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PhD School - Politecnico di Milano

Regulations of the PhD Programme in:

Mathematical Models and Methods in Engineering

Cycle XXXVII

1. General Information

PhD School - Politecnico di Milano

PhD Programme: Mathematical Models and Methods in Engineering

Course start: November 2021

Location of the PhD Programme: Milano Leonardo

Promoter Department: Dipartimento di Matematica

Scientific Disciplinary Sectors
> MAT/05 Mathematical Analysis; MAT/06 Probability and Statistics; MAT/07 Mathematical Physics; MAT/08 Numerical Analysis; MAT/09 Operational Research; SECS-S/01 Statistics; SECS-S/06 Mathematical Methods of economy, finance and actuarial sciences.

PhD School Website: **http://www.polimi.it/phd**
PhD Programme Website: http://mate.polimi.it/dottorato

2. General presentation

Mathematical Modeling plays a central role in the development of Engineering, Life Sciences, Physics and Finance. The Department of Mathematics of the Politecnico di Milano, in particular the MOX Laboratory of Modeling and Scientific Computing (http://mox.polimi.it) and the Quantitative Finance Lab (https://www.qfinlab.polimi.it/), have developed close interactions with several Engineering, Mathematics and Physics Departments in Politecnico and in many other Italian and International Institutions, Industrial firms and Research Agencies.

Since the statement of the Ph.D. program in "Mathematical Models and Methods in Engineering" (in 2008, 24th cycle), it has focused its activity on the development of advanced mathematical theories and of methods for solving practical problems of industrial and technological interest. Correspondingly, five thematic macro-areas have been identified for the Ph.D. researches:
- Mathematical models and methods in materials science
- Mathematical models and methods in physics
- Mathematical models and methods in life sciences
- Mathematical models and methods in earth and environmental sciences
- Mathematical models and methods for industrial and financial processes

Each thematic area gathers, in an interdisciplinary manner, the know-how needed to develop the multi-scale and multi-physics models essential to study practical problems whose complexity arises either from the entangled geometry and topology (see, e.g., the analysis of blood flow in the cardiovascular human system), from the interaction between micro- and macroscopic degrees of freedom (as in shape memory alloys or liquid crystals), from the wide range of timescales involved (see the sedimentary evolution in geological basins), from the computational complexity of the solution algorithms (optimization of NP-hard problems in industrial applications), from the complexity of the statistical methods to analyse big data and high dimensional data or from the lack of deterministic solutions (stochastic evolution in quantitative finance, statistical processing of huge number of functional data).

The Ph.D. Course in *"Mathematical Models and Methods in Engineering"* has greatly benefited from the interactions with other University Departments and external Industries and Research Agencies. An evidence of such a fruitful interaction is pointed out by several thematic Ph.D. grants – funded by external sponsors –, allocated in the last four cycles of the Ph.D. program. Several grants have favored student mobility (more than half of our candidates possess a M.Sc. degree different from the Mathematical Engineering degree directly supplied by the Department of Mathematics of the Politecnico di Milano). The inter-disciplinary character of the Ph.D. program is confirmed also in the Faculty Board, where several technical disciplines are represented.

The main research subjects sponsored by external institutions in the last four years

- An integrated Heart Model for the simulation of the cardiac function sponsored by the ERC Advanced Grant project iHEART
- Reduced Order Modelling, Simulation and Optimization of Coupled systems, sponsored by H2020-MSCA-ITN-2017, EU project 765374 ROMSOC
- Non-conforming polyhedral finite element methods for the approximation of partial differential equations sponsored by SIR Starting Grant "PolyPDEs" and by Fondazione Cariplo & Regione Lombardia
- Mathematical and numerical models of the cardiovascular system and for medical models and design (sponsors: IIT, Caritro, European Union, MIUR/PRIN, FIRB)
- Topology optimization (FARB Politecnico di Milano)
- Numerical and statistical modelling of geological and geophysical processes (sponsor ENI)
- Discontinuous spectral elements for the modelling of seismic events (sponsor Munich Re)
- High performance simulation of power semiconductor devices (sponsor ABB)
- Mathematical modeling of nanoscale therapeutic systems (sponsors Regione Lombardia, CEN Foundation, Politecnico di Milano, Fondazione Politecnico di Milano)
- Memristive devices for brain inspired computing (sponsor Consiglio Nazionale delle Ricerche)
- Numerical modeling of continuous mixing processes in industrial applications (Fondazione Politecnico, Pirelli Tyre spa)

