



6<sup>th</sup> Framework Programme  
Anticipating scientific and technological needs

## **NEST**

New and Emerging Science and Technology

REFERENCE DOCUMENT ON

# **“What it means to be human”**

**2003/4-NEST-PATHFINDER INITIATIVES**

**16 December 2003**

This document complements the NEST 2003/4 work programme, by providing more detailed guidance to proposers on the above PATHFINDER initiative.

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Please note that there is a National Contact Point (NCP) for NEST in your country who can offer personalized services. The mission of NEST NCPs is to inform, advice and support potential applicants in the preparation, submission and follow-up of NEST proposals.  
For contact details: <http://www.cordis.lu/nest/ncp.htm>

## 1. RATIONALE AND OBJECTIVES

This PATHFINDER initiative is intended to exploit the new scientific opportunities which exist at the interface between the cognitive sciences and related disciplines and to give momentum to the transformation taking place in the cognitive sciences as the result of these interdisciplinary developments.

It is a European initiative, which aims to build cross-national as well as cross-disciplinary links, in order to support the development of European competence which will have payoffs for science, for society and for the economy in the longer term.

New developments in genomics, neurobiology, etc., are making it possible to examine cognitive phenomena at different levels of analysis, linking genetic and biological dimensions to the behavioural and ultimately social and cultural. This suggests the prospect of a more integrated understanding of the human mind/brain, in the sense of an organ which has been shaped by human evolution, and which encompasses (amongst others) the following ideas:

- that “individual intelligence” is multidimensional, encompassing cognitive, emotional, communicational, perceptual, and other faculties that are highly inter-linked, and functionally integrated;
- that the characteristics of the mind are intimately connected to the structural features of the brain, and human biology in a more general sense;
- that the human brain and mental faculties have been influenced by multiple selection pressures, operating at different levels, with significant interactions between physiological, mental, cultural and environmental factors;
- that the mature mind is created through a process of individual development, linking genetic, environmental and socio-cultural factors, which is itself the outcome of evolutionary processes.

This global understanding of the mind is clearly a very long way off. But in order to make progress towards it, there is crucial need for interdisciplinary work, to generate concepts that make sense not only at a particular level of analysis, but also within a broader “system of understanding” that encompasses these different levels. For example, if the links between genetics and mental faculties are to be understood, there will be a need to find categories for defining behavioural phenomena which allow them to be linked to genetic factors, and vice versa. This need for interdisciplinary work is all the more pressing because of the very rapid pace of developments in the various relevant fields, in particular in biology and genomics.

The combination of different levels of analysis and a wide range of scientific fields, would seem to open up an infinite variety of research directions. On the other hand, a more integrated, inter-disciplinary philosophy should also help to define more clearly the *constraints* on plausible explanation of mental phenomena, by “triangulating” between different perspectives. It will surely serve the cognitive sciences and the other disciplines involved by generating concepts, insights and explanations that are scientifically rigorous, and thus help to make real progress *within* any of these disciplines.

The question “*what features make human cognitive abilities unique, and what are the origins of these features?*” is scientifically precise and limited, but can be addressed from a number of disciplinary angles – from genetics through brain sciences through to cultural

analysis and the humanities. For this reason it offers a productive arena for real interdisciplinary work.

In addition to the payoffs for science, work in this area is expected to have important long term implications for technology, society and the economy. A more integrated understanding of the mind and brain will help us to understand ourselves, and to create better medical therapies, cognitive technologies and educational techniques, for example.

## 2. ORGANISATION OF THE INITIATIVE

NEST has limited resources, dedicated to early stage funding of emerging research areas. The organization of this initiative reflects these parameters. It will involve:

- A series of research projects (using the STREP instrument – specific targeted research projects), aiming to promote highly interdisciplinary research that will make substantial advances in understanding of human cognitive faculties from an evolutionary perspective.
- A networking action (using the CA instrument - co-ordination action), the function of which will be to develop a wider “community of knowledge” across Europe, to exchange knowledge and experience and promote a wider understanding of the implications of research across the various relevant disciplines, as regards “what it means to be human”.

In its management role, the Commission, for its part, will work to build links between this initiative and other research programmes and associated activities, at national, European and international levels.

## 3. WHAT KIND OF RESEARCH WILL BE PURSUED?

The work programme specifies that projects should bring different disciplines and levels of analysis to bear in novel combinations, to address specific questions which have high scientific interest in the context of the quest for an *integrated* understanding of human cognition.

The initiative is designed to foster scientific advance within a coherent perspective while at the same time encouraging researchers to come forward with novel ideas and approaches. The aim is to create a portfolio of ambitious “beacon projects” which, by seeking interdisciplinary opportunities at the limits of scientific knowledge, expand the knowledge base in significant ways.

Projects will have different specific objectives, and involve different combinations of disciplines, but should clearly reflect the overall thrust of this initiative and focus on the questions: “*what features make human cognitive abilities unique, and what are the origins of these features?*” To be specific:

- this initiative is concerned with understanding human cognitive faculties from a **comparative and evolutionary** perspective: how we have become what we are. The basic point of interest is the apparent paradox between, on one hand small genetic differences between human and other species and, on the other apparently vastly different cognitive capabilities. It is hoped that by forging an understanding of how

large qualitative changes emerge from small quantitative changes, it may be possible to arrive at answers (or at least constrain the possible answers) to important open questions about how the mind and brain work.

