

June 19-20, 2012 Nancy, France

RETHINKING SCIENCE AFTER THE PRACTICE TURN

Repenser les sciences après le tournant pratique
MSH Lorraine / Archives Henri Poincaré
91 Avenue de la Libération (3ème étage), Nancy - France

Speakers

Hanne Andersen (Aarhus University, Denmark)
Jean-Paul van Bendegem (Vrije Universiteit Brussel, Belgium)
Louis L. Bucciarelli (Massachusetts Institute of Technology, USA)
Hasok Chang (Cambridge University, United Kingdom)
Karine Chemla (Université Paris 7 Diderot, ERC Project SAW, France)
Michael Lynch (Cornell University, USA)
Hans-Jörg Rheinberger (Max Planck Institute, Germany)
Joseph Rouse (Wesleyan University, USA)
Jean-Michel Salanskis (Université Paris Ouest Nanterre La Défense, France)
Andrea Woody (University of Washington, USA)

Commentators

Catherine Allamel-Raffin (IRIST, Strasbourg, PratiScienS)
Mélissa Arneton (IRIST, Strasbourg, PratiScienS)
Régis Catinaud (Geneva University / Archives H. Poincaré, PratiScienS)
Jean-Luc Gangloff (IRIST, Strasbourg, PratiScienS)
Cyrille Imbert (Archives H. Poincaré, PratiScienS)
Vincent Israel-Jost (Archives H. Poincaré, PratiScienS)
Caroline Jullien (Archives H. Poincaré)
Katherina Kinzel (University of Vienna, associated member of PratiScienS)
Peter Kroes (Delft University of technology)
Jean-Pierre Llored (CREA, associated member of PratiScienS)
Amirouche Moktefi (IRIST, Strasbourg, PratiScienS)
Léna Soler (Archives H. Poincaré, PratiScienS)
Emiliano Trizio (Archives H. Poincaré, PratiScienS)
Frédéric Wieber (Archives Poincaré, PratiScienS)
Sjoerd Zwart (Delft and Eindhoven Universities of technology, associated member of PratiScienS)

Langue des conférences : Anglais
Organized by Léna Soler and the PratiScienS group
<http://poincare.univ-nancy2.fr/PratiScienS/Activites/?contentId=6987>

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Rethinking Science after the Practice Turn

Since the 1980s the turn to practice has had an ever increasing influence on the studies devoted to science, whatever label and orientation these studies may favour—be it philosophy of science, sociology of science, history of science, anthropology of science, science studies, etc. The conference will develop and confront interpretations of the shift towards taking practices in science seriously, with the aim to examine how the turn to practice has modified our conceptions of science and the ways in which we analyse it—where ‘science’ is understood in a broad sense, including the empirical sciences, mathematics and logic, as well as engineering sciences and technology.

PROGRAMME: OVERVIEW

Tuesday June 19

- 8:30 – 9:00 Registration
9:00 – 9:15 Léna Soler: Welcome and Introduction

Session One. Chair: Gerhard Heinzmann (Archives H. Poincaré, Director of the MSH Lorraine)

- 9:15 – 10:15 **Jean-Michel Salanskis** (Université de Paris Ouest Nanterre, France)
Some notions of actions
- 10:15 – 10:55 Michael Lynch (Cornell University, USA)
From normative to descriptive and back: Science and technology studies and the practice turn(s)
- 10:55 – 11:10 Commentary by Vincent Israel-Jost (Archives H. Poincaré) and Katherina Kinzel (University of Vienna)
- 11:10 – 11:30 Discussion with the audience
- 11:30 – 11:45 Coffee break
- 11:45 – 12:25 **Hasok Chang** (Cambridge University, U.K.)
Epistemic activities and Systems of Practice: Units of Analysis in Philosophy of Science after the Practice Turn
- 12:25 – 12:40 Commentary by Léna Soler (Archives H. Poincaré) and Régis Catinaud (Geneva University / Archives H. Poincaré)
- 12:40 – 1:00 Discussion with the audience
- 1:00 – 2:30 Buffet lunch

Session Two. Chair: Emiliano Trizio (Archives H. Poincaré)

- 2:30 – 3:10 Hanne Andersen (Aarhus University, Denmark)
Epistemic dependence in contemporary science: Practices and malpractices
- 3:10 – 3:25 Commentary by Cyrille Imbert (Archives H. Poincaré)
- 3:25 – 3:45 Discussion with the audience
- 3:45 – 4:00 Coffee break
- 4:00 – 4:40 **Andrea Woody** (University of Washington, USA)
The turn to Practice: Rethinking Representation and Explanation
- 4:40 – 4:55 Commentary by Régis Catinaud (Geneva University / Nancy University) and Frédéric Wieber (Archives Poincaré)
- 4:55 – 5:15 Discussion with the audience
- 8:00 Dinner