The main projects involving collaboration with external partners partially supporting the research include:

- iHEART: "integrated heart model for the simulation of the cardiac function", H2020-EU.1.1. -

EXCELLENT SCIENCE - European Research Council (ERC) aims to create a complete mathematical model of the human heart.

- VINCI fellowship "A new computational approach for fluid-structure interaction of slender bodies immersed in three-dimensional flows " (in collaboration with Sorbonne, Paris).
- HERO fellowship "Hierarchical computational models for predicting the vascular and Extravascular transport of molecules, nanoconstructs and cells in neoplastic tissues". Supported by DMAT and IIT-Genova it aims to develop an integrated framework for a rational design of nanoconstructs.
- ABB fellowships: development of mathematical and statistical tools for the analysis of data generated by smart grid.
- ENI fellowships: Numerical and statistical modelling of geological and geophysical processes.

The PhD course is run by a Coordinator and a Faculty Board.

The Coordinator chairs the Faculty Board, coordinates the preparation of the annual Educational Programme and organises the general educational activities of the PhD course (see Attachment A1).

The Faculty Board is responsible for the Educational programme and for teaching and administrative activities related to the PhD course (see Attachment A2).

3. Objectives

The development of advanced technologies in Science and Engineering (such as but not reduced to Artificial Intelligence, Coding Theory, Data Science, Machine Learning, Mathematics for Genomics and Medicine, Quantum Computing) brings an increasing demand of advanced mathematical theories and methods, which in turn fosters the demand for education and training of skilled mathematicians in pure and applied research. The main scope of the Ph.D. course *"Mathematical Models and Methods in Engineering"* is to train high-level researchers in various fields of pure and applied mathematics, statistics and mathematical finance. Several components must be mixed to guarantee a profitable success in applications. A deep knowledge of the relevant physical, chemical and/or biological phenomena is necessary, along with the ability in modeling complex systems, and the skills in the use and development of the mathematical tools able to provide quantitative solutions. With this aim, inter-disciplinary preparation and team-working capability are basic elements in the training of the Ph.D. candidates.

4. Professional opportunities and job market

Candidates who successfully complete the Ph.D. course possess a solid educational training in pure and applied mathematics, as they are required to achieve original research results in one or more of the following areas: Numerical Analysis, Mathematical Physics, Mathematical Analysis, Statistical Learning, Operations Research, Stochastic Modeling, Geometry and Algebra.

Candidates are also required to acquire competences and ability of performing critical analysis and design in one or more branches of Engineering, including: Fluid dynamics, Bioengineering, Materials Science, Life Sciences, Decision making, Geophysics, Building Science, Energy, and Risk assessment.

Expected professional placements for Ph.D. doctorates are: academic research in Italian or International Universities and Research Institutions, R & D divisions of private companies, study and research centers of public Agencies, financial and insurance Institutions.

5. Enrolment

5.1 Admission requirements

Italian and International citizens can apply. They are requested to have graduated in accordance with the pre-existing laws D.M. 3.11.1999 n. 509, or to have a Master of Science degree in accordance with D.M. 3.11.1999 n. 509, or a Master of Science in accordance with D.M. 22.10.2004 n. 270, or similar academic title obtained abroad, equivalent for duration and content to the Italian title, with an overall duration of university studies of at least five years.

The certified knowledge of the English language is a requirement for admission. Please refer to the PhD School website for details.

