we showed that there is a lot of interest for this way of approaching science and technology, and that there is already a critical mass (from junior to more senior scholars) that *do* Phil Techno-Science. PSP and SPSP are the natural home for us. It was of course provocative to ask whether we should change PSP into PSTP, the real point is make this line of work more visible and with a distinct 'object', and as I said, PSP is the natural home. But to claim that techno-science (and the philosophy thereof) is a distinct object is not to draw sharp disciplinary boundaries. If anything, it is to put at the centre, where the paths of Phil Sci, Phil Tech (and STS) can fruitfully cross, and lead to new avenues for thinking.

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## Realism for realistic people

celebrating Hasok Chang's most recent book in Copenhagen



**Hasok Chang** is Hans Rausing Professor of History and Philosophy of Science at Department of History and Philosophy of Science, University of Cambridge

Supposedly, Feyerabend once told a student that if you want people to throw conferences in your name, you have to say outrageous things. It is probably fair to say that Hasok Chang is not generally known for saying 'outrageous' things; most people will know him for his kind and caring manner and his detailed and conscientious historical-philosophical work in philosophy of science, especially on physics and chemistry. Despite Chang's enthusiastic style and humble tone, however, many of his thoughts are in fact rather radical in the face of traditional philosophical positions, and his recent book *Realism for Realistic People* is no exception to this. In it, he suggests a pragmatic reclaiming of the word 'realism', releasing it from many years as a captive in the hands of hardcore metaphysical realists, who are – as Chang would perhaps say – rather unrealistic about the scientific process. Chang's book therefore calls for us to carefully consider what we mean, when we talk about knowledge, truth, and what is real, and he offers a pragmatic approach to answer these questions.



Worried about whether science carves nature at its joints? According to Chang, we should “lose the thought that the world is a chicken” ... You can see him outlining the overall argument of the book, and the motivations for it in the video recording of his opening lecture at this [link](#).

To explore different facets of Chang’s work and celebrate the publication of his book, we organized a two-day symposium at the University of Copenhagen in June, shortly before the SPSP. The event was hosted by the History and Philosophy of Science Section at The Department for Science Education. The core part of the meeting consisted of presentations on the use and application of Chang’s work by junior scholars (with commentaries), as well as detailed comments on the book from three senior speakers. The full program can be viewed [here](#).



*Group picture of the symposium participants*

The seniors included Brad Wray (Aarhus University), Ann-Sophie Barwich (Indiana University, Bloomington), and Hans Halvorsson (Princeton University and University of Copenhagen). Wray suggested that the position Chang wants to reclaim for the term realism, is in fact anti-realist. Wray, being one of the main exponents of anti-realism, was happy to welcome Chang aboard – Chang resisted. Barwich, who was welcoming Chang’s new brand of pragmatist realism with open arms, made a case for studying its cognitive foundations and provided some first steps in that direction. Halvorsson spoke about Bohr, Kierkegaard, and Poul Martin Møller, and argued that both strong traditional realism and anti-realism were threats to scientific practices: one leaves us indifferent to

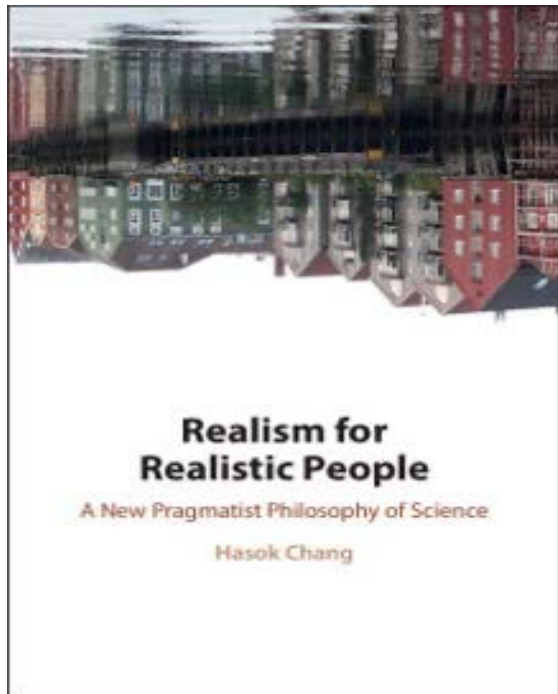


the world, the other presents the impossible task of always aiming for perfect fits. Halvorson praised Chang for having come up with a position that allows for productive yet pragmatic scientific inquiry.

Chang's students took us through the usefulness of Chang's realism, but also his ideas of iterative epistemology and pluralism in topics ranging from the ontology of chemical components, geodesy, the work of John Dewey, and even political theory.

On the second day of the symposium, all the participants joined in a workshop to discuss whether and how to teach realism to STEM students. The general agreement was that it was not an obvious topic, but that teaching strategies could be employed to tailor the philosophical discussions to examples and cases of relevance to the student's own practice.

Hasok introduced his book and defended his thesis where necessary. We warmly recommend that you read the book for all the aspects of this argument and position, as well as for its subtle humor.



#### **Organisers**

Helene Scott-Fordsmand (Cambridge University)

Bobby Vos (Cambridge University)

Joeri Witteveen (University of Copenhagen)

Sara Green (University of Copenhagen)

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## Open Access: Implications for Philosophy of Science

The importance of publishing for sharing and communicating research results can hardly be overstated. As new initiatives for open access are on the rise, we have asked a selected group of SPSP-scholars to provide their reflections on the current situation and the way to move forward.

*Sara Green talks to David Teira, Sabina Leonelli, and Rachel Ankeny*



*Rachel A. Ankeny* is professor of history and philosophy at The University of Adelaide, Australia. She co-leads several research projects including [Enabling Openness in Australian stem cell Research \(EOAR\)](#), and serves as editor-in-chief of [Studies in History and Philosophy of Science](#) as well as on the editorial board of the new open access journal [Philosophy of Medicine](#), and [History and Philosophy of the Life Sciences](#).



*Sabina Leonelli* is professor of philosophy and history of science and director of the Exeter Centre for the Study of the Life Sciences ([Egenis](#)) at the University of Exeter. She leads the project “[A Philosophy of Open Science for Diverse Research Environments](#)” and serves as editor-in-chief of [History and Philosophy of the Life Sciences](#), executive board member of [Phil-Sci Archive](#) and [Plan S Ambassador](#).



