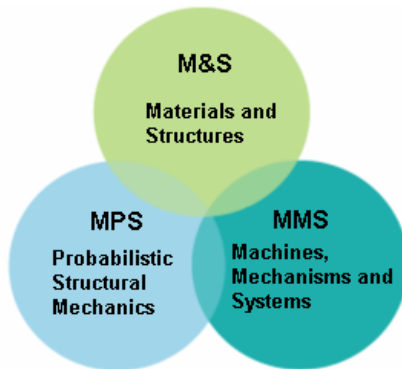


## LABORATOIRE DE MECANIQUE ET INGENIERIES (EA 3867 – FR TIMS / CNRS 2856) MECHANICAL ENGINEERING RESEARCH GROUP

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**Academic research staff:** 53 Professors and Associate Professors; 49 PhD students



**LaMI is:**  
an engineering sciences research laboratory ;  
organized into three mechanical engineering **Research Teams**;  
mechanical engineering partner of the automatic systems and  
information systems laboratories in the Research Group **TIMS**  
(Technologies of Information, Mobility and Safety).

In engineering sciences, as in any other science, the researcher is not only an observer but also a creator and inventor. For the aim of engineering is to take part in the creation of objects and systems and in the analysis of their operation. Objects and systems have complex structures integrating very varied contents. Such research cannot be reduced to a simple application of one discipline or profession, but possesses its own methodological and scientific content. It cannot be limited to the implementation of a particular engineering science, but comprises research in the whole field of engineering. In **LaMI**, this research is articulated around three topics whose development is linked to academic and industrial partnerships, in particular within the framework of the TIMS Research Group.

### Key words:

*reliability, probabilistic mechanics, structural mechanics optimization, smart manufacturing systems, parallel robots, high speed machining, suspension mechanisms, composite materials, inert or viable materials, hierarchical structure, optimisation, fatigue, assembling, optimization, granular materials, mixed structures, soil mechanics*

### Scientific partnerships:

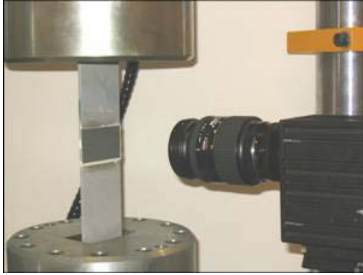
Industrial partnership: ADIV, Arcelor-Mittal, Aubert et Duval, EDF, Fonderie d'Ussel, PCI Scemm, Phimeca engineering SA, PSA, Renault, SNCF, Sol Solution, Véolia  
Research laboratories and scientific and technical centres: CEMAGREF, DGA, INRA, IRCCYN, LASMEA, LCPC, LIMOS, LIRMM, LM, LMPF, LMT, CEAT, CTICM, CSTB, CETIM  
Universités: Paris VI and XIII (France), Sao Paulo (Brazil), Aalborg (Denmark), Cluj-Napoca (Romania), Budapest (Hungary), Zilina (Slovakia), Seoul (South Korea), Valparaiso (Chile), Agder College of Engineering (Norway), LNEC (Portugal)

### Master by research and doctoral studies:

Engineering Sciences Doctoral School of Clermont-Ferrand  
Master of Mechanical and Civil Engineering - Research Specialization «Innovation - Mechanisms – Material Science - Structures» (Blaise Pascal University and the French Institute of Advanced Mechanics)

## MAIN RESEARCH TOPICS

### Materials and Structures (MS)



**Materials and Structures** research team develops cross-fertilization of modelling and experimentation approaches relating to materials and structures in mechanical and civil engineering. MS research team has created and coordinates a CNRS research group (GDR) on deformation field measurement and identification in solid mechanics with the participation of 18 research laboratories. The main actual research areas are related to: (1) deformation field measurement in solid mechanics and (2) multi-scale analysis applied to continuous or discontinuous materials with a strong hierarchical structure.

Coordinator: **Abdelhamid BOUCHAIR** (Abdelhamid.Bouchair@univ-bpclermont.fr)

### Probabilistic Structural Mechanics (MPS)



Adding a mechanical dimension to a long tradition of probability theory studies in the Auvergne region of France, the “**Probabilistic Structural Mechanics**” team focuses its researches on random dynamics and reliability by mastering the introduction of uncertainty into modelling, design and utilisation of materials and structures in mechanical and civil engineering. The main actual research areas are related to: (1) development of algorithms for stochastic modelling and (2) probabilistic identification of dynamic models and data.

Coordinantor : **Michel FOGLI** (Michel.Fogli@univ-bpclermont.fr)

### Machines, Mechanisms and Systems (MMS)



Adding research in structural synthesis to its expertise in the real behaviour of mechanisms, robots and machines, the “**Machines, Mechanisms and Systems**” research team develops trans-disciplinary approaches on innovation methodology, modelling and optimization of machines, mechanisms and robots. The main actual research areas are connected to: (1) structural synthesis and innovation and (2) modelling of real life behaviour of mechanisms, machines and robots.

Coordinator: **Emmanuel DUC** (Emmanuel.Duc@ifma.fr)

#### Experimental facilities:

- Testing fatigue machine with camera vision
- Traction-compression-flexion testing machine with thermo control
- Testing equipment for structural components
- High speed machining with serial and parallel machine architecture
- Experimental devices for dynamic testing
- Parallel computing network with 28 PC bi-processors
- High speed camera and infrared thermal camera