The admission to the programmes will be established according to the evaluation of the candidates' curricula, motivation letters, and an illustrative report about the development of a possible PhD research, which candidates will send contextually with their application to the admission announcement.

5.2 Admission deadlines and number of vacancies

The number of positions is indicated in the Call for admission to the 37th PhD cycle Programmes:
http://www.polimi.it/phd

Scholarships both on general and on specific themes are available, in accordance with what is specified in the call for admission.

6. Contents

6.1 Requirements for the PhD title achievement

The achievement of the PhD title in *"Mathematical Models and Methods in Engineering"* requires a study and research activity of at least three years equivalent of full time study, research and development of PhD thesis.

PhD candidates in *"Mathematical Models and Methods in Engineering"* must earn a minimum of 30 course credits (see paragraph 6.3 below), and to continuously conduct studies and research.

At the beginning of the course, the Faculty Board assigns a tutor to each PhD candidate to supervise and assist him/her in the overall training programme. The tutor shall be a professor belonging to the Faculty Board. The tutors assist the candidates in the choice of courses to be included in the study plan, which is eventually submitted for approval to the Coordinator of the PhD Programme (see also section 6.4 below).

The Faculty Board may assign extra course credits to one or more candidates, in case they need to complete their preparation in specific topics, relevant for their research projects.

6.2 Research development

The main aim of all Politecnico di Milano PhD programmes is the development in the candidates of a research-oriented mind-set, with expertise and skills in a specific research topic.   To this end, candidates develop a problem-solving capability in complex contexts, including the capacity of performing deep analysis of the problems, identifying original solutions, possibly implementing them in scientific software and evaluating their applicability in practical contexts.

These skills provide the PhD candidates with major opportunities of development in their research both in the academic field, and in public and private organisations.

PhD candidates are requested to develop an original research work. The PhD thesis must thus contribute to increase the knowledge in the candidate's research field. Besides, it has to be coherent with the research topics developed in the Department where the PhD Programme in Mathematical Models and Methods in Engineering is carried out.

The original research results are collected in the PhD thesis, where the candidate's contribution is put in perspective with respect to the research state of the art in the specific research field.

The PhD research is developed under the guidance of a supervisor, who supports the candidate in the setting-out and in the everyday activities related to the thesis development. The supervisor is not necessarily a member of the Faculty Board, and may also belong to an institution different from Politecnico di Milano. The supervisor can be supported by one or more co-supervisors.

Further activities intended to develop the candidate's personal skills and research expertise are encouraged during the PhD path.

Candidates must acquire the capability to present and discuss their work in their research community. Consequently, both the participation to international conferences and the publication of the research results in peer-reviewed journals are encouraged.

The PhD programme favors the candidates' research interactions with other groups in their research field, preferably abroad. Research visits of at least three months are strongly encouraged, as through

them the candidates may acquire further skills to develop their research work and thesis.
The duration of the programme is normally three years.

6.3 Objectives and general framework of the teaching activities

The PhD Programmes and the PhD School activate teaching forms of different kind and credit value, including courses, seminars, project workshops, laboratories. Teaching activities both cover the basic research issues (problems, theories, methods), which represent the founding element of the PhD Programme and identify clearly its cultural position, and deepening in a specialist way some research issues connected with the problems developed in the theses.
Lessons are usually held in English, except when indicated otherwise. The PhD programme includes at least one complete path delivered in English language.
Structured teaching activities allow to earn ECTS credits. Other activities, typically specialised and for which it is difficult to evaluate the learning and its quantification, fall within the scientific activities of which the Faculty Board takes into account in the overall evaluation, but they do not allow to earn ECTS.

The PhD School of Politecnico di Milano proposes a set of courses aiming to train the PhD candidates in soft and transferable skills. The skills and abilities provided by these courses are expected to help candidates across different areas of their careers in order to respond to the rapidly evolving needs of the global economy and society at large. The list of PhD courses organized by the PhD School is available at the website http://www.dottorato.polimi.it/en/during-your-phd/phd-level-courses/.
At least 10 of the 30 course credits that each candidate is required to earn shall be obtained through soft and transferable skills courses organized by the PhD School.