Wednesday June 20

Session Three. Chair: Philippe Nabonnand (Archives H. Poincaré)

- 9:00 – 9:40 Louis L. Bucciarelli (Massachusetts Institute of Technology, USA)
Engineering Science; Object-worlds; Engineering Education
- 9:40 – 9:55 Commentary by Peter Kroes (Delft University of technology) and Sjoerd Zwart (Delft and Eindhoven Universities of technology)
- 9:55 – 10:15 Discussion with the audience
- 10:15 – 10:55 Jean-Paul van Bendegem (Vrije Universiteit Brussel, Belgium)
The impact of the philosophy of mathematical practice on the philosophy of mathematics
- 10:55 – 11:10 Commentary by Caroline Jullien (Archives H. Poincaré) and Jean-Pierre Llored (CREA)
- 11:10 – 11:30 Discussion with the audience
- 11:30 – 11:45 Coffee break
- 11:45 – 12:25 Karine Chemla (Université de Paris 7 Diderot, ERC Project SAW, France)
Observing mathematical practices as a key to mining our sources and conducting conceptual history. Division in ancient Chine as a case study
- 12:25 – 12:40 Commentary by Amirouche Moktefi (IRIST, Strasbourg) and Mélissa Arneton (IRIST, Strasbourg)
- 12:40 – 1:00 Discussion with the audience
- 1:00 – 2:30 Buffet lunch

Session Four. Chair: Jean-Michel Salanskis (Université de Paris Ouest Nanterre, France)

- 2:30 – 3:10 Hans-Jorg Rheinberger (Max Planck Institute, Germany)
A Plea for a Historical Epistemology of Research
- 3:10 – 3:25 Commentary by Catherine Allamel-Raffin (IRIST, Strasbourg) and Jean-Luc Gangloff (IRIST, Strasbourg)
- 3:25 – 3:45 Discussion with the audience
- 3:45 – 4:00 Coffee break
- 4:00 – 4:40 Joseph Rouse (Wesleyan University, USA)
Scientific Practice and the Scientific Image
- 4:40 – 4:55 Commentary by Emiliano Trizio (Archives H. Poincaré)
- 4:55 – 5:15 Discussion with the audience

ABSTRACTS

Tuesday June 19

09:15 – 10:15 **Jean-Michel Salanskis** (Université Paris Ouest Nanterre, France)
Some notions of actions

If we are to follow the “practice turn” in philosophy of science, then we should be able to recognize as actions part of the global event of science, hoping that such recognition counts for something, brings information, and has some value. This requires that we refer to some substantial notion of action, i.e. that we do not allow that anything can be termed action. In this talk, three models of what an action could be are offered, namely the physical model, the linguistic model, and the mathematical model. It is shown that each model satisfies a general definition, combining what could be called the morphological side of action with its behavioural side. After having defined and explained these models, I discuss how they may be applied to science and its complex event. I do so by referring to some classical descriptions of practical aspects of science, or to approaches that I had the opportunity to pinpoint in various talks on logic and mathematics. I also consider other types of action, emphasized by various philosophers, and comment either on the fact that contemporary science studies refer to some of these types, make use of them, or on the contrary on the fact that some other types seem to be neglected by them.

10:15 – 10:55 **Michael Lynch** (Cornell University, USA)
From normative to descriptive and back: Science and technology studies and the practice turn(s)

This paper addresses the conference theme – “*How the so-called ‘practice turn’ in philosophy of science has modified both our conception of science and the way in which we analyze it*” – by drawing upon the author’s experience as the editor of a leading journal in Science and Technology Studies (STS) over the past decade. The ‘practice turn’ in STS has been succeeded by various aspiring ‘turns’ that seek to move from the description of scientific practice to one or another normative engagement with science. This paper critically examines this turn *from* practice, and argues in favor of describing how normative analyses are constitutive features of particular practices and judgments about practice. Instead of trying to create a science of expertise, the paper recommends a form of casuistry: an intensive effort to come to terms with specific cases in which “key concepts” are situated in practices.

11:45 – 12:25 **Hasok Chang** (Cambridge University, U.K.)
Epistemic Activities and Systems of Practice: Units of Analysis in Philosophy of Science after the Practice Turn

Moving away from the usual Anglophone philosophical habit of analyzing science in terms of propositions expressing the contents of theories and observations, I articulate the concepts of “epistemic activity” and “system of practice” as units of analysis for framing discussions of science after the practice turn. I aim to create a structured and precise philosophical framework for describing scientific practices, helped by a broad range of previous authors. An epistemic activity is a coherent set of mental or physical operations with an overall purpose, which contributes to the production or improvement of knowledge; a system of practice is formed by a coherent set of epistemic activities. A system of practice may also function as an epistemic activity that is part of a larger system. The notion

of coherence, which goes beyond logical consistency between propositions, is defined through the synergy of different actions in achieving the aims of an activity or system, and has many dimensions to it. The proposed framework will aid descriptions and normative judgments in the history and philosophy of science; it will also re-shape our views on the nature of scientific knowledge, and give useful re-orientations to many philosophical questions.

