Master Degree in Mathematics
University of Verona

http://www.univr.it/mathematics

Department (of excellence) of Computer Science

a.y. 2018/2019
Why mathematics?

Economic repercussions of mathematics:

Why mathematics?

Growing professional environments requiring strong mathematics skills:

- Life sciences, biology, health and medicine.
- Computer science in general, and HPC (High Performance Computing) and big data in particular (we have a cluster).
- Physics at all scales and engineering sciences. Material science.
- Social sciences, in the broadest sense. Development of complex systems or modelling and data analysis.
- Finance, insurance.

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PhD Modelling Week, September 4-11, 2016 - Verona (Italy)

Home
Projects
Schedule
Participants
Sponsors

Home

Between September 4 and 11, 2016, the joint Bachelor's degree in Mathematics of the Universities of Trento and Verona and the Department of Computer Science of the University of Verona organize a Modelling Week for PhD students. This event will take place at the Department of Computer Science and will gather PhD students in Mathematics/Science from different European countries, together with academic supervisors and representatives from industry. The event consists of a series of presentations, discussions, and intense workshops. The distance learning course will allow students to register in groups or projects defined and implemented jointly by academic and industrial cooperation partners, and then find out how mathematics contributes to solving currently relevant industrial problems.

Projects

1) Simulation of Particle Accelerator Cavities (Instructor: Dr. Carlo De Felice, Milan Polytechnic)

Particle accelerators, such as the LHC at CERN, take fundamental particles up to the speedlightly exceeding those in properly excited electromagnetic fields. Radio frequency cavities are responsible for the acceleration of the beams. The fields created within these devices are extremely sensitive to the geometry of the cavity itself. A company in Italy (Cavitec, Italy), for which the instructor does a research consultancy, constructs such particle accelerator cavities and needs highly reliable simulation of these fields to ensure the geometry of the cavity to achieve their goals for scientific accelerators. The problem is then, assigned different cavity geometries of interest, to appropriately represent the computational domain through a CFD code (such as ANSYS) in order to evaluate the field patterns. This project will support the team in the management of such systems. The instructor will support the team in the management of such systems. The instructor will support the team in the management of such systems. The instructor will support the team in the management of such systems.

2) Stress models and optimization models for the banking/industry sector (Instructor: Dr. Luca Di Persio, University of Verona, in collaboration with IASSON Ltd. (Dr. Michele Bombini), and in collaboration with Dr. Ben Pasquet)

The purpose of the project is to provide a comprehensive framework for the development of models for the simulation of complex systems, especially those involving financial and economic processes. The project will focus on the development of models for the simulation of complex systems, especially those involving financial and economic processes. The project will focus on the development of models for the simulation of complex systems, especially those involving financial and economic processes.
Why in English?

- The official language of science is English
- More opportunities for studying/research/job both in Italy and abroad
- CLIL: English as mandatory teaching language in high school classes (C1 level required)
- Highly qualified international teaching staff
Internships (some examples)

- Chiara, 2016, Google Summer of Code
- Cristiano, 2016, European Space Agency SOCIS
- Chiara, 2014, Camera di Commercio, Verona
- Andrea, 2014, Fairmat (software house and financial mathematics)
- Isacco, 2014, Aleph Energy (models for energy markets)
- Alessandro, 2014, Cattolica Insurance
- Cristina, 2013/14, Erasmus and internship, University of Innsbruck (Austria)
- Sara, 2011, French Institute of Petroleum, Paris (France)
- Gregorio, 2014, Enginsoft (Computer Aided Engineering)
- Elisa, 2012, Zamperla (roller coasters design), Vicenza
- Martina, 2013, Atraki (traffic flow modeling), Verona
Job opportunities: alumni

- Matteo 2017, PhD, Nice
- Giulia 2016, PhD, Nice
- Greta 2016, Unicredit, Milano
- Silvia 2016, Intesa S. Paolo
- Gregorio 2015 Generali
- Franco 2016, PhD in Mathematics, Universities of Trento and Verona
- Giulia 2015, KPMG, Verona
- Chiara 2015, PhD Innsbruck
- Marcella 2014, internship and PhD in Applied Mathematics, University of Sophia-Antipolis (France)
- Simone, 2014, PhD in Applied Mathematics, Cambridge (UK)
- Davide, 2013 PhD in Computer Science, University of Lugano (Switzerland)
- Giulia, Elena, … 2013–15, PhD in Mathematics, Universities of Trento and Verona
- Marcello, 2013, analyst, Panrhema (financial advice), Milan
- Anna, 2013, business intelligence analyst, Deloitte, Milan
- Chiara, 2013, quantitative analyst, Almaiura, Verona
- Silvia, Andrea, …, 2012, high school teachers
- [http://www.univr.it/mathematics/alumni-ae](http://www.univr.it/mathematics/alumni-ae)
Curricula and tracks

Common foundational courses

- Differential geometry
- Functional analysis
- Analytical mechanics
- Algebra
Curricula

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- Differential geometry
- Functional analysis
- Analytical mechanics
- Algebra

Curriculum Mathematics for education - core courses

- Mathematical logic
- Mathematics teaching and workshop
- Mathematical methods for computer science

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Curricula

Common foundational courses

- Differential geometry
- Functional analysis
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Curriculum Mathematics for education - core courses

- Mathematical logic
- Mathematics teaching and workshop
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Curriculum Applied Mathematics - core courses

- Partial differential equations
- Advanced numerical analysis I and II
- Stochastic differential equations
- Optimization

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Master Degree in Mathematics @ UNIVR.IT
Elective courses: main tracks and tutors

- **Education** (foundations, modern physics, physics education laboratory, TFA, teaching): Sisto Baldo
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- **Industrial maths** (numerical modeling in applied sciences, scientific computing, ECMI): Giacomo Albi, Nicola Sansonetto
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- **Financial maths** (quantitative finance, stochastic modeling, numerical methods, ECMI): Luca Di Persio
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I. seminar and mini courses delivered by international faculties
II. courses from other masters in Verona (partially in Italian)
III. courses in agreement with University of Trento
IV. courses within Erasmus+ mobility program

Type III. or IV. courses may supersede foundational or core courses

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Further activities

- 1 semester (or 2) of mobility experience abroad (Erasmus+ & UniVR Worldwide programs)
- Presentation of agreements to students: December/January
- Deadline for first semester (a.y. 2019/20) abroad: June/July
- Deadline for second semester (a.y. 2019/20) abroad: October/November
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- soft skills (Matlab, Scilab, C/C++, FreeFem++, Clawpack, Python, R, foreign languages)
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- Internships and schools
  (http://profs.scienze.univr.it/mathematics/internship)
  - From interacting particle systems to kinetic equations
  - ECMI modelling week in Darmstadt

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- Final project (also abroad within Erasmus+ program)
Web page
http://www.univr.it/mathematics

Email
master.math@ateneo.univr.it or marco.caliari@univr.it

Facebook page (managed by students’ representatives)
https://goo.gl/mNzbS9, calendar of mathematical activities (minicourses, meetings, . . .), ask me for sharing