

**IMT School PhD Programs in “Cognitive and Cultural Systems”
and in “Systems Science”**

Call for applications 2018/2019
Executive Summary
Deadline: August 3rd, 2018 (12:00 pm CEST)

PHD PROGRAMS DESCRIPTION

The IMT School for Advanced Studies Lucca has launched the call for applications for the PhD Programs in “Cognitive and Cultural Systems” and in “Systems Science” (academic year 2018/2019):

	Description
<p>PhD in “Cognitive and Cultural Systems”</p> <p>Track in “Analysis and Management of Cultural Heritage” (AMCH)</p>	<p>The Track in Analysis and Management of Cultural Heritage proposes courses in Archaeology, Art History, European and International Legislation on Cultural Heritage and Landscape, Philosophy and Aesthetics, Management of Cultural Heritage and Cultural Institutions, Museology, Technologies applied to Cultural Heritage. Both research oriented and practice oriented courses constitute the program, which aims at training both qualified researchers who will operate in the academic field and professionals who will operate in the field of cultural management. The program promotes research offering the students a lively contact with different research approaches and methodologies.</p> <p><i>Input and Output Profiles</i></p> <p>The Track aims at providing prospective researchers and professionals operating in the field of culture and cultural heritage with specific know-hows and analytical methodologies. Prospective students should preferably have an undergraduate background in the Social Sciences, the Humanities, or ICT related to Cultural Heritage.</p> <p>This Track will enable graduates to access:</p> <ol style="list-style-type: none"> Academic career in the Social Sciences and Humanities. Professional career in the public and private Institutions operating in the fields of Culture and Cultural Heritage. <p><i>Research Units contributing to the Track:</i> LYNX (main contributor), AXES, MoMiLab, Networks.</p> <p>PhD students also have the opportunity to collaborate with other institutions that work with LYNX.</p>
	<p>This research-based, multidisciplinary doctorate program focuses on cognitive, computational and social neurosciences. Students will attend multiple courses, including fundamentals in cognitive psychology, behavioral and social neuroscience, forensic psychopathology, neuropsychology, psychophysiology, neural basis of</p>

PhD in "Cognitive and Cultural Systems"

Track in "Cognitive, Computational and Social Neurosciences" (CCSN)

perception, neural basis of consciousness, philosophy of science, critical thinking, structural and functional neuroimaging, and basic/advanced methods for data analysis. In particular, the program is designed to train researchers who will contribute to knowledge in areas such as sensation and perception; sleep and consciousness; motor system and action; neuroplasticity and learning; language and concept representation; emotion and motivation; social psychology; decision-making processes; neuroethics; philosophy and neuroscience in moral reasoning; forensic psychology and psychopathology.

Students will receive intensive practical research training in basic and advanced methods in experimental psychology and neuroimaging, experimental design and data analysis in the facilities of the Molecular Mind Laboratory (MoMiLab). An overview of human brain anatomy and neuroimaging techniques (mainly structural and functional MRI), neurophysiology (EEG, TMS and tDCS) will address research and clinical applications and their use in human subjects.

This Track integrates basic neuroscience methods, including molecular biology and genetics, with traditional experimental psychology and cognitive neuroscience. Within the interdisciplinary orientation of the IMT School, students will be exposed to seminars and conjoint research projects on different topics, ranging from molecular neurobiology of human behavior to advanced computational methods for the analysis of complex systems, from social neuroscience to decision-making processes in economic systems, from neuro-engineering applications in bionics and robotics to complex networks, from the neural bases of perception and conceptual representation to the image analysis and management of cultural heritage.

Input and Output Profiles

Candidates with a solid background in psychology, neuroscience, medicine, molecular biology, bio-engineer, computer sciences, philosophy and logics are strongly encouraged to apply. Because of the multidisciplinary nature of this doctorate Track, applications are welcome from any area of knowledge, including both scientific and social fields and humanities.