2:30 – 3:10

Hanne Andersen (Aarhus University, Denmark)

Epistemic dependence in contemporary science: Practices and malpractices

Interest in philosophy of science in practice has grown immensely over the last decades. However, despite this increasing focus on scientific practice, there has been little interest among the practitioners of philosophy of science on the counterpart to scientific practice, namely scientific malpractice. In this talk I shall focus on the important role of epistemic dependence in the communal practices of contemporary science and especially on the ways in which epistemic dependence may be violated. Based on Hardwig's analysis of epistemic dependence and his distinction between moral and epistemic character I shall argue that the difficulties distinguishing between carelessness, ignorance and honest error has led to a strong focus on making regulations against fraudulent research, while at the same time it has been lamented that the grey zone of poor research probably constitute a more widespread problem. Drawing on this philosophical analysis as well as a number of cases I shall point to three areas in which philosophical analysis can provide guidance to current discussions in the scientific community. First, I shall argue that a distinction between honest error, ignorance and carelessness is closely tied to the notion of expertise and that an attempt to demarcate honest error from wrongful or actionable error will have to take expertise into account. Second, I shall argue that peer assessment of moral and epistemic character is a highly dynamical activity that depends on mutual interaction over time. Third, I shall argue that analyzing research collaborations in terms of shared, cooperative activities can cast new light on current discussions of authors as contributors or guarantors.

4:00 – 4:40

Andrea Woody (University of Washington, USA)

The turn to Practice: Rethinking Representation and Explanation

In this essay, I reflect on the significance of the so-called turn to practice for contemporary philosophy of science. First I offer preliminary remarks concerning what is involved in the turn to practice and outline some of the challenges inherent in this research. Next I discuss the periodic law in chemistry, considering the establishment of the so-called law in the 19th century to illustrate how the turn to practice is relevant for current discussions about the nature of scientific representation, and considering the entrenchment of the periodic table in subsequent disciplinary practice to argue for the interrelation between representation and explanation in science. The example lays foundation for what I call the functional perspective on scientific explanation, itself a product of the issues within philosophy that generated the turn to practice. At the end of the essay, I highlight certain virtues of the turn to practice revealed by this discussion.

Wednesday June 20

9:00 – 9:40

Louis L. Bucciarelli (Massachusetts Institute of Technology, USA)
Engineering Science; Object-worlds; Engineering Education

The engineering sciences have a prominent place in undergraduate, engineering education. While how the engineering sciences differ from the classical sciences has drawn the attention of scholars, that is not my concern. Rather, my focus is on the role of engineering science in the context of engineering education and in the context of practice. In engineering education, the engineering sciences dominate the ways of thinking, attitudes and values of students and faculty. Solving exemplary problems within an engineering science – e.g., thermodynamics, fluid mechanics, electronics – is a key ingredient of what I call “object-world” learning. But such learning, while necessary, does not suffice in the context of practice. Not all the problems an engineer confronts yield to instrumental rationality. As a remedy, I propose that *comparative study of the engineering sciences* be made an essential piece of the engineering curriculum – to study the fundamentals of an engineering science above and beyond the instrumental analysis one finds in the text book by focusing on the relation between theory and technique; the critical role of language, especially mathematical expression, in instrumental reasoning; and the limitations as well as power of the engineering sciences in application.

10:15 – 10:55

Jean-Paul van Bendegem (Vrije Universiteit Brussel, Belgium)
The impact of the philosophy of mathematical practice on the philosophy of mathematics

In contrast with developments in the philosophy of science, the development of a philosophy of mathematical practice has needed more time to gain some importance and still occupies a rather special status in the broader field of the philosophy of mathematics. Apparently, even after the practice turn, mathematics still maintains its special position among the sciences. The paper comes in two parts. The first (major) part presents a sketch of the historical development of the study of mathematical practice, which will lead to a fairly complex picture that generates problems of its own as any form of unity seems to be lacking. In the second (minor) part I deal with the relationship between the ‘traditional’ philosophy of mathematics and the philosophy of mathematical practice. This relationship is all too often seen as one of opposition but here the idea will be defended that the search for mutual translatability, relying on the usefulness of logical models, might prove to be more fruitful.