The tables below summarize the candidate's path (as regards coursework activities). At the same time, the programme foresees that the candidates are devoted to research activity in a continuous way, following the lead of their supervisors, and of the Faculty Board.

First/Second Year

Courses	Possible details or reference to following tables	Number of credits (or min-max)	Note
PhD School Courses		10	
Courses characterising the PhD Programme		10-20	
Other PhD courses	Summer or Winter Schools/ Reading Courses	0-10	

Third year

In the third year the candidate should be devoted entirely to the research and to the development of the PhD thesis.

PhD Course List
A) The PhD Programme in "Mathematical Models and Methods in Engineering" organises the **Characterising Courses** listed in table A.
For the admission to the final exam the acquisition of at least 10 credits in this list is **mandatory**.

B) The PhD School organises every year general and Interdoctoral courses. The acquisition of **at least 5 credits** is **strongly suggested** among the courses of B type. The list of PhD courses organized by the PhD School is available at the website:
http://www.dottorato.polimi.it/en/during-your-phd/phd-level-courses/

C) Other PhD courses
A maximum of 5 mandatory credits can be obtained by choosing among courses provided by other PhD programmes at Politecnico di Milano and/or external Institutions (in this case the previous approval of the tutor and the coordinator is mandatory).

PREPARATORY COURSES

If the supervisor and the tutor find it useful or necessary that the candidate attends preparatory courses (chosen among the activated courses at the Politecnico di Milano) the Faculty Board of the PhD programme may assign some extra-credits to be acquired to complete the training path. The credits acquired in this way will be considered as additional, in relation to the mandatory credits to be acquired with the PhD courses.

SPECIALISTIC COURSES, LONG-TRAINING SEMINARS
The attendance of Specialist Courses, Workshops, Schools, Seminars cycles is strongly encouraged and (if these seminars, workshops are certified and evaluated) may permit to acquire credits according the modalities established by the Faculty Board and previous approval of the study plan submitted by the candidate. These courses and workshops can be inserted in the study plan, even if they are not evaluated (and therefore not qualified as credits), as optional "additional teaching".

The scheduled course planning for the academic year 2021-2022 follows. Other courses may be activated during the year. In this case the candidates will be promptly informed, and will be allowed to insert these new courses in their study plan.

Table A: PHD COURSES CHARACTERISING THE PHD PROGRAMME

SSD	Name of the course	Professor	A.A./Semester	Language	Credits
MAT/06 MAT/05	Wasserstein metrics: from diffusion equations to statistical issues	Bassetti and Muratori	Fall	English	5
MAT/05	Reaction-diffusion equations	Verzini and Soave	Spring	English	5
MAT/05	Semigroups of Linear Operators and Applications to Evolution Equations	Pata and Conti	Spring	English/Italiano	5
MAT/07	Mathematics of Quantum Mechanics	Correggi	Spring	English/Italiano	5
MAT/08	Mathematical Methods for Deep Learning	Miglio and Verani	Spring	English	5
MAT/08	High-Order Discretization Methods for Partial Differential Equations	Antonietti and Dedè	Spring	English	5
MAT/08	Python per il calcolo scientifico	Miglio	Fall	English	5
MAT/08	Advanced numerical methods for predictive digital twins	Zunino and Manzoni	Spring	English	5
MAT/08	Numerical methods for the fluid structure interaction problem	Formaggia and Vergara	Fall	English/Italiano	5
MAT/08	Numerical methods for the geosciences	Scotti and Fumagalli	Fall	English/Italiano	5
MAT/08	Numerical optimal control in engineering, finance and quantum mechanics	Ciaramella	Spring	English	5
MAT/03	Numerical solutions of systems of polynomials	Lella and Notari	Fall	English	5

