Recent years have seen a revival of the Pragmatist tradition in philosophy of science. This panel aims at exploring the contribution of one of the most forceful voices in this tradition, who turns out to be also its founding father: Charles S. Peirce. It is well known that Peirce's contributions to philosophy, logic and methodology are to be interpreted as inseparable from his practice as a scientist. This panel explores four central areas of Peirce's philosophy, all reflecting key aspects of his distinctive pragmatist account of science: his work on abduction, his methodeutics and ethics, and his works in the history and historiography of science.

Abduction forms one of the centrepieces of Peirce's approach to logic. It also constitutes the fundamental link between logic and Pragmatism more broadly. Peirce himself stated that, if considered carefully, his formulation of Pragmatism "is nothing else than the question of abduction" (EP 2, 234). Our panel addresses the question of abduction from the particular viewpoint of Peirce's contribution to ill-posed inverse problems – that is, problems which arise in severely under-structured contexts. One of the tasks of abduction is indeed to cast light on how scientific inquiry deals with "unknown unknowns", and Peirce's interrogative construal of abduction offers a broader logical mode of investigation, especially suited for situations in which strict cause-effect relationships may be unobtainable.

Peirce often referred to logic as complementary to methodeutic, which he defined as "logic in the broadest sense". Our panel addresses an aspect of Peirce's methodeutic which is particularly central to scientific practice: his account of the Economy of Research. Along with the contemporary significance of Peirce's account, we explore how the Economy of Research as a regulative ideal relates to scientific discovery, and to Peirce's maxim not to block the way of inquiry more broadly.

Peirce's philosophy offers powerful conceptual tools to address issues in ethics, as well as logical and methodological ones. We present its relevance with reference to the specific question of ethical empiricism. Peirce's pragmatism, along with his account of emotional interpretants, seems particularly compatible with current philosophical positions relating emotions and perception. Specifically, we argue that it may be possible to draw on Peirce's ideas in developing a productive analogy between the possibility of revising our ethical views in light of (collateral) emotions, and revising (non-normative) theories in light of (collateral) observation. We conclude our contributions by placing logic, ethics and methodeutic in the broader context of Peirce's understanding of inquiry in its historical development. Peirce's work as a historian of science is often neglected even by Peirce scholars, and yet it forms an indispensable connection between his philosophy and his practice as a scientist. We use Peirce's formulation of the First Rule of Reason as a prime example of a methodological, logical and ethical maxim that emerged precisely from the context of Peirce's historical investigations, and show that in doing so Peirce advocated a view of history and philosophy as inherently complementary modes of inquiry into the nature of science.

Paper 1: Interrogative Abduction in Ill-Posed Inverse Problems

According to Peirce, abduction is a Modus Tollens from the premises “If A is true, C is not true” and “But C is not true”, where the conclusion is an interrogative, “Is A not true?”. He described the process as “Reasoning from Surprise to Inquiry”, where the mood of the conclusion is a mixture of interrogative and imperative moods: “It is to be inquired whether A is not true” (MS L 463, 1905). Peirce termed this the “investigand” mood. Niiniluoto (“Abduction, tomography, and other inverse problems”, 2011) observed that the branch of applied mathematics that studies inverse problems deals successfully with abductive types of inference. Niiniluoto takes abduction to be reasoning from effects to causes. This is a limiting view of abduction and may reduce some (e.g., well-posed, continuous, parametric-model) inverse problems as to be matters of deductive inferences.

Peirce's interrogative construal suggests a broad view of abduction fitted for situations in which strict cause-effect relationships may be unobtainable. Those situations concern severely under-structured problems.
contexts. In the area of inverse problems, such contexts give rise to ill-posed problems, where the converse of a continuous mapping is discontinuous, so that analog samples do not work, models are non-parametric, etc. Inference in such contexts calls for abduction in its interrogative or investigand mood of ‘guessing at the unknown unknowns’, for example when forming confidence regions or choosing parameters tend to be under-smoothing.

If the inverse problems are well-posed, that is, if the relevant parameters or properties of models are known so that the solution depends continuously on the available data, the predominant mode of reasoning is the deductive one. Third, the predominant mode of inference in inverse problems that are well-posed but ill-conditioned is inductive.

