

## MIT PORTUGAL

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# TERMS OF REFERENCE FOR MIT PORTUGAL 2013 CALL FOR PROPOSALS

DRIVING INNOVATION THROUGH INTEGRATED TESTBED RESEARCH

NOVEMBER 2013

**MIT** Portugal

**FCT**  
Fundação para a Ciência e a Tecnologia  
MINISTÉRIO DA EDUCAÇÃO E CIÊNCIA



## 1. Synopsis

The MIT Portugal Program is inviting submissions for the 2013 Call for Research Proposal for Testbed Oriented Research.

MIT Portugal, an FCT initiative, is a strategic partnership between Portuguese universities and Research Centers, the Massachusetts Institute of Technology as well as partners from industry and government. Launched by the Portuguese government in 2006 and renewed in 2013, its goal is to strengthen the country's knowledge base and international competitiveness through a strategic investment in people, knowledge and ideas in innovative technology sectors. This call is the flagship component of MIT Portugal's research agenda for the second phase and will determine the Program's impact and success considerably.

For the 2013 call, we are seeking outstanding collaborative proposals in three categories, which will be detailed in the following:

1. Sustainable Cities
2. Stem Cell Engineering & Regenerative Medicine
3. Design and Manufacturing Approaches in Mobility Industries

Successful proposals will meet the following criteria:

- Be of exceptional quality and high relevance for Portugal. They will target innovative, high-impact research that addresses unique research needs and opportunities in Portugal
- Take a “testbed approach,” i.e. address the research topic in a holistic fashion through integrated, multi-disciplinary research design with a view towards piloting and scalability. Ideally, the research would make use of unique ecosystems and living laboratories available in Portugal.
- Be designed with a view towards the long-term objective of developing innovative products and services with high export potential in Portugal, demonstrating and leading Portugal's international competitiveness and innovative capacity in science and technology, and contributing to the growth of the Portuguese economy.
- Be strongly collaborative, involving at least:
  - Three Portuguese universities through its research centers, preferably including representation of multiple disciplines and departments
  - Two companies (In cases justified by the proponents, the participation of one of the companies may be substituted by one independent non-academic organization that may invest in the testbed like hospitals, foundations, private or public associations, municipalities, etc.)
  - A multi-disciplinary MIT research team, involving at least four Professors/researchers of MIT
- Be rooted in one or more engineering systems fields, e.g. Sustainable Energy and Transportation Systems, Bioengineering Systems, or Engineering Design and Advanced Manufacturing
- Build on previous MIT-Portugal research strengths and achievements with the goal to build critical mass in priority areas in Portugal

The call is open to all faculty and researchers affiliated or collaborating with Portuguese institutions of higher education and research, as well as faculty and research staff of MIT. The total awarded grant for Portuguese institutions may vary between 300.000 € Euro and 450.000 € per year, depending on the overall project size and requirements. Research activities of participating MIT research teams will be covered independently through designated MIT funds at a comparable level. The project duration is limited to 3 years.

The deadline for submissions is **January 20, 2014**.

For more information, email [testbeds2013@mitportugal.org](mailto:testbeds2013@mitportugal.org) (scientific information) or [projetosMIT@fct.pt](mailto:projetosMIT@fct.pt) (specific information related to application submission)

## 2. Testbed topics

### 2.1. Area 1: Sustainable Cities

This section provides information for the MIT Portugal Call for Proposals on Testbed Oriented Research in the area of Sustainable Cities. The goal of this call is to support high-quality research and implementation projects that demonstrate, in an integrated way and at a pilot scale, innovative and potentially economically viable solutions to the challenges arising in today's urban ecosystems and that help develop models for sustainable, smart cities in Portugal and around the world. The pilot solutions to be implemented should, as much as possible, be articulated as a way to promote a holistic approach to the energy and transportation challenges that make part of the urban systems daily life. The research topics below are intended to address smart cities challenges by integrating cross-disciplinary applied research that supports the development of innovative services and products jointly by universities and industry. Competitive proposals should include more than one of the following research domains and cover integrated energy and transportation topics:

#### Smart Energy Solutions at a City level

Research activities in this domain should focus on developing innovative approaches to energy challenges, including the management services and technologies aiming at an improved usage of distributed energy resources (DER) at a city level from both the supply and the demand sides. The development of pilot installations jointly by academic and industrial partners to demonstrate the feasibility of new energy solutions is encouraged in areas such as:

- Distributed energy solutions that focus on technologies and models for energy generation, storage and forecast, appropriate for integration at a city level. The proposed solutions should demonstrate microgrid concepts with the integration of micro and mini-generation technologies, distributed storage solutions and load management techniques, including distributed intelligence applications and involving ICT infrastructures capable of supporting the necessary control and operation requirements. It should also incorporate meteorological predictions with energy consumption and renewable production forecasts;
- Smart electric vehicle charging solutions focusing on the planning and management of ICT systems and EV infrastructures that may accommodate V2G, new payment methods and new charging strategies for different types of customers, as well as technical and business related DSO requirements;
- Remote management of smart end-use equipment, integrated with grid management in order to influence energy consumption at grid level, towards overall optimization of energy and capacity resources.

#### Smart Services for Final Consumers

Research activities in this domain should focus on the development of innovative services that enable building users and owners and transportation users to better and more easily control their use of energy in a range of services. The development of pilot installations jointly by academic and industrial partners to demonstrate the feasibility of new energy solutions is encouraged in areas such as:

- Smart metering of all commodities (electricity, gas and water) that enable final consumers to monitor their utilities production and consumption profiles in order to predict and optimize their savings and environmental footprint.
- Development of demand response schemes for energy usage based on smart metering capabilities and interfaces to home and building automation systems, in order to support price demand responsiveness and ancillary services to network operators.
- New end user engagement tools focused on monitoring and control of energy & transportation services that allow for a more efficient and meaningful sharing of information through novel web platforms.

## Innovative Transportation Solutions

Research activities in this domain should focus on developing innovative transportation solutions that respond efficiently and flexibly to the mobility needs of urban areas while improving the use of energy resources. The development of pilot installations jointly by academic and industrial partners to demonstrate the feasibility of new transportation solutions is encouraged in areas such as:

- Alternative transportation means and vehicle-sharing systems including the modeling and testing of demand response transportation, multi-modal systems, shared-taxis, car-sharing, bike-sharing and freight services through different business models and the development of ITS-based tools.
- Advanced mobility safety solutions involving remote control tools for preventive and predictive alerts to drivers, thus promoting increased road safety and the development of models and safety management systems possibly leading to effective urban mobility safety measures.
- Smart transit and parking solutions based on advanced decision support approaches and ICT technologies, to apply in the planning, design, implementation and operation stages, considering both passenger and freight requirements.

## Urban Analytics

Research activities in this domain should focus on developing innovative techniques to define, measure and analyze key indicators that will allow improved efficiency of the urban resources utilization. The development of pilot models and advanced representation of the urban dynamics, jointly by academic and industrial partners to demonstrate the feasibility of new energy solutions is encouraged, in areas such as:

- Resource productivity assessment through urban metabolism approach, in order to have a complete description of all metabolic flows, their correlation with residential urban patterns and their impact in the environment and local economy.
- Urban benchmarking tools including methods, systems or observatories with indicators constructed with a robust sampling of variables consistent with global urban metabolisms (transportation and infrastructure, technological readiness, intellectual capital and innovation, sustainability and the natural environment, demographics and livability, amongst others)
- Sustainability technologies and certification of buildings. Proposed solutions should include a knowledge model that integrates the analysis of all resources consumption in a building and leads to certification schemes.
- Tools for scalable integrated design, simulation and multi-criteria optimization to enable multi-stakeholder analyses of different spatial and sectorial perspectives.

## Terms of proposal

The proposal should follow the attached format guidelines. The call is open to all faculty and researchers affiliated or collaborating with Portuguese institutions of higher education and research, as well as faculty and research staff of MIT. Funding for Portuguese institution is limited to a maximum of 1.300.000 € total for the intended project duration of 3 years. Research activities of participating MIT research teams will be covered independently and at a comparable level through designated MIT Portugal funds at MIT. The project duration is limited to 3 years. The deadline for submission is January 20, 2014.

