The goal of the project is to make a significant contribution to modern epistemology. While traditionally the field is understood as theory of knowledge, this project belongs to the area of belief rationality: (1) what norms regarding beliefs (or degrees of belief, i.e. credences) are there which would bind rational agents? And (2): how can we argue for these norms?

As for (2), a recent trend in epistemology is to appeal to the notion of epistemic accuracy, which roughly means "closeness to truth". The accuracy-centered approach claims that epistemic accuracy is the fundamental source of validity of epistemic norms of rationality. Namely, if a norm constraining rational credences is valid, it is so because such constraints promote accuracy. Philosophers who attempt arguments of this sort typically use formal methods, e.g., rigorously defined mathematical measures of inaccuracy (roughly, "distance from truth"; it is more amenable to formal treatment than accuracy).

There are a few pressing issues regarding the formal treatment of the notion of inaccuracy which will be pursued in this project, for example the question of the best inaccuracy measure. One research goal is to investigate recent arguments against one of the most popular measures, the Brier Score, according to which in some situations in which the agent clearly improves his or hers credence by excluding a false hypothesis, his or hers inaccuracy as measured by the Brier Score increases. Another goal is to investigate a promising measure of inaccuracy which, by employing the notion of entropy, has a connection to computer science.

Irrationality has numerous sources. Some of them involve features of one's credences. For example, an agent is incoherent if that agent's credences are not classical probabilities. An agent is exploitable by means of a Dutch Book if there is a set of bets all of which the agent considers to be fair, but which taken altogether guarantee the agent's loss. And while connections between incoherence and inaccuracy have been a subject of recent discussion, one of the research goals of the current project is to add a third source of irrationality, Dutch Book exploitability, to the mix, to better understand the connections between various forms of irrationality.

As for (1), in recent decades quite a few candidates for epistemic norms of rationality have been discussed, for example:

- Probabilism, which says that credences of rational agents should be classical probabilities;
- the Principal Principle, which requires coordinating one's credence in A with one's credence about the chance of A;
- the Principle of Reflection, which deals with current credences of a rational agent conditional on the agent's future credences;
- the Principle of Indifference, which requires one to, in the absence of any relevant evidence, distribute one's credence equally amongst all possibilities under consideration.

Since it is reasonable to assume that credences and chances are probabilities, some of these norms require us to consider probabilities of probabilities, that is, higher-order probabilities. Throughout the years the field of formal epistemology has abounded with arguments concerning these norms. Unfortunately, the vast majority of them, despite involving supposedly rigorous "theorems" or "lemmas", have been informal in crucial aspects, not using any rigorously defined structures for handling higher-order probabilities. And so many "results" in formal epistemology are actually highly suspicious. One of the goals of the current project is to provide a rigorous framework and philosophically well motivated framework for modelling higher-order probabilities. This will allow philosophers who aspire to rigorous reasoning about these issues to achieve their goal.

A number of questions regarding the logical structure and competing formulations of the norms have appeared recently which will be investigated during the project. For example, foremost authors in the field display widely differing views as to whether the Principal Principle implies the Principle of Indifference, and if so, why that is the case. Once the framework mentioned in the previous paragraph is established, this sort of questions will also be pursued.

In summary, the project will help us understand the connections between various norms of epistemic rationality and forms of epistemic irrationality. This will be achieved by philosophical analysis backed by rigorous mathematical arguments.