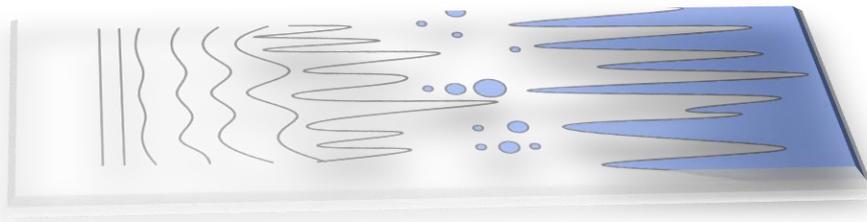


## Data-driven modelling of laminar-turbulent transition in wall-bounded flows

**Supervisor:** Dr Giovanni Iacobello, University of Surrey, School of Mech. Eng. Sciences

**Co-supervisor:** Dr Marco Placidi, University of Surrey, School of Mech. Eng. Sciences

**Contacts:** [g.iacobello@surrey.ac.uk](mailto:g.iacobello@surrey.ac.uk) - [m.placidi@surrey.ac.uk](mailto:m.placidi@surrey.ac.uk)



### Project outline

Transition from a laminar to a turbulent state in a fluid flow is a widely observed phenomenon occurring in a large variety of natural and engineering applications. Understanding under which conditions laminar-turbulence transition takes place, as well as the dominant mechanisms at play, is crucial for the development of reliable models, and for the implementation of effective control strategies<sup>1</sup>. The aim of this project is to provide a data-driven characterization of laminar-turbulence transition in wall-bounded flows, combining fluid dynamics, data analysis, and network theory within a multidisciplinary framework. The project will be mainly numerically/theoretically oriented, but experimental work exploiting one of EPSRC's National Wind Tunnel Facilities could be included.

### Student profile

We are seeking highly motivated candidates with degrees in a relevant engineering field (e.g., aeronautics, environmental, civil, mechanical), as well as physical sciences or applied mathematics, with excellent communications skills, and a strong inclination towards multidisciplinary research. UK and international students holding a first-class degree (or a good 2:1) in the aforementioned disciplines and a background in fluid mechanics are encouraged to apply. Previous experience with Matlab (or Python) computing is essential for the data analysis and code development; some exposure to experimental work would be beneficial.

### Training opportunities

Specialised MSc modules on various aspects of atmospheric fluid mechanics and aerodynamics are available at the University of Surrey. The student will also be encouraged to take part in the Summer School in "Fluid Dynamics of Sustainability and the Environment" offered by the University of Cambridge (UK).

---

<sup>1</sup> Tuckerman, Chantry, and Barkley, (2020) *Annual Review of Fluid Mechanics*, 52, 343-367.