

IBM Italy S.p.A.

Circonvallazione Idroscalo – 20090 Segrate (MI) – Italy

Marie Curie Actions, Experienced Researcher

Deadline for Applications: February 15, 2014

Expected Starting Date: April 1st, 2014

Job description

The job is a full-time position for an Experienced Researcher (ER) in the field of Mathematical Optimization, with special emphasis on the development and improvement of algorithms for Mixed Integer Linear and Mixed Integer Non-Linear Programming.

Job Duration 18 Months

Main Research Field Mathematics

Research Sub Field Engineering

Institution description

The project will take place at the IBM-Unibo Center of Excellence in Mathematical Optimization, located at the Department of Electrical, Electronic and Information Engineering "Guglielmo Marconi" (DEI) of the University of Bologna, within the MINO Initial Training Network (ITN) funded under the Marie Curie 7th Framework programme.

[IBM](#) is a globally integrated technology and consulting company headquartered in Armonk, New York. With operations in more than 170 countries, IBM attracts and retains some of the world's most talented people to help solve problems and provide an edge for businesses, governments and non-profits. Innovation is at the core of IBM's strategy. The company applies its business consulting, technology and R&D expertise to develop and sell software and systems hardware and a broad range of infrastructure, cloud and consulting services.

The IBM–Unibo Center of Excellence in Mathematical Optimization is a joint laboratory between IBM Italy and the University of Bologna (Unibo), founded in 2011 with the aim of creating a tight collaboration and exchange of know-how between IBM and Unibo, and promoting Research, Development and consulting activities, especially in the fields of Optimization and Operations Research. Working in the IBM–Unibo laboratory, the ER will have the opportunity to collaborate with the Operations Research (OR) group at DEI, which is highly

recognized for its strong record in Integer Programming and Combinatorial Optimization in both methodological development and computing.

The ER is also expected to work in tight contact with the IBM ILOG CPLEX Research and Development (R&D) team. [IBM ILOG CPLEX Optimizer](#) is one of the top level commercial solvers for Mixed Integer linear and non-linear programming (MIP). The CPLEX R&D team develops the most up-to-date algorithmic methodologies for MIP, and it is also well recognized for its research activity in this field.

Working place

The project will take place at the IBM–Unibo Center of Excellence in Mathematical Optimization, located at the Department of Electrical, Electronic and Information Engineering “Guglielmo Marconi” (DEI) of the University of Bologna, Viale Risorgimento 2, 40136, Bologna, Italy.

The project will have the scientific supervision of Dr. Andrea Tramontani (IBM Italy – CPLEX R&D).

Project description

The main area of interest for the project is on general purpose techniques for the exact solution of Mixed Integer Linear Programming (MILP) problems and Mixed Integer Non-Linear Programming (MINLP) problems that are quadratic in the objective function and/or in the constraints. For the MINLP case, problems whose continuous relaxation is not convex will also be considered.

The emphasis is on methodological aspects (in cooperation with the other partners of the MINO network), in conjunction with software implementations for solving problems in practice.

Marie Curie Initial Training Network (ITN) MINO

The MINO ITN is an interdisciplinary research and training network of 11 full academic partners, 1 associated academic partner and 3 industrial companies. All partners are internationally recognized to be leading experts in the field of Mathematical Optimization. The project has been funded under the [Marie Curie Framework 7th programme](#).

The aims of the MINO ITN are:

- 1) Training of the next generation of experienced researchers and managers in the field of Mixed-Integer Nonlinear Optimization.

- 2) Strengthening the cooperation between Academia and Industry by developing innovative decision making tools that will be used in a variety of applied fields, including energy production and distribution, image processing, biological networks, just to mention a few.
- 3) Pushing forward the scientific frontiers of Mixed-Integer Nonlinear Optimization.
- 4) Consolidating and expand the network of collaborations among the partners.

The network will deliver a joint multidisciplinary research and training programme for eleven Early Stage Researchers and three Experienced Researchers (ERs).

For further information about the network and the available positions, please refer to the project webpage www.mino-itn.unibo.it, or contact mino.recruitment@gmail.com, or refer to the associated vacancy announcements that can be retrieved from the [Euraxess website](#) using the keyword MINO.

IBM ER Activity

In the framework of MINO ITN the successful applicant for the ER position at IBM will be involved in both research and training activities as required by the general framework of ITN networks.

The research project available at IBM mainly focuses on the development and improvement of general purpose algorithms for the solution of MILP problems and MINLP problems that are quadratic in the objective function and/or in the constraints.

The training activities will involve scientific training such as seminars and other research activities, as well as soft skills development as the participation to courses on different aspects related to the development of commercial software (e.g., courses on Intellectual Property enforcement and protection, courses on the integration between open source and commercial software, etc.). Finally, software development and software engineering skills of the enrolled ER will be reinforced by working in tight contact with the IBM ILOG CPLEX R&D team.

Candidate Profile

The candidate is required to have a solid background in applied mathematics, including nonlinear programming and discrete optimization, and software development skills, as well as a strong interest in the computational aspects of mathematical optimization.

General evaluation criteria will be the following:

- educational background relevant for the chosen position;
- previous research experience, relevant to the chosen position;
- language skills (good oral and written communication skills in English is compulsory);
- networking and communication skills (to be evaluated by an interview);
- willingness to travel internationally for the purpose of research, training and dissemination.

Eligibility requirements

ER appointments are full-time, fixed term for 18 months. Candidates matching the required profile for the available position will be continuously interviewed until a successful candidate is appointed.

There are strict eligibility rules associated with the recruitment of Early Stage Researchers in Marie Curie Initial Training Networks.

