PhD POSITION IN "ALGEBRA AND GEOMETRY: ARITHMETIC GEOMETRY" AT THE ICMAT FOR THE INPhINIT PROGRAMME

Job Position title: PhD in Algebra and Geometry: Arithmetic Geometry

Research project/ group description

ICMAT RESEARCH GROUP A: ALGEBRA AND GEOMETRY

The group conducts research in the areas of abstract algebra, algebraic geometry, differential geometry, and topology. In addition, a number of the themes we study find their motivation in ideas stemming from physics, such as special metrics, gauge theories and their algebro-geometric counterparts.

The main research lines may be grouped into the following general directions:

- **Algebraic Geometry and Mathematical Physics**: The research of this line is devoted to the study of moduli spaces of vector bundles and related objects, and their interplay with various algebraic and geometric structures, involving techniques from algebraic geometry, differential geometry, topology, Lie theory, geometric analysis and theoretical physics.
- **Differential Geometry, Symplectic Geometry and Geometric Mechanics**: The research of this line centers on differential and contact topology, differential and riemannian geometry, geometric mechanics with applications to control theory, dynamical systems and the geometry of PDEs.
- **Group Theory**: This line includes several areas of group theory with applications to other fields, such as ring theory, topology, dynamics, and logic. Connecting threads of this line are the approximation of infinite groups by finite structures, and the study of groups through their actions on non-positively curved spaces.
- **Arithmetic Geometry**: The research in this line is devoted to problems at the core of arithmetic geometry, like the equivariant Tamagawa number conjecture or the development of Arakelov geometry, as well as its interplay with related fields like complex and non-Archimedean analysis, algebraic geometry and even theoretical physics.

The group is formed by the following faculty members:

L. Álvarez-Consul, J. Aramayona, A. Bravo, J. I. Burgos, M. de León, J. F. Fernando, O. García-Prada, T. L. Gómez, L. Guijarro, A. Jaikin, I. Luengo, D. Martín, D. Peralta, F. Presas, P. Tempesta, O. Villamayor.

Job position description

The PhD candidate will be involved in work related to one of the research topics in which the group is particularly active: additive properties and the Erdös-Turan conjecture within the area of arithmetic combinatorics; the arithmetic properties of L-functions, for instance through the conjecture of Birch and Swinnerton-Dyer or the equivariant Tamagawa number conjecture; and Arakelov theory.

The PhD candidate will be appointed a supervisor among the faculty members of the Group, with whom regular meetings will be held. He/she will be expected to participate in the group activities including

seminars and conferences, interacting with visitors and international colleagues. ICMAT will also provide counselling to help the PhD candidate develop a successful research career.

Research Group Contact: J.I. Burgos (burgos@icmat.es)

Research Group website:

ICMAT RESEARCH GROUP A: ALGEBRA AND GEOMETRY: https://www.icmat.es/researchers/groups/group-a/

Links to the INPhINIT 2022 Incoming Open Call:

Programme description: https://fundacionlacaixa.org/en/educacion-becas/becas-la-caixa/doctorado-inphinit/descripcion-del-programa

Application website: https://candidate.lacaixafellowships.org/login

Programme rules here.

PhD position finder: https://hosts.lacaixafellowships.org/finder