The aim of this project of 5 years is to create a research group on geometric control methods in PDEs with the arrival of the PI at the CNRS Laboratoire CMAP (Centre de Mathematiques Appliquees) of the Ecole Polytechnique in Paris (in January 09). With the ERC-Starting Grant, the PI plans to hire 4 post-doc fellows, 2 PhD students and also to organize advanced research schools and workshops. One of the main purpose of this project is to facilitate the collaboration with my research group which is quite spread across France and Italy. The PI plans to develop a research group studying certain PDEs for which geometric control techniques open new horizons. More precisely the PI plans to exploit the relation between the sub-Riemannian distance and the properties of the kernel of the corresponding hypoelliptic heat equation and to study controllability properties of the Schroedinger equation. In the last years the PI has developed a net of high level international collaborations and, together with his collaborators and PhD students, has obtained many important
results via a mixed combination of geometric methods in control (Hamiltonian methods, Lie group techniques, conjugate point theory, singularity theory etc.) and noncommutative Fourier analysis. This has allowed to solve open problems in the field, e.g., the definition of an intrinsic hypoelliptic Laplacian, the explicit construction of the hypoelliptic heat kernel for the most important 3D Lie groups, and the proof of the controllability of the bilinear Schroedinger equation with discrete spectrum, under some "generic" assumptions. Many more related questions are still open and the scope of this project is to tackle them. All subjects studied in this project have real applications: the problem of controllability of the Schroedinger equation has direct applications in Nuclear Magnetic Resonance; the problem of nonisotropic diffusion has applications in models of human vision."

**Campo scientifico**

/scienze naturali/matematica/matematica pura/analisi matematica/analisi di fourier
/scienze naturali/matematica/matematica pura/analisi matematica/equazioni differenziali/equazioni differenziali parziali

**Programma(i)**

**Argomento(i)**

**Invito a presentare proposte**

ERC-2009-StG

**Meccanismo di finanziamento**

ERC-SG - ERC Starting Grant

**Istituzione ospitante**

**CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS**

<table>
<thead>
<tr>
<th>Indirizzo</th>
<th>Tipo di attività</th>
<th>Contributo UE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rue Michel Ange 3 75794 Paris</td>
<td>Research Organisations</td>
<td>€ 785 000</td>
</tr>
</tbody>
</table>

[Contatta l’organizzazione](#)
CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS

Francia
Contributo UE
€ 785 000

Indirizzo
Rue Michel Ange 3
75794 Paris

Tipo di attività
Research Organisations

Sito web
Contatta l’organizzazione

Ricercatore principale
Ugo Boscaín (Dr.)

Contatto amministrativo
Véronique Debisschop (Mrs.)

Ultimo aggiornamento: 16 Luglio 2019
Numero di registrazione: 93898

Permalink: https://cordis.europa.eu/project/id/239748//it

© European Union, 2020