*David Teira* is professor of philosophy of science at UNED, the Spanish Open University. He is now co-editor (with [Bryan Roberts](#)) of [BSPS Open](#), the first diamond open access monograph collection in the field, and also a board member at the [Phil-Sci Archive](#).

### **How do you view the current situation with respect to sharing and dissemination of our work in history and philosophy of science?**

**David:** In our social media age, philosophers are now more willing to share their work than ever. The problem is which platform they use to share it. I've always been puzzled that so many of our colleagues use clunky, proprietary repositories (like Academia.edu or Researchgate) requiring registration to extract personal data, when people just want to click and download. Luckily we also have non-profit repositories like the Phil-Sci Archive or Philpapers that, I hope, are nudging our field in the right direction: free, uncomplicated access, respecting privacy and maximizing the spread of ideas.

Repositories, though, were a good solution for preprints. Now, many funding bodies of Europe and the USA are requiring that their authors publish open access and commercial publishers are offering the so-called gold pathway: for a fee, the published paper will be released under a creative commons license allowing free access. The same solution is being developed for books. But there are challenges here that probably Rachel and Sabina will know better than me.

**Sabina:** I actually wish more colleagues in history and philosophy of science paid attention to the importance of making our work widely accessible. This is pretty clear to many SPSP colleagues, whose research concerns some of the most pressing global challenges, and it is important to bring that awareness back to our institutions and departments. We are so lucky that some academic institutions stepped up to provide us with preprint repositories that are run by researchers for researchers, with the express and only purpose of disseminating our work beyond the ivory tower. Phil-Sci Archive and Philpapers are a treasure for our field, as are Open Access journals and tools such as the *Stanford Encyclopedia of Philosophy*. I cannot see any downsides for posting our work to preprint repositories, especially given the recent policies strongly encouraging such posting not only in Europe but also in the US. These policies make it impossible for many of the commercial publishers to block the posting of preprints on public repositories, and in fact publishers like Springer now actively encourage that move, in the hope that it will enable authors to continue to publish with them while also complying with institutional requirements. As an editor of the Springer journal *History and Philosophy of the Life Sciences*, I strongly encourage authors to post their submissions and/or accepted papers to Phil-Sci Archive, and I know editors of other leading journals in our field do the same - including Rachel as editor of Elsevier's *Studies in the History and*

*Philosophy of Science*. I share David's puzzlement around many colleagues choosing proprietary platforms such as Academia.edu, where data are being monetized and academic work mercilessly exploited in ways that damage academic work and freedom of expression.

When it comes to publication in journals, the situation is more complex since most of the top journals in HPS are tied to commercial publishers. Those publishers are pushing - alongside some research funders in rich countries - to move away from a subscription model (where it is readers, rather than authors, who pay to access the work) and towards an "author-pays" model. This is a terrible idea, in my view, as publication should depend solely on the quality of the research and not on any financial factors. For our field, where the majority of authors are not funded externally and do not have access to money to pay for publication, this is a disastrous development. Initiatives such as 'transformative agreements' with publishers, which make it possible for authors based in specific institutions or countries to publish for free, only exacerbate the divides between authors in ways that will severely damage epistemic diversity and justice. Many initiatives and colleagues are working towards "diamond" solutions where neither authors nor readers pay for publication - I think these are the future we should aim for, but realizing them requires engagement and commitment from the field as a whole. As a Springer editor, I engage with these debates in the hope that we will find a way to get commercial publishers on board, given both their expertise in assisting with publication and the fact that many own the rights to the journals and/or journal archives, which makes it very difficult to switch publishing model without damaging our journals and access to past scholarship.

**Rachel:** I think that a critical issue raised by Sabina, but worth emphasizing as it is often overlooked in these debates, is that although various solutions such as transformative agreements might provide more openness and equity in terms of readers, there are many other mechanisms to make our publications more widely available to readers, as discussed above. And we often neglect the diverse situations in which potential authors find themselves which might actively exclude them from accessing open access outlets due the types of institution at which they work or even countries in which they live. We are currently in danger of developing parallel tracks for publication where only those in countries or at large, research-focused universities which have come to agreements with publishers will publish in certain journals and those who have not in others, resulting in fractured dialogues, lack of exchange, and potentially 'ghettoisation' of certain points of view. Books are even more complicated as the publication model within commercial presses or most academic publishing houses hinges on selling hard copies. Although this domain also is in transition and there are some notable projects to publish open-access books (e.g., see David's comments below), such efforts are difficult and hence are not occurring as quickly as we might hope, which also accentuates the diversity of availability of resources and networks in different types of academic settings.

An additional issue is that different subfields within the SPSP community and scholarship relevant to it have very different norms: for instance, philosophy does have well-established preprint sites, but in history preprints are not particularly valued or supported (or even frowned upon, depending

on the institution or subfield. The situation becomes even more complex when we collaborate with those in other fields including scientists. What is very useful about the current complex and rapidly changing situation in our fields is that it can be used as a space to promote debate about what openness, diversity, and access really mean, and to consider how to align our structures and institutions to promote these values. SPSP is an important venue for raising awareness of these issues, and fostering and testing potential solutions.

Finally, I worry about those early career scholars who are attempting to make wise and strategic publication decisions in these transitional times. The various uncertainties about where open access is heading and journals being in 'transformation' can make it difficult to know what the right choices are, particularly in relation to institutional or national norms about what counts as the highest quality of research. Again, more forthright discussions are needed about trade-offs between participating in novel approaches to publishing that foster openness that we want to encourage, with making certain that scholarly work is read, cited, and used as the basis of dialogue and that it is in the 'right places' according to norms against which we are being measured.



*Sabina, David and Rachel before the PSA Interest Group Lunch on Open Access publication in philosophy of science, hosted by David Teira, Zvi Biener (Phil-Sci Archive), Jon Fuller (Phil of Medicine), Sabina Leonelli (Open Science studies), and Bryan Roberts (BSPS Open).*

### **Which initiatives for open access are you aware of that would be important to discuss?**

**David:** Allow me to be self-promotional here. Whereas in philosophy we have a bunch of diamond open access journals (like *Philosopher's Imprint* or *Ergo*, and many others outside the English-speaking world: *Theoria*, *Lato Sensu*), there was no such option for books. A group of scholars created one, BSPS Open, under the sponsorship of the British Society of Philosophy of Science and Calgary University Press. The BSPS oversees the quality of the review process and Calgary has found grants that allow authors to publish their research monographs without fees. It's the quality of the manuscript, and not the author's budget, which should count to make a book available open access.

