

IMT Ph.D. Program “Institutions, Markets and Technologies”

**Call for applications 2015/2016
Executive Summary**

Deadline: 29 June 2015 (6:00 pm CEST)

IMT’s international PhD program – “Institutions, Markets and Technologies” – is truly unique. The program, which lasts three years and includes a research period abroad, is governed by a single collegial body (called Scientific Board) made up primarily of tenured professors of the Institute.

Based on the strong interdisciplinary nature of the Institute, which integrates competences in economics, engineering, computer science, physics, history and cultural heritage, IMT’s doctoral program offers advanced training for the analysis and management of a variety of technological and societal systems. More specifically, the program encompasses the four scientific macro-areas present at IMT: Computer Science, Systems Engineering, Economics and Management, and Cultural Heritage, and is articulated in 3 field-specific, yet complementary, curricula:

1. Computer Science and Systems Engineering (CSSE)
2. Economics, Management and Data Science (EMDS)
3. Analysis and Management of Cultural Heritage (AMCH)

Each curriculum is affiliated with one or more macro-areas and is linked with one of the Institute’s Research Units. The structure of the program therefore perfectly reflects IMT’s multidisciplinary organization model, which places the integration of research and teaching at the fulcrum of its mission.

Table 1 – Curricula description

Curriculum	Description
<p>Computer Science and Systems Engineering (CSSE)</p>	<p>Current trends in society show an increasing pervasiveness of information and communication technologies into our lives, as witnessed by the growing popularity of mobile, portable, and wearable devices, as well as by the massive shift toward equipping everyday objects with computational and networking capabilities.</p> <p>The integration of computing devices and physical processes leads to the emergence of new cyber-physical systems that exhibit intricate dependencies between parts of inherently different nature. These systems pose very challenging and fundamental questions of both methodological and technological nature. Their successful engineering and operation requires a novel holistic inter-disciplinary approach, combining fundamental research at least in the following domains: synthesis and verification of highly concurrent computing systems; data-driven modeling, control and optimization of large-scale dynamical systems; modeling of novel surfaces and materials; analysis of massive quantities of data, such as imaging data.</p> <p>The CSSE curriculum provides the doctoral student with a solid interdisciplinary background to analyze cyber-physical systems and provide solutions to a huge variety of complex engineering problems. The program of studies is based on a set of common courses, covering the fundamentals of numerical linear algebra and numerical methods for differential equations, computer programming, dynamical systems and control, numerical optimization, stochastic processes, and machine learning. These basic courses are followed by a number of advanced courses and research seminars, related to the different areas of specialization for the PhD work, that can be chosen by the student.</p> <p>The specialization in computer science deals with the development of</p>

	<p>models, algorithms, and verification methods for modern distributed systems, focusing on cutting-edge research issues on the fundamentals and the applications of architectures and languages to modern distributed systems, including global and cloud computing systems, web systems and services, and mobile systems.</p> <p>The specialization in control systems is oriented towards identification and optimization-based control of dynamical systems, with an emphasis on real-time embedded optimization algorithms for control of stochastic, distributed, and large-scale dynamical systems, and their application in industrial problems arising from the automotive, aerospace, and smart-grid domains.</p> <p>The specialization in computational mechanics is concerned with the development of innovative computational methods to study advanced problems of solid mechanics, fluid mechanics, and cutting-edge problems involving multiple fields and length scales of high interest in both the academic and industrial sectors.</p> <p>Students focusing on image analysis work on devising new machine learning and data mining algorithms for innovative feature extraction, sparse data representation and scientific visualization of large-scale multimodal data, with emphasis on images arising in the natural and life sciences.</p> <p><i>Keywords:</i> computer science; control systems; computational mechanics; image analysis; machine learning.</p> <p><i>Input and output profiles:</i></p> <p>Perspective students should preferably have a master-level background in computer science, engineering, physics, mathematics, statistics, or in a related field. The CSSE curriculum prepares researchers and professionals that are able to analyze and propose constructive solutions to several real-life problems of industrial, economic, and societal interest, making them qualified to work in high-profile professional roles within universities, research centers, and companies.</p> <p><i>Research units contributing to the curriculum:</i> SYSMA, DYSCO, MUSAM, PRIAN, NETWORKS</p> <p>Ph.D. candidates also have the opportunity to collaborate with other institutions that work with IMT Research Units.</p>
<p>Economics, Management and Data Science (EMDS)</p>	<p>This curriculum provides participants with a solid knowledge base in analytical methods in economics and management science. With its multidisciplinary approach, the curriculum is unique in its deployment of a strong integration of concepts, analytical foundations, and practical expertise, to educate a new professional élite with distinctive capabilities in analyzing, visualizing, interpreting, and managing complex problems in economics and management. Graduates are trained as future leaders in policy and industry. Students are involved in the analysis of real world big/high dimensional data, in collaboration with companies and institutions. The curriculum relies on distinctive competences at IMT Institute for Advanced Studies in economics, management science and analytics, computer science, applied mathematics, network theory, and system engineering/operation research. Specific fields of study are economic networks and network industries; healthcare and pharmaceuticals; systemic risk analysis; economics and finance; organization, entrepreneurship, and technology; strategy; marketing</p>