Career: At the time of recruitment, applicants for the ER posts must either possess a Ph.D. degree or have at least four years of research experience, but not have more than five years of research experience. Research experience (full-time equivalent) is measured from the date when an ER applicant obtained the degree which formally entitled him/her to embark on a doctorate, either in the country in which the degree was obtained or in the country in which the research training is provided, irrespective of whether or not a doctorate was envisaged.

Mobility: Trans-national mobility (i.e. move from one country to another) is an essential requirement of Marie Curie Training Networks. At the time of recruitment by the host organization, the ER must not have resided or carried out their main activity (work, studies, etc) in the country of the host institution for more than 12 months in the 3 years immediately prior to the reference date.

Secondments: Applicants must also be prepared to be seconded for a total duration of up to three months to other network partners to carry out part of their research work.

Language: A good knowledge of the English language is required, fluent speaking and writing, and it will be evaluated during the selection process.

How to apply

Applicant should provide the following documentation:

- The Application Form duly completed (attachment 1).
- A detailed CV including a summary of technical and scientific experiences. If applicable, the CV might contain detailed descriptions of previous research projects, a list of publications, and/or presentations at scientific meetings.
- A letter of motivation including research interests, reasons for applying for this programme, etc.
- If the candidate has a Ph.D. degree, copy of his Ph.D. Thesis; otherwise, undergraduate level certificates including university grades and the detailed list of university courses (with grades).

Copies of any other scientific publication that the candidate believes significant are also welcome. The applicant might also provide up to two recommendation letters with names and contacts of the two referees who are acquainted with previous academic and research/professional activity of the candidate.

The documents above need to be filled/uploaded online via

<https://www.easychair.org/conferences/?conf=mino2013>

An e-mail acknowledgment will be sent once the application is submitted. In case of technical problems, please refer to mino.recruitment@gmail.com

Evaluation and Interview

For further information concerning this position, please contact Dr. Andrea Tramontani.

The selection process will consist of CVs and records evaluation and an interview.

The Evaluation Committee in charge for the whole MINO project and consisting of the site leaders of all involved institutions will evaluate the candidates' CVs and their records. Based on the excellence of previous scholar and research career of the candidate and on the relevance of previous experiences with the work to be carried out during the 18 months commitment, the committee will either reject the application or admit the candidate to the interview. The interview to assert the technical skills and motivation of the candidate will be carried out at the Host Institution by the site leader and department members. For those candidates not able to travel to Bologna (Italy) the interview process will take place over the phone or by Skype.

After the interviews, some of the applications can still be rejected. The remaining candidates will be ranked according to both their records and the interview itself. The candidate at the highest rank position will be offered the position. If for any reason the selected candidate will decline the offer, or will

fail to comply with the requirements for enrolment in the position, the one following in the list will be chosen.

Rights and Responsibilities of researchers participating in Marie Curie Actions

The European Charter for Researchers is a set of general principles and requirements, which specifies the roles, responsibilities and entitlements of both researchers and the employers and/or funders of researchers. The aim of the Charter is to ensure that the nature of the relationship between researchers and employers or funders is conducive to successful performance in generating, transferring, sharing and disseminating knowledge and technological development, and to the career development of researchers.

It is obligatory for applicants to read and understand the detailed information regarding the rights and responsibilities of researchers engaged in a Marie Curie Initial Training Network. The European Charter for Researchers can be accessed at: <http://ec.europa.eu/euraxess/index.cfm/rights/europeanCharter>

Employment contract and remuneration

The selected candidate will be appointed under an employment contract with full social security and fiscal coverage, as foreseen by the Italian national legislation.

The remuneration will be compliant with the rules of the ITN-PEOPLE, as foreseen in the [People Work Programme 2012, Annex III](#) (taxes depend on the country of the host institution).

ATTACHMENT 1: ER-ITN MINO APPLICATION FORM

The undersigned (surname and first name) _____

Born in _____ (_____) on _____

city Country

Address _____ Post code _____

City, Country

Telephone (*optional*) _____ / _____ ; e-mail address _____

IS APPLYING FOR

the competition for the awarding of no. 1 fellowship/s for research programmes to be carried out at _____ with reference to the call of Experienced Researcher -ITN MINO _____.

THE UNDERSIGNED HEREBY DECLARES UNDER HIS/HER OWN RESPONSIBILITY:

- citizenship (*specify*) _____ ;

- not to have been convicted for criminal offenses (otherwise, indicate which _____);

- to have been awarded a Ph.D. / Master degree (delete what not applicable) in _____ at University of _____ on (*date*) _____ discussing the thesis _____

_____ under the supervision of Professor _____

Concerning the Mobility Rule at *April 1, 2014* *:

From	To	Place	Activity
	<i>April 1, 2014</i>		

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**The candidate shall complete the table indicating, under his/her sole responsibility, the reference dates, the place of activity (town and country) and activity carried out during the previous 5 years.*

The candidate acknowledges that the MINO Evaluation Committee must accept the documents for the sole purpose of the admission to the opening and that the selected candidate may be required to provide the official translation and a legal recognition of his/her qualification, if required by the national Law of the Host Institution.

The undersigned will receive all communications regarding the competition at the following address _____, and will advise of any change of address.

THE UNDERSIGNED HEREBY ENCLOSURES TO THIS APPLICATION THE FOLLOWING DOCUMENTS FOR THE PURPOSE OF ASSESSEMENT

- Curriculum vitae
- Letter of motivation
- Ph.D. Thesis or undergraduate certificates (including grades and university courses)
- N. _____ reference letter(s)

(Place and Date)

(Candidate's Signature)