



## **CALL FOR EXPRESSION OF INTEREST FOR MSCA POSTDOCTORAL FELLOWSHIPS AT POLITECNICO DI BARI**

### **Research project**

**Nome and Surname:** Prof. Erasmo Caponio, Prof. Pietro d'Avenia, Prof. Alessio Pomponio

**Title:** Variational Methods and Nonlinear Analysis

**Description:** Our research group at Politecnico di Bari combines complementary expertise in variational methods, geometric analysis, and nonlinear PDEs, to address fundamental mathematical challenges with far-reaching applications.

We investigate the existence, multiplicity, and qualitative properties of solutions to nonlinear differential equations.

Our work spans from abstract functional analysis to concrete applications in physics and engineering.

Research interests include, but are not limited to:

**Nonlinear elliptic equations** – developing mathematical tools with applications to nonlinear Schrödinger or Klein Gordon equations, optical theory, quantum mechanics.

**Fractional and nonlocal differential equations** - modelling complex phenomena with different types of interactions.

**Geometric PDEs and Mathematical Physics** - including extended gravitational and electromagnetic theories, mean curvature problems, and characteristic surfaces in spacetimes.

**Critical point theory and minimax methods** - advancing fundamental techniques for finding solutions to nonlinear problems as critical points of suitable functionals.

**Qualitative analysis of solutions** - understanding properties like symmetry, stability, concentration phenomena, blow-up behaviour, regularity, decay.

**Candidates should provide detailed CV**

**Candidates must be eligible according to the criteria established by the 2026 MSCA Postdoctoral fellowship call:**

- to have a PhD by the call deadline.
- to have up to 8 years of research experience after PhD.
- to be citizens of an EU State or of an Associated Country.
- not to have resided or carried out their main activity in Italy for more than 12 months in the 36 months before the call deadline.



**Dipartimento  
Meccanica  
Matematica  
Management**

MUR  
Dipartimento  
di Eccellenza  
2018-2022  
2023-2027

## Contacts

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