	<p>science; critical infrastructures; systems modeling and optimization; stochastic systems; production and operations. Close associations with a selected set of companies and institutions provide the opportunity to analyze relevant problems, motivating new analytical techniques from practical problem solving.</p> <p><i>Input and Output Profiles</i></p> <p>This curriculum aims at preparing researchers and professionals with a deep knowledge of methods and techniques for the analysis of big/high dimensional data in economics and management science. Prospective students should preferably have a master-level background in economics, management science, physics, mathematics, statistics, computer science, engineering, or in a related field. The curriculum is designed to prepare candidates for leading positions in companies, research centers, and institutions. Job opportunities for graduates from this curriculum are at companies and institutions, with a focus on analytics and data science.</p> <p><i>Research Units contributing to the curriculum: AXES, ICES, LIME, NETWORKS, DYSCO.</i></p> <p>Ph.D. candidates also have the opportunity to collaborate with other institutions that work with IMT Research Units.</p>
<p>Analysis and Management of Cultural Heritage</p> <p>(AMCH)</p>	<p>The curriculum in Analysis and Management of Cultural Heritage proposes courses in Management of Cultural Heritage and Cultural Institutions, European and International Legislation on Cultural Heritage and Landscape, Art History, Museology, Technologies applied to the valorization of Cultural Heritage. Both research oriented and practice oriented courses constitute the program, which aims at educating qualified professionals operating in the concrete field of cultural management and academics. It promotes research offering the students a lively contact with different research approaches and methodologies, through case studies belonging to research fields such as Art History, Classical Archaeology and Museology.</p> <p><i>Input and Output Profiles</i></p> <p>The curriculum aims at providing prospective professionals operating in the field of management of culture and cultural heritage with specific know-hows. Prospective students should preferably have an undergraduate background in the Social Sciences, the Humanities, or ICT related to Cultural Heritage. This curriculum will enable graduates to access to:</p> <ol style="list-style-type: none"> a. Academic career in Art History. b. Public and private Institutions dealing with the concrete management of Cultural Heritage, promotion of Culture and Tourism, organization of cultural events, diffusion and teaching of culture. <p><i>Research Units contributing to the curriculum: LYNX (main), AXES, LIME.</i></p> <p>Ph.D. candidates also have the opportunity to collaborate with other institutions that work with IMT Research Units:</p> <ul style="list-style-type: none"> • ASK Centre (Art, Science and Knowledge), Bocconi University, • ISTI-CNR, for themes related to the use of ICT technologies in the field of Cultural Heritage both in terms of valorization and analysis (e.g. CH applications of data management and data mining technologies).

Duration: 3 years

Language: Courses and seminars are held in English.

Classes start on 02 November 2015.

