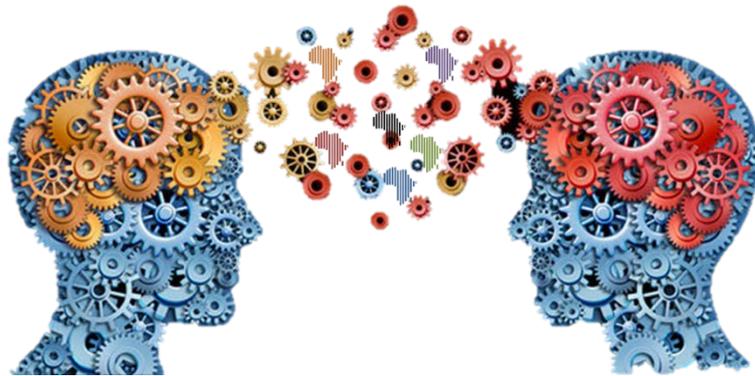




WORKSHOP “REASSESSING SCIENTIFIC COLLABORATION”

Museo Nazionale Scienza e Tecnologia Leonardo da Vinci, 28 October 2021



Collaborative approach to research has become crucial in order to attain substantial results in practically all domains of natural sciences. Correspondingly, the notion of scientific collaboration has raised much interest among scholars of different disciplines and background, coming from domains as diverse as social epistemology and sociology of science, computer science, science policy, cognitive science and philosophy of action, history and philosophy of science. Indeed, there seems to be many cross-disciplinary questions that can only be answered with contributions from different areas — E.g., who is entitled to be a collaborator in a certain common effort and who is not? Are there many kinds of collaboration, and how could we distinguish among them? Why is collaboration more popular in certain fields than in others? Does only material/technical/economic advantages matter to collaboration, or are there cognitive benefits? And, of course, many other questions.

This interdisciplinary workshop brings together scientists from different areas, philosophers and historians of science, and social scientists. It aims to discuss the real collaborative practices in which scientists have been or are currently involved. It encourages scientists to reflect upon their actual practices and dealing with questions and ideas coming from different disciplines or specialties, while offering to historians, philosophers, and social scientists novel and fresh insights as well as an inside view for further research.

A list of issues

Thinking about the project in which you collaborated/are collaborating, we ask you to focus on the following issues and consider these carefully in your presentation as well as in the debate.

Please, note that each of us will have up to 30 minutes for presentation. Debate is postponed until the end of each session.



- The reasons for the collaborative work: Why to collaborate instead of “bowling alone”? A typical answer is that scientists collaborate because their individual competences are limited, or because resources (financial, technological, human, etc.) are limited. Besides such reasonable “division of scientific labor”, are there other reasons for which they tend to collaborate instead of doing alone?
- The importance of recognition: Is there any scheme of individual/team recognition in collaborative research? For example, who is entitled, in the collaboration, to have/share a prize? Is a co-authorship a form of recognition in its own right? And who is entitled to be a co-author?
- The role of hierarchies in the collaborations: are there recurrent patterns for managing the relations between peers (from the same or different discipline), senior and junior scientists, teacher/apprentice, employer/employee, etc. In particular, what is the role of students and engineers within the collaboration?
- Inter-team vs intra-team collaboration: What are or have been the differences, if any, between intra-team and inter-team collaboration — i.e., the collaborative dimension within a certain team and the coordination/collaboration of a certain team with others?
- Adversarial collaboration and results checking: Have you experienced, or are you experiencing, some form of adversarial collaboration? (Even some very loose and artificial form, such as subdividing a team in more sub-groups working on a certain issue with different methods or approaches in order to cross-check their results.)
- Interdisciplinary collaboration: Have you experienced, or are you experiencing, forms of collaboration with scientists from other disciplines or background? How would you grade their importance? When is interdisciplinary collaboration particularly needed?
- Collaboration and confidentiality policies: Collaboration may imply disclosure about confidential or highly confidential data. This may give rise to potential conflicts of interests by the individual collaborators or collaborating institutions. Have been developed approaches to avoid or treat these?
- *Other issues...*

BOOKLET OF THE ABSTRACTS

K. Brad Wray — Centre for Science Studies, Aarhus University
kbwray@css.au.dk

The Epistemic Significance of the Size of Research Teams



I present data that suggests that in scientific research, team-size matters. Compared to small and medium sized research teams, larger teams are (i) less prone to produce research that needs to be retracted. But when large research teams do produce research that is retracted, these teams are (ii) more likely to publish ambiguous retraction notices. This is problematic, I argue, because there are good reasons to believe that ambiguous retraction notices are really covering over research that involves misconduct. Hence, though large teams produce proportionately less research that is retracted, the retractions are proportionately (iii) more likely to involve misconduct, and they are also (iv) less likely to make the source of the misconduct clear.

