Per i **Seminari di Fisica Matematica** della Federico II,

martedì 21 aprile 2026 alle ore 16:00, presso l'aula F terzo livello del DMA,
il professore *Tommaso Lorenzi* del Politecnico di Torino terrà il seminario:

Phenotype structuring in collective cell migration: a tutorial of PDE models and methods

Abstract: Populations are heterogeneous, deviating in numerous ways. Phenotypic diversity refers to the range of traits or characteristics across a population, where for cells this could be the levels of signalling, movement, and growth activity, etc. Clearly, the phenotypic distribution – and how this changes over time and space – could be a major determinant of population-level dynamics. In this seminar, I will discuss how classical partial differential equation (PDE) approaches for modelling cellular systems and collective cell migration can be extended to include phenotypic structuring. The resulting non-local PDE models form an interesting class of models with rich dynamics. I will set the scene through a short review of extensions of several classic PDE models – including the Fisher-KPP and Keller-Segel equations – into a non-local form. I will then proceed with a tutorial-style presentation on key qualitative properties of the solutions to these models and mathematical methods that have been developed to study such properties, recounting travelling waves in PDE models of spatial spread dynamics and concentration phenomena in non-local PDE models of evolutionary dynamics, and combining the two to deduce phenotypic structuring across travelling waves in non-local PDE models of collective cell migration.

I proponenti:
Florinda Capone, Maria Rosaria Mattei