

The DAIMON Team - Advanced Modelling and AI for Sustainable Innovation

Francesco Mercuri¹

¹ DAIMON Team, CNR-ISMN, Via P. Gobetti 101, 40129 Bologna, Italy, francesco.mercuri@cnr.it,
www.daimoners.eu

Key Words: *Instructions, Multiscale modelling, Digitalization, Artificial Intelligence, High-Performance Computing*

Abstract

The DAIMON Team, based at CNR-ISMN in Bologna, Italy, is a multidisciplinary research group with expertise in digitalization, artificial intelligence (AI), advanced simulations, and high-performance computing (HPC). We apply state-of-the-art computational infrastructures to address complex challenges across a broad range of applications and value chains, including advanced manufacturing, healthcare, energy, ICT, quantum technologies, agri-food, mobility, and more.

We integrate expertise in multiscale modelling, big data, and AI to design and implement digital frameworks targeted to the development of advanced materials, smarter systems, and optimized processes, with a focus on advancing both industrial and research-driven solutions. With an emphasis on sustainability, safety, and circularity, we develop key enabling platforms such as digital twins and decision support systems. These platforms are essential in enabling transformative, data-driven solutions, advancing scientific research, and fostering innovation across a wide range of sectors.

DAIMON is deeply embedded in a global network of leading academic institutions, industries, and innovation hubs, actively participating in several high-impact projects and collaborations. Our involvement spans a range of critical domains and value chains, including for example digitalization and modelling for safe-and-sustainable-by-design (SSbD) and circularity (LCA assessment, etc.) frameworks[1], advanced materials and processes for sustainable coatings[2], development of digital twins and modelling for advanced manufacturing[3], green and sustainable energies[4] and many others. These initiatives extend to several national, industrial, and bi-lateral projects. In particular, DAIMON chairs the **COST Action EuMiNe - European Materials Informatics Network**[5], one of Europe's major hubs for the application of AI, data-driven technologies, and modelling of advanced materials. This platform facilitates extensive collaboration among institutions and industries, advancing Europe's leadership in materials informatics and driving innovation in this rapidly evolving field. With expertise in critical innovation fields and key enabling technologies, the DAIMON Team is eager to collaborate with partners on R&D-driven developments, contributing to the development of innovative digital and computational solutions.

References

- [1] www.pink-project.eu - Horizon Europe, GA 101137809; www.ecosister.eu - Next Generation EU, B33D21019790006.
- [2] www.bio-sushy.eu - Horizon Europe, GA 101091464.
- [3] www.design-it.spindox.it - Ministry for the Economic Development, Italy
- [4] www.pnrr-ricerca2.it - Ministry of Ecology Transition, Italy
- [5] www.eumine-cost.eu - COST Action CA22143