Eugenio Petrovich — Department of Economics and Statistics, University of Siena, Italy
eugenio.petrovich@gmail.com, eugenio.petrovich@unisi.it

The acknowledgements of scientific publications between scientific collaboration and academic signaling

In quantitative studies of science, the co-authorship of scientific publications has been considered as the main evidence of collaboration between researchers, institutions, and countries. Co-authorship as a proxy suffers nonetheless from well-known limitations, due both to authorship practices, which varies among scientific fields, and academic misbehavior (e.g., ghost and gift authorship). The acknowledgments of academic publications have thus been explored as a further source of data that can complement standard co-authorship analysis. The acknowledgments seem especially relevant for reconstructing interactions in those fields where multiple authorship is less frequent, such as the social sciences and humanities. However, acknowledgments have their own limitations too, as they may reflect further social dynamics besides collaboration. In particular, the acknowledgment may serve as signalling devices used by authors to mark their affiliation to academic circles or schools of thought, rather than to recognize informal collaboration. In this talk, I will examine the value of acknowledgments data drawing from two case studies, philosophy and economics. From several quantitative analyses of acknowledgments trends in these two fields, I will draw some provisional conclusions about the interpretation of acknowledgments and how they can contribute to our understanding of scientific collaboration.

The presentation will be based on the following papers. Pre-prints are available upon request: Petrovich, E., “Acknowledgments-based Networks: A new method for mapping the social structure of research fields” [Submitted to Synthese special issue on “Digital Studies of Digital Science”]

Lucio Rossi — Department of Physics, University of Milan
lucio.rossi@unimi.it

Physics research as large international collaborative enterprise

Particle accelerator and colliders are large scientific enterprise, carried out by international collaboration of hundreds or even thousands of researchers, engineers and technicians in a genuine international environment.

The governance is mainly bottom-up for the experimental detectors and more top-down for accelerator projects. However, many issues are similar: technical choices and decision mechanism and, budget control, leadership selection (at all levels) motivation for young researchers. These big collaborations allow reaching results beyond the capability of small-medium teams, like the discovery of the long-awaited Higgs boson at LHC of CERN, however the risk of involution is certainly not a small one. The international collaboration model set up in particle physics is exemplary in many respects: ability to identify common goals, to unify many large teams with independent budget resources toward shared objectives, to streamline technologies development and distributed resources, to prioritize milestones and deliverables of different (sometime competing) groups with a common schedule. These are only a few of the aspect that make Particle Physics a case study in management. However, the gigantism in collaboration may be at a turning point, where autoreferentiality, push for self-preservation and structural aging of the Institution may prevail over innovation, readiness in accepting new point of view and capacity of risk vs. stagnation and conservatism.

In my opinion the greatest challenge of this community is the ability to find a right balance between a necessary structure and discipline for such collaborative research and the ability of giving the right value and weight to new ideas, young energy, bright individuals that not necessarily fits in a rigid scheme.

The talk will give examples of the above-mentioned issue and opinions how to reconcile individual creativity with the discipline of a research that is by necessity a team game.

Marco Giammarchi — Istituto Nazionale di Fisica Nucleare, Sezione di Milano
marco.giammarchi@mi.infn.it

Astroparticle Physics and Particle Physics. Not only size matters.

I will focus my discussion on astroparticle physics projects, with emphasis on the Borexino Solar Neutrino experiment, the LIGO-Virgo Gravitational Waves detection and collaboration and the Auger Cosmic Rays experiment. I will discuss how the consensus on data analysis and treatment is being reached, with emphasis on the “Working Group” concept. I will then address publication policies and consider how previous results from other experiments might influence it. In doing this, I will also highlight the difference between a Particle Physics project and an Astroparticle Physics experiment. I will finally move on to concepts that are specific of the very low-background observations, like multimessenger issues (and coordination) and the “fake signal” techniques.

Martin Kater — Department of Biosciences, University of Milan
martin.kater@unimi.it

**Research on rice genetics as an interdisciplinary
and cross-institutional collaborative effort**

My research group studies the molecular genetic control of the development of reproductive structures in rice, which is both a model species for genetic research and an important crop to feed the world population. Rice is especially important in countries where we observe the highest population growth rate. We try through many collaborations to understand how regulatory genes control developmental processes that determine the number of seeds that a rice plant produces. This knowledge is of great value since it may enable the development of molecular breeding strategies to increase the final yield per hectare and thereby contributing to food security in the near future.

My group collaborates in an international environment both with academia and industry. These collaborations not only have a value to get funding, speed up research or to overcome technological infrastructure limitations but also have a strong educational value.

Furthermore, we operate, like most life-science researchers, in a multidisciplinary research area. To create transparency around contributions and to give the right recognition in the form of authorship is sometimes difficult and clear policies for authorship should therefore be in place.

Moreover, my collaborations with industry are very much based on creating trust between the partners, which is a delicate and difficult process which I will also discuss during my presentation.

Letizia Bonizzoni, Department of Physics, University of Milan
letizia.bonizzoni@unimi.it

Interdisciplinary projects in the field of Cultural Heritage conservation

I'm sharing my own experience in interdisciplinary projects devoted to the characterization and conservation of cultural heritage materials. In many cases, both humanities and hard science are involved, bringing different points of view. This allows to approach the problem in a more complete way and gives synergic power to the research. Surely, both "sides" take advantage from this kind of collaboration, often establishing a fruitful dialogue. On the other hand, each subject has its own specific language that sometimes can make this dialogue apparently harder.