Paper 2: Economy of Research in Peirce’s Methodeutic
Although C. S. Peirce claimed that he had devoted most of his life to methodeutic, which he defined generally as the study of the “principles of the production of valuable courses of research and exposition”, he never produced a definitive account of the contents of this branch of his ‘logic in the broad sense’. In the Carnegie Application of 1902, Peirce identified the core concern of methodeutic as heuristic, but he also argued that its first consideration ought to be guidelines and restrictions set by the economics of scientific investigation. While some later commentators have rightly highlighted the relevance of Peirce's pioneering ‘Note on the Theory of Economic of Research’ (1879), relatively little attention has been paid to the question of the central part that this scheme was meant to play in his general account of scientific inquiry.

In this paper, I will first identify the central characteristics of Peirce’s ‘economy of endeavour’, and then proceed to an explication of the systemic significance of this doctrine. This exposition will elucidate Peirce’s contention that the rules of scientific abduction ought to be based on economic considerations and thereby clarify the vital connection between the logic of discovery and the economy of research. In addition, the discussion will raise some pertinent questions about the relation of cost-effectiveness to the overarching Peircean prohibition against blocking the path of inquiry. I will argue that Peirce's economy of research is most fruitfully comprehended as a regulative methodological principle, applicable to virtually any particular field of investigation, yet subordinated to the more general ideal. I will close with some critical reflections on the implications of this appraisal for Peirce’s ordering of the sciences and its possible contemporary significance.

Paper 3: Ethical Empiricism and Emotional Interpretants

Justification or evidence for non-normative claims is empirical, by most accounts, and exclusively empirical, by some accounts. But is there such a thing as evidence “of the senses” for normative claims? A positive response has seemed implausible to most, and the possibility of ethics as an empirical science has not been seriously advanced. Since G. E. Moore, non-naturalists have proposed that ethical truths are knowable by intuition, usually understood as a form of a priori knowledge, while ethical expressivists and naturalists have not developed forms of specifically moral epistemology.

In recent work on emotions the view is however emerging that emotion is analogous to perception in being both spontaneous and contentful, and able to justify normative views. I will argue that Charles S. Peirce’s semiotic ideas might be fruitfully applied in developing an empirical ethics. Peirce distinguished between emotional, energetic and logical interpretants, which all may have (dynamical) objects of which they may be correct and mistaken. This opens the possibility of revising our ethical views in light of (collateral) emotions, analogously to the revision of (non-normative) theories in light of (collateral) observation. Indeed, the purpose of Peirce’s “Study of Great Men” undertaken with his students at Johns Hopkins in 1883–4 was, as he later explains, to “explode the ordinary notions that mathematical treatment is of no advantage when observations are devoid of precision and that no scientific use can be made of very inexact observations” (7.256).

The most central problem for this approach could be titled the causal question: are, say, feelings of indignation towards an action caused by its wrongness? Drawing from Peirce’s (original) pragmatism I will suggest that this issue is not due to the specific nature of emotion as opposed to perception and its justificatory powers, but a variant of the more general problem of perception, roughly, that there is no immediate way of distinguishing between a perception of actual objects and illusions. Moreover, I will argue that the causal question is motivated by a simplistic ethical skepticism blocking the way of (scientific) inquiry into ethical questions.

Paper 4: Peirce’s First Rule of Reason, and History

The First Rule of Reason is one of the pillars of Peirce’s Pragmatism. Peirce describes it as a logical, methodological and epistemological maxim aiming at the cultivation of “the desire to learn”. From the maxim, there follows one corollary – Peirce claims – “which itself deserves to be inscribed upon every wall in the city of philosophy: do not block the way of inquiry” (EP2, 48).

In this paper I will address the relationship between Peirce’s Rule of Reason and his concerns with the history of science. Drawing on archival material, I intend to show that Peirce’s Rule of Reason was first formulated in the broader context of a larger body of works that should have eventually converged in a (never completed) book on the History of Science. I will argue that this is not a coincidence, as Peirce’s Rule of Reason becomes much more robust when placed in relation to the history of science.

Susan Haack (1997) has forcefully argued that, despite the emphasis in current Peirce scholarship on the corollary of Peirce’s Rule of Reason, it is indeed Peirce’s stress on the desire to learn that deserves philosophical attention, as it constitutes the epistemological and methodological core of Peirce’s maxim. Without rejecting her interpretation, I want to show that her argument can be stretched further, to encompass the very context in which the rule was conceived. The desire to learn is the hallmark of genuine scientific research, but this goal can be pursued only with a critical eye to the past. Peirce’s Rule of Reason elevates the desire to learn to a normative maxim, but the maxim itself would be empty without a specification of what is
it exactly that we learn, and where we learn it from. The historical nature of knowledge is the answer, in this case. By providing concrete examples of logical reasoning in the context of practical action, the history of science prompts a critical relationship with our past that renders it the very fuel of scientific inquiry.