Graduates from this doctorate Track will be able to pursue a career in research and academics, as well as in the professional world, public and private institutions and companies.

Research Unit Contributing to the Track: All the Research Units contribute to the Track.

PhD students will have also the opportunity to be involved in collaborative research programs with national and international institutions and clinical centers, including the University of Pisa (Molecular Biology Lab, Research Center Piaggio Center and Linguistic Center), the Fondazione Toscana G. Monasterio, the Department of Brain and Behavioral Sciences at the University of Pavia, the Department of Philosophy at the University of Milan, Biological Psychology and Neuropsychology of the University of Hamburg, the Department of Psychology at the University of Padua, the CIMEC – Center for Mind/Brain Sciences in Trento, the Center for Consciousness and Sleep at the University of Wisconsin, the Mind Research Network of the University of New Mexico, the Center for Investigation and Research on Sleep, Lausanne University Hospital, Lausanne.

PhD in "Systems Science"

Track in "Computer Science and Systems Engineering"

(CSSE)

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. 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 interdisciplinary 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; and modeling and simulation of smart interfaces and materials for advanced sensing and energy harvesting.

The CSSE Track 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.

Research in computer science deals with the development of languages, models, algorithms, and verification methods for modern distributed systems. We carry out research on cutting-edge topics that span several areas such as automated verification, cloud computing, cyber-security, concurrency theory, dynamical systems, performance evaluation and stochastic modeling, programming languages, self-adaptive systems, and software engineering.

Research in control systems is oriented towards identification- and optimization-based control of dynamical systems, with an emphasis on real-time embedded optimization algorithms for the control of stochastic, distributed, and large-scale dynamical systems, and their application in industrial problems arising from the automotive, aerospace, and smart-grid domains.

Research in computational mechanics is concerned with the development of innovative computational methods to study advanced problems of solid mechanics, with special focus on fracture mechanics, contact mechanics, computational materials science, and computational chemistry. A particular attention is given to cutting-edge problems involving multiple fields and length scales, of high interest in both the academic and industrial sectors for the design of durable materials and components.

Input and Output Profiles

Prospective students should preferably have a master-level background in computer science, engineering, physics, materials science, mathematics, statistics, or in a related field.

The CSSE Track 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

	<p>within universities, research centers, and companies.</p> <p><i>Research Units contributing to the Track: DySCO, MUSAM, Networks, SysMA.</i></p> <p><u>Ph.D students also have the opportunity to collaborate with other institutions that work with IMT School Research Units.</u></p>
<p>PhD in "systems Science"</p> <p>Track in "Economics, Networks and Business Analytics" (ENBA)</p>	<p>This Track provides participants with a solid knowledge on modern analytical methods in economics and management. With its multidisciplinary approach, the Track is unique in its deployment of a strong integration of concepts, analytical foundations, and practical expertise, to educate the new generation of economists, scientists and practitioners with distinctive capabilities in analyzing, interpreting, and managing complex socio-economic systems. Graduates will be trained to become researchers and decision makers in academia, policy and industry by integrating knowledge at the boundary of Economics, Statistical Physics, Computer and Social Sciences with the unifying language of Mathematics and Statistics. 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. Students are involved in the analysis of real world high dimensional data, in collaboration with companies and institutions.</p> <p>The Track relies on distinctive competences at the IMT School in economics, management, statistical physics, applied mathematics, statistics, computer science, system engineering/operation research and neuroscience. Specific fields of study are economic and financial networks and network industries; healthcare and pharmaceuticals; systemic risk analysis; systems modeling and optimization; economics, finance and complex system analysis in general.</p> <p><i>Input and Output Profiles</i></p> <p>This Track aims at preparing researchers and professionals with a deep knowledge of methods and techniques for the analysis of big/high dimensional data in economics, management and different instances of complex systems. Prospective students should preferably have a master-level background in economics, physics, mathematics, statistics, computer science, engineering or in a related field.</p> <p>The Track is designed to prepare candidates for leading positions in companies, research centers, and institutions. Job opportunities for graduates from this Track are at companies and research institutions, with a focus on quantitative assessment and solution of complex problems.</p> <p><i>Research Units contributing to the Track: AXES, DySCO, MoMiLab, Networks.</i></p> <p>PhD students also have the opportunity to collaborate with other institutions that work with IMT School Research Units.</p>

Programs official duration: 3 years.

