Gaspard Monge Program for optimization and operational research

2016 Call for projects

SUMMARY

1. Introduction

The **Gaspard Monge Program for Optimization and operations research (PGMO)**, launched by EDF and the Jacques Hadamard Mathematical Foundation (FMJH) in 2012, is a new type of corporate patronage whose aim is to foster, liven up a mathematical community of researchers coming from academia and industry, working in the field of optimization and operation research from academic themes to industrial issues.

The objective is to support research projects through collaborative actions between academic researchers and industrial researchers, focused on solving industrial problems in the fields of energy and complex industrial systems. These projects are encouraged to be a kick-off for a future partnership between academic and industrial researchers.

All results produced in the scope of projects supported will be free and publicly available, respectful of the FMJH-EDF agreement creating PGMO. Reports, communications or papers will be freely published and free software production is encouraged.

This call for project is composed of 2 main areas :

- **PRMO : Mathematical Optimization Research Projects**
- **IROE : Optimization and Energy Research Initiative**

Projects are open to all academic researchers with no restrictions due to administrative or geographic location. Nevertheless, if a team from a lab outside France whishes to submit a project, they should associate themselves with a team in France. Agreement for supporting the project can be signed between FMJH and a lab outside France, provided this lab will ensure the management of the budget. Support for PhD to a non French team is possible but a joint supervision with a French team is required.

1.1. PRMO

The objective of PRMO is to support research in the field of optimization and operational research, as well as to create and enliven a scientific community in that field, and to help developing teaching of optimization (master degree and PhD). Projects supported by PGMO will have to be widely open. Cooperative projects between different teams from different horizons as well as projects leading to industrial applications will be encouraged.

The scientific program of PGMO encompasses the following themes : modeling, continuous optimization (convex and non-convex, non-smooth…), optimization of large systems (decomposition-coordination methods, centralized-decentralized optimization…), combinatorial optimization and operations research, optimization with uncertainty (stochastic, robust, stochastic optimal control…), global optimization (relaxation and approximation, semi-algebraic programming, stochastic algorithms…) as well as connected fields : artificial intelligence (learning…), statistical learning, risk management, uncertainties analysis…

Projects at the interface of optimization and Data Sciences are also encouraged.

The typical projects supported by PGMO in that sub-program consist of projects mixing researchers from different fields, with a common research objective in the field of optimization and operational research and may support for instance traveling, working meetings, internships.

1.2. IROE

IROE focuses on energy, mainly energy management. The objective is to support research projects, through collaborative actions between academic researchers and industrial

researchers, focused on solving difficult optimization problems in the field of energy, those problems being described in the IROE appendix.

Realistic data sets may be provided, and the teams will benefit from the help of EDF experts during the setting up of the project as well as its whole life.

A confidentiality agreement concerning datas and some specific EDF knowledge will have to be signed. It will nevertheless be possible, after keeping informed EDF, to publish results based on EDF data.

1.3. PGMO coordination and animation

As an objective of PGMO is to foster and liven up a research community around optimization and operational research, regular events will be organised.

Workshops or working sessions gathering project teams on close subjects will be organizing, with the aim of discussing the methods proposed for solving the problems.

A seminar is organised every month in the PGMO offices at Ecole Polytechnique. All project teams are asked to present their work in that seminar, at least once during the project. This seminar is widely open to the whole optimization community.

Big size projects are also invited to organize workshops.

Projects may use the PGMO offices at Ecole Polytechnique or ENSTA ParisTech for organizing working meetings.

2. Rules of the present call for projects

Projects will be submitted by filling an online form on the FMJH website : http://www.fondation-hadamard.fr/pgmo/call. Submissions may be written in French or English.

A summary of the project, which has to be understandable by non specialists will be asked. The quality of the submission documents will be taken into account for granting the financial support.

All submitted projects will be evaluated by the executive board and the scientific committee.

In view of the recommendations of the scientific committee and of the executive board, the steering committee will then decide which projects to support and the budgets allocated to those projects.

2.1. Rules and Agenda

Beware : this year, there is only one submission for PRMO and IROE projects. Nevertheless, in the case of 'one shot' submissions, the scientific committee of PGMO will interact with project teams before final evaluation and a second submission may be asked.

Publication of the call	12/2015
Submission	28/02/2016
Scientific committee	May 2016
Steering commitee	May/June 2016

Duration of the projects may be of 1, 2 or 3 years for PRMO and IROE projects. The PGMO will allocate a budget only for the first year of each project. A yearly evaluation (scientific and financial) will be made for each project, which may lead to renew or not the financial support.

Anyway, the support for PhD will be secured for 3 years.

2.2. Categories of projects

Projects must rely on research personnel funded elsewhere (permanent researcher, PhD student, postdoc, ...), specifically recruited staff (Internship, PhD students and postdocs) or visiting scholars. Given the differences of possible financial supports, projects are classified into three categories.

Category A projects will match most of the supported projects. Teams based outside France will have to be associated with at least a team in France for their application.

Category B projects (a limited number will be granted) deal with full funding PhD or post-doctoral fellowship contract. It is recommended that teams interested in Category B write a variant of their proposal based on a Category A project.