**Sabina:** Initiatives such as BSPS Open are indeed the way forward, and the *Stanford Encyclopedia* provides another fantastic model for how an Open Access publication can become the most authoritative in its domain, and help to bring new publics to philosophy. One way to support them is simply to make use of them through reading, refereeing and submitting! Another way to support open access is to participate in editorial boards and in discussions at academic conferences around the future of publishing in our field, and volunteer some time to help out with transforming our

current journals into diamond Open Access journals wherever possible. For many editors and editorial boards, the interest and will to effect such changes is there, the problem is lack of time and hands-on-deck. Finally, it would help enormously for authors to be aware of Open Access and at least attempt to negotiate favourable conditions. This is particularly important in the case of book publishing, where bringing up Open Access at the initial stage of negotiation signals the importance of this issue to authors, and may lead to better deals for authors (for instance, where the book is released OA for a limited time for free, or certain chapters are made available OA in perpetuity).

**Rachel:** In addition to these new initiatives, I think there are a number of types of initiatives that have been long underway that warrant much more attention by those in our community, including the use of institutional repositories such as occurs in the UK, Australia, and elsewhere, which could usefully be mimicked in other settings. Most publications are readily available within these, and authors can actively negotiate terms with publishers for instance to shorten embargo periods particularly for placement of articles in these sorts of repositories. The kind of new initiatives that could really make an impact in this domain would focus on cultivating collective approaches and strategies for considering the range of available options and making good decisions about where and how to publish.



**How do you think such initiatives could affect our field?**

**David:** Perhaps we should think instead of what would happen to our field if Gold Open Access proliferates. Through an informal survey, we found that most research grants in Europe provide, on average, 2000EUR per person/year to fund whatever conferences, publications, etc. For commercial

publishers, that's barely enough to make payment for a couple of journal articles to be released as Open Access, and you may need five times more to pay the fee for a book. So we may quickly evolve into a publication landscape in which a well-funded minority publishes with the most prestigious editors in Gold Open Access and everybody else is either behind a paywall or relegated to not so central outlets. If we don't want to see this happen, we need to develop Diamond Open Access alternatives.

**Sabina:** The advantages of Open Access are numerous and I cannot hope to list them all here. In my own experience, OA has made it so much easier for me to do research by accessing publications from all domains and regions, without bumping against paywalls! And it has made it possible for readers in the sciences, policy or activist communities to find my work, without me having to send copies of my papers over email or social media. This openness does change the intellectual landscape we work in, and also enables large-scale analysis of scholarly materials in ways that were unthinkable under the subscription model. As for the threats, I agree with David entirely. Even aside the existing constraints on using externally funded grants to fund publication, what about work by graduate students, early career researchers, independent scholars and colleagues working in institutions who do not provide financial support for publication? Unless the prevalence of "author-pays" OA models is challenged, we will end up in a situation where such work cannot be published in our best journals.

**Rachel:** Variations on open access initiatives are already having considerable effects on our fields: providing access has widened audiences considerably both within our own field and far beyond, particularly for promoting more access of our scholarship to policymakers, scientists, and broader publics. In some of these cases, the publications would already have been available to these readers through university subscriptions but open access can raise the findability of the articles and books, and in turn increase the diversity of the readership. In turn, these cross-connections can result in new dialogues and novel collaborations.

### **Do you see distinctive issues for journal and book publications?**

**David:** I guess that the main difference, regarding Diamond open access, is that, in our field, we don't have much experience about books, whereas it is enough to mention Ergo or Philosopher's Imprint to ring a positive bell and attract manuscripts. We hope that BSPS Open will prompt a similar positive reaction soon. Our strategy is selective: we have a contract to publish 10 monographs in the next five years. If we succeed in finding 9 more excellent manuscripts (after John Norton's Material Theory of Induction), I guess we'll have the proof of concept that our field needs. We need to bet on alternative publication models.

**Sabina:** While I think there are distinctive issues with journal and book publications, there are common and serious challenges on both counts in terms of how to ensure the sustainability, quality and distribution of OA publications. On the one hand, we need to find ways to preserve proper publishing services (indexing, distribution, copy-editing and so forth) while also protecting the



legacy of our top journals and book series, and their archives of precious scholarship. On the other hand, we need to back initiatives that foster OA while not trapping us into a “gold”, author-pays model. Initiatives such as BSPS Open, the new Philosophy of Medicine and Philosophy of Physics journal - which leverage institutional backing by several institutions to support publishing costs - are very encouraging, but very time-consuming to achieve and maintain. The more such initiatives emerge and flourish, the easier it will be to grow and spread this model (see for instance the [Open Library of Humanities](#)).

**Rachel:** Clearly books will be more difficult to publish open access, despite all of the new initiatives, about which I have significant concerns regarding sustainability given the heavy dependence on institutional or organisational subsidies in terms of financing, labour or both. In some sense journals are easier to ‘flip,’ as existing models can be modified including converting library subscriptions into open access payments and similar. I also have worries that the conversion models largely make certain assumptions about volume, audience, and so on that derive from scientific and medical publishing, and which might not easily or effectively transfer into humanities or social science fields, such as philosophy of science (in practice and otherwise), which is in part why there also are gaps in our successful models in the space of books.



**What do you view as the ideal future of our field with respect to open access? And which possible actions could be taken towards that aim?**

**David:** I would like our scholarly societies to take some distance from commercial publishers to fund their activities. If the review process is the key to guarantee good publications, our scholarly societies should be able to form partnerships with non-commercial publishers (university presses) and help them deliver great Diamond Open Access journals and books. This would signal to funding bodies that it is good to invest in journals and book collections, and not just authors, bringing more intellectual diversity to our field.

**Sabina:** I agree on encouraging our scholarly societies to avoid commercial publishers. This is a very big challenge, but by working together and across regions and subfields, it is a challenge that we could and should confront. I would also encourage us all to think carefully about where we publish our work and ensure that whatever we publish with a commercial outlet is also available on a non-commercial preprint repository. Those of us in faculty positions should campaign for Open Access journals and books to be valued as much as commercially published outputs in career evaluations, including hires and promotions. Similarly, those in faculty appointments should work against the use of metrics such as impact factors, and question institutional reliance on commercial platforms for calculating such metrics - such as Pure or Clarivate. We cannot ensure Open Access to publications without contesting some of the ways in which research is financed, communicated and evaluated, particularly in countries where those processes are semi-automated and modeled on a problematic view of how knowledge should be developed. I like to think that it is part of our expertise as philosophers of science to think critically about scientific communication and its effect on knowledge development - and this reflects on our everyday life as scholars.