Scholarships and Facilities

- 34 Ph.D. positions are covered by scholarships in the gross amount of 13,638.47€ /year.
- All Ph.D. students will have tuition fees waived (regional tax of around 140€/year excluded).
- Ph.D. students who are granted a scholarship have free accommodation in shared double rooms in the School residence halls (with the exception of students whose permanent residence is within a 30km radius from IMT).
- All Ph.D. students will have free access to the canteen services.
- All Ph.D. students are covered by insurance against any accident and/or injury that may occur while carrying out their Ph.D. activities.

The number of scholarships may be increased as a result of additional funding made available by public or private organizations after the publication of the call and within the deadline for submission of applications (in this case notice will be given on IMT's website and Online Notice Board).

All Ph.D. positions may be covered by an apprenticeship contract. This is a type of work contract specifically created for youth, in which a company provides both remuneration and professional training for the young worker while benefiting from tax reductions in exchange. Therefore, it is a type of contract particularly suited for growing companies willing to invest in young workers to allow them to progressively grow within the enterprise.

For more information, please visit the IMT [PhD/Prospective Students](#) webpage.

1- REQUIREMENTS

Applications are open to candidates who meet the below requirements without regard to nationality, age, gender or religion.

- **Knowledge of English** is compulsory.
- The candidate must have completed and obtained **a degree equivalent to at least 4 years of university studies**. The 4-year duration has to be considered as the minimum but not sufficient requirement: the eligibility of degrees will be assessed by the Selection Committee.

For the selection procedure, candidates are required to upload online the documents indicated in the Table 3 - Attachments to the application

For the enrollment, candidates will be required to hand in the documents indicated in Table 4 - Documents required for enrollment

2- APPLICATION

Applicants must fill out **the online application form in English** and attach the required documents by **29 June 2015 at 6:00 pm (CEST), under penalty of exclusion from the competition.**

Applications submitted by means other than the online procedure will not be accepted, unless explicitly permitted by IMT following a well-motivated request concerning technical impediments.

Application Procedure

In order to apply, applicants must first submit their personal data: applicants will then receive a confirmation e-mail containing a password and basic instructions for the submission procedure.

The first time applicants access their account, they will be requested to choose the curriculum/curricula for which they wish to apply.

Although not mandatory, information and attachments marked as **Optional** are most welcome, as they enable the Admissions Committee to evaluate candidates comprehensively.

Data and documents entered into the application form are the sole responsibility of the applicant. In the event of false declaration(s), the applicant will not be allowed to enroll in the Ph.D. Program at IMT.

In order to submit the application form, applicants must insert all the mandatory data and attachments as listed below.

Table 2 – Information requested when applying		
Curriculum/curricula	Compulsory	It is possible to apply for more than one curriculum. In this case, basic personal information will remain the same in all individual applications. The information related to education can be changed from application to application. Applicants will be free to switch from one application to another as they wish, but are not allowed to register more than once with different e-mail addresses and/or different names or to submit more than one application for the same curriculum (in this case only the last one will be considered valid).
Personal Information	Compulsory	In this section you must enter your personal data (name, address, contact details, etc.)
English Language Level	Compulsory	Applicants must indicate their level of English.
Additional information/Interview	Compulsory	Applicants have to indicate the modality by which they wish to be interviewed (IMT headquarters, videoconference or similar, or by telephone at an Italian embassy/consulate)
Additional information/Disability	Optional	Applicants should indicate if they need assistance to participate in the selection procedure
Additional information/How did you first find out about IMT?	Compulsory	Applicants must indicate how they found out about IMT
Education	Compulsory	Applicants must have completed and obtained a degree equivalent to at least 4 years of university studies. The 4-year duration has to be considered as the minimum requirement but not sufficient: the eligibility of degrees will be assessed by the Selection Committee. Applicants must indicate the average exams mark and final vote (if any) for each degree obtained.