## 2.2. Area 2: Stem Cell Engineering and Regenerative Medicine

This section provides information for the MIT Portugal Call for Proposals on Testbed Oriented Research in the area of Stem Cell Engineering and Regenerative Medicine. The goal of this call is to support high-quality research and implementation projects that develop novel cell therapies or enabling technologies for cell therapies based on cutting edge research on stem cells and their derivatives. The goal includes translation into clinical applications to improve human health and to promote new business ventures or new technologic platforms by merging different fields including stem cell research and engineering, biomaterials development, and tissue engineering, in an integrated way by bringing together faculty, researchers, clinicians, and industry. Competitive proposals should include (but do not need to be limited to) one or more of the following research domains:

### Stem Cell Processing

Research activities focusing on innovative approaches to the isolation, induction, purification, maintenance, expansion, or differentiation of human stem cells as well as their progeny, ensuring their availability for therapeutic uses. Included in this work can be the implementation of GMP manufacturing and the establishment of facilities fully compliant with current European and other regulatory bodies. The development of pilot installations developed jointly by academic, medical, and industrial partners to demonstrate the feasibility of new approaches is encouraged.

### Developmental Platforms

Research activities focusing on the development of high-throughput platforms, systems biology approaches, and computational models to enhance research and clinical development activities for therapies in stem cell engineering and regenerative medicine. Included in this category are research projects that develop or apply technology to understand at the molecular level cellular processes responsible for stem cell fate and tissue organization.

### Systems Engineering

Research activities focusing on engineering innovative scaffold biocompatible materials and controlled-release delivery systems for use in stem cell and regenerative medicine clinical applications.

### Terms of proposal

Within this call, proposals using the following human stem cell model systems will be accepted: hematopoietic stem/progenitor cells (hHSC), mesenchymal stem/stromal (hMSC), endothelial progenitor cells (EPC), neural stem cells (NSC), embryonic stem cells (ESC), and induced pluripotent stem cells (iPSC). The proposal should follow the attached format guidelines. The call is open to all faculty and researchers affiliated or collaborating with Portuguese institutions of higher education and research, as well as faculty and research staff of MIT. Funding for Portuguese institutions is limited to a maximum of 980.000 € total for the intended project duration of 3 years. Research activities of participating MIT research teams will be covered independently and at a comparable level through designated MIT Portugal funds at MIT. The project duration is limited to 3 years. The deadline for submission is January 20, 2014.

### **2.3. Area 3: Design and manufacturing approaches in mobility industries**

This section provides information for the MIT Portugal Call for Proposals on Testbed Oriented Research in the area of engineering design and advanced manufacturing. The goal of this call is to support high-quality research and implementation projects that studies materials, components and manufacturing approaches for new mobility concepts and paradigms, including those associated with sustainable mobility, and applies this research with industry leaders in Portugal and Europe. Priority will be given to projects that have a potential immediate application in industrial processes, existing products or products under development. Competitive proposals should include (but do not need to be limited to) one or more of the following research domains:

#### **Computational Materials, Integrated Manufacturing and Commercialization of new materials and products**

Projects are sought that utilize the revolution taking place in Computational Solutions Design, coupled with an analysis of what is required for commercialization of new materials and devices. Recent development of high throughput computational solutions (including Inverse Design, where we go from industry requirements for materials properties to new solutions, rather than the other way around) has enabled researchers to generate a large number of potential solutions for new materials and devices. There are needs to (1) evaluate what is needed for commercial feasible, and to (2) understand how to design, synthesize and manufacture the novel materials and devices.

Another high priority is in the area of integrated manufacturing and smart manufacturing approaches. Current product and component designs are frequently based on composite/hybrid/multi-material systems solutions that include features of dissimilar size or in-closed architectures to maximize performance and functionality at different scales, and to minimize costs. We seek research to find technological and design solutions that enable full integration of several elementary operations into a single manufacturing step.

Evaluation at a pilot scale should be performed considering the sensitiveness to production scale and product performance and quality criteria, together with economic and environmental life cycle dimensions. Moreover, possibilities for rapid prototyping and rapid tooling should be considered at a proof of concept, together with manufacturing processes simulation.