MAT/03	Discrete and Geometric Tomography	Dulio	Spring	English/Italiano	5
MAT/06	Quantum information – A primer course	Toigo	Fall	English	5
MAT/02	(Semi)group theory and automata	Rodaro	Spring	English	5
SEC-S/01	Advanced Statistical Learning for Complex Data	Ieva	Fall	English	5
	Advanced mathematical methods in engineering I	Zunino	Spring/Fall		5
	Advanced mathematical methods in engineering II	Sabadini	Spring/Fall		5

Table B SUGGESTED CROSS –SECTORAL COURSES

SSD	Name of the Course	Professor	Semester	Language	Credits
	Laboratorio di insegnamento a classi numerose	Zani		Italiano	5
	La comunicazione nella scienza	Paganoni	Spring	Italiano	5
	Scientific reasoning, philosophy, logic and applications	Valente			5
	Introduction to Academic Research	Volonté			5
	English for Academic Communication	Biscari			5
	Advanced Interaction Skills for Academic Professionals	Arnaboldi			5

OTHER PhD COURSES
Further Courses and Summer/Winter Schools may be made available.

6.4 Presentation of the study plan
PhD candidates must submit a study plan, which may be revised periodically (approximately every three months), in order to adequate them to possible changes in the course list, or to needs motivated by the development of their PhD career. The study plans must be approved by the PhD programme Coordinator, according to the modalities established by the Faculty Board of the PhD Programme itself.

6.5 Yearly evaluations
Candidates present their work to the Faculty Board at least once a year. In particular, the candidates must pass an annual evaluation in order to be admitted to the following PhD year. The third year evaluation establishes the candidate's admission to the final PhD defense.

As a result of each annual evaluation, the candidates who pass the exam receive an evaluation (A/B/C/D) and may proceed with the enrolment at the following year. Candidates who do not pass the exam are qualified either as "Repeating candidate"(Er) or "not able to carry on with the PhD (Ei)". In the former case (Er), the candidates are allowed to repeat the PhD year at most once. The PhD scholarships – if any – are suspended during the repetition year. In the latter case (Ei) the candidates are excluded from the PhD programme and lose their scholarships – if any.

In case the Faculty Board holds appropriate to assign directly an exclusion evaluation (Ei) without a previous repetition year, the request must be properly motivated, and validated by the PhD School.

After the final year, candidates who have achieved sufficient results but need more time to draw up their theses, may obtain a prorogation of up to 12 months.

6.6 PhD thesis preparation
The main objective of the PhD career is the development of an original research contribute. The PhD thesis is expected to contribute to the advance of the knowledge in the candidate's research field.

The PhD study and research work is carried out, full time, during the three years of the PhD course. Stages or study periods in (Italian or International) companies or external Institutions may complete the candidate's preparation.

The resulting theses need to be coherent with the research issues developed in the Department where the PhD programme is developed.

The candidate must present an original thesis, discuss its contribution to the state of the art in the research field in the research community.

The PhD research is developed following the lead of a supervisor, who supports the candidate in the setting out and in the everyday activities regarding the thesis development.

At the conclusion of the PhD studies, the Faculty Board evaluates the candidates. Candidates who receive a positive evaluation submit their theses to two external reviewers for refereeing. If the evaluation provided by the reviewers is positive (o after the revisions required by the external reviewers), the candidates defend their thesis in a final exam, in front of a Committee composed of three members (at least two of which must be external experts).

7. Laboratories, PhD Secretary Services

Secretary Services: Dr. Esperia Ferrara

esperia.ferrara@polimi.it ;
Phone +39 02/2399.4616

8. Internationalisation and inter-sectoriality

Carrying out study and research activities at external laboratories is strongly recommended.
Politecnico di Milano supports joint PhD paths with International Institutions, as well as Joint and Double PhD programmes. Further information is available on the PhD School website and on the PhD programme website.