**Rachel:** We need to avoid oversimplified solutions that will not be sustainable, and not base our arguments on false dichotomies. For instance, even many university publishers work on what is effectively a for-profit basis and without much transparency. Professional organisations differ significantly in terms of their resourcing, and SPSP has traditionally not even had formal membership or finances. So the details matter here, including the long-term financial planning associated with any open access attempts. As noted above, these issues are not just associated with open access in isolation but go to the heart of how quality and success are measured, how research is funded, and how knowledge should be produced. I also would advocate for more attention to the range of academic ecosystems that exist across our field, not just in one or a few geographic locales, given that the institutional and funding structures differ considerably even across or within well-resourced countries. Given the considerable risks associated with many of the plans to encourage or pivot to open access, it is critical that we trial a number of types of models and evaluate them explicitly against our shared goals and values: openness is not an end in itself. More senior scholars need to take responsibility for some of the riskier endeavours and for beginning to change the overall academic system before early-career researchers are encouraged to publish in some of these more novel forms of outlets or shoulder significant responsibilities for these types of initiatives.

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# The Philosophy of the Geosciences has Arrived

A joint interview with Alisa Bokulich and Maarten Kleinhaus

by Hernán Bobadilla and Max Dresow

The earth and environmental sciences study our planet, from its oceans and atmosphere to its landscapes, coastlines, mountains and interior. They study the giant engine of plate tectonics and the darkest recesses of deep time. They use high-pressure experiments to investigate the physical properties of minerals and spacefaring machines to study the structure and composition of other planets. They also examine how living things interact with their environments on a range of spatial and temporal scales. This includes, but is not limited to, studies of anthropogenic climate change and its effects: arguably the most serious matters facing human societies today.

Philosophical interest in geology dates to the nineteenth century, when William Whewell became the only philosopher ever to hold the presidency of the Geological Society of London. However, for much of the history of philosophy of science, geology and geophysics have been Cinderellas among the sciences. While the “Stanford Encyclopedia of Philosophy” has an entry for climate science, there is not yet any entry for “earth science,” “geoscience,” “geology,” or “geophysics.” Nor are there entries for “historical science,” “deep time,” or “earth system science.” This reflects a lack of sustained philosophical interest in these areas. But signs of deepening engagement are becoming difficult to ignore. These range from monographs and dissertations to conference symposia and graduate seminars. In short, the philosophy of the geosciences has arrived.

Earlier this year, researchers at TU Berlin and Politecnico di Milano (including co-author Hernán Bobadilla) organised a workshop on modelling practices in the geosciences. Among its aims was to coordinate efforts in this emerging field and to begin the process of organising the broader community. We have invited two participants from the workshop—Alisa Bokulich and Maarten Kleinhaus—to participate in the following joint interview.



[Alisa Bokulich](#) is professor of philosophy of science and Director of the Center for Philosophy & History of Science (CPHS) at Boston University and leader of the [Φ-Geo Research Group](#). She is currently writing a book on philosophical issues in the earth sciences.

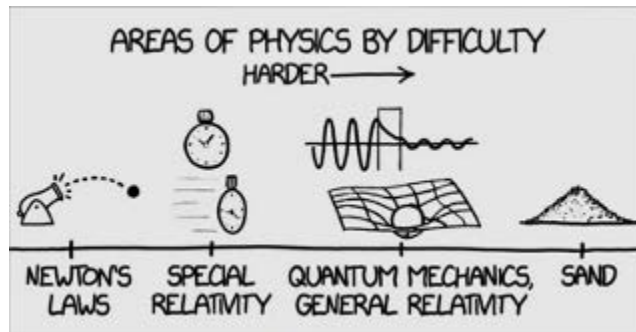


[Maarten Kleinhans](#) is professor in the Faculty of Geosciences at Utrecht University, and is the developer of the [“Metronome” tidal flume](#): an apparatus that simulates tidal flows in river systems.

**Tell us a bit about your background. How did you become interested in the philosophy of the geosciences?**

**Alisa:** As a philosopher of science, I have always had wide-ranging interests, which were perhaps first cultivated by getting my Ph.D. from a large, pluralistic program in the History & Philosophy of Science (at Notre Dame, where there were historians of science working in Earth, planetary, & environmental sciences, for example). I am also Director of CPHS and am committed to designing annual colloquia that represent a broad spectrum of the field, including areas I thought were not getting enough attention by philosophers of science.

Much of my earlier work was focused on traditional philosophy of physics, but I began to lose interest insofar as the subfield seemed to be stuck on the same small set of questions and topics (which I poked fun at with xkcd’s [Types of \[Philosophy of Physics\] Papers](#) meme on Twitter and [Daily Nous](#)). However, there is a large part of the geosciences that could also be classified as physics, often grouped under the label of *geophysics*, and which includes areas like geodesy and geodynamics. To cite another xkcd comic that ordered “areas of physics by difficulty,” the physics of sand is arguably even more difficult than quantum mechanics or general relativity!



I actually wrote a paper (published in [2018](#)) on the philosophy of sand, or more precisely the philosophy of aeolian geomorphology, arguing that the scientific explanation for how sand ripples form is a type of noncausal explanation.

My interest in the geosciences is not confined to those areas of Earth science that overlap with physics, however. I became particularly interested in paleontology and paleobiology by a fun experience I had in 2012 with my son Julian when he was just 6 years old. I had taken him to the Harvard Museum of Natural History where he noticed that one of the largest trilobite fossils on display, a genus of trilobite known as *Paradoxides* from 541 million years ago, had been collected on the South Shore near Boston. With the unbridled confidence of youth, he became determined to find one himself, even though I explained their rarity and the fact that the quarry where it had been found was destroyed in 1884 to make way for a shipyard. We nonetheless went for a hike in the neighborhood and somehow in less than hour he had found one! Even more interesting for this audience, perhaps, is that the *Paradoxides* my son had seen on display at the museum also turned out to be an important one in the history of science, insofar as it had been collected by the geologist and founder of MIT, William Barton Rogers (1804-1882), who brought it to Louis Agassiz at Harvard in 1856 for identification, as one of Boston's first locally found fossils. Agassiz was able to identify it as a *Paradoxides* because he had seen the same genus of trilobite in Wales, and he could thereby also use this index fossil to date Boston's rocks; this led Agassiz to conclude, "A more interesting and important discovery for the geology of Boston's vicinity could not have been made" (see Selby Cull's 2006 "[From Gondwanaland, With Love: The Tale of How Boston Got Its Rocks](#)"). I ended up helping my son put together a comprehensive presentation for his elementary school class all about his discovery—and the geologic and paleontologic history of the area—and I was hooked.

