The new mechanical philosophy is particularly focused on the issue of causal explanation of natural phenomena and offers an interesting methodology of causal discovery and building causal models. The uniqueness of new mechanical philosophy consists in fact that, to certain degree but not sufficiently, it has embraced two approaches to causal explanation: the empirical-physicalist and the probabilistic one. The aim of this project consists in elaborating a unified framework, labelled CFPI (causation-foundation-probability-interaction), for the mechanistic causation. CFPI will offer new formal tools for representing causal mechanisms and to analyze mechanistic explanations.

The project is divided into three parts. In the first part of the project, I will focus on the philosophical foundation of mechanistic causation by examining the admissibility of the existence of infinite chains of causal mechanisms. This part of the project will concern both the problem of the metaphysical causation (nothing happens without a cause) and the explanatory reasoning (nothing without reason or foundation). In the second part of the project, I will elaborate probabilistic reasoning in case of recurrent causal mechanisms. I will particularly work on two aspects: formal characterization of the structural properties of recurrent mechanisms and introducing probabilities in the description of specified aspects of mechanisms. In the last part of the project, I will elucidate the mechanistic explanation as the sort of defective causal explanation since it is employing epistemic strategies of abstraction and idealization. Referring to the case study from life sciences, I will formulate some general methodological principles of the interactive approach to causal explanation, which is operating due to controlled application of incomplete causal explanations. I will present the account of explanatory interaction as a middle-ground position between reductionism, on the one hand, and "radical pluralism", on the other. It is envisaged that this middle-ground position will have the following features. Against reductionism, it will reject the view that some explanations (e.g. molecular or neuroscientific ones) have epistemological or ontological priority. Against "radical pluralism", it will reject the view that sciences are epistemologically disunified.

The main theoretical results from the whole project will evidence that CFPI framework can be useful tool to assess both strengths and limitations of so far elaborated mechanistic theories of causation and conceptions of mechanistic explanation. The first and the second part of the project deals directly with the ontology of causal mechanisms and at the same time aims at developing new formal tools to deal with philosophical aspects of mechanistic causation. The third part focuses on the explanatory issues in straight connection with scientific practice. Such a structure of the project highly increases feasibility of providing really a unified framework for the mechanistic causation.

The method adopted in the project is based on conceptual analysis, i.e., precise definitions of key concepts, detailed analysis of the examined issues, axiomatization. The project will use typical methods of analytic philosophy and philosophy of science: conceptual analysis, formal approach, study of relevant aspects of mechanistic explanation, case study.

The results of the project have a direct bearing for the development of contemporary philosophy of science, especially in case of the debate on mechanistic explanation and foundations of causation. The project would not only extend the research conducted in the discipline but will offer a novel approach to the foundation of mechanistic causation and formal representation of causal mechanisms and methodological analysis of mechanistic explanation.

The project will touch following issues:

- how to make logically tractable functional structure of mechanisms,
- how to introduce probabilistic reasoning to the realm of mechanistic causation,
- how to approach in a formal way elusive notion of mechanistic causal production (which is the unobservable causal power of mechanisms to produce objects, events, or certain states),
- how to interpret the principle of determinism in the light of not well-founded mechanistic causal relations,
- how to approach mechanistic explanation as the sort of defective (incomplete) causal explanation.

Since the project addresses the central issues of the contemporary philosophy of science – mechanistic causation and explanation – and the research proposed in this project is based on the latest scientific literature on the topic, the results of the project should be valuable in the history and philosophy of science field.