More specifically, the PhD programme in Mathematical Models and Methods in Engineering collaborates with with Université La Sorbonne, University of Leiden (Netherlands) to award double degrees.
The PhD programme benefits of the project *EU PROJECT 713485,* INdAM-DP-Cofund-2015, see https://cofund.altamatematica.it

Interaction with and exposure to non-academic sectors provides significant benefits to doctoral candidates as well as to research and innovation intensive employment sectors. Direct exposure to the challenges and opportunities in non-academic sectors of the economy and society at large is fostered by networking, connectivity, inter-sectoral mobility and wide access to knowledge. In particular, the PhD programme in Mathematical Models and Methods in Engineering collaborates with the following Research Agencies and/or Industrial partners: Istituto Italiano di Tecnologia, ABB, Eni, Consiglio Nazionale delle Ricerche which support some of the fellowships.

Starting from the academic year 2017/18 some inter-sectorial fellowships will be made available. Among the topics covered, in collaboration with other departments, there are: health, smart cities, Industry 4.0.

Attachment A1 – PhD Programme Coordinator

Irene Maria Sabadini.
EXPERIENCE: April 2015-present Full professor, Politecnico di Milano, SSD Geometria, MAT/03;
March 2007- March 2015: Associate professor, Politecnico di Milano;   June 2002 - February 2007 Researcher,   Politecnico di Milano; September 1999 - May, 2002, Researcher as "assegnista di ricerca", Politecnico di Milano;
1996   PhD in Mathematics, University of Milano, Italy.
1989: degree (summa cum laude) in Mathematics, University of Milano.
PUBLICATIONS: Author of about 200 papers, 7 research books and editor of 10 books.
VISITING professor in the following universities: (list from 2000)
from 2007 to 2019: Chapman University Orange USA;
2002, 2006, 2010, 2014, 2017, 2019: Charles University of Prague;
2003, 2004, 2005, 2006: George Mason University, Fairfax, USA;
2002, 2004, 2008, 2009, 2017, 2019: State University of Ghent, Belgium;
2010 Instituto Politecnico Nacional, Citta' del Messico;
2012, 2013, 2015, 2016, 2018, 2019, 2020: Tel Aviv University, Israel;
2013, 2015, 2017: University of Macau, China;
2017, University USTC Hefei, China;
2012, 2013, 2014, 2015, 2016, 2017: Ben Gurion University Beer Sheva, Israel.
INVITED SPEAKER to conferences in various countries among which (list from 2000): Porto (Portugal), Amsterdam (Netherland), Aveiro (Portugal), Praga (Czech Republic), Cracovia (Poland), Orange (USA), Mosca (Russia), Weimar, (Germany), Gent (Belgium), Citta' del Messico (Mexico), Roma, Macao (China), Berlino (Germany), Londra (United Kingdon), Ankara, (Turkey), Toulouse (France), Catania, Fairfax, (USA), Vaxjo (Sweden), Erfurt (Germany), Lisbon (Portugal), Weimar (Germany).
Invited speaker in several universities, among which: Universita' di Firenze (Italy), Universita' di Trento (Italy), Universita' di Pavia (Italy), Universita' di Milano (Italy), Politecnico di Torino (Italy), University of Gent (Belgium), Charles University of Prague (Czech Republic), University of Maryland at College Park (US), George Mason University, Fairfax (USA) University of Hefei (China), University of Macau (China).
REFEREE for several international Journals; referee for National Science Foundation (USA), and FWO-Research Foundation – Flanders, Belgium.
MEMBER of the expertpanel "Mathematical Sciences", FWO- Belgium since 2019, CHAIR since 2021.
MAIN EDITOR of the section "Higher dimensional geometric function theory and hypercomplex analysis" of the journal Complex Analysis and Operator Theory.
MEMBER of the EDITORIAL BOARD of "Complex Variables and Elliptic Equations", "Milan journal of Mathematics", "Advances in Applied Clifford Algebras".
DIRECTOR of the "Seminario Matematico e Fisico di Milano".
MEMBER of the steering committee of the ICCA Conferences since 2017 and PRESIDENT since 2020.
Secretary and treasurer and member of the board of the ISAAC Society since 2017.
RECIPIENT in 2017 with the co-authors Y. Aharonov, F. Colombo, S. Popescu, D.C. Struppa, J. Tollaksen the prestigious Cozzarelli prize of the National Academy of Science, USA, for the article "Quantum violation of the pigeonhole principle and the nature of quantum correlations" published on PNAS in 2016.