**Maarten:** I have always been interested in nature, science, music, theology, philosophy and history of science. In high school and as an undergraduate, I kept reading and rereading books that were too difficult for me. Some of them made no sense to me at all, like Popper's idea that we make scientific progress through falsification. These ideas did not resonate with what I was learning about science in practice. This dissonance became louder when I volunteered to teach primary school kids



about the universe and how we know about it. I built tens of telescopes with them, which I tweaked to minimise optical distortions. With these skills, I was able to see the shockwave of the 1994 comet crash into Jupiter with my own eyes, days before the Hubble Space Telescope images were released. With those children as an impatient but curious audience I learned to ask simpler and simpler questions, something I still greatly enjoy doing with students.

In graduate school I studied physical geography because I did not want to specialise in physics and I wanted my work to be relevant to society. Perhaps due to complete lack of philosophical training, I had trouble connecting geoscientific practice to notions like ‘falsification’ and ‘incommensurability’. Was geoscience just a sloppy or applied version of the science described in famous works of philosophy? The light went on when my graduate school offered a course on philosophy of science by Chris Buskes (Radboud University Nijmegen). A few years later, after so much reading and scores of revisions in the evening hours (my professor forbade me to work on this), I published my first philosophy of science paper with Chris and Henk de Regt (in [2005](#)). Since then I have built a career in geoscience and could not find time to do more than a bit of reading, but I am tuned back in now.



**Why do you think geosciences were so long overlooked by philosophers? And why does the philosophy of the geosciences seem to be having a moment right now?**

**Maarten:** Geoscientists also overlooked philosophy. The fact is that very few geoscientists have been interested in philosophy and not a few react allergically when asked about it. “Mention theory to a geomorphologist,” Richard Chorley quipped in 1978, “and he will instinctively reach for his soil auger.”

The sentiment is understandable. Like them, I did not recognize my practice of geoscience in philosophy of science. Much of philosophy of science in the previous century was philosophy of physics (and was the rest of science merely stamp collecting?). Philosophy of biology emancipated half a century ago, and that opened the door for philosophical studies of the other ‘special’ sciences. Some sciences were more special than others, though: geology, a well-known discipline of



geoscience, led some to call geoscience a historic science, even though so much physics, chemistry and biology are going on in other, less well-known disciplines.

I can only speculate why the interest is now on the rise. Maybe we crossed a tipping point of a minimum number of interested philosophers. Or perhaps the interest in climate science, which is both physics and geoscience, invited philosophers to have a closer look. The emergence of Philosophy of Science in Practice certainly helped to encourage that closer look and to make philosophy relevant to scientists and their education.

**Alisa:** I think it is important to acknowledge that there were some important precursors in the philosophy of the geosciences, broadly understood, and indeed many of them were women whose work was marginalized by the philosophy of science. For example, Rachel Laudan published a wonderful book in 1987 *From Mineralogy to Geology: The Foundations of a Science 1650-1830*. Naomi Oreskes was working on methodological issues in plate tectonics, seismology, hydrology, & geophysics long before her public-facing work on climate science made her famous (e.g., *The Rejection of Continental Drift: Theory and Method in American Earth Science*). Broadening to the historical sciences, there was not just Alison Wylie's work on philosophy of archaeology, but also Merilee Salmon's work on philosophy of anthropology. For a long time these women and the areas they worked on were marginalized by mainstream philosophy of science.

There is also a long tradition of geoscientists reaching across to the philosophy of science, such as the volume *Uniformity and Simplicity* edited by the geoscientist Claude Albritton, to which Nelson Goodman contributed a paper. Albritton also edited *The Fabric of Geology*, which included a bibliography he had compiled on the philosophy of geology. That book was the inspiration of the later *Rethinking the Fabric of Geology*, edited by the hydrologist Victor Baker, which included papers by philosophers of science such as Carol Cleland and Derek Turner. There was also the work of the paleontologist-geologist David Kitts, who was a visiting researcher in the Philosophy Department at Princeton University (1964-65), where he worked closely with Carl Hempel, becoming known as a "metageologist." Another example is Robert Frodeman (who has a PhD in Philosophy, a MSc in Geology, and was a consultant for the U.S. Geological Survey), who published several books on the philosophy of geology, including *Geo-Logic: Breaking Ground Between Philosophy and the Earth Sciences* and *Earth Matters*.

Despite these precursors, however, the philosophy of the geosciences remained largely neglected. In part, this was due to the hegemony that, first, philosophy of physics, and later, philosophy of biology held over the field. It was arguably the turn to Philosophy of Science in Practice that helped the field recognize that there were huge swaths of scientific practice that had been ignored, including numerous geosciences, such as seismology, glaciology, volcanology, geomorphology, climate science, paleontology, stratigraphy, atmospheric science, geodesy, hydrology, mineralogy, soil science, oceanography, geochronology, and geodynamics (to name a few). Another factor was surely the growing focus of attention on climate science and its models, but as philosophers of science have slowly begun to realize, this one subfield of the geosciences is just the tip of the proverbial iceberg!

**Why is it philosophically important to examine issues in the geosciences? Are there any philosophical problems that are specific to the geosciences? What philosophical discussions would benefit from an engagement with geoscientific practice?**

**Alisa:** There are three broad reasons why it is philosophically important to examine issues in the geosciences: First, as for any “Philosophy of X”, there are conceptual and foundational issues in the geosciences that arise from the specific scientific content of geoscientific fields. Examples of foundational issues unique to the geosciences that I discuss in my forthcoming book include the concept of a ‘stratotype,’ the concept of ‘sea level,’ and the philosophy of geologic time.