Additional qualifications	Optional	In this section applicants may detail any other qualifications considered relevant in relation to the application.
Apprenticeship	Compulsory	Applicants have to indicate if they are interested in the higher education and research apprenticeship program. More information on: http://imtlucca.it/phd/phd_apprenticeships.php
Research Field(s)	Compulsory (only for CSSE)	<p>Candidates applying for CSSE are required to express their interest in one or more of the following Research Fields:</p> <ul style="list-style-type: none"> - <i>System Modelling and Analysis</i> (SYSMA) - <i>Dynamical systems, Control and Optimization</i> (DYSCO) - <i>Multi-Scale Analysis of Materials</i> (MUSAM) - <i>Pattern recognition and image Analysis</i> (PRIAN) - <i>Complex Networks</i> (NETWORKS) <p>The choice is not binding: admitted students will be assigned a <i>Research Unit</i> when being assigned an Advisor (according to the IMT PhD Regulations).</p>
Publications	Optional	Applicants can indicate published articles, books or any material that can be considered relevant for the Ph.D. and research activity.
Referees	Compulsory	<p>Applicants have to provide the names and contact information (e-mail and telephone number) of two referees. The first referee must agree to submit a reference letter in English, through IMT's online application system, by 31 August 2015. The referee will receive an automatic notification from IMT's application system.</p> <p>IMT does not notify applicants in the event that referees fail to provide a reference. Applicants will be able to verify the status of the references on the "Summary" page, but are not granted access to any reference provided.</p>

Attachments

The selection committee will accept attachments in **Italian** or **English** language only (unless otherwise specified in the table below).

- Applicants have to upload the document in PDF or other non-modifiable standard format (i.e.: JPEG, JPG, GIF).
- The maximum size is 3MB for each single attachment.
- If the file is too heavy, it can be uploaded as a ZIP file as long as it is in PDF (or other non-modifiable format).

Table 3 - Attachments to the application

1.	Copy of National Identity Card or Passport	Compulsory	<ul style="list-style-type: none"> - For Italian and EU citizens: Valid National Identity card or passport - Non-EU applicants: National Identity card or Passport (Passport is highly recommended). <p>The copy has to be signed by the candidate, indicating the date and place of signature (in particular the page(s) containing the applicant's photograph, personal data, document number, place and date of issue). If some of this information is missing, the document will not be accepted.</p> <p>In case the document is not in English or Italian, a translation into English or Italian should be also uploaded (an official/legal translation is <u>not</u> required).</p> <p>In the event that the copy of the document is unreadable, the Selection Committee may request a new submission.</p>
2.	Curriculum vitae et studiorum	Compulsory	In Italian or English (English is highly recommended)
3.	Education	Compulsory	<p>Candidates are required to upload one of the following documents in Italian or English:</p> <ul style="list-style-type: none"> - for degrees obtained in Italy and/or in France, Ireland, Belgium, Denmark (Bruxelles Convention of May 25, 1987) and Germany (Italian-German Convention, ratified by the Law nr. 176 of 1973): a self-declaration (according to art. 46 of the D.P.R. 12.2000, n. 445) stating the possession of a degree, conferral date, issuing University and final grade; - for degrees obtained in all other EU countries: a declaration stating the possession of a degree, conferral date, issuing University and final grade.
4.	Academic transcript/Diploma Supplement	Compulsory	<p>For each degree, the applicant has to attach one of the documents listed below in Italian or English (English is highly recommended):</p> <ul style="list-style-type: none"> - Academic transcript: an official document detailing the course, classes taken or subjects studied and results, completion date, graduation date, <u>or alternatively</u>, - Diploma Supplement: document produced by the university accompanying the diploma, providing a standardized description of the nature, level, context, content and status of the studies completed by the applicant (http://ec.europa.eu/education/tools/diploma-supplement_en.htm).
5.	Research Statement	Compulsory	<p>Candidates are required to upload a document (of maximum 10,000 characters, spaces included) only in English, as specified below for each curriculum:</p> <ul style="list-style-type: none"> - for AMCH: the research statement consists of a research proposal. The proposal is not binding and is used largely for

			<p>the purposes of evaluating the application. Once admitted, the candidate will define a research topic in agreement with his/her Advisor.</p> <ul style="list-style-type: none"> - for CSSE and EMDS: the research statement consists of a cover letter describing the applicant's scientific or academic expertise and experience in relevant methods and areas of study, research interests, future plans and reasons for wishing to pursue Ph.D. study at IMT.
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If the application lacks an information or an attachment referred to as "compulsory", applicants can be conditionally admitted to the selection procedure and their application will be considered valid only if they produce the required documents within the day scheduled for the exam.