Category C projects are meant for invited professors. PGMO may only fund 6 months visiting professor, these projects are then primarily reserved for laboratories attached to Saclay campus.

PRMO projects are only eligible to A or C category.

Catégory A :

- **Internship** (3 to 6 months)
- **Short duration invitations for research visitors (travel and accommodation)**
- **Travel (for the researchers in the project team)**
- **Software, computers, data**

Catégory B :

- **PhD allocation**. The financial amount for the salary will be 33k€/year (including taxes and social security). Environment support (travel…) can also be asked, in the limit of 15k€/year. Only IROE project may be offered full PhD allocations. As the number of PhD allocations is limited, it is asked to the project teams to think also of a co-funding for a PhD (for instance, PGMO could support 1 or 2 years while the remaining 1 or 2 years are supported elsewhere, or environment could be supplied only….)
- **Post-doctoral**. The financial amount for the salary will be 50k€/year (including taxes and social security). Environment support (travel…) can also be asked, in the limit of 15k€/year. Only IROE project may be offered postdoctoral allocations. As the number of postdoctoral allocations is limited, it is asked to the project teams to think also of a co-funding. It is expected that the postdoc candidate has completed his PhD in a different laboratory. The perspective of professional insertion of the candidate after this postdoc must be explained in the application.

Catégory C :

- **Invited Professor**. This professor will be invited by a laboratory near the Saclay area. He will have to participate to some PGMO events (like the seminar), and to give an advanced course in optimization, either in the Paris Saclay Optimization Master or Hadamard doctoral school. Proposals have to be submitted by the inviting institution (CV, course proposal and research project). Such submissions may be considered at any time. The financial support will be at most 5k€ per month.

2.3. Important recommendations

Candidates for PGMO projects are invited to get in touch with the PGMO board (pgmo@fondation-hadamard.fr) who may help them to build their project before submission.

In the case of IROE projects, it is mandatory to get in touch with the PGMO board (pgmo@fondation-hadamard.fr) for getting the help of an EDF expert.

Project teams are invited to consider the possibility of grouping with other teams who may work on a close topic. Projects grouping many teams of different laboratories are encouraged in order to favour exchanges between laboratories on close topics.

Young researchers participation is highly encouraged.

Pluridisciplinarity is encouraged.

Projects with several labs will have a unique leader, who will be in charge of the management of the allocated financial support.

PGMO being a program of the FMJH, which is part of the FCS (Fondation de Coopération Scientifique Campus Paris Saclay), all projects teams are asked to participate to research events in the Saclay area (at least in the PGMO seminar). Big size project will have a part of their budget devoted to organizing events on the campus.

It is recommended that each researcher is not involved in too many different PGMO projects.

All works published related to a PGMO supported project have to mention the support of PGMO, using the following formula (among cases) :

In french « Ces travaux de recherche (congrès, ateliers, …), ont bénéficié du support du 'Programme Gaspard Monge pour l'optimisation et la recherche opérationnelle de la FMJH' et du soutien d'EDF »

Or in English : « This research (meeting, workshop …), benefited from the support of the FMJH 'Program Gaspard Monge for optimization and operations research', and from the support from EDF »

Management fees shall not be funded by the PGMO. The former are considered as being part of the contribution of the partner laboratory to the project. Project leaders shall get a formal authorization from their laboratory director (or equivalent) for managing their project.

2.4. Agreements information

For each project, an agreement will be signed between the institution which will take in charge the management of the financial support and FMJH. Only research and teaching institution may sign those agreements.

2.5. Note on datas

As far as possible, industrial sponsors will provide data and/or references to public data sets for the sake of publication and reproducible research. Projects must emphasize the link with real data. Projects based on public data or on the creation of public data similar to industrial or confidential data will be particularly welcome.

2.6. Contacts

PGMO coordinators : Stéphane Gaubert, Pierre Carpentier
IROE leader : Sandrine Charousset

FMJH administrator (in charge of negociating agreements between FMJH and partners) : Ariane Littardi
Management assistant : Virginie Fruchard
Email : pgmo@fondation-hadamard.fr

3. Scientific scope

3.1. PRMO

The scope of PRMO corresponds to the one described in section 1.

PRMO projects will be in the fields of optimization and operational research and will have to fulfill at least one of the following conditions :

- Research projects with young researchers or meant for attracting students or young researchers to optimization / operational research
- Collaborative research project or network between several different teams. *Those projects will be asked, after 1-3 years of existence, to make a synthetic presentation of their work, which should be understandable by non specialists of the field, and which should identify further research perspectives in other fields of optimization, as well as new applications.*
- Pluridisciplinary project between mathematics and computer science
- Research project with industrial or societal applications,
- Research project looking at interactions between optimization and other fields of mathematics
- Teaching of optimization project with, for instance, creation of multi-media documents or adapted pedagogic tools. It is recommended for this kind of projects to get in touch with PGMO board very early in order to make links with existing initiatives in that topic.
- Projects at the interface of optimization and Data Sciences

Scientific quality will be a leading criteria.

3.2. IROE

IROE is meant for solving difficult problems regarding management of energy. A detailed description is provided in the IROE appendix.