The other two reasons why the philosophy of the geosciences is important have been nicely summarized by Naomi Oreskes: “the earth sciences are profoundly important, not only because they challenge conventional philosophical portraits of how scientific knowledge is produced, tested, and stabilized, but also because they matter for the future of the *world*” (2012, p. 100). As she is emphasizing here, the second reason relates to broader epistemological and methodological issues in the philosophy of science. The geosciences are important, not because they are completely unique, but because they make salient several dimensions of scientific practice that have traditionally been overlooked by philosophers of science focusing on the usual examples. These important features of the geosciences include the following: While some of the geosciences are laboratory based, a significant portion of them are field-based sciences, which have received comparatively little attention. The geosciences also must grapple with a vast range of spatial and temporal scales—from the movement of a grain of sand on the order of seconds to the evolution of an entire planet over 4.56 billion years—which raises many issues, including those related to multiscale modeling (e.g., [Bokulich 2021](#)). Not only are geoscientific phenomena complex, but their investigation fundamentally requires interdisciplinary research, drawing on fields as wide-ranging as physics, biology, chemistry, and even the social sciences to understand the behavior of Earth system processes. Finally, they are fields that must confront how one builds scientific knowledge in the face of significant uncertainties. For all these reasons, the philosophy of geosciences provides many opportunities for the philosophy of science to expand and grow.

The third and final reason, as Oreskes highlights, is that the philosophy of the geosciences matters for the future of the *world*. Many of the most pressing global issues today—climate change, scarcity of clean water, the acceleration of species extinction, and other geohazards ranging from earthquakes to sea-level rise—involve the geosciences, and philosophers of science have a role to play in calling attention to these critical issues, and identifying the conceptual, methodological, and epistemic problems—and solutions—that are needed to move forward.

**Maarten:** If the geosciences are not merely sloppy physics or historic science, then all the knives of philosophy, history and ethics of science can be sharpened on it. On this planet, so many things and processes are playing out in concert. To make sense of the pandemonium, scientists often describe, explain and model phenomena in terms of complex systems, and these systems often include humans with intentions. It is often possible to ‘experimentally’ investigate how multiple causes and

feedback determine the development of systems; but the development path of complex systems may be unpredictable and must be reconstructed, which is the historical aspect of the geosciences. History and philosophy of the geosciences in practice could look at the intersection of experimental and historical approaches.

Further, what geoscientists mean by 'system', 'model', 'cause', 'complexity' and so on, has developed and diversified over time, but the geoscientists themselves are not always very clear about their terminology and methods, and confusion in conferences and between authors and reviewers happens a lot. Likewise, recent decades have seen significant changes in how geoscientists view the role of humans in earth systems, with the coining of the 'Anthropocene' as one clear mark of change. All these issues need historical and philosophical attention. Complementary science, as Hasok Chang calls it in *Inventing temperature*, is sorely lacking for geosciences.

**What is your experience interacting with (other) geoscientists about philosophical matters? Are they interested in philosophy? Why should they be?**

**Maarten:** Doing philosophy of science has been a very lonely hobby but things are improving. Some scientists are really interested, especially the younger ones, but many immediately assume that I intend to be normative and tell them how to do their science. On the other hand, philosophers of science have a great deal of insight to share with geoscientists that the latter are mostly unaware of. Sometimes geoscientists produce annoyingly naive philosophical accounts or whig histories of their science and technology that do not help the education of the next generation. Asking a geoscientist to explain the philosophy of geoscience is like asking a school kid to write a treatise on pedagogy. But asking a philosopher of science to pay attention to the geosciences is like asking a school kid to observe Jupiter without a telescope. I am happy to have had a long-term collaboration with philosophers and historians which helped all of us to build bridges and gain access to the other's lenses and insights.

**Alisa:** I have had very positive experiences interacting with geoscientists. For example, after reaching out to the geomorphologist Brad Murray about a paper of his, we started a correspondence about modeling issues in the geosciences, which culminated in his inviting me to spend a semester visiting his lab in the Earth & Climate Sciences Department at Duke University, which I did in 2018. It was a really wonderful experience, spending a whole semester sitting in on geoscience classes, lab meetings, and talking with various geoscientists. Everyone I spoke to there was very supportive of my research on the philosophy of the geosciences.

In 2019 I spent a whole week at a geochronology conference at a woodland retreat in New Hampshire. I found that after an initial puzzlement and wariness as to why a philosopher of science was in their midst, they warmed up to me once I made it clear that I had "done my homework" by immersing myself in their scientific literature and making sure that I "got the science right" before doing the philosophy of it. When the pandemic first struck in 2020, a new course I had designed on

the “Philosophy of the Historical & Earth Sciences” moved online. The paleontologist Doug Erwin who, because of the closing of the Smithsonian and prohibition on traveling, had some rare extra time on his hands, ended up sitting in on my course for much of the semester, and gave a guest lecture. This ended up being a wonderful opportunity for the graduate students in the class as well. Finally, I have also been able to get to know a lot of geoscientists through the unlikely (and now precarious) medium of Twitter, which has made it possible for me to invite many geoscientists to my Phi-Geo Research Group to discuss the philosophically interesting dimensions of their work. The important thing to remember is that these are relationships that have to be built over time and require that we, as philosophers of science, be willing to put in the needed effort to learn the relevant science, be willing to give a primer on our own field, and be open to dialogue and listening to what they say, even if we ultimately take a different view on an issue. My luck in building relationships with geoscientists has also been helped by identifying those geoscientists who are already very reflective about their discipline and scientific practice, even if they don’t identify it as philosophy per se. In such cases the bridges between our disciplines are already half built.

**How can philosophical studies of the geosciences contribute to broader discussions of important social issues, in particular, issues arising from anthropogenic climate change?**

**Alisa:** As I mentioned before, many of the most pressing global issues today are related to issues in the geosciences, and yet at the same time most people lack a basic geoscience literacy. This is due in part to the fact that most public high schools in the U.S. don’t even offer a class in the geosciences, let alone require it. Unlike biology and physics, there is also no Advanced Placement Geosciences exam to encourage the most talented students, nor is there a Nobel Prize in the geosciences for groundbreaking discoveries and advances. One could argue that this gap in geoscience education is in part responsible for the public’s slow understanding of—and response to—the urgency of the climate crisis. Our neglect of the geosciences is coming back to haunt us in the harms we are doing to the Earth. Our collective actions have become a geologic force, fundamentally altering the state of the Earth, its climate, and its oceans, and yet most of us have no idea about how these Earth systems work and what their irreversible tipping points might be. Why should we care about a couple of degrees of warming? The vast majority of people still have no understanding of the very big differences these small numbers make.