PhD Programs Coordinator: IMT School Director, Prof. Pietro Pietrini.

The Programs start on November 5th, 2018.

Official language of the Programs: English.

36 Available Scholarships:

- 18 for the PhD Program in "Cognitive and Cultural Systems";
- 18 for the PhD Program in "Systems Science"; one (1) scholarship is reserved for candidates willing to write their doctoral thesis in applied economics and management under the joint supervision of a promotor from the IMT School and a promotor from the KU Leuven.

Scholarship gross amount: 15,343.28 Euros/year (see article 8).

Additional benefits:

- All PhD students admitted to the PhD program are exempt from paying tuition fees, although they are still responsible for paying the yearly Regional Education Tax (currently €140.00/year);
- All PhD students are offered free meals (lunch and dinner) at the on-campus canteen;
- All scholarship recipients are provided with free accommodation in shared double rooms within the campus residential facilities.

REQUIREMENTS

Applications are open to candidates who meet the following requirements:

1. Degree:

- "Laurea Magistrale" or "Specialistica" (according to DM n° 509, of November 3, 1999), or a four- or five-year degree (according to the previous rules of the Italian higher education system) obtained in Italy;
- Foreign degrees with a minimum duration equivalent to 4 years (full time). The 4-year duration should be considered a minimum but not sufficient requirement: the eligibility of degrees will be assessed by the Selection Committees.

For the selection procedure, candidates are required to upload online the documents indicated in Table 2 - Attachments to the application.

Applicants who obtain their degree by no later than **October 31st, 2018** can also apply. These candidates will be admitted to the selection procedure "with reserve" and must provide their degree certificate by the date of enrolment or they will be excluded from the program. These documents may be sent sooner via email (phdapplications@imtlucca.it) or via fax (+39 0583 4326565).

2. Knowledge of English language: Applicants are required to indicate their level of English.

APPLICATION

The **application form** must be **mandatorily** filled out in **English** through the online procedure available on the School's website, **by August 3rd, 2018, at 12:00pm (CEST)**.

Applicants have to upload the **documents** in **PDF or any 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).

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

Table 1: Information

Track(s)	compulsory	It is possible to apply for more than one track. 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 email addresses and/or different names or to submit more than one application for the same track (in this case only the last one will be considered valid).
Personal information	compulsory	In this section applicants must enter their 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 School campus, 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 are required to indicate how they found out about the IMT School.
Education	compulsory	Applicants are required to indicate their university degrees (whose duration must be equivalent to at least 4 years of university studies), the average exam mark and final grade (if any) for each degree obtained.
Additional qualifications	optional	In this section applicants may list any other qualifications considered relevant in relation to their 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	Candidates applying for CCSN are required to express their interest in one or more of the following Research Fields: <ul style="list-style-type: none"> <i>Molecular Mind Laboratory (MOMILAB)</i>

