(BL231/2016_IST-ID)

CALL FOR A RESEARCH MASTER FELLOWSHIP AT AN R&D INSTITUTION

Five (5) Master grants

The present call for applications refers to **5 research positions for MSc holders** to perform R&D within the project RD0652 - DM4Manufacturing, POCI-01-0145-FEDER-016418, with the financial support of the FCT/MCTES (PIDDAC), the following conditions:

Scientific Area: Engineering Science and Technologies, Operation research, Operation Management

Eligibility:

Academica Qualifications:

- Master Degree in Engineering, MSC Degree, Computer Science,Computer Science, or similar.
- Excellent candidates with other backgrounds will be also considered.

Minimum Profile Required:

- Experience and knowledge of operational research techniques and optimization algorithms.
- Sound knowledge of computer programming.
- Previous research publications in this or similar domains.
- High knowledge of English, sound and wrtitten.

Preferential criteria:

- Previous experience in one of the following specific areas: Engineering and management problems.
- Programming skills.
- Good knowledge of english.

Work plan: .The DM4Robotics project proposes a multidisciplinary approach to perform the co-development on advanced robotics and advanced Decision making techniques to prepare the next generation of manufacturing. Manufacturing competitiveness depends largely on its productivity, flexibility and agility to react to market demands. Advances in manufacturing technologies with high flexibility, such as robotics, will play an important role in future manufacturing industries, but its impact in the overall decision making strategies is still an open question.

The main objective of the DM4Manufacturing project is the integrated development of advanced robotics with decision making methodologies to maximize the productivity of the factories of the future. On the other hand the decision making tools will have to evolve to deal with production technologies with high flexibility, capable of performing different tasks with minimum reprogramming, capable of sensing the environment and working in environments designed for human-use. This new paradigm represents a challenge for the traditional production process modelling techniques, where machines are almost static resources and the flexibility is completely provided by the human resources. Following a human-centered automation methodologies, the DM4Manufacturing project will search the optimal automation level for each manufacturing scenario, to produce efficiently but also to promote better working environments.

The 5 Master Grants are awarded to the following assignments:

Monitoring advanced robotics operations for sustainability Manufacturing companies deal, on a real-time basis, with shop-floor uncertainties and complexities associated with the high number of components and with the unstable market. To successfully control highly automated manufacturing processes, real-time data collection is required while enabling the synchronization of the information flow with the physical flow of materials. Data mining should be applied to extract and analyze the collected data, translating the data into useful information (Key Performance Indicators (KPI)). Aiming to establish an integrated system of data collection and its assessment, a set of KPIs are going to be developed, quantifying the efficiency and effectiveness of actions in the manufacturing floor, the agility of the robots.
An innovative system of including sustainability issues in the planning and scheduling decisions through the inclusion of environmental and social indicators will be done, leading to a sustainable planning and integration system between robots and human resources.

Internal Logistics and inventory control Product based manufacturing industries rely in strong internal logistics operations that enable efficient production strategies, as assembly line feed and support or components? supermarket management. Inventory accuracy is cornerstone for production efficiency. Agile decision making in flexible manufacturing elevates the need for integrated planning and scheduling for overall shop-floor operations and control. This task focuses in solution methods for the augmented planning problem integrating internal logistics and inventory control requisites

Reactive Scheduling for efficient use of advanced robotics In a context of quick change in terms of demand variability, breakdowns, maintenances stoppages and production volume/capacity availability, innovative reactive scheduling solutions for efficient use of advanced robotic solutions in manufacture environment, are required. Solutions exploring quick responses to expected events with low computation burden are to be developed in this task based on a combination of approaches that will explore event driven policies coupled with exact formulation and meta-heuristic approaches where uncertainty is to be considered.

Planning and optimizing maintenance activities Maintenance activities have evolved from a supporting activity to an essential element of the business strategy for any manufacturing production system namely aeronautics and automotive systems. Characterized by a high degree of uncertainty, such activity emcompasses three main sub-activities that have been currently addressed in an independent form: capacity planning; parts forecasting; and task scheduling. This task explores the integration of such sub-activities pursuing higher flexibility and increased industrial performance. Bayesian Networks will be used within the problem structuring allowing for the linkage of the involved tasks with efficient forecast methods serving as inputs to the planning and scheduling of maintenance tasks, the latter defined through the use efficient optimization and heuristics methods.

The applicants are required to conduct independent and original research in the area mentioned above and to publish the research results in international high-quality peer reviewed journals.
In particular, must:

- Conceive original research built upon state-of-the-art knowledge
- Write and submit manuscripts to top peer reviewed journals
- Reinforce the participation in existing research networks and promote the establishment of new networks
- Participate in and organize scientific meetings
- Participate at unit´s scientific activities and collaborate in the unit's reporting duties

Legislation and official rules: Law N º. 40/2004, dated August 18 (Statute of Scientific Research Fellow); and updated regulation for Studentships and Fellowships of the Fundação para a Ciência e a Tecnologia

(www.fct.pt/apoios/bolsas/docs/RegulamentoBolsasFCT2015.pdf) and of IST-ID (http://ist-id.pt/files/sites/43/DecretoLei_202_20121.pdf).

Place of work: The project will be developed at the Centre for Management Studies, of Instituto Superior Técnico, TagusPark campus.

Fellowship duration: The grant covers 12 months and is expected to start on January 2017. The fellowship can be eventually extended for a period of 12 months till October 2019.

Monthly allowance: The monthly maintenance allowance is € 980, in agreement with the monthly maintenance stipend table of the grants directly attributed by FCT, I.P. within the country (http://www.fct.pt/apoios/bolsas/valores). The fellowship will be paid by bank transfer.

Selection method: The selection criteria is based on the Curriculum evaluation and the requirments necessary to apply, followed by an individual interview if the Jury requirets it: 90% cuuriculum evaluation (55%CV, 20% scientific domains and 15% Expertise) and 10% interview.

Selection Committee: President: Prof. Ana Póvoa (istid 3662), Prof. Tânia Varela (istid 5305) e Prof. Susana Relvas (istid 4867).

Publication/Notifications of results: All the applicants will be notified by e-mail.

Deadline: The call will be open from 23/12/2016 to 05/01/2017

Application:

All applications must be formalized by filing the following mandatory documents:

- Formulário ID B1 – Candidatura a Bolsa de Investigação (www.ist-id.pt);
- Motivation letter, including the candidate's research interests, identifying clearly the tasks above characterized, and view regarding his/her skills to fulfill the position;
- Detailed CV stating relevant data (name, qualifications, professional experience, scientific research, courses lectures (if any), research interests);
- One reference letter.

Applications should be sent in zip file, via email to the tania.pinto.varela@tecnico.ulisboa.pt