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<https://jmc2026.sciencesconf.org/>

## BAM04 : Synthetic Active Matter

**Organizers:** Laura Alvarez, Martin Brandenbourger, Antoine Aubret

**Invited Speakers: Open to everybody !**

### Content:

Active Matter is made from building blocks that transduce energy into work. While prototypical examples are given by living organisms, their complexity has inspired the development of their synthetic analogues made from active particles. Over the past two decades, synthetic particles have been designed and actuated by various means, like catalytic reactions, electric or magnetic fields, or light.

A strong interest in the use of artificial, active particles lies in their functional tunability during synthesis, allowing to unveil phases of matter far-from-equilibrium that may replicate biological complexity or create new regimes. As such, collective assemblies of particles have also been demonstrated as useful building blocks for the generation of active devices, machines, solids, or fluids with unusual transport, rheological, or elastic properties for instance. Today, a central challenge in synthetic active matter remains the development of design rules for targeting far-from-equilibrium states, alongside a rational framework to describe the statistical properties of large-scale active ensembles. This necessitates the convergence of experiments, numerical simulations and theoretical studies that span from the microscale to human scale, depending on the type of system investigated.

The aim of this mini-colloque is to present recent discoveries and advancements within the field of synthetic active matter, ranging from the nano to the macro-scale, covering topics such as (but not only):

- Phoretic swimmers
- Actuated active colloids
- Collective and emergent behavior
- Active machines and solids
- Non-equilibrium synthetic bioinspired systems
- ...