#### **Sustainable eco-design**

The use of natural/renewable materials such as natural fibers or biodegradable polymers in mobility oriented products is gaining increasing attraction both on a local and a global scale as these materials can foster local community development and lower the environmental impact of finished products, if carefully used in a holistic perspective. - The mechanical behavior, environmental degradation rate, reliability, and general compatibility with current industrial needs remain widely debated between natural and synthetic materials implementation. Further studies are needed to understand the extent to which they can successfully replace the suite of materials currently used in mobility products, which are predominantly man-made synthetics and highly polluting. Specifically, revolutionary (rather than incremental) concepts and technologies are sought in the area of lightweighting. The use of high performance lightweight materials can potentially enhance the sustainability of mobility oriented products without compromising other attributes like safety, performance, recyclability and cost, since the environmental impact of power driven vehicles is strongly correlated to the weight dependence of energy consumption in their phase of use. Taking full economic and environmental advantage of such materials along the product life cycle requires developing new design architectures and optimizing design for life performance in accordance to the qualification and capability of manufacturing technologies. Other considerations include the joining of multi-materials and repair strategies. Moreover, the development of associated services (from integrated

services that support the total cost of ownership approaches to discrete maintenance and reconditioning ones) will be key to devising successful strategies to reduce environmental impacts.

### **Management of uncertainty in design**

In spite of numerous studies on the product development process and its modeling, there still is some uncertainty as to what factors affect the most complex design processes, typical of mobility industries, particularly in regard to design iterations and rework, cost and effort drivers, synchronization and lead times and others. The translation of customer needs into product requirements and their flow down into sub-systems specifications and ultimately into product features has been a difficult task historically. A source of uncertainty in complex design processes when several teams and several companies are involved in a tiered relation and a sort of dynamic negotiation process arises among the intervenient and evolves along the design process. Also uncertainty in the design process can arise from immature technologies and from the integration of new materials. A number of modeling frameworks exist to help shed some light on uncertainty management, but they are based on mechanistic approaches and they do not provide definitive answers, especially considering human and societal influences. Research in this area seeks advanced understanding on how to manage uncertainty in the front-end of product design and development, to characterize downstream implications, and demonstrate how uncertainty is progressively reduces until the design emerges to inform new products.

### **Supply Chain Systems towards sustainability in high-variety and uncertain markets**

The competitiveness of Portuguese mobility industry is dependent on an agile production capability. The need to adjust quickly to new products with a growing number of variants of uncertain demand, the complexity of production dynamics of the extended manufacturing systems (including the supply chain of final integrators or of first tier suppliers of complex systems) introduces tough management challenges. Traditional lean approaches streamline the manufacturing chain and minimize variability sources. Further studies are needed to better understand the lumpy and just-in-sequence nature of the new demand patterns. The next generation of manufacturing systems needs to consider flexibility to accommodate aggressive fluctuations in medium to small volumes of multiple products without damaging efficiency, responsiveness and cost effectiveness. This calls for new and extended manufacturing/assembly systems concepts, which in turn requires appropriate modeling and optimization capabilities to test hypothesis and support the identification of relevant decision variables. These novel techniques should assure resilient performance, regarding the physical behavior of the manufacturing system (WIP, cycle time, resources use/consumption, and process variability) and the effectiveness and sustainability of the supply chain.

### **Terms of proposal**

The call is open to all faculty and researchers affiliated or collaborating with Portuguese institutions of higher education and research, as well as faculty and research staff of MIT. Funding for Portuguese institutions is limited to a maximum of 980.000 € total for the intended project duration of 3 years. Research activities of participating MIT research teams will be covered independently and at a comparable level through designated MIT Portugal funds at MIT. The project duration is limited to 3 years. The deadline for submission is January 20, 2014.

## 3. Award information

### 3.1. Regulations and guidelines

Regulations governing access to funding are available at:

- <http://www.fct.pt/apoios/projectos/regulamento.phtml.en>
- <http://www.fct.pt/apoios/projectos/normasexecucaofinanceira.phtml.en>
- <http://www.fct.pt/apoios/bolsas/normasbolsasemprojectosunidades.phtml.en>

The announcement of the opening of this call is available at:

- <http://www.fct.pt/apoios/projectos/concursos/index.phtml.en>

The guidelines to writing and submitting proposals are available at:

- <http://www.fct.pt/apoios/projectos/guiaoen.pdf>
- [http://www.fct.pt/apoios/projectos/concursos/mit/2013/docs/Proposal\\_Submission\\_Guide\\_MIT\\_TB\\_2013.pdf](http://www.fct.pt/apoios/projectos/concursos/mit/2013/docs/Proposal_Submission_Guide_MIT_TB_2013.pdf)

### 3.2. Number of awards and funding amount

A maximum of 3 (three) testbed projects, one from each of the three areas identified above, are expected to receive funding through the current proposals. The actual number of testbed projects funded will depend on the scale and scope of the proposed Initiatives and the quality of the proposals submitted.