Information and attachments referred to as "optional" are useful to the Selection Committee.

Submission

Prior to final submission, applicants will have the possibility to modify and save the inserted information whenever they wish.

We strongly recommend applicants to review the inserted information and the uploaded attachments before submitting the application. **No changes are allowed to the data inserted in the system, after submission.**

Please note that applicants are responsible for ensuring that their completed application **is received on time**. We strongly suggest that applicants submit their application well in advance of the deadline in order to avoid last-minute congestion in the online application procedure.

3- SELECTION PROCEDURE

Candidates will be evaluated on the basis of their academic background, skills and scientific value with reference to the subjects of the interdisciplinary program, and their general aptitudes to research. The selection committee will also assess the relevance of any publications, the suitability of the research project or motivation letter and any additional special qualifications, educational activities and/or participation in research groups or projects.

The selection procedure will be carried out in two phases:

1. **Assessment of all the applications submitted through the online procedure:** The shortlisted candidates admitted to the interview will be published on IMT's web site and the Online Notice Board **not earlier than 25 July 2015**.
2. **Interview:** shortlisted applicants will be required to participate (in the period **07-18 September 2015**) in a comprehensive interview in English in order to assess their aptitude for research in the curriculum/curricula for which they have applied, as well as their English proficiency. The dates of the interviews for each curriculum will be published on the web site and on the Online Notice Board of IMT.

Candidates admitted to the interview must confirm their participation by email to phdapplications@imtlucca.it within 48 hours of publication of the shortlist.

The interview can be conducted with the following modalities (chosen by the candidates at the time of application):

- At IMT headquarters in Lucca, Italy.

- Via videoconference or through any other procedure allowing visual contact with the candidates (candidates must show their identity document before the interview begins).
- By telephone, at an Italian Embassy/Consulate. In this case, the candidate must provide IMT with the contact details of the relevant Italian Embassy/Consulate. Before the interview, the Embassy/consulate staff will proceed with the identification of the candidate.

Admission

After the interviews, the final ranking will be published on IMT's Online Notice Board and website. The list will indicate the names of the applicants who have been admitted to the Ph.D. Program.

Candidates who apply for more than one curriculum are eligible to be admitted to the ranking of one curriculum only. Moreover, if considered more appropriate to the candidate's profile, the Selection Committee can admit a candidate to a curriculum different from the one selected when applying.

In the event of withdrawal or exclusion of a candidate within 45 days from the start date of the program, he/she shall be replaced by the next suitable candidate according to the ranking.

4- ENROLLMENT

Once admitted to the Ph.D. program, candidates wishing to enroll must submit to IMT the completed enrollment form, downloadable from IMT's website, **within 10 days** from the publication of the results on IMT's Online Notice Board and website, with the following modalities:

- in person or by post to:
IMT Alti Studi Lucca
RPO Office – c.a. Serena Argentieri
Piazza S. Ponziano, n. 6,
55100 Lucca – Italy
- by fax to +39 0583 4326565
- by certified e-mail to imtlucca@postecert.it

Failure to submit the enrollment request within the deadline and through the above-mentioned modalities will result in an automatic withdrawal of the candidate from the program.

The enrollment request is valid only if all the requested documents have been enclosed.

In the event that any of the documents submitted during the application procedure do not correspond to those submitted during enrollment due to deliberate false declaration, the applicant will automatically lose his/her right to enroll in the program.

Enrollment is effective on the first day of official classes. Unauthorized absences may nullify the enrollment procedure.

"Dichiarazione di Valore"

Prior to registration, admitted candidates with a foreign degree may have to send the "Dichiarazione di Valore" (see **Table 4**) or a document certifying that the procedure for obtaining such document has been initiated.