Properly understanding these threats requires being able to situate our present within the vast context of deep (geologic) time. Yet again, we run into the problem that the neglect of the geosciences has led to our society being *chronoilliterate*, or even (to borrow a term from the geologist Marcia Bjornerud) *chronophobic*—unable to think about our decisions and actions beyond the short-term. Bjornerud has a wonderful and accessible book called *Timefulness: How Thinking Like a Geologist Can Help Save the World*. In it she argues that learning the “rhythms of Earth’s deep past and conceiving of time as a geologist does can give us the perspective we need for a more sustainable future” (2018).

Philosophers of science have a valuable role to play in these conversations and in bringing the geosciences to a broader audience. The next generation of philosophers of science are just beginning to address these issues. For example, one of my PhD students, Aja Watkins, is writing her dissertation on how paleoclimates in Earth's deep past can most reliably be used as analogue models for understanding our current environmental crisis and likely climate futures—in other words, how the deep past can be a guide to the future. Another PhD student, Federica Bocchi, is writing her dissertation on how paleodiversity, and the perhaps surprising field of conservation paleoecology, can be a valuable resource for present conservation biology, and the incommensurabilities that will have to be overcome to do so. These are just a few examples of the crucial contributions that philosophers of science can make to these important discussions.

**Maarten:** Discussions are conducted in words and arguments, and scientists have much to learn from historians and philosophers. They need the conceptual apparatus and skills to improve their broader discussions. As scholars of didactics tell us, practising this will greatly benefit academic thinking skills. This is a huge opportunity for philosophers. The recent [topical collection](#) on education in the *European Journal for Philosophy of Science*, to which I also contributed, sketches some ways to go about this. But I see a problem: literature about relevant HPS that is accessible for students of science is rare, if not nonexistent. There are introductions to history or philosophy of science, but we don't want to turn scientists into philosophers or historians. We want scientists to become better scientists. The book on causality by Phyllis Illari and Federica Russo has been extremely helpful to me because it was written for two audiences: philosophers and scientists, and it provides an overview and synthesis. This enables scientists to learn how to view their own science through the lens of philosophy. Most other works I read on causality already assume a philosophical background or focus only on one or two accounts of causality while ignoring the rest. They do so for good reasons, but as a consequence they are not accessible for scientists and science students. Another huge opportunity is missed. Many scientists simplify and communicate their results to the public, to specific stakeholders and to primary and secondary students. But for these publics to understand the value and relevance of science, they need to understand something about its methods. Where are the philosophers explaining in simple words what happens and what it means, at the level of understanding that the public, stakeholders and teachers can understand? I never had a public more curious to learn about science and how it works in practice than in primary schools. And I never needed the thinking skills more than in interactions with stakeholders who deny the causes of global change because they mix up empirical and normative aspects of the problems, while also thinking that scientists need to be perfectly objective, and that statistics and models are both lies.

**What are the important frontiers in the philosophical study of the geosciences? Are there any areas of science, concepts, problems or practices that are most in need of philosophical scrutiny?**

**Maarten:** So little has been done about the geosciences that nearly everything needs scrutiny and is on a frontier that needs pushing. Don't wait for me to tell you what to do. However, we don't need more "scientific revolutions" and such, nor histories of big heroes of science (usually pale, male and

stale like me). The recent practical turn is most useful and welcoming to interactions with scientists. I also think that more work on the history of core concepts would help to open the eyes of scientists to the changing meaning of the words we use in the geosciences.

**Alisa:** All of it! Given the long neglect of the philosophy of the geosciences and the enormous variety of fields and topics within the geosciences, the philosophical study of the geosciences is wide open. Dive into the geoscientific literature and you are sure to stumble across any number of interesting philosophical issues to explore.

**Do you have any words of wisdom for young scholars interested in pursuing this area of inquiry?**

**Alisa:** My advice would be the following: network with others working in this area, reach out to geoscientists, and spend time actually reading and learning the geoscience literature in order to do the philosophy of it responsibly; put together a reading group, organize a small conference, or propose a symposium on philosophy of the geosciences for one of the major conferences in our field; assign a paper on the philosophy of the geosciences in your philosophy of science classes. It is through small steps like these that your new area of research will begin to grow and flourish. Those of us at later career stages also have a responsibility to make sure that our archives, journals, and conference submission websites have a pull-down option or available category for “philosophy of the geosciences,” and have an obligation to make room for this topic in these various venues, in addition to in our grant reviewing and hiring, right alongside the more traditional areas of philosophy of physics and philosophy of biology. The Philosophy of the Geosciences has arrived—it is time for our community and institutions to recognize how important and valuable this work can be.

**Maarten:** Do it. Stop listening to the distant music of the spheres and start feeling the beat of our perpetually changing habitat under your feet. I believe geoscience is a paradise gained for philosophers (but I might be a bit biased and carried away here). Go and talk with scientists, look through their lenses and listen to what they are not saying; help them and their students to become better scientists and gain access to the geosciences in the process. And tell the rest of the world about it in simple words.

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## SPSP Members Talk Fossil Data at the PSA Conference

By Julia R.S. Bursten



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When does a fossil become data? How should epistemologists account for the people who prepare fossils—especially when those people can re-prepare and alter fossil records over time? And just how spicy *is* spinosaurus twitter? (Very!) Speakers and audience members wrestled with these questions and more during the SPSP Cognate Society Session at the 2022 Philosophy of Science Association (PSA) Meeting in Pittsburgh, PA USA: “Beyond Incompleteness: New Perspectives on Fossil Data.”

“Beyond Incompleteness” was organized by Dr. Meghan Page, an assistant professor of philosophy at Loyola University Maryland and Aja Watkins, a Ph.D. candidate in philosophy at Boston University. The goal of the interdisciplinary, intercontinental symposium-style session was to “explore novel approaches to the production of knowledge through fossil-based paleontological practices.” The symposium extended recent work in the philosophy of the historical sciences by uniting questions about how scientists gain knowledge from fossils with questions about the myriad relationships between phenomena, data, evidence, and knowledge.

Watkins gave the first talk of the symposium, focusing on when and how fossils become scientific data. Watkins used and critiqued Leonelli’s “data journeys” framework to investigate the various

and accumulative stages of data life that a fossil undergoes, from initial fossilization and subsequent excavation through preparation and cataloging.



*A packed house of happy SPSP-ers at "Beyond Incompleteness." Photo credit: Adrian Currie*

Building on this investigation, the second talk by Dr. Caitlin Wylie, an associate professor of science, technology, and society at the University of Virginia, argued that to develop an account of how fossils become data, it is necessary to analyze the various roles of the people who interact with the fossils. Wylie built an account of fossil data journeys that included "scientist time," i.e., the timelines of various scientific professionals who interact with the fossil samples to create and use data. She invited listeners to consider in particular the roles of professionals such as fossil preparators, museum curators, and others who are often overlooked for their roles in stewarding fossil data. She also considered the epistemology of "performative data creation" in which fossils can be re-prepared to reveal new details of structure or function and test new hypotheses.

