Dr. Maria Colombo

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Maria Colombo is an Italian mathematician who is active in the fields of calculus of variations, optimal transport and partial differential equations in fluid dynamics. She graduated in Scuola Normale Superiore in 2015 and, after a postdoc at ETH Zuerich, she is currently professor at the École polytechnique fédérale de Lausanne (EPFL). She received in 2022 the Peter Lax award and in 2023 the Collatz Prize of the International Council for Industrial and Applied Mathematics.

Maria Colombo's contributions regard the regularity and the analysis of singularities in elliptic PDEs, geometric variational problems, transport equations, and incompressible fluid dynamics. One of her most recent contributons, in collaboration with Albritton and Brué, rigorously established non-uniqueness of Leray-Hopf solutions of the forced Navier-Stokes equations.

Title: Instability and non-uniqueness for the Euler and Navier-Stokes equations

Abstract: The incompressible Navier-Stokes and Euler equations are fundamental PDEs in mathematical fluid dynamics and their well-posedness theory is nowadays largely open.
The past decade has seen a surprising and remarkable progress, through various different attempts, in describing some non-unique solutions of these PDEs.
The talk will survey some of the recent contributions in this direction, including works in collaboration with Albritton and Brué which show that Leray-Hopf solutions of the forced Navier-Stokes equations are not unique.