Social Epistemology at Work:
from Philosophical Theory to Policy Advice

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The Twentieth century witnessed the raise of several academic disciplines targeting science as a research object. History of science and philosophy of science were the first to get institutionalized in the university system, with the birth of the journal *Isis* by George Sarton in 1912 and the diffusion of Neo-positivist philosophy of science in U.S. universities by emigrated members of the Vienna Circle. Sociology of science soon followed, with the establishment of the institutional sociology of science school lead by Robert Merton in the Fifties. The publication of *The Structure of Scientific Revolutions* by Thomas Kuhn in 1962 set a landmark in the history of the study of science, fueling the raise of new approaches in all the three mentioned disciplines. The sociology of scientific knowledge (SSK) advanced by Edinburgh School and the emergence of the galaxy of Science and Technology Studies (STS) would not have been possible without Kuhn's work. The Sixties saw also the birth of the quantitative study of science, with the creation of the Science Citation Index by Eugene Garfield in 1964. From the Eighties onward, the academic research targeting science has flourished enormously, addressing its research object from a wide range of methods and disciplinary perspectives (from cultural anthropology to economics, from philosophy to bibliometrics). Even if it these different studies of science have not coalesced into a unified and coherent picture of science, still it is right to say that today we know more and better how scientific inquiry works, at different levels and in different contexts.

The second half of the century was marked not only by the flourishing of academic meta-discourses on science, but also by the increasing interaction of science and society at large. The Manhattan project was the first occurrence of so-called "Big Science", i.e. a huge techno-scientific project involving thousands of scientists, engineers and technicians, and funded by massive amount of public money. *Science, the Endless frontier,* the report delivered by Vannevar Bush to President Roosevelt in 1945, marked the dawn of *science policy* as a strategic issue in the United States. National Science Foundation (NSF) was soon created and categories like "basic" and "applied" research started rapidly to shape policy discussion about the organization and the funding of scientific research[1]. The main tenet of Fifties and Sixties science policy was the clear separation between scientific community

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[1] See Schauz (2014) and Schauz and Godin (2016) for an excellent history of how the notions of basic and applied research changed over the Twentieth century.

on one side, and politics and society on the other.[2] Scientific community was conceived as an independent and self-managing community of experts, with the role of the government limited to inject public money into science, to which the managing of such money was entirely left. The economic crisis of middle-Seventies, as well as an increasing public awareness of the societal impact of science and technology, dramatically undermined the idea of a strict separation of science and society. The raise of New Public Management in the Eighties affected science policy, entering currency to the idea that the scientific community had to be accountable for the use it makes of public money. UK was the laboratory of new practices of research performance assessments, conducted in the name of the social accountability of the research and university system. In subsequent years, all major European countries began to establish their own agencies devoted to research quality assessment. Some of them were used to implement performance-based research funding systems the Italian ANVUR being one of the last to become operative (Hicks 2012). Nonetheless, even this most recent governance is getting scrutinized and debated by scholars all over the World. Thus, the social organization of science is unlikely to stop morphing over time.

In sum, during the Twentieth century science become at the same time the *object* of a variety of meta-disciplines and a *social activity* meant to be steered by appropriate policies, also in the name of social accountability. Broadly speaking, the past century delivered to us two major perspectives on science, the former more descriptive and academic-based, the latter more prescriptive and government-based.

Can these two frameworks interact, or do they speak from incommensurable points of view? Can theoretical and empirical investigations of science influence the design of appropriate science policy? To frame the question in a philosophical fashion: can the *descriptive* research on science affect the *normative* business of designing its organization? In order to frame this concern, in our call for papers we borrowed the following Marxian-flavored slogan from Philip Kitcher (1990: 22): "How do we best design social institutions for the advancement of learning? The philosophers have ignored the social structure of science. The point, however, is to change it".

The contributions collected in this Special Issue of *Roars Transactions* represent different fruitful ways of addressing these issues. Drawing from several of the above mentioned meta-disciplines (including philosophy of science, Science and Technology Studies and qualitative sociology), they display in different ways how to bridge academic-based reflections on science with political concerns about, amongst others, responsible innovation (Fuller, MacFarlane), grant allocation (Avin), interdisciplinarity (Gillett), and scientific careers (Eigi et al.). Globally, they provide a useful kaleidoscope of the variety of meanings under which "social epistemology" may be considered.

We are particularly pride of hosting the letters of two founding fathers of social epistemology: Steve Fuller and Philip Kitcher. They both wrote crucial contributions that paved the way to research at the intersection of philosophy, STS and science policy. Fuller's book *Social Epistemology* (1988) conceived social epistemology as the study of what kinds of knowledge are desirable and how such knowledge(s) can best be produced, assessed, and circulated. Fuller's research programme is entrenched in post-Kuhnian philosophy of science and STS, whereas Philip Kitcher's variant of social epistemology is more connected to traditional epistemology. One of its greater merit has been to reintroduce the concern (originally investigated by American philosopher Charles Pierce, see Peirce 1879) over how the "division of cognitive labor" in science should be arranged in order to maximize

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[2] For a nice reconstruction of this historical passage, followed by a critical reappraisal, see Douglas (2009).

epistemic progress (Kitcher 1990), thereby igniting a stream of research (sometimes labelled as "economic epistemology"), where mathematical and computer tools are used to model the behavior of agents in epistemic communities.