Additional Documentation and Entry Visa

All information concerning foreign degrees and entry visas is available on the dedicated IMT Facilities webpage. IMT offers assistance concerning entry visa procedures. Additional information is provided on the website of the Italian Embassies and Consulates.

5- SCHOLARSHIPS

The scholarships are awarded according to the final ranking determined by the evaluation process. Where there is equal merit, the assessment of the candidates' economic situation prevails, as determined pursuant to the Decree of the President of the Council of Ministers of 9 April 2001.

Scholarships for the Ph.D. program are subject to the payment of social security contributions (INPS) managed separately pursuant to Article 2, paragraph 26 of Law n. 335 of 8 August 1995, as amended, with two-thirds paid by the Administration and one third by the scholarship recipient.

The amount of the scholarship cannot be less than that determined in accordance with Article 1, paragraph 1, letter a) of Law n. 315 of 3 August 1998 and subsequent amendments and additions. Holders of scholarships are exempt from the payment of admission fees for the attendance of the program.

The scholarship has a maximum duration of three years and is subject to annual confirmation, after verification, in accordance with Article 14 of these Regulations, that the student has completed the program of activities for the previous year.

Scholarship shall be disbursed in monthly instalments at the end of each relevant period, with the exception foreseen in Article 13 of the PhD Regulations.

For any research or training activities at universities or research centers abroad, the amount of the scholarship is increased by 50% for the first 9 months.

Scholarship holders may renounce their scholarship at any time without withdrawing from the program. In this case, the Scientific Board may decide to award the scholarship to the first eligible student in the ranking. Students who withdraw or are expelled from the program within the first 45 days of the start of the program or from registration are not entitled to the scholarship.

If a student is registered conditionally for reasons related to the timing of the release of the "Dichiarazione di Valore" by the diplomatic or consular representation, the disbursement of the scholarship is suspended as a precautionary measure. Upon the resolution of the conditional registration, all installments due to the student shall be paid.

For further information, please contact:

phdapplications@imtlucca.it

t+39 0583 4326745

Table 4 - Documents required for enrollment

DEGREE (country and degree level)		CITIZENSHIP			
		Italian	EU (non Italian)	EXTRA EU	
				Legally residing in Italy	Not legally residing in Italy
Italian	"Laurea Magistrale" or "Specialistica" (according to DM n° 509, of November 3, 1999), or four- five-year degree (according to the previous rules of the Italian higher education system)	Self declaration (according to art. 46 of the D.P.R. 12.2000, n. 445) stating the possession of a degree, conferral date, issuing University and final grade.		Declaration stating the possession of a degree, conferral date, issuing University and final grade. (*)	
EU (non Italian)	Foreign degrees with a minimum duration equivalent to 4 years (full time). The 4-year duration has to be considered as the minimum but not sufficient requirement: the eligibility of degrees will be assessed by the Selection Committee.	Self declaration (according to art. 46 of the D.P.R. 12.2000, n. 445) stating the possession of a degree, conferral date, issuing University and final grade for degrees obtained in France, Ireland, Belgium, Denmark (Bruxelles Convention of May 25, 1987) and Germany (Italian-German Convention, ratified by the Law nr. 176 of 1973). For degrees obtained in other EU countries: "Dichiarazione di Valore" or Diploma Supplement (if issued by the university).			
EXTRA EU	Foreign degrees with a minimum duration equivalent to 4 years (full time). The 4-year duration has to be considered as the minimum but not sufficient requirement: the eligibility of degrees will be assessed by the Selection Committee.	Dichiarazione di valore issued by a qualified Italian diplomatic or consular representative in the country where the degree has been issued. The "Dichiarazione di Valore" has to report: - the legal status of the institution issuing the degree; - the validity of the degree; - the institution is part of the National Educational System of the country where the degree has been issued; - the academic and/or professional progression the degree gives access to in the country where it has been issued.			

(*) Extra EU citizens not legally residing in Italy will be conditionally enrolled. The conditional registration will be solved (and the declaration considered valid) only after all necessary procedures to obtain the "permesso di soggiorno" have been accomplished.