Attachment A2 – PhD Faculty Board

NAME	AFFILIATION	SSD - TITLE OF SSD
Prof.ssa Sabadini Irene Maria	Dipartimento di Matematica	MAT03 / Geometria
Prof.ssa Antonietti Paola Francesca	Dipartimento di Matematica	MAT08 / Analisi Numerica
Prof. Catino Giovanni	Dipartimento di Matematica	MAT03 / Geometria
Prof. Ciarletta Pasquale	Dipartimento di Matematica	MAT07 / Fisica Matematica
Prof.ssa Confortola Fulvia	Dipartimento di Matematica	MAT06 / Probabilità e statistica matematica
Prof.ssa Conti Monica	Dipartimento di Matematica	MAT05 / Analisi Matematica
Prof. Correggi Michele	Dipartimento di Matematica	MAT07 / Fisica Matematica
Prof. Fagnola Franco	Dipartimento di Matematica	MAT06 / Probabilità e statistica matematica
Prof. Formaggia Luca	Dipartimento di Matematica	MAT08 / Analisi Numerica
Prof. Grillo Gabriele	Dipartimento di Matematica	MAT05 / Analisi Matematica
Prof. Gazzola Filippo	Dipartimento di Matematica	MAT05 / Analisi Matematica
Prof.ssa Guglielmi Alessandra	Dipartimento di Matematica	SECS-S01 / Statistica
Prof. Lella Paolo	Dipartimento di Matematica	MAT03 / Geometria
Prof. Magli Giulio	Dipartimento di Matematica	MAT07 / Fisica Matematica
Prof. Marazzina Daniele	Dipartimento di Matematica	SECS-S06 / Metodi Matematici dell'economia e delle scienze attuariali e finanziarie
Prof.ssa Marchini Elsa Maria	Dipartimento di Matematica	MAT05 / Analisi Matematica
Prof. Paganoni Anna Maria	Dipartimento di Matematica	SECS-S01 / Statistica
Prof. Perotto Simona	Dipartimento di Matematica	MAT08 / Analisi numerica

Prof. Quarteroni Alfio Maria	Dipartimento di Matematica	MAT08 / Analisi numerica
Prof. Rodaro Emanuele	Dipartimento di Matematica	MAT02/ Algebra
Prof. Sacco Riccardo	Dipartimento di Matematica	MAT08 / Analisi Numerica
Prof.ssa Sangalli Laura	Dipartimento di Matematica	SECS-S01 / Statistica
Prof. Sgarra Carlo	Dipartimento di Matematica	SECS-S06 / Metodi Matematici dell'economia e delle scienze attuariali e finanziarie
Prof. Verani Marco	Dipartimento di Matematica	MAT08 / Analisi numerica
Prof. Verzini Gianmaria	Dipartimento di Matematica	MAT05 / Analisi Matematica
Prof. Zunino Paolo	Dipartimento di Matematica	MAT08 / Analisi numerica

Attachment A3 – PhD Advisory Board

Name	Affiliation
Bianchetti Marco	Intesa San Paolo
Chiaromonte Francesca	Scuola Superiore Sant'Anna
Decuzzi Paolo	Istituto Italiano di Tecnologia
Gerbeau Jean-Frédéric	INRIA-Paris, France
Mauri Aurelio	Micron Semiconductor Italy
Ruffo Paolo	Eni S.p.A.