



Venerdì 5 Dicembre 2025 alle ore 14:30 presso l'aula F

## il Dr. Daniele Del Giudice

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terrà il seminario dal titolo:

# From Non-Equilibrium Behavior to Supramolecular Polymerization and Liquid- Liquid Phase Separation: Exploring Complexity in Supramolecular Systems

Non-equilibrium states are a hallmark of living systems. From the dynamic instability of microtubule assembly to cell division and slime-mold proliferation, matter often operates far from equilibrium, continuously consuming energy to sustain structure and function. Inspired by these processes, many efforts have been devoted to understanding and harnessing non-equilibrium behaviors to design synthetic systems and materials that display life-like properties. Furthermore, pathway complexity in supramolecular polymerization and liquid–liquid phase separation (LLPS) have emerged in this context as powerful design principles, where competing assembly routes, kinetic traps, and transient states offer new opportunities to control structure, function, and responsiveness.

In this talk, I will highlight some examples in which non-equilibrium conditions have been exploited to drive the operation of supramolecular systems, including molecular switches, DNA-based nanodevices and smart materials, as well as to enable spatiotemporal control in supramolecular polymerization. I will further show how cooperative and competitive interactions between orthogonal chiral elements can be used to control pathway complexity during supramolecular polymerization, to finally outline emerging directions of supramolecular polymers in the context of LLPS.

*La presenza della S. V. sarà molto gradita*

Organizzatore  
Luka Đorđević

Il Direttore del Dipartimento  
Stefano Mammi