Following Wylie, Dr. Doug Erwin, senior research biologist and curator of Paleozoic invertebrates at the Smithsonian Museum of Natural History, took a historical perspective on how fossil research has evolved through the 20th and 21st centuries. He considered how changes in the kinds of questions that researchers are asking affect the nature of paleontological data and relationship between data and the fossil record in the case of Ediacaran-Cambrian radiation. Using this case, he highlighted a shift in the field from descriptive to explanatory to quantitative research questions. Dr. Adrian Currie, senior lecturer in philosophy at Exeter University, presented the final talk of the symposium, which centered on the ongoing paleontological debate about whether, and how, the dinosaur spinosaurus swam. The debate considers a variety of types of data as evidence in the development of what Currie calls "capacity hypotheses," that is, hypotheses about what functions an animal or plant could have had, as opposed to what functions they actually did have. Currie argued that the use of capacity hypothesis is a crucial factor in shaping the present epistemic landscape of paleontology.



*“Beyond Incompleteness” panelists, from left: Doug Erwin, Caitlin Wylie, Aja Watkins, and Adrian Currie. Photo credit: Meghan Page*

Page provided summary commentary linking the talks’ discussions at the close of Currie’s talk. Rather than fielding individual questions at the end of their talks, the symposiasts gathered at the front of the room after Currie’s talk for a group panel discussion with the audience. Many questions were directed to the panel as a whole, asking them to consider the epistemic implications of various features of the fossil record and different ways of delineating stages in the data journey of a fossil. The audience was treated to a series of mutually reinforcing research discussions between various panel members as they built on each others’ work to answer questions. One common theme throughout the half-hour panel discussion was how time shapes evidence, and how delineating various temporal stages in a fossil’s lifecycle is a relational process that incorporates the practitioners who interact with the fossil.

“Beyond Incompleteness” was selected to represent SPSP at the PSA this year through a competitive review process. The symposium skillfully represented many aspects of SPSP’s mission and ethos, including ear-to-the-ground engagement with the sciences across the talks, the use of interdisciplinary methodologies, and the consistent focus on how the practice of using fossils as data contributes to scientific knowledge. Both the symposiasts and audience included a mix of SPSP veterans and newcomers, and the relaxed and convivial atmosphere of the session reflected that of an SPSP meeting.

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# The Proust Questionnaire

Saana Jukola talks to Hanne Anderson



## **Who are your favourite heroines or heroes? In real life or in fiction.**

I have had several really good role models - but none mentioned, none forgotten. But a candidate for a real heroine in recent years has to be Gretha Thunberg. Her strength and perseverance has been so admirable. I must admit that I have found it difficult to cut down on my travelling, simply because I love it so much. But I have come to realize that it is a change I have to do, even if I don't like it. And yes, being scolded by an angry teenager actually helps realizing it.

## **What is your favourite book?**

I have had different favourite books at different points in life or in different contexts. But right now my absolute favorite is Solveig Balle's "Om Udregning af Rumfang". I don't think it has been translated yet, but a direct translation of the title is "On calculation of volume". It is a 7 volume work of which so far only the first 3 have been published, so all in all, this recommendation may be difficult to convey. But the story about a women who gets trapped in time is simply the most outstanding examination of time, space, life and existence. It ought to speak to the heart - and brain - of every philosopher. She just won the Nordic Council Literature Prize, and my projection is that once this septology gets completed and translated, she will be a strong candidate for the Nobel Prize. While you wait for the translation (a German translation should be on its way), you may enjoy her "According to the law: Four Stories about Humankind".

## **What is the most critical academic or non-academic feedback you ever received?**

I vividly remember when I gave my very first conference keynote. One of the participants, a real big shot in the field, asked a question in a way that clearly showed that he thought that this was the most terrible talk given by the most stupid person. But somehow I managed to persuade myself

that instead of being devastated I should just decide to take pride in the fact that if this big shot thought that Hanne Andersen was an idiot, that actually meant that he knew who Hanne Andersen was. For me as a young newcomer to the field, somehow that was a consolation.

**Where do you write your best work?**

An odd mixture of "at my home desk" and "while travelling". I spent my first year abroad while I was still a student, and somehow, once you get infected with that travelling bug, there is no going back. It was during sabbaticals in Berlin and in Pittsburgh that I started developing some of my most important ideas, and I hope that I will soon get new opportunities for writing in new places.

**What is your favourite entertainment?**

Music, opera, theatre, art - and food. And as much as I enjoy the former, I also have to admit that the annual number of visits I make to restaurants by far exceeds the annual number of visits I make to theatres or concert halls. But maybe I should start working on that by combining the two kinds of activities...

**What profession would you like to attempt besides your own?**

When I was a teenager, I thought that I was going to study law and become a defense attorney. When I look back, I think that a very important factor was that, at the time, there was a very successful female defense attorney in Denmark who got a lot of media coverage. Role models really are important. But I also think that if I had gone to law school, I would probably in the end have become a professor in history and philosophy of law rather than an attorney.

**Where were or are you happiest?**

When my husband and I moved from Aarhus back to Copenhagen, we found an apartment that is close to the centre of Copenhagen, but which is also situated in a quiet street and has a small garden. When I walk down the street towards the house where we live, and all the noise of the big city slowly gives way to the sounds of nature - that really makes me happy. The reverse holds as well. It also makes me happy to start out from our quiet corner and then in a few minutes be in the middle of the vibrant city.

**What is your most valued possession?**

Of course there are certain things that I value very highly because of how or from whom I got them. But apart from that I must reveal that I am very fond of gadgets. I can really take joy in finding some new, smart feature of my watch, or of finding some tiny thing that can do something very handy. I have once heard that the smart phone companies have special engineers employed to remove some of the functions that other engineers have invented and installed. I understand that it reduces complexity and probably makes it easier for the customer to use the product - but that would never be a job for me.





## Save the date for SPSP2024

The SPSP2024 conference will be hosted by the [Ann Johnson Institute for Science, Technology and Society](#) at the University of South Carolina. The conference dates are May 16-18, 2024. The pre-conference workshop will be held on May 15.

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