ABSTRACT ETIENNE GSTALTER:

Titre : Disruptive method for optimization study in automotive industry, using EIM modes.

In the last decades, the automotive industry has been deeply modified by the use of « machine learning » techniques. The reduction of weight on a car body is a crucial matter, which better the environmental impact and the cost of the product.

During the last 2 years, Renault's teams have developed a disruptive way to conduct optimization study using massive extraction of data from the crash solver, and High Performance Computing (HPC).

In order to improve this method, we must use the more data we can extract from the crash, and post-treat them to find efficient ways to describe a car crash.

One of the improvements made in the last months is the use of EIM (Empirical Interpolation Method) to identify moments (snapshots) and nodes of the FE-mesh which constitutes may explain the behavior of the body during the crash. The EIM method replaces a former K-means algorithm, which was processed online, for every ROM. Instead, the computation of EIM method is made off-line, once and for all, for each simulation. This new method allows us to compute a ROM faster, and to reduce the number of features that we use for the regression (approx. 100). The regression is processed by a Random Forest algorithm.