

LAAS-CNRS: Laboratory for Analysis and Architecture of Systems (David Pech)

■ LAAS

- CNRS lab located in Toulouse, France
- Associated to the University of Toulouse

■ Taskforce

- 700 among which 300 researchers and engineers
- 60 PhD students graduating/year

■ Budget

- 3 M€/month (including salaries)
- Main funding sources: 60% National, 20% Europe and 16% Industrial partnership/Innovation

■ 5 (ERC & European contracts)/year

■ 10 Patents/year – 4 Licenses/year

■ 1.5 Publications/day (50% in the first quartile)



N A M e

GDR Nanomaterials for Energy Applications

ELABORATION
MEASUREMENTS & METROLOGY
SIMULATIONS & THEORY
APPLICATIONS

LAAS
CNRS



4 major research fields

COMPUTER
SCIENCE



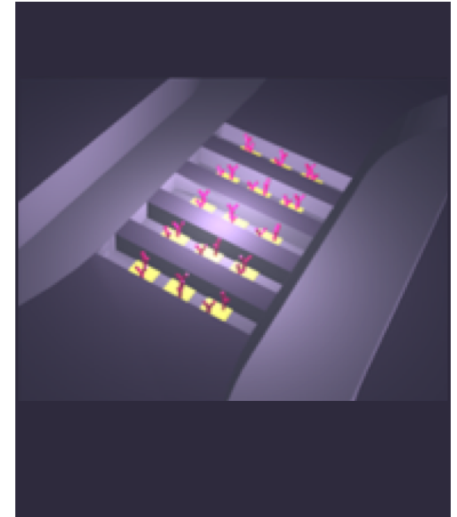
AUTOMATIC
CONTROL



ROBOTICS



MICRO &
NANOSYSTEMS



Micro & Nano Bio
Technologies

Microwaves
& Optics

Energy
Management

Energy Management Department

Address challenges related to energetic efficiency and sustainable development



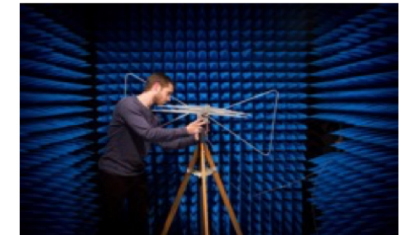
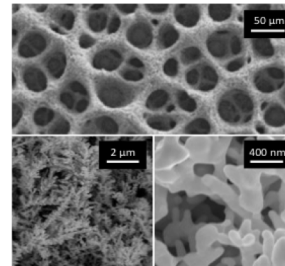
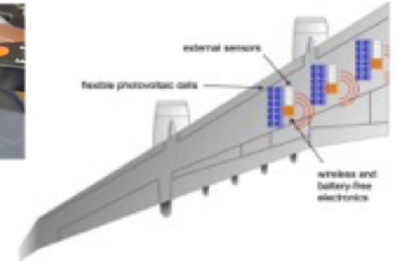
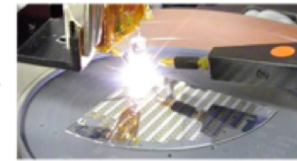
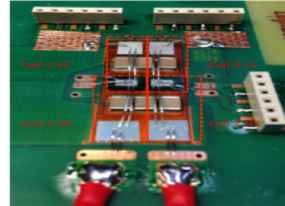
- Energy management: from nanomaterials to system
- Energy self-sufficiency of embedded systems
- Reliability: ESD/CEM, thermo-electric modelling

Strategy:

- Predictive modelling, simulation
- Technological developments
- Physical and electrical characterization

Applications:

- Renewable energy sources, Power grids, Transports, Space, Aeronautics, Pyrotechnics,...



NEO Team : Nano-Engineering and integration of metal-Oxide-based nanostructures and their interfaces

(Alain Estève, Carole Rossi, Mehdi Djafari-Rouhani, David Pech)

AXIS 1. Design and integration of nanothermites for pyroMEMS

- Fundamentals of nanothermite materials (multi-scale modelling and characterization of basic mechanisms)
- Nanoengineering of reactive interfaces
- Aging
- PyroMEMS for ignition applications
- Pressure/Gas production

AXIS 2. Design and integration of novel materials for micro-energy storage

- Fundamentals of chemical processes in micro-supercapacitors
- Innovative materials and nanostructures for micro-supercapacitors and micro-batteries
- On a chip integration

AXIS 3. Nanoengineering of novel materials and catalysts for H₂ production

- Fundamentals of water splitting processes (electronic, plasmonic, chemical)
- Innovative nanomaterials and nanostructures for photo-reduction of water (water splitting)
- Devices integration and demonstration



ERC Advanced Grant "PyroSafe" (2019-2024) on the *Integration of new nano-engineered safe energetic layers with sensors and electronics to manufacture safety-critical microsystems*

ERC Consolidator Grant "3D-CAP" (2018-2023) on the *3D micro-supercapacitors for embedded electronics*

LABORATOIRE D'ANALYSE ET D'ARCHITECTURE DES SYSTÈMES DU CNRS



Juillet 2015