

## Ph.D course in Mathematical Analysis, Modelling, and Applications

Head of the Ph.D course:

Prof. Massimiliano Berti

Web site:

[Mathematical Analysis, Modelling, and Applications](#)

Research projects:

**1. “Development of Algorithms for Reinforcement Learning” in collaboration with Danieli Automation SpA;**

Danieli operates in the design and construction of plants for the production of steel. The Automation division carries out research and development activities related to the design of complex systems through digital twins, modeling, simulation, optimization and control, high-performance computing, data science, computational reduction models, machine learning algorithms for innovative products and processes. The activities are aimed to an improvement in design with increasingly sustainable plants, less polluting and impacting on the environment.

**2. “Mathematical and numerical modeling, scientific computing, data science and the study of automatic and intelligent algorithms for the study of products and / or processes” in collaboration with Dofware S.r.l.;**

Dofware operates in the mathematical and physical modelling of complex processes and products. Research and development activities related to the development of digital twins, modeling, simulation, shape optimization, high performance computing, data science, computational reduction models, machine learning algorithms for innovative products and processes. The activities aim to lead to an improvement of the IT supply chain through the integration of simulation procedures and complex optimization.

**3. "Reduction models for the parametric study of temporary flooring panels for large events" in collaboration with EPS Italia;**

EPS operates in the construction of barriers and flooring for large events and the safe management of large flows of people, gates and escape routes. The R&D division deals with the design and testing of temporary barriers and flooring through finite element structural analysis and optimization techniques, with the aim of using less polluting, recyclable, sustainable materials that meet certain needs of resistance and safety. Advanced design takes place by integrating simulation techniques and parametric optimization with computational reduction models.

**4. “Development of advanced reduced methods of parametric optimization for the structural analysis of cruise vessels” in collaboration with Fincantieri SpA**

Fincantieri, Italian shipyards. Research and development activities related to the design of large ships through digital twins, modeling, simulation, shape optimization, high performance computing, data science, computational reduction models, machine learning algorithms for innovative products and processes. The activities want to lead to an improvement in design with increasingly sustainable, less polluting and impactful shipbuilding at sea.

**Admission: Academic and scientific qualifications + oral exam**

**Beginning of the Courses: 3 October, 2022**

**Evaluation of academic and scientific qualifications: 30 points**

**Access to Oral Exam:** minimum mark of 21/30 on academic and scientific qualifications

**Evaluation of Oral Exam: 70 points**

**Total Evaluation: 100 points**

**Eligibility: 70 points**

**Deadline for online submission of applications: 31 August, 2022**

**Oral Exam: 7-8 September, 2022**

**Admission to the written exam and results of all evaluations will be notified by email.**