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Active control of Lagrangian particle transport in complex and turbulent flows

Wednesday 15 October 2025 14:00 (20 minutes)

In this presentation, I will provide an overview of the main results of my PhD, which focused on the control and optimization of Lagrangian particle transport in turbulent flows. I will present my work on using optimal control theory and reinforcement learning to minimize the relative separation of fluid particles navigating chaotic environments, enabling efficient pursuit of drifting targets despite turbulent dispersion. These results illustrate the potential of both equation-based and data-driven approaches for controlling particle dynamics in complex flows. In the final part of the talk, I will briefly mention other projects carried out during my PhD, including the control of active swarms and studies of turbulent intermittency, and I will conclude with a short outlook on my current research directions.

Presenter: CALASCIBETTA, Chiara