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EDTAS Workshop

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Melbourne Australia

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FRANCE

summary

1- The CNRS

2- National and International Network

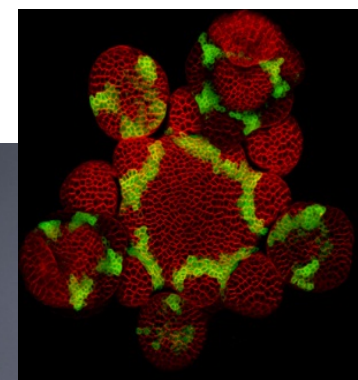
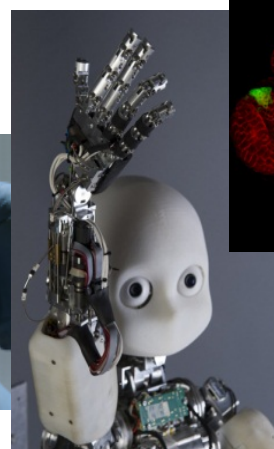
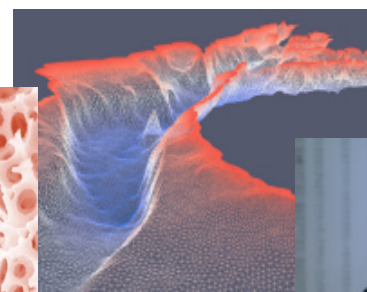
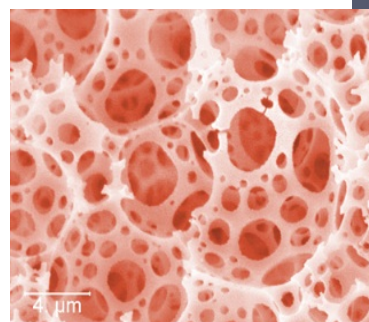
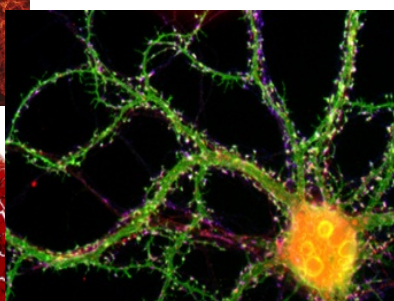
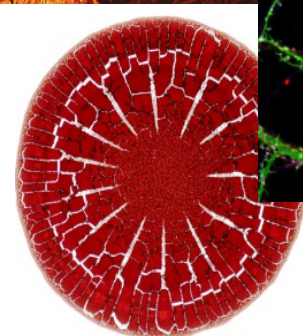
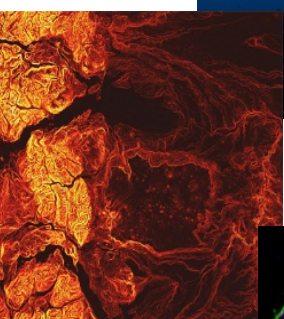
