

Agropolis Fondation

&

Inria

Call for proposals “Computational Plants and Eco-systems”

[Ref. CfP 2008-03]

TERMS OF REFERENCE

Background

The aim of Agropolis Fondation, located in Montpellier, France, is to promote and support the development of international level projects (programmes for research and training by research) in agricultural sciences and sustainable development on themes and issues concerning both the North and the South. The foundation supports a Thematic Advanced Research Network (*Réseau Thématique de Recherche Avancée - RTRA*) as defined under the French Research Programming Act of 2006. The Foundation aims at providing complementary resources for the RTRA research units (see attached list) to help them attract high level scientists from abroad and reinforce international partnership.

From the outset, the Foundation has affirmed that the development of scientific partnerships at the interfaces between Agricultural Sciences and more fundamental disciplines, in particular Mathematics & ICST - Information and Communication Science and Technology-, is a key issue.

Inria, the French National Institute in Information and Communication Sciences and Technologies (<http://www.inria.fr>), has just published its strategic plan for 2008-2012. The priorities of Inria for the next five years are defined around the following key areas in ICST of *Modeling, Communicating, Programming* and *Interacting*, in addition to the interdisciplinary priorities of *Computational Engineering, Computational Medicine* and *Computational Sciences*, the latter includes Computational Plants, Ecology and Environment.

Inria, which has eight research centers in France, wishes to develop its facilities on a more permanent basis in Montpellier. There, it intends to focus its research efforts in the scientific field of *Computational Plants*, and to develop a partnership with the Agropolis Fondation, which Inria considers to be a major player in the scientific community.

Given their shared interests, Inria and Agropolis Fondation have decided to carry out common actions at the interface between Agricultural Sciences and Mathematics & ICST. The programme is called « Computational Plants and Ecosystems ». Its main thrust is a model-centered approach for plants, ecosystems, and plant utilization. This project includes 3 main topics, namely:

- computational modelling of plants and plant utilization,
- software platforms,
- international collaboration projects

Scope of the Call for Proposals

The present Call for Proposals (CfP) targets development- and innovation-oriented research activities that focus on main scientific challenges related to a better interface between agricultural sciences and biology, on one hand, and with mathematics, and information and communication science & technologies (ICTs) on the other hand.

The general scope of the CfP is the computational modelling of plants, their environment and their use.

The goal is to conceive, analyze, implement, simulate and validate models of plants and their interactions with ecosystems.

The modelling process produces a virtual representation of the plant and its environment, which can be implemented as computer programs, and used, for instance, for visualization, evaluation and optimization purposes, and generally as an experimental tool allowing the confrontation with data, the estimation of parameters etc.

Modelling plants as a system, or through its interactions with its environment, typically involves models of complex dynamic systems, the understanding of which involves more and more computer implementations and computerized experiments.

The following topics (non exclusive) are of particular interest in the context of this Call for Proposals:

- plant systems biology and integrative biology (signalling, adaptation, development, organogenesis and morphogenesis, including bio-mechanics, *etc.*)
- plant and plant pests and pathogens diversity, systematics and evolution (from phylogenetic approaches to field-oriented taxonomic identification systems; from population and quantitative genetics to plant breeding; *etc.*)
- plant/pest or pathogen interactions and symbiotic interactions (from molecular and cellular interactions to large scale epidemiology)
- ecosystems & landscape functioning, dynamics and management (interactions between plants and resources (atmosphere, water, nutrients, *etc.*); soil/plant roots interactions and related biogeochemical cycles; plant/plant and plant/pests and pathogens interactions; *etc.*)
- processing of plants for food and non-food uses (processes and their control, bioprocesses, bioreactors, *etc.*)
- integrated cropping systems (plantation, optimal fertilization, pest and disease control, harvest, post-harvest operations, *etc.*): design, optimization and assessment
- large scale data integration (high throughput genotyping & phenotyping, 3D-4D imaging, distributed sensor networks, *etc.*).

The research and development activities related to mathematical and computer modelling which are favoured under this Call include:

- multi-scale modelling (gene-cell-organ-plant-populations-communities-ecosystems-landscapes)
- dynamic models, discrete or continuous
- deterministic or stochastic models
- spatio-temporal models
- optimal control, optimization, game theory, decision making
- computer imaging, algorithmic geometry, virtual reality
- computer simulation, *in silico* experimentation
- software sensors and failure diagnostic
- coupling of models and data (data assimilation, computational statistics, model validation, *etc.*)

Eligibility of proposals submitted for funding by the Foundation

Eligibility is restricted to proposals:

- Involving at least one unit specialized in Agricultural sciences and one unit specialized in Mathematics or Information and Communication Science & Technology;
- Put forward by an RTRA unit (see attached list) and led by a couple of project leaders (Agricultural sciences/ Mathematics & ICST) who work in twos.

Description of the categories of funding

The present Call for Proposals is the first action of the Foundation at the interface between agricultural sciences and mathematics & ICST. As such, the Call is intentionally widely opened to the seven categories of funding support of the Foundation, as described below.

