



## A “three logos” award for the best PhD thesis in Mathematics

This award is steeped in a weird world (every research area is a weird, magic world) so ... be patient: we must introduce you to it and we will do ... explaining the three acronyms!

The first is [iNSdAM], that you must read as *Istituto Nazionale di Alta Matematica* and associate to the name of *Francesco Severi* (the most authoritative of its founders, in 1939: if you are curious about him, you can easily download a collection of all his works from few links in his English [Wikipedia page](#)). The second is SIMAI that means *Società Italiana di Matematica Applicata e Industriale*: it came exactly 50 years after the previous institution and is strongly committed with the keywords in its name, that is to link research and researchers to the practical – interdisciplinary – applications of their work. Eventually, the last acronym is UMI, whose coloured (and moving: see the [site!](#)) logo stands for *Unione Matematica Italiana*, the older association of the three.

These three institutions organize congresses and workshops, propose courses and training activities, publish journals and bulletins and, among an intense set of cultural activities, give *awards*. Only one of these awards is given together (and only every three years): two prizes for studies in pure



mathematics and two in applied mathematics. This makes it the outmost recognition, at an Italian level, for a PhD thesis (defended in an Italian University) in the field.

This long foreword was due.

What if we had just written about someone who got the *premio INdAM-SIMAI-UMI 2017*, without any explanation?

And this is the news: Matteo Muratori, selected as the best PhD doctor in the last three years in his Polimi PhD programme ([Mathematical Models and Methods in Engineering](#)) was chosen by the committee appointed by these three institution and awarded with the *premio INdAM-SIMAI-UMI 2017* for pure mathematics, just few days ago.

Well done, Matteo!



### Short Interview with *Matteo*

**Q:** Can you briefly explain the contents of your dissertation?

**A:** My Ph.D. thesis deals with some theoretical results in pure mathematics regarding a class of nonlinear partial differential equations of diffusion type. I think it is important to mention that such equations come from the real world and serve as models for describing some actual physical phenomena, like the flow of a gas through a porous medium or heat propagation with finite speed, even though once the equation is written down the mathematician tends to forget it. However, knowing the physical meaning of the equations we investigate often helps us guess what might be the behavior of the corresponding solutions, or at least gives us a clue on what not to expect. The main concern, during my thesis, was to understand the asymptotic behavior of solutions to nonlinear diffusion equations and establish key connections with some old and new tools of functional analysis that are crucial to study this kind of equations both from a purely theoretical point of view and as concerns their quantitative, hence physically significant, properties.



**Q:** Which of your results you consider particularly interesting?

**A:** Among the main results of my thesis I mention the ones dealing with the sharp asymptotics of solutions to nonlinear diffusion equations. Sharp means that the long-time behavior is captured at least at leading order, often with quantitative bounds on the error. This is potentially very significant in view of possible applications, as well as mathematically challenging since sophisticated tools in functional analysis and partial differential equations must be exploited. One of the main features of these results is their flexibility: they are based on abstract and quite general mathematical tools, hence they are applicable to very different settings.

**Q:** How is your career continuing?

**A:** I am currently an Assistant Professor at Politecnico di Milano (Ricercatore di tipo A). Previously, after I obtained my Ph.D., I was a Research Fellow at Università degli Studi di Milano for 6 months and then at Università degli studi di Pavia for 1 year and a half. My research is following some of the lines set up during the Ph.D. Thesis but also some new ones, especially with regards to the interplay between Analysis and Geometry. This has led me to broaden the network of people with whom I collaborate, which is something very important and stimulating!



## Call and events

### EDISON GRANT FOR PHYSICS

The Alessandro Volta Foundation issues a call for a scholarship of 10.000 € to be assigned to a candidate of Italian nationality (or coming from the Canton of Ticino in Switzerland) who aims at developing research in Physics in a non-Italian University

Deadline: 23 April 2018



### "FONDAZIONE MEGALIA" – YEAR 2018 – PHD THESIS PRIZE

The PhD prize (€5.000.00 inclusive and comprehensive of the taxes owed by the Politecnico di Milano) is reserved to the PhD students who, in the calendar years 2015, 2016 and 2017, have obtained a Doctorate in "Energy and Nuclear Science and Technology" and "Electrical Engineering" at the Politecnico di Milano.

The thesis that led, in the opinion of the Commission, the most innovative research contributions to energy technologies and sustainable development will be rewarded.

**Deadline for application: 12.00 noon (Italian time) of 5th March 2018**



### FULBRIGHT GRANTS USA

The event is a «*Presentazione delle opportunità di studio, ricerca e insegnamento negli USA offerte dalla Commissione Fulbright, ente binazionale congiuntamente istituito dal Governo italiano e dal Governo statunitense*». It will be in Italian and organized in two sessions:

- In the *first* session (13h00-14h00) the American academic system will be described: how to choose a program (in particular post-graduate level programs, MSc and PhD courses), application timing and requirements, entry visas and financial support possibilities.
- In the *second* session (17h00-18h00) the Fulbright calls (scholarships for study, research and teaching in the United States) and their requirements will be presented.
- A *Questions and Answers* session will follow.

Please, confirm your participation on the Politecnico events website, [here](#):

March 14<sup>th</sup> 2018, Beltrami Room building #5 (Campus Leonardo)



### BOCCONI & AFRICA 2018 - FORUM ON ENTREPRENEURSHIP

Three days of panel discussions and interactive events open to the public, addressing trends and entrepreneurial opportunities in the African continent with a focus on: energy, climate change, entrepreneurship, development, demography and migration. This will be an unique opportunity to interact with high-level representatives from both the private and public sectors.