11:45 – 12:25

Karine Chemla (Université Paris 7 Diderot, ERC Project SAW, France)
Observing mathematical practices as a key to mining our sources and conducting conceptual history. Division in ancient China as a case study

How to make sources speak is a question of general interest for historians. This article discusses which benefits history of science, and even conceptual history, can derive from studying clues drawn from our documents. The thesis for which I argue is that restoring mathematical practices in relation to which our sources were produced yields key resources to inquire into facets of conceptual history on which our sources only leave clues. I also claim the description of practices allows us to perceive changes in actors’ knowledge. I unfold the argument in the context of a case study, i.e., the mathematical work done on arithmetical operations, more specifically division, in ancient China. I first outline aspects of a

state of knowledge on this topic that can be captured on the basis of a book composed in China in the first century CE and related evidence. There, the argument pieces together evidence on this state of knowledge and information we have acquired on mathematical practices at the time. I then contrast the results obtained with features of the state of knowledge on the same topic to which other writings, produced in the preceding centuries in China, testify. The comparison highlights that the state of knowledge evidenced in the first century must have been the result of a work for which we so far have no other written evidence. The conclusion draws general remarks from this specific case study.

2:30 – 3:10

Hans-Jorg Rheinberger (Max Planck Institute, Germany)
A Plea for a Historical Epistemology of Research

The paper approaches the topic of what a general philosophy of science could mean today from the perspective of an historical epistemology. Consequently, in a first step, the paper looks at the notion of generality in the sciences, and how it evolved over time, on the example of the life sciences. In the second part of the paper, the urgency of a general philosophy of science is located in the history of philosophy of science. Two attempts at the beginning of the twentieth century are particularly highlighted: that of Karl Popper and that of Martin Heidegger. Both of them concentrate, albeit in widely different form, on the phenomenon of research as an open-ended process. This trend is even more pronounced in Gaston Bachelard's version of an historical epistemology, whose work is taken as a point of reference for a general historical epistemology of research. The paper concludes with a plea to look, with Georges Canguilhem, at the history of the sciences as a laboratory for epistemology.

4:00 – 4:40

Joseph Rouse (Wesleyan University, USA)
Scientific Practice and the Scientific Image

Wilfrid Sellars's aspiration to reconcile the "manifest image" of ourselves as persons with the "scientific image" of ourselves drawn from the natural sciences requires revisions to received conceptions of both images. In this paper, I attend to how scientific practice should change our "image" of scientific understanding. Some prominent studies of scientific practice advocate a disunified "scientific image." I argue instead that scientific understanding opens and refines a conceptual "space of reasons" that cannot be reduced to a unified or disunified body of knowledge within that space. The sciences articulate the world conceptually and allow us to talk, reason about, and respond to newly articulated aspects of the world. This achievement incorporates the material development of experimental systems as well as theoretical models or laws. It transforms "laws" into norms of reasoning in scientific practice. Scientific conceptualization is then prospectively open-ended within research, and partially contested within scientific fields, rather than forming a completed image. This revised conception contributes to a naturalistic account of scientific understanding itself as a form of evolutionary niche construction. It also emphasizes how the authority and significance of scientific understanding arises because of rather than despite its historical and biological contingency.

The PratiScienS Research Project

Rethinking Sciences from the Standpoint of Scientific Practices

The aim of the PratiScienS project is to analyze the lessons learned from the so-called 'practice turn' in the philosophy of science, with respect to the nature of science and its specificity compared to other human activities. The project explores scientific practices in their relations with the construction and validation of scientific knowledge.

Three issues are central to the project:

- Robustness, i.e., the strategies and schemes through which the status of 'robust result' is acquired by a scientific item, and as a particular widespread case in the empirical sciences, the Wimsatt scheme 'invariance of a derived result R under multiple independent derivations'.
- The role of tacit aspects in the constitution of scientific results.
- The contingency vs. inevitability issue, i.e., the degree of contingency that can be attributed to what is taken as a robust scientific achievement.

The PratiScienS Team

The PratiScienS' core group, born in January 2007, is led by Léna Soler and includes about ten researchers based in Nancy, Strasbourg and Paris. These researchers look at various scientific disciplines (physics, the life sciences, mathematics and logic) that they approach with different methodologies (conceptual analysis, historical investigations and ethnographic laboratory studies of ongoing scientific research – conceived as complementary). Beyond this core group, PratiScienS' associated members are Jean-Paul van Bendegem, Mieke Boon, Hasok Chang, Karine Chemla, Peter Galison, Katherina Kinzel, Ralf Krömer, Jean-Pierre Llored, Philippe Lombard, Thomas Nickles, Andrew Pickering, Claude Rosental, Jacob Stegenga, Eran Tal, William C. Wimsatt, and Sjoerd Zwart. Further information is available from:

<http://poincare.univ-nancy2.fr/PratiScienS/Groupe/?contentId=6979>

The PratiScienS group is supported by: the Agence Nationale de la Recherche (ANR), the Région Lorraine, the Maison des Sciences de l'Homme Lorraine (USR CNRS 3261), the LHSP – Archives Henri Poincaré, the Université de Lorraine, and the Centre National de la Recherche Scientifique (CNRS).