- the focus will be on *higher cognitive faculties*, such as thinking, reasoning, using language – the faculties that appear to be unique to humans - but these must be understood, both functionally and in an evolutionary sense, in the context of other mental capabilities and indeed the physiological traits of the human being.
- *Individual cognitive development* is considered to be an important component, as it reflects the fact that the mature mind is created by a biological (and socio-cultural) process, on which genetic and other influences act.
- The unit of analysis is considered to be the individual, while acknowledging that individual intelligence, and in particular higher cognitive processes cannot be fully addressed without reference to *social and cultural factors*, and that genetic and biological research depends on understanding of individuals within *populations*.

The research should identify and address innovative and “well-posed” problems – research challenges that promise tangible results and significant scientific advance at the frontiers of knowledge and the interface between disciplines, but which are also methodologically tractable given the current state of knowledge. Projects should demonstrate real interdisciplinary dialogue, which involves new collaborations across conceptual boundaries, rather than simply parallel work in different disciplinary areas.

The selection criteria (see below) are intended to ensure that proposals selected will be those considered to have the highest overall “value-added” in terms of advancing science and long term impact.

#### **4. WHAT KIND OF RESEARCH WILL NOT BE PURSUED?**

The following activities will not be funded under this initiative:

- research on brain or mental disorders within a medical (prevention/diagnosis/therapeutics) perspective. This does not exclude the use of data and analysis on brain or mental disorders as research tools, for other ends;
- research on artificial life, artificial intelligence, neuro-informatics and cognitive systems more generally. This does not exclude computational modelling, where relevant and appropriate.
- development of new infrastructure or major equipment and facilities for investigation;
- research which could be carried out under the thematic priorities of the 6<sup>th</sup> framework programme;
- research which is mono-disciplinary, or where there is no substantial interdisciplinary dialogue across conceptual boundaries.

## **5. WHAT IS THE FUNCTION OF THE CO-ORDINATION ACTION?**

The role of the co-ordination action (CA)<sup>1</sup> is to provide broader networking of the research community in Europe in relevant fields around the theme, and a forum for the development and exchange of ideas. One outcome could be a “community of knowledge” with a common strategic perspective.

It is envisaged that the approach will be broad and inclusive, bringing ideas to bear beyond the range of the work in individual projects. The CA should therefore consider innovative ways of building interaction and communication across diverse fields. It could consider how the broader interdisciplinary research agenda might develop in the future, and also address the question of how outcomes from this initiative might lead to practical applications of the knowledge generated.

The CA instrument may involve various different types of activity, including meetings, seminars, studies, exchanges of personnel, etc. Thus, depending on the proposals submitted, the strategy adopted and the specific work it carries out could be configured in a number of different ways. It could have a role in the co-ordination of research projects funded under this PATHFINDER initiative. It could organise think tanks, interdisciplinary meetings, workshops or seminar series on key topics etc.

A high level of public interest might be expected in this field of research, and this suggests that it will be important to involve a wider range of actors than those involved in the research projects, or indeed the research community more broadly.

The CA also provides the research community with a means to generate ideas for further development of research and related activities within the institutional environment of the European Research Area, including European and other programmes for training, mobility, infrastructure development, etc.

## **6. LINKS WITH OTHER ACTIVITIES AND EXPLICATIONS OF THE RESULTS.**

Proposers should be aware of other activities in the 6<sup>th</sup> Framework programme that bear on cognitive sciences, including research on neurosciences under Thematic priority 1 (Genomics) and on neuro-informatics under the Thematic priority 2 (Information Society Technologies, under the heading “Future and Emerging Technologies”).

It should, however be understood that the objectives of this NEST PATHFINDER initiative are distinct and clearly differentiated in their form and content from these other FP6 activities.

## **7. PRESENTATION OF PROPOSALS**

Proposals will be presented as individual FULL PROPOSALS for research projects (STREPs) or co-ordination actions (CAs), to meet the deadline 14 April 2004. They will be evaluated individually, according to the standard FP6 evaluation criteria for these

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<sup>1</sup> the possibility of more than one co-ordination action might be envisaged if there are compelling reasons for this.

instruments. A guide for proposers, and guidance notes for proposal evaluation will be published on the NEST web-site.

A pre-proposal check service will be provided up to three weeks before the deadline. This will enable brief feedback to be given to proposers, in order to help them assure the eligibility and judge the relevance of their proposals. This service is to assist proposers; it does not contribute to the official independent evaluation (peer review) of proposals, once they are submitted.

Proposers are encouraged to be concise and address the specific evaluation criteria in their proposals:

- **Relevance** : the specific objectives of the proposal and the cross-disciplinary dimension should be clearly set out. It should be shown how the proposal meets the requirements set out above, including ambitious goals and the broader spirit of the PATHFINDER initiative on “what it means to be human.”
- **Excellence**: The research should be presented in the context of an assessment of the current state of the art in the relevant fields, demonstrating the specific advances that are to be sought and how these derive from advances in the various disciplines and from the cross-disciplinary work involved. The feasibility of the methodology should be clearly demonstrated.
- **Impact**: the specific impact of the work in terms of scientific advance (empirical and theoretical) should be stated and justified, broader potential impacts and applicability in the short or long term should be set out.
- **Consortium**: The full range of competencies necessary to complete the work, at an appropriate level of experience, should be demonstrated.
- **Financial aspects**: the requirements for, and the use of, funds should be sufficiently detailed for the independent evaluators to assess the feasibility and cost-effectiveness of the use of resources (personnel and equipment). Project lifespan should not normally exceed 3 years and a community grant of €1.5 million.
- **Management**: The organisation of the work, including the ways in which cross-disciplinary effort will be achieved, should be set out. Any relevant ethical considerations should be stated, as well as the ways these will be addressed in the course of the project.