A [Detailed program of the event](#) (pdf) is available. Registration is required [here](#)

March 6-7-8th Bocconi University, Aula Magna, via Gobbi 5, Milano





## Seminars and Workshops

### WORKSHOP UK-ITALY DIALOGUE: EXPLOITING THE POTENTIAL OF THE DIGITAL ECONOMY

The UK government has set the development of a Digital economy among its priorities and want to keep and strengthen partnerships on this topic with EU Countries, in spite of BREXIT. Government Chief Technology Officer Liam Maxwell will present the UK Government's actions and exchange views with key Italian stakeholders, both from the public and the private sector.

March 8th, 08h30 – 11h00, Auditorium Via Pascoli, 53 (Campus Leonardo)



### ADVANCED WIND ENGINEERING: CHANGING CLIMATES, AERODYNAMICS AND DYNAMICS

Prof. Teng Wu, from University of Buffalo, will introduce some efforts made on the consideration of the nonstationary winds, nonlinear aerodynamics and nonlinear structural dynamics in the simulation of wind-induced effects on civil infrastructures.

March 12<sup>th</sup>, Sala Consiglio, Dept. of Mechanical Engineering, Via La Masa 1 (Campus Bovisa)



### WORKSHOP "PAINTING DEGRADATION? LET'S HAVE A LOOK!"

The aim of the one-day meeting is to provide an overview of the latest innovation in photonic techniques for painting investigation. The session is free after on-line registration ([Online Form](#)). places are limited!

April 17<sup>th</sup>, Aula Natta, building #6 (Campus Leonardo)



### ARCHAEOASTRONOMY SUMMER SCHOOL "ISOLA DI USTICA"

The "Isola di Ustica" *Archeoastronomy School* will take place from July 16th to 20th (2018) in Ustica. The teachers of the School (that will be held in Italian) are Franco Foresta Martin, Director of the Laboratory-Museum of Earth Sciences of Ustica and Giulio Magli, director of the Department of Mathematics of Politecnico di Milano. A detailed program is available from [here](#).

July 16-20<sup>th</sup>, 2018, Ustica (PA)



## Starting courses – PhD School

### COMMUNICATING SCIENTIFIC RESEARCH

#### Prof. Anna Maria Paganoni

The principal aim of the course is to promote and spread the scientific culture in a broad sense, emphasizing its connection with other disciplines and taking advantage of the great experience grown at "Laboratorio di Formazione Matematica e di Sperimentazione Scientifica (Dept. of Mathematics) and of the strengthened collaboration between the Piccolo Teatro di Milano and the Politecnico.

From 1 March 2018 to 30 June 2018



### PROJECT MANAGEMENT (IN ACTION)

#### Prof. Mauro Mancini

The course aims at introducing the students in the characteristics of project-based operations and offering them the opportunity to practicing on the tools and techniques for the planning and control of projects. Three sectors will be specifically addressed - Oil and Gas, civil and ICT - in order to share practical techniques to manage small, large and mega projects.

From 5 March 2018 to 9 March 2018



### PROJECT MANAGEMENT PMI-CAPM CERTIFICATION PREPARATION

#### Prof. Alfonso Fuggetta

Provide an internationally recognized certification in Project Management. The course cannot be considered as a "stand alone course" but it should be delivered after the preliminary course "PROJECT MANAGEMENT BASICS".



From 7 March 2018 to 14 March 2018



## Starting courses – Doctoral Programmes

### PhD in *Architecture, Built Environment and Construction Engineering*

#### DEALING WITH UNCERTAINTY IN CONSTRUCTION MANAGEMENT

**Prof. Fulvio Re Cecconi**

Uncertainty affects many decisions in the construction sector; the mission of the course is to teach how to deal with it using Monte Carlo simulation method and to give students some basic knowledge of how to do MC simulations using the software that suits best their specific research application, with a special attention to Construction Management questions.

Lectures will start on March 12<sup>th</sup>



#### DISTINCT ELEMENT ANALYSIS OF BLOCKY SYSTEMS

**Prof. Francesco Calvetti**

The course is devoted to present the fundamentals of the Distinct Element Method (DEM) and to show its application to blocky discrete systems, such as granular materials, rock masses and stone structures. Students will learn which mechanical problem is best suited for a DEM or for other numerical or analytical methods and the rules for a reliable DEM-model set-up. Modelling strategy and the procedure of the simulations will also be thoroughly discussed through practical rock mechanics and other structural examples.

Lectures will start on March 20<sup>th</sup>



### PhD in *Physics*

#### THE THEORY OF RELATIVITY AND ITS IMPLICATIONS

**Prof. Ezio Puppini**

The course will teach the key events that force us to rethink the common concepts of space and time, leading to the theory of special relativity. The approach is Lagrangian and specific attention is paid to the role of symmetry.

Lectures will start on March 1<sup>st</sup>, and will be offered every Thursday afternoon



### PhD in *Mechanical Engineering*

#### ADDITIVE MANUFACTURING FOR SPACE AND AEROSPACE APPLICATIONS

**Dr. Tommaso Ghidini**

The course will provide the students with a very deep understanding of the different Additive Manufacturing technologies and their industrial applications with focus on space and aerospace.

Lectures will start on March 5<sup>th</sup>



## Colloquia Doctoralia

#### MECCPHD COLLOQUIA DOCTORALIA 2018

**Prof. Daniele Rocchi – Programme Coordinator**

Doctoral Defence of *Valentina Furlan* – Department of Mechanical Engineering

March 14, 2018, 10:00 am Sala Comunicante, Department of Mechanical Engineering, Via La Masa 1

