

**PROJECT TITLE:** Cognition and representation in non-symbolic programmes in cognitive science (Dynamic and ecological approaches to learning in perception-action, to the concepts of computation, algorithm and implementation, and to the induction of grammatical structures) (CREASEC 3)

## **SUMMARY**

(brief and precise, outlining only the most relevant topics and the proposed objectives)

Recent “post-cognitivist” developments call for a review of the cognitivist division between a computational, an algorithmic and an implementational level. Our aim is to develop, within the post-cognitivist paradigm, the dynamicist and ecological approaches, both at the more philosophical level, as well as in terms of experimental and modelling work with artificial neural networks. Specifically, our aim is to:

- (i) analyse in a new fashion the notions of computation, algorithm, and implementation, and the existing relationship among the three notions;
- (ii) emphasize the dynamic and ecological approaches in perception-action; and finally
- (iii) generate new testable predictions in order to contrast cognitivist and post-cognitivist hypotheses in the field of the induction of grammatical structures by means of artificial neural networks.

Our core idea is to contribute to our understanding of cognitive phenomena as a result of the complex interaction among brain, body and environmental factors. Our working hypotheses are that (a) it is possible to describe the processes of perception, learning and action by means of dynamical systems theory, taking as a unit of analysis variables at an ecological scale, and that (b) the notion of an “algorithm” is not necessary in post-cognitivist explanations. In this way, our objective is to contribute to our appraisal of cognition via a dynamical and ecological approach to learning in perception-action, and by means of an understanding of our grammatical competencies, and to make progress in the study of the relation between the levels of computation, algorithm and implementation.