Human beings share a large amount of genetic material with other primates. The same is true regarding the structure and function of the brain, and some advanced cognitive skills, such as the capacity to use tools. However, despite these similarities, technologies invented by humans—aircraft, architecture, or IT—are much more complicated and sophisticated than relatively simple tools produced and used by chimpanzees, like rigid sticks for fishing termites from mounds. This ambiguity raises the question about the origins of cognition. Trying to answer the question, many cognitive scientists traditionally limit themselves to discussing the internal computational system of the human being. On the other hand, a research approach emphasizing that relatively simple human-made could reshape our cognitive capacities has been gaining popularity for at least the last three decades. In this scenario, even relatively simple artifacts make us smarter by building a scaffolding for collaboration between peers or even significantly enhancing our cognitive toolkit shared with other animals. This approach assumes that some artifacts are not merely material objects.

According to Don Norman (1991), one of the pioneers of both cognitive science and design studies, some of artifacts could be called "cognitive," since they "maintain, display, or operate upon information in order to serve a representational function and (...) affect human cognitive performance." In our daily life as well as in scientific practice, we aid ourselves by relying on many cognitive artifacts. We use various external memory aids, like timetables and calendars, to remember our duties, maps to navigate in the environment, mathematical symbols to calculi, or diagrams to make inferences. What is more, they not only scaffold or extend the cognition of individuals but also allow division of cognitive labor in wide, or distributed, systems involving many individuals. In the philosophical and cognitive science literature it is well recognized that artifacts facilitate problem-solving, but also aid cognition in time scales longer than "here and now." For instance, findings of developmental psychology show that gaining experience in using numerals by children facilitates the transition from the innate capacity to process magnitudes into stable and precise knowledge about abstract numbers. Cognitive historians claim that disseminating new forms of artificial symbols has allowed the development of new fields of mathematics. Last but not least, cognitive archeologists argue that the increasing prevalence of using stone tools facilitated encephalization, and in consequence, the evolution of human cognition.

Even though a multitude of cognitive artifacts has been extensively studied by representatives of various subdisciplines of cognitive science and philosophy, there persists a lack of integrative account of investigating cognitive artifacts on various time scales: proximal "here and now," developmental, historical, and evolutionary. This project aims at filling this gap. Although, until recently, such an enterprise could seem like a pipe dream, we firmly believe that the development of cognitive science and its philosophy has delivered conceptual tools allowing the successful investigation. The project will be driven by systematic case studies and implemented within the new mechanistic framework. In particular, it will be based on the notion of a representational-computational mechanism, which requires, however, further development to include external representations. The main reasons for adopting the mechanistic framework are as follows. First, there is a growing consensus that current cognitive science research delivers, or at least should deliver, mechanistic explanations. Secondly, mechanistic approach has already been employed, but in a sketchy way, to account for wide cognitive systems with artifacts. Thirdly, it has been shown that the mechanistic framework is well-suited to integrative work, though previous proposals focused mainly on individualistic cognition. Having appropriately developed notion of representational-computational mechanism at hand, the project will elaborate a new version of the continuous intertemporal integration suitable to account for artifacts-based cognition on various time scales.

In our investigations, we will use methods of scientifically oriented philosophy, with particular emphasis on the analysis of findings from fields such as cognitive science of problem-solving, interaction studies, cognitive development, cognitive history, cognitive archeology, and evolutionary theory. The project will be implemented in an interdisciplinary and international collaboration involving both the core research team (3 persons including PI) and external collaborators from the University of California San Diego and the New University of Lisbon. We believe that the project will facilitate a greater and more precise understanding of why, how, and when our inventions and environment improve our cognitive skills.