PhD position starting in 2021  
**Analysis of non-standard hydrodynamic models**

Supervisor: E. Zatorska (Imperial College London)

This PhD project aims at mathematical analysis of non-standard equations of Fluid Mechanics, used for example, for modelling of collective behaviour [2, 3]. This framework is highly desirable for applications where the number of interacting agents makes a particle description computationally intractable. The successful candidate will conduct their research in one of the three areas of research:

*Existence of solutions.* A central problem is to define the notion of solutions for a naturally emerging class of hydrodynamic equations with complex form of the pressure, nonlocal attraction, repulsion, and dissipation forces, and to prove their existence globally-in-time for arbitrarily large initial data.


*Agent-fluid coupling.* Macroscopic models describing interactions between agents surrounded by viscous fluid lead to strongly coupled multi-component systems [1]. The project involves rigorous derivation of such systems from the microscopic level as well as analysis of the corresponding macroscopic equations.

The scholarship covers the studies at Imperial College London for 3.5 years and it includes:

- home (UK/EU) tuition fees;
- an annual tax-free stipend (the starting rate is £17,285 pa);
- research training support (£1000 annual allowance).

PhD students at Imperial College London do not have teaching responsibilities, but if they wish they might do an extra paid Graduate Teaching Assistant work during their studies.

For more details visit the webpage: [https://www.mimuw.edu.pl/~ekami/Apply_for_PhD](https://www.mimuw.edu.pl/~ekami/Apply_for_PhD) or contact me by e-mail: e.zatorska@imperial.ac.uk

**References**

