LaMCoS, (Haoming Luo)

- Joint Research Unit of INSA Lyon and CNRS (UMR 5259)
- Number of people: 202
  - 21 Professors - Research Directors
  - 37 Associate professors - Researchers
  - 28 Engineers and Technicians
  - 89 PhD students & 9 post-doctoral students
  - 18 Associate Persons
- Number of people involved in the GDR : 5
- Area of expertise of the labs:
  - **Energy Recovery**, Structural Monitoring, Vibration Control
  - Mechanical and electromechanical **transmissions**
  - **Non-linear dynamics**
  - Numerical simulation of processes / innovative processes
  - Surfaces and interfaces, tribology
  - Integrity of surfaces, solids and structures under extreme stress
  - Formatting composites, Bioengineering
- Which preferential axes ?
  - Property measurements
  - Performance measurements
  - Simulations / Theory

N A M E

GDR Nanomaterials for Energy Applications

ELABORATION
MEASUREMENTS & METROLOGY
SIMULATIONS & THEORY
APPLICATIONS

LaMCoS
UMR 5259

cnrs

Scientific expertise, overview, major themes in relation to the GDR

- Back bone of the labs (main research subject)
  - Marion Fourmeau & Daniel Nélias (*Durability of solar cell systems*)
  - Dominique Baillis (*Thermal property of porous materials or bio-based composites*)
  - Anne Tanguy (*Phonon transport in nano-composite materials*)
  - Philippe Sainsot (*Prediction of effective thermal conductivity of heterogeneous materials using large scale 3D simulation*)
  - David Dureisseix (*Unconventional thermal behavior: memory effect & Optimization and reliability of micro-architectured materials*)
  - Sébastien Baguet & Régis Dufour (*Micro/nano-electromechanical mass sensing*)
- Heat carriers:
  - Phonon, electron, photon (radiation)
- Type of energy conversion:
  - Thermoelectric, photovoltaic
- Application:
  - Thermal management of nano-devices
  - Performance/reliability of nano-devices
  - Mass sensor

Sensibility: 10^-20 (kg)

Technical or technological expertise in relation to the GDR issues

- What kind of materials/dimensions
  - Solar cell: Crystalline Silicon wafer (156 * 156 * 0.2 mm)
  - Foam materials (mm)
  - Si-based crystalline/amorphous nano-composites (nm)
  - Mass sensor: Crystalline silicon beam (10 um * 300 nm *160 nm)
- Bottom-up or top-down ?
  - Top-down
- What kind of characterization technique are mastered by the lab/group/team
  - Characterization and simulations
    (Microstructural/thermic/mechanic properties)
- Special instruments or methods (give few highlights)
  - 3D Stereo DIC (Digital Image Correlation) + micro version, High-speed imaging technology, MEB, Acoustic emission, Laser profilometry, AFM (platform CLYM)
- Codes/numerical tools/modelling
  - Finite element (X-FEM), Molecular Dynamic, Monte Carlo
  - Maxwell's equations: discrete dipole approximation
  - Nonlinear problem: modeling based on HBM (harmonic balance method)
  - Topologic optimization: genetic algorithm
  - Code ISSAC: semi-analytic method for contact problems