		<ul style="list-style-type: none"> • <i>Complex Networks (NETWORKS)</i> • <i>Center for the interdisciplinary Analysis of Images (LYNX)</i> • <i>Dynamical systems, Control and Optimization (DYSCO)</i> • <i>System Modelling and Analysis (SYSMA)</i> • <i>Laboratory for the Analysis of complex Economic Systems (AXES)</i> <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 (SYSMA)</i> • <i>Dynamical systems, Control and Optimization (DYSCO)</i> • <i>Multi-Scale Analysis of Materials (MUSAM)</i> • <i>Complex Networks (NETWORKS)</i> <p>The choice is not binding: admitted students will be assigned a <i>Research Area</i> when being assigned an Advisor (according to the IMT School PhD Regulations).</p>
Interest in writing a co-supervised thesis	compulsory	Candidates applying for ENBA have to indicate if they are interested in writing their thesis under the co-supervision of a promotor from the IMT School and a promotor from the KU Leuven.
Publications	optional	Applicants can list their own published articles, books or any material that can be considered relevant for the PhD and research activity.
References	compulsory	<p>Applicants are required to provide the names and contact information (e-mail and telephone number) of two referees: only the first referee is invited to submit a reference letter in English, through the IMT School's online application system, by September 7th, 2018 at 12:00pm (CEST). The referee will receive an automatic notification from the School's application system.</p> <p>The IMT School 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>
Preferred Track	compulsory	Candidates applying for more than one track are required to rank the tracks in order of preference.

Table 2: Attachments

1	Copy of National Identity Card or Passport	compulsory	<p>Applicants have to upload a copy of a valid identity document:</p> <ul style="list-style-type: none"> • <u>For Italian and EU citizens</u>: Valid National Identity card or passport • <u>Non-EU applicants</u>: 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 any 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/resume	compulsory	<p>Applicants have to upload their curriculum vitae et studiorum/resume in Italian or English (English is highly recommended), indicating their university degrees, work and research experience, and publications (if any).</p>
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 no. 176 of 1973): a self-declaration stating the possession of a degree, conferral date, issuing University and final grade; • for degrees obtained in all other EU and non-EU countries: an official certificate that indicates 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; <p><u>or, alternatively,</u></p> <ul style="list-style-type: none"> • 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 (maximum 10,000 characters, spaces included) mandatorily in English, as specified below for each track:</p> <ul style="list-style-type: none"> for AMCH: the research statement consists of a research proposal. The proposal is non-binding and is used largely for the purposes of evaluating the application. Once admitted, the candidate will define a research topic in agreement with his/her Advisor; for CCSN, CSSE and ENBA: 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 their doctoral studies at the IMT School.

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 by the day scheduled for the interview.

The correct conclusion of the online application procedure is confirmed by an automatic email sent to the email address indicated by each applicant while registering to the procedure; the message only confirms the receipt of the application. The School will not verify the validity and completeness of applications before the call closes.

After the submission, no changes are allowed to the data inserted.

EVALUATION CRITERIA AND SELECTION PROCEDURE

Evaluation criteria

The Selection Committees will evaluate candidates'

- academic background, knowledge, skills and scientific value;
- general aptitude to research and potential to collaborate in the specific research activities of the selected Track in the application form;
- interdisciplinarity, knowledge and skills with reference to the multidisciplinary of the IMT School PhD Programs;
- pertinence with a track different from the one chosen in the application form.

Assessment of qualifications

The first phase of the selection procedure is the assessment of qualifications. The Selection Committees will assess all applications to create a shortlist of applicants admitted to the interview.

The shortlist of applicants admitted to the interview will be published on the School's website and Online Notice Board ("*Albo Online*"). This is the only official communication of the preliminary results to all applicants.

Interview

Candidates admitted to the interview must confirm their participation by email to phdapplications@imtlucca.it within 48 hours of the publication of the shortlist, confirming their preference to have the interview conducted in one of the modalities provided for in article 3 of this call.

During the comprehensive interview, the Selection Committees will assess the candidates' knowledge and skills with reference to the specific characteristics of the PhD Program.

The Selection Committees will assess all interviews assigning a score (up to 100 points): applicants scoring at least 70 out of 100 will be eligible for the Program and will therefore be listed in the final ranking.

Final ranking

At the end of the interviews, each Selection Committees will draft the final ranking of the eligible candidates according to their scores obtained in the interview.

If multiple candidates get the same score, preference will be given to the youngest.