Category 1: Senior Fellowships¹

Category 2: Structuring scientific platforms, **restricted to software platforms, and including financial support for salaries of software development engineers.**

Category 3: Junior Fellowships

Category 4: Pre-doctoral, doctoral and post-doctoral Fellowships

Category 5: Support for doctoral or post-doctoral students performing part of their work abroad

Category 6: International thematic seminar/training

Category 7: Various funding supports, including

7.1 Support for the preparation of any type of proposal under Categories 1 to 6 (either research or training by research)

7.2 Support for the organization of high-level scientific events (conferences, seminars)

7.3 Support for the preparation of application for international calls for proposals (e.g. recruitment of fixed-term staff or consultant in developing proposals...)

7.4 “Release from teaching duties” with a view to contributing to the attainment of RTRA objectives

7.5 Support for publication and dissemination of research results

7.6 Support for small exploratory, risky and innovative projects (proof-of-concept studies, new frontier research) including projects focused on training by research

7.7 Invitation of Senior or Junior scientists for short period (less than 12 months)

These seven categories are further defined in [the attached table](#) which also presents the selection and specific eligibility criteria for each category, the required counterpart funding from the research units as well as the corresponding level of financial support that can be provided by the Foundation.

Proposals can combine several support categories. Such “Packages” are expected to create a strong leverage effect on the promotion or strengthening of strategic scientific themes and international visibility.

All proposals are expected to foster strong linkages between RTRA units and Inria and/or external partners specialized in Mathematics & ICST, and to create a strong leverage effect on international visibility and attractiveness.

¹ Proposals under this category should be submitted *jointly* by the prospective Senior Fellow and the relevant RTRA Research Units. See attached table for further details.

Criteria for the evaluation of the proposals

Proposals submitted to the Foundation shall be evaluated according to the criteria listed below. Complementary or specific eligibility or evaluation criteria for each category of support are defined in the attached table.

- a. Scientific quality: originality, innovativeness, feasibility. *In the case of proposals involving the development software platforms, and the recruitment of software developers, the capability of the teams to supervise this activity will be a key point in the evaluation.*
- b. Fostering strong linkages
 - Interactions between agricultural sciences and mathematics & ICST,
 - Interactions between temperate, Mediterranean and tropical issues to be tackled by the proposed project
 - Partnership strengthening
 - Contribution to increasing international attractiveness.
- c. Relevance to socio-economic and sustainable development issues. *Although the focus is clearly on stimulating the interactions between agronomy and ICST, proposals should explicitly state how its expected outputs (data, knowledge, software, tools, etc.) can be linked to broader issues related to sustainable development.*
- d. Value addition (What is the added value of the Foundation's financial support as compared to other sources of funding? Is the Foundation the most appropriate funding source for the proposed initiative? What is the leverage effect of the Foundation's funding to the proposed initiative?). Budget adequacy will also be taken into account.

Provisional Calendar

Depending on the category, proposals will undergo:

- ✓ Either a “*One stage process*” which consists of the submission of a Concept Note. This is the case for categories 3 to 7.

OR

- ✓ a “*Two-stage process*”, with 1) submission of a Concept Note (CN); 2) CN proponents receiving positive evaluation will be requested to submit a Full Proposal which will be subjected to a second round of review. This is the case for categories 1 and 2, and proposals that will be classified as “*Packages*”.

One stage procedure (categories 3 to 7)

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| - Call for Proposals | 10 April 2008 |
| - Deadline for the submission of Concept Notes | 4 June, by noon (12:00) |
| - Publication of results: the proposals selected for funding | 10 July 2008 |

Two stage procedure (categories 1 & 2 and “Packages”)

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|--|--------------------------------|
| - Call for Proposals | 10 April 2008 |
| - Deadline for the submission of Concept Notes | 4 June, by noon (12:00) |
| - Publication of results: CN selected for elaboration of Full Proposal | 10 July 2008 |
| - Deadline for the submission of Full Proposals | 10 September 2008 |
| - Publication of results: proposals selected for funding | 22 October 2008 |

Submitting proposals

- All Concept Notes submitted regardless of funding Category must follow the prescribed the 4-page format provided by the Foundation (attached), completed with the one-page financial annex format provided by the Foundation (attached).
- All Concept Notes must be written in English.
- Nota Bene: by submitting a proposal, the proponent assures that he/she has obtained the approval of his managing authorities and of all the participants involved in the project.
- For Junior and Post-doc Fellowships, the Concept Notes must include the CV of the candidate. If candidates have not been identified in due time, proposals can be submitted under the category 7-1, explaining the proposed process for candidate identification.
- For pre-doc and doctoral fellowship, the identification of the candidate prior to the submission of the proposals is not compulsory. The CN can be submitted without any identified candidate.
- Deadline: all CN must arrive at cfp2008-03@agropolis.fr by noon (12:00) on 4 June.
- For more information: please contact cfp2008-03@agropolis.fr

Documents attached

- Concept note and Financial annex
- Table of Funding Categories
- List of RTRA units

Documents available online

- All documents related to the present Call for Proposals are available online at <http://www.agropolis-fondation.fr> and [http://www. Inria .fr](http://www.Inria.fr)
- Information concerning the Foundation and RTRA is available online at <http://www.agropolis-fondation.fr>