

# Alberto Ferrero

## Personal data

Born in Asti, Italy, on 1976, June 24<sup>th</sup>

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## CURRICULUM VITAE ET STUDIORUM

Graduated in Mathematics at Università del Piemonte Orientale “Amedeo Avogadro”, on 2000, July 5<sup>th</sup>.

Ph.D. in Mathematics at Università di Milano, on 2005, March 7<sup>th</sup>.

## UNIVERSITY CAREER

2023-	Full Professor, Università del Piemonte Orientale
2018-2023	Associate Professor, Università del Piemonte Orientale
2011-2018	Assistant Professor, Università del Piemonte Orientale
2007-2011	Assistant Professor, Università di Milano-Bicocca
2005-2007	Post-doc, Università di Pisa

## MAIN FIELDS OF INTEREST

1. Partial differential equations of elliptic type
2. Nonlinear Partial differential equations
3. Shape optimization problems
4. Higher order elliptic problems
5. Nonlinear elliptic equations on Riemannian manifolds
6. Higher order wave equations and their applications to suspension bridges models

## **CURRENT ISSUES OF RESEARCH INTEREST**

### **1. Monotonicity formulas and their applications**

The Almgren-type monotonicity formula is a fundamental tool for studying the qualitative properties of the solutions of a large class of linear or semilinear elliptic equations. In past years we have dealt in particular with equations with singular potentials, with angular points on the edge of the domain or with mixed boundary conditions of Dirichlet-Neumann type. More recently we have dealt with the applications of these methodologies in the study of equations with the Grushin operator which falls into the class of hypoelliptic operators.

### **2. Fourth order wave equations and their applications to the study of dynamics of suspension bridges**

A particular class of fourth-order nonlinear wave equations finds application in the study of the dynamic behavior of structures such as suspension bridges. The objective of these studies is to provide useful information for the study of the stability properties of particular oscillation modes. It is conjectured that some modes of oscillation, observed before famous collapses, could be triggered by internal resonance phenomena as well as by the action of external forces.

### **3. Semilinear second order elliptic problems on Riemannian manifolds with pole**

Particular interest has arisen in recent years the study of elliptic equations with the Laplace-Beltrami operator on Riemannian manifolds such as the  $n$ -dimensional hyperbolic space. We studied the existence, qualitative properties, and symmetry for a class of semilinear elliptic equations on Riemannian manifolds with pole and having negative curvature when the distance from the pole approaches infinity.

## **THE FIVE MORE SIGNIFICANT PUBLICATIONS OF CAREER**

1. A. Ferrero, F. Gazzola, Existence of solutions for singular critical growth semilinear elliptic equations, *Journal of Differential Equations* 177, 2001, 494-522.

2. A. Ferrero, H.-C. Grunau, The Dirichlet problem for supercritical biharmonic equations with power-type nonlinearity, *Journal of Differential Equations* 234, 2007, 582-606.

3. D. Bucur, A. Ferrero, F. Gazzola, On the first eigenvalue of a fourth order Steklov problem, *Calculus of Variations and Partial Differential Equations* 35, 2009, 103-131.

4. V. Felli, A. Ferrero, S. Terracini, Asymptotic behavior of solutions to Schrodinger equations near an isolated singularity of the electromagnetic potential, *Journal of the European Mathematical Society* 13, 2011, 119-174.

5. E. Berchio, A. Ferrero, G. Grillo, Stability and qualitative properties of radial solutions of the Lane-Emden-Fowler equation on Riemannian models, *Journal de Mathématiques Pures et Appliquées* 102, 2014, 1-35.