For each PhD Program, the first **six (6)** candidates ranked for each track will be assigned the scholarship; in the event of the withdrawal or exclusion of a candidate, he/she shall be replaced by the next suitable candidate according to the ranking of the track.

The remaining **twelve (12)** positions will be assigned according solely to the ranking of all of the other eligible candidates, regardless of the track for which they have applied. In the event of the withdrawal or exclusion of a candidate, he/she shall be replaced by the next suitable candidate according to the ranking.

In the event the ranking of a track does not list enough eligible candidates to assign all available positions, the remaining scholarships will be assigned according to the ranking of other eligible candidates regardless of the track for which they have applied.

All rankings will be published on the School's website and Online Notice Board ("*Albo Online*").

ENROLMENT

The enrolment request will be considered valid only if all required documents are enclosed (see Attachment A).

Once admitted to the PhD Program, candidates wishing to enroll must submit the completed enrolment form to the IMT School **no later than 10 days from the publication of the results** on the School's Online Notice Board ("*Albo Online*") and website, using one of the following modalities:

- in person or by post to:
IMT School for Advanced Studies Lucca
Graduate Education and Student Services Office
Piazza S. Ponziano, 6
55100 Lucca – Italy
- by fax to +39 0583 4326565
- by certified e-mail to imtlucca@postecert.it

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

The enrolment 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 enrolment due to deliberate false declaration, the applicant will automatically lose his/her right to enroll in the program.

Enrolment is effective on the first day of official classes. Unauthorized absences may nullify the enrolment procedure.

SCHOLARSHIPS

The scholarship amount is 15,343.28 euros/year and shall be disbursed in monthly instalments.

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.

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

Admitted candidates who have already benefited from a PhD scholarship in Italy cannot be assigned another one.

The scholarship has a maximum duration of three years and is subject to annual confirmation: according to articles 13 and 14 of the IMT School PhD Regulations, students must have completed all the activities provided for in each academic year.

In the event a student withdraws or is excluded within 45 days from the beginning of the Program, he/she is not entitled to the scholarship. The scholarship will be awarded to the next eligible candidate according to the final ranking.

If a student registers after 45 days from the beginning of the Program, he/she is entitled to the scholarship starting from the actual date of enrolment.

FACILITIES

Residential facilities: accommodation

All PhD students who are granted a scholarship have free accommodation in shared double rooms in the on-campus residential facilities for the whole official duration of the Program (3 years), except for the periods spent off campus for study and/or research.

The School can revoke the right to accommodation in case it is rarely or not used.

Residential facilities: canteen

All PhD students are offered free meals (lunch and dinner) at the School canteen located on campus for the whole official duration of the Program (3 years). Lunch and dinner are served each day, Monday through Sunday, for the entire academic year, except for the closing periods.

Other facilities

All PhD students have access to library facilities and can benefit from the services of the IT support staff for all technical requests related to study and research till the thesis defense.

The School subscribes to an insurance policy for all PhD students. It provides coverage against accidents and injuries incurred by students, in Lucca or abroad, while performing academic activities. The IMT School also provides students with health insurance policies for research trips outside of Europe (students are automatically within Europe).

All foreign PhD students are given the possibility to take an Italian language and culture course to receive an A2 language certificate (as defined by the Common European Framework of Reference for Languages), useful for obtaining credits in accordance with Italian Immigration law.

TREATMENT OF PERSONAL DATA

The IMT School will use the personal data provided by all applicants for selection procedures and institutional aims only, in accordance with the provisions of the Italian legislation in force (Dlg. 196/03 - *Italian Privacy Code*) and of the relevant School Regulations.

Applicants are granted all the rights established by art. 7 of Dlg. 196/03 (*Italian Privacy Code*).

For any further information on the call and the whole selection procedure, please contact the Graduate Education and Student Services Office by email at phdapplications@imtlucca.it or by phone at +39 0583 4326597.

Further information on the PhD Program and on the IMT School is available at www.imtlucca.it.