In his brief letter, Kitcher ascertains that traditional epistemology has often maldeveloped Descartes' legacy, and blames it for having insisted on overly scholarly debates of little import, threatening to turn epistemology into a new Aristotelianism. In contrast, he praises those who inherited and brought forward Descartes' thrive for finding reliable knowledge, and who looked for that across scientific disciplines. Yet, given that science is a collective rather than an individualistic endeavor, Kitcher claims that «the chief epistemological problem of our day is to understand how to improve the knowledge-seeking endeavors of communities of investigators» (Kitcher, *this issue*). And he warmly welcomes the fact that this inquiry is being undertaken.

Steve Fuller's letter provides an excellent example of how philosophical reflection may affect the design of science policy principles, in this case the cluster of policies around the notion of "Responsible Innovation". Responsible Innovation is one of the hottest themes in contemporary science policy and it is especially central in European science policy (see the RRI framework promoted by European Commission[3]). In Fuller's essay, we can see how philosophy is used with a double-fold aim. On one hand, it serves as a *critical* tool to unveil general but tacit assumptions that inform present policies. On the other hand, it is used as a positive source of alternative principles that can produce very different policies. In particular, Fuller opposed to the current notion of "Anticipatory Governance" (i.e. the idea that societal actors and stakeholder should be involved in the whole research and innovation process, see Guston 2014), the radical idea of "precipitatory governance". Precipitatory governance «operates on the assumption that some harm will be done, no matter what course of action is taken, and the task is to derive the most good from it» (Fuller, *this issue*). In this new framework, innovation becomes to a certain extent an end in itself. Even worst-case scenarios may become acceptable, in so far as they foster the innovation process in a way unreachable in normal conditions. Even if Fuller's proposal may be seen as provocative and the idea that innovation is desirable *per se* may be questioned, his essay provides a precious example of how philosophical reflection can unveil and criticize assumptions that remain often tacit and unquestioned within science policy debates.

The next two contributions may be described as contemporary research conducted, respectively, within Fuller's and Kitcher's research programmes in social epistemology.
The paper by James M. MacFarlane bridges the gap between theoretical reflection and political action by advancing a theoretically-informed call for the establishment of a STS profession outside the academia. MacFarlane argues that STS practitioners would benefit from translating into a profession a role they already play in new technology assessments projects (such as Anticipatory Governance projects in UK) where they act as mediators between new technologies and the public. His proposal is to create a new sector of Science-Public-Relations professionals, where the cognitive-base and normative horizons of STS could find useful, extra-academic applications. According to MacFarlane, this would provide at the same time enhanced autonomy to STS practitioners and new directions for future STS research. It is interesting to point out that MacFarlane's professional project echoes similar

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[3] Responsible Research and Innovation. See https://ec.europa.eu/programmes/horizon2020/en/h2020-section/responsible-research-innovation

attempts, made by social and human scientists around the world, to build extra-academic professions out of their fields[4].

In his essay, Shahar Avin exhaustively discusses the rationale for implementing a lottery system for the selection and funding of research projects. Moreover, he also lays out the foundation of a viable lottery system, specifying its constraints and general limitations. While the idea to introduce randomness into funding allocation may *prima facie* sound irrational, a thorough examination reveals that allocation based on peer review bears many elements of randomness and uncertainty too, as well as requiring much time (both for writing and for reviewing) and actual money (for administrative costs). In turn, lotteries employed in other contexts have been argued to increase both efficiency and fairness. In the context of grant allocation, introducing lotteries may (among other things) avoid harmful biases that often prevent unorthodox ideas from winning grants. It should be noticed that Avin is not arguing for a pure lottery system, but rather for a hybrid one that he dubs "triage". In a triage allocation system, shorter projects are to be written and reviewed (allowing to save time), and placed in three groups, according to their estimated merit. Projects of higher and lower merit must then be respectively financed and discarded, whereas lottery is used to adjudicate between middle-merit projects.

The paper by Alexander J. Gillett shows how insights drawn from theoretical biology and behavioral science (notably the notion of "virtual collaboration" originally introduced by Michael Tomasello) may be useful not only to unveil the inter-generational structure of science, but also to optimize epistemic progress of science. Research in these fields points out that innovation occur often as the result of the re-combination of culturally accumulated knowledge across generations, reducing the role traditionally attributed to "geniuses" in the progress of science. In the light of these results, Gillett argues that interdisciplinary environments should be fostered both in science practice and scientific training, since they are the suitable conditions for innovative re-combination processes to happen.

The final contribution is authored by an Estonian team of philosophers of science. Their research exemplifies what may be dubbed "micro-social epistemology". Using a focus groups interviews methodology, they studied how the "production of the producers of knowledge" – i.e. the training of PhD students and early career researches in Estonian – can be ameliorated. Their main result is that wider support networks of peers and colleagues may compensate for shortcomings of official supervision. Once again, we can see how versatile the notion of social epistemology is: it can range from very general, philosophical contributions to carefully detailed case-studies.

Overall, this collection of papers represents an attempt to bring descriptive consideration concerning the social organization of science onto practical and prescriptive grounds. Aside from gathering the valuable contributions of each single paper, we thus deem that this special issue has the further merit to show that scholars in philosophy and in STS more in general need not confine themselves to the observation of how the social endeavor we call science actually works, but can (and perhaps should) provide their informed contribution for making it better.

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[4] In Italy it is worth mentioning the case of cultural anthropologists, who recently established a Professional Association of Cultural Anthropologists (ANPIA - *Associazione Nazionale Professionale Italiana di Antropologia*) with similar proposals. See http://anpia.it/ and the recent volume edited by Ivan Severi and Nicoletta Landi (2016).

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