Total funding available for Portuguese research institutions as part of this research call may reach €3,260,000 (three million, two hundred and sixty thousand euros), allocated across the three areas as follows:

1. Sustainable Cities, up to €1.300,000 (one million three hundred thousand euros) over a 3 year period;
2. Stem Cell Engineering & Regenerative Medicine, up to €980,000 (nine hundred and eighty thousand euros) over a 3 year period;
3. Design and Manufacturing Approaches in Mobility Industries, up to €980,000 (nine hundred and eighty thousand Euros) over a 3 year period.

Research activities of participating MIT research teams (involving faculty, research staff, post-docs and MIT PhD research assistants) will be covered independently through designated MIT funds at a comparable level. Financial support through the MIT Portugal Program should be augmented by financial and/or in-kind support provided by participating companies, and possibly by other national and local government agencies.

### 3.3. Supporting Entities

Only the following entities are eligible to receive funding from FCT through the present call for proposals:

- Higher Education Institutions, their institutes and R&D centers
- Associated Laboratories
- State Laboratories

- Private non-profit institutions whose main objective is to carry out S&T activities

### 3.4. Duration

A typical proposal should cover efforts for a period of up to three years. The progress achieved by the team will be assessed on an annual basis by the Program Governing Committee (PGC) of the MIT Portugal Program and FCT, which then decides on approving continued funding.

### 3.5. Application deadline

Applications must be submitted online through the FCT website <https://concursos.fct.mctes.pt/projectos> following the Announcement of the Call for Proposals. The applications must follow the guidelines provided in the Terms of Reference outlined below and in the general FCT guidelines for the submission of on-line applications for grants, specified in <http://www.fct.pt/apoiios/projectos/concursos/instrucoes.phtml.pt>.

The call is open from November 15<sup>th</sup>, 2013 until January 20<sup>th</sup>, 2014 at 5 pm Lisbon time.

### 3.6. Review of applicants

Projects will be selected on a competitive basis. Applications will be reviewed by an international panel of independent experts, organized by FCT. The review panel will be responsible for evaluating the merit of each proposal. The selection for funding is based on the criteria presented in section 5.

### 3.7. Notification, start of activities

Applicants will be notified in accordance with article 11 of the Regulations Governing Access to Funding for Scientific Research and Technological Development Projects. Funded applications are intended to commence by April 1, 2014.

### 3.8. Interim evaluation

A yearly report of each funded testbed project will be delivered for interim review by the Program Governing Committee (PGC) of the MIT Portugal Program and by FCT. The PGC has the right to recommend to FCT that further funding be discontinued. At the end of each testbed project a final report will be delivered, for review to the PGC and FCT. The PGC and FCT may request that a panel of experts reviews the progress, yearly and at its end.

### 3.9. Objectives and proposed testbed structure

All testbed projects have the long-term objective to develop innovative products and services with high export potential that should spearhead Portugal's international competitiveness and innovative capacity in science and technology, and ultimately contribute to the growth of the Portuguese economy.

The projects should have a relevant support from industry and other stakeholders like independent non-academic organizations that do not belong to the Higher Education Sector of the Portuguese National Scientific and Technologic System (e.g. hospitals, foundations, municipalities, private or public associations, etc.) being able to demonstrate a significant financial, in-kind or intellectual commitment from the stakeholders on the project development.

Testbed proposals should be presented by consortia that three research groups from the entities identified on section 3.3, Two of them need to belong to distinct higher education institutions, their institutes and research centers, from different Portuguese Universities, at least two private companies (if justified by the proponents, one of these companies may be substituted by a non-academic institution such as a hospital, a foundation, a public sector organization, or a municipality) and at least one research teams at MIT. At MIT, each testbed project should involve several MIT faculty members, research staff and post-docs. In addition, the testbed project should promote the participation of MIT PhD Research Assistants (RAs) in joint research projects with Portuguese researchers and students, striving to produce joint publications.

Given the size of the testbed projects, it is suggested to organize them in the form of multiple sub-projects according to the specific research scope, organization, and requirements of the target area. When appropriate, each sub-project should be composed of several tasks with well-defined goals and deliverables to be achieved throughout the project durations. The specific role and contribution of each sub-project to the overall strategic objectives of the testbed should be highlighted clearly.

To guarantee the overall scientific excellence the of the cross-cutting inter-institutional research project, each testbed proposal is required to finance at least one senior researcher/junior faculty position in order to support the coordination of the multiple sub-projects involved in the testbed projects. The projects should further consider the allocation of PhD preferably from the MPP related PhD programs and/or Post-doc scholarships in order to support the development of excellent young researchers and strengthen human resource development in critical-need areas in Portugal.

### 3.10. Submission requirements

Full applications must meet the following format requirements:

- Completion of the on-line FCT form, available through the FCT platform (<https://concursos.fct.mctes.pt/projectos>), according to the Guidelines for MIT Portugal Program Testbed Call for projects (<http://www.fct.pt/apoios/cooptrans/parcerias/mit/index.phtml.pt>);
- Submission of a required Annex with the on-line FCT form, which fulfills the proposal requirements as specified in section 9 of the document "MIT Portugal 2013 Proposal Submission Guide";
- All sections of the FCT form must be completed. Except where mentioned otherwise, all the requested information needs to be in English. Please make sure that text entered in the on-line form is formatted and comprehensive.

## 4. Eligibility information

### 4.1. Eligibility of Organizations

Applications must be submitted by research consortia that include:

- a) Three research groups from the entities identified on section 3.3, Two of them need to belong to distinct higher education institutions, their institutes and research centers, from different Portuguese Universities,;
- b) at least two companies (In cases justified by the proponents, the participation of one of the companies may be substituted by one independent non-academic organization that may invest in the testbed like hospitals, foundations, private or public associations, municipalities, etc.);
- c) at least one multi-disciplinary MIT research team, involving at least four Professors/researchers of MIT.

Beyond the entities mentioned above, the consortia may include other public or private entities, profit or non-profit, that may also invest in the testbed project and that may bring relevant competencies to the project.

### 4.2. Principal Investigator (PI) and Research team Eligibility

The Principal Investigator responsible for the proposal should be a Doctorate, and the document that certifies the PhD degree should be included as one annex to the candidacy electronic submission form. The PI may only submit one candidacy in the quality of Principal Investigator and should have as a minimum a 35% time dedication to the project. All other members of the research team shall participate at no less than 15% dedication, according to their tasks.

Candidacies will not be accepted from Principal Investigators or Proposing Institutions that are on a situation of unjustified fault with FCT requirements regarding the delivery of the scientific and/or financial execution reports from previous financed projects.

### 4.3. Limit on number of proposals per organization

There is no limit on the number of proposals to be submitted by a lead research institution and there is no limit on the number of testbed project consortia a partner research institution may join.

## 5. Evaluation and selection criteria

### 5.1. Evaluation panel

Applications will be reviewed by international panels of independent experts, organized by FCT that will coordinate the evaluation process.

### 5.2. Selection criteria

The selection and ranking of the applications will be based on the following criteria, detailed in the Regulations Governing Access to Funding for Scientific Research and Technological Development Projects:

- A. Scientific merit and innovative nature of the project at an international standpoint (in the context of the testbed topics, as referred in section 2)
- B. Scientific merit of the research team
- C. Feasibility of the work plan and reasonability of the budget
- D. Contribution to the body of knowledge and competence of the National Science and Technology System
- E. Potential Economic Value of the technology

Reviewers will be asked to take into consideration, among other things.

- a. For criterion A:
  - i. Relevance and originality of the project proposed (based on the state-of-the-art in a determined scientific area and previous work done by the proposing team);
  - ii. Thematic alignment of the proposal with the testbed topics as referred in section 2;
  - iii. Methodology adopted for carrying out the project;
  - iv. Adequacy of methodology adopted for carrying out the project;
  - v. Expected results and their contribution to scientific and technological knowledge;
  - vi. Resulting publications and articles;
  - vii. Contribution towards promoting and disseminating science and technology;
  - viii. Production of Knowledge that can contribute to benefits to society or to the business sector
  - ix. Advancement of knowledge and understanding within the proposed field and/or across fields, highlighting the vision and break-through ambitions of the proposed research, rather than incremental progress;
  - x. Integration and synergy with the educational programs created through the MIT Portugal Program in Phase 1, i.e. graduate degrees in sustainable energy systems, engineering design and advanced manufacturing, bioengineering systems, and transportation systems;
  - xi. Integration and synergy with the educational offers created through the Program in Phase 1 in innovation and entrepreneurship.
- b. For criterion B:
  - i. Scientific productivity of the team (references to publications and citations in published works, other relevant indicators);

- ii. Abilities and skills to adequately execute the proposed project (team configuration, Principal Investigator's qualifications);
  - iii. Ability to involve young researchers in training;
  - iv. Availability of the team and non-duplication of objectives in relation to other projects underway;
  - v. Degree of internationalization of the team;
  - vi. Degree of success in previous projects of the Principal Investigator (PI) (in the case of young PIs, this requirement must be assessed based on the potential revealed by the PIs curriculum vitae in the absence of prior concrete accomplishments);
  - vii. Qualifications of the lead Portugal PI as faculty member, and relevance of the PI's doctoral degree and/or career experience;
  - viii. Participation in the Testbed project from PhD students from the PhD Programs within the scope of the MIT Portugal Program;
  - ix. Inclusion of Portuguese partner research institutions with researchers who are faculty members in Portuguese universities offering doctoral programs with the breadth and depth appropriate to support the Testbed vision;
  - x. Strong advisory committee, with industry and academia representation, working symbiotically to contribute to bridge science and industry;
  - xi. Level of commitment of any companies and other stakeholders like independent non-academic organizations (e.g. hospitals, foundations, municipalities, private or public associations, etc.) that participate in the project.
- c. For criterion C:
- i. Organization of the project in terms of the proposed objectives and resources (duration, equipment, size of the team, institutional and management resources);
  - ii. Institutional resources of the participating entities, in particular of the Principal Contractor (PC) (technical-scientific, organizational and managerial and, when appropriate, co-funding capacity on the part of companies);
  - iii. Quality of project design and rationale for the proposed budget;
  - iv. Level of committed industry financial and/or in-kind support commensurate with typical levels of support for academic research in the fields involved in the Testbed project.
- d. For criterion D:
- i. Contribution to the body of knowledge and competence of the National Science and Technology System (expected effects and results);
  - ii. Enhancement of partnerships for research, education and innovation.
- e. For criterion E:
- i. Potential economic value of the technology (if appropriate), namely in terms of its impact on the competitiveness of the national socio-economic system;
  - ii. Production of knowledge that can be incorporated into and applied to the business sector, if applicable;
  - iii. A rationale for selecting industry partners, and means to engage these partners in planning, research, education, and innovation;
  - iv. Effective plans and instruments to promote interaction with potential markets and end users, including prototyping, proof-of-concept and proof-of-market;

# MIT Portugal 2013 Call for Proposals

## Driving innovation through integrated testbed research

- v. Clear strategy for researchers to affiliate with startups and/or established companies, to license IP, carry out translational research, accelerate commercialization, and provide students with innovation experiences;
- vi. Importance of the targeted real world problems and of the identified technical, societal and economic challenges;
- vii. A clear path for the sustainability of the testbed project that relates to the long-term vision and break-through ambitions of the project;
- viii. A clear understanding of how this project fits the needs of, and can benefit, the Portuguese innovation system;
- ix. Contribution to the development and enhancement of innovation and entrepreneurship activities in Portugal;
- x. Willingness to build on Phase 1-successes in university innovation and entrepreneurship, and to adopt and adapt global best practices.

For inquires of a scientific nature, please contact the MIT Portugal Program at [testbeds2013@mitportugal.org](mailto:testbeds2013@mitportugal.org).

For specific information related to application submission, please contact [projetosMIT@fct.pt](mailto:projetosMIT@fct.pt).

For information regarding questions related to the technical aspects of the website, please contact the webmaster by e-mail at [webmaster@fct.pt](mailto:webmaster@fct.pt).