



Dipartimento di Matematica
ed Applicazioni
"Renato Caccioppoli"

PhD at "Renato Caccioppoli" Department

An international PhD School in Mathematics and Applications in collaboration with Istituto Nazionale di Alta Matematica "Francesco Severi"

**Application deadline
(34th cycle):
July 31
2018**

Students from all scientific areas are selected according to the highest international standards prevailing in the best graduate schools worldwide

Application info:
<http://www.matematica.unina.it/en/didattica/dottorato.html>

Coordinator of the PhD School in Mathematics and Applications:
Prof. Carlo Sbordone
Email: sbordone@unina.it



The PhD program for the academic year 2018-2019 focuses on the following research topics

Algebra

Finiteness conditions in group theory, soluble groups of infinite rank, groups of large cardinality, large characteristic subgroups.

Analysis

PDEs, topological and variational methods in nonlinear analysis, control theory, dynamical systems, conservation laws, geometric measure theory, models in continuum mechanics, thin structures, homogenization techniques for composite materials, geometric analysis, evolution of geometric structures, shape optimization, symmetrization techniques.

Geometry

Algebraic geometry: varieties with just one singular point, Cohen-Macaulay varieties, Hilbert polynomials, Hilbert functions. Combinatorial geometry: classification of flocks, translation generalized quadrangles, finite semifields. Topology: cohomology of commutative Hopf algebras, invariant theory.

Mathematical physics

Construction and development of mathematical models (PDEs, autonomous or non autonomous ODEs) to describe real world phenomena, quantitative and qualitative analysis of models by using analytical and numerical approaches: linear and nonlinear stability, asymptotic behaviour of solutions, existence of absorbing sets in phase space.

Combinatorial optimization, probability and statistics

Shortest path and flux problems in networks, computationally hard problems in combinatorial optimization, stochastic arrangements in reliability theory, neural models, dynamic models for motor proteins.

Scientific computing

High performance computing: hardware-software architectures, algorithms, software for GPU computing.

Numerical analysis and data mining

Algorithms and solvers for numerical optimization methods for multivariate data interpolation and approximation, design and analysis of numerical methods for differential and integral equations, reduced order methods; numerical approaches in data mining, learning methodologies for data analysis and image processing.