

STAN

Advanced Science and Techniques in Numerical Mechanics

Main activities

The core business of the team is modelling and simulation in mechanical engineering sciences and its interactions. Closely blending classical disciplines (material sciences, applied mathematics, etc.) and other more emerging disciplines (such as AI), the team develops modelling approaches and computational strategies that integrate new knowledge and allow to address major societal challenges. These approaches and strategies are focused on the analysis of physics and are largely influenced by the needs of the mechanical engineering sectors and their interactions, so that they are adapted, effective and innovative in an industrial context.

Objectives

One of the team's objectives is to contribute, through its upstream research productions, to the progress of mechanical sciences in terms of advanced modelling and numerical simulation. This progress is necessary to better understand and apprehend the complex physical systems studied, and to meet current and future challenges in various fields such as health, energy, the environment and mobility.

Another objective of the team is to make a strong and relevant contribution to controlled design in multiple industrial sectors, under increasingly demanding specifications (safety, durability, cost, impact on the environment, compatibility with engineering time, etc.) requiring the elaboration and processing, at the right cost, of increasingly complex problems (multi-scale, multi-physics, stochastic, etc.). The aim is to propose methods and tools to assist in the decision making process in order to imagine, design, characterise, optimise, certify and control the complex materials, structures and systems of today and tomorrow, and thus contribute to the development of the industry of the future.

Competencies

The skills mobilised for the team's activities are, in a complementary and indissociable manner, the analysis of the underlying physics and its modelling, applied mathematics at the service of the engineer, as well as advanced techniques and algorithms for digital simulation. The synergy of these skills allows the team to address a wide range of topics for modelling and simulation in mechanical sciences.

Collaborations

All these research developments are carried out in close connection with the activities of the Moulon mesocentre, within national (CSMA, F2M, etc.) and international (IACM, ECCOMAS, etc.) learned societies in the field of numerical mechanics, and with numerous, varied and increasingly multi-disciplinary academic and industrial collaborations.

Research Operations (RO)

RO1 : Integrated development of efficient algorithms and numerical methods

RO2 : Physics-based, data-enhanced, reality-integrated simulation

RO3 : Parametric, stochastic and optimisation problems

RO4 : Modelling and simulation of multi-scale/model/physical problems



Managers

EQUIPE STAN

Ludovic CHAMOIN

**Responsable de l'équipe
STAN**

Responsable de l'opération
de recherche Simulation
basée sur la physique
augmentée par les données et
intégrée au réel

Membre Junior de l'IUF
(Institut Universitaire de
France), Professeur des
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EQUIPE STAN

Bing TIE

Responsable suppléante de
l'équipe STAN

Chargé de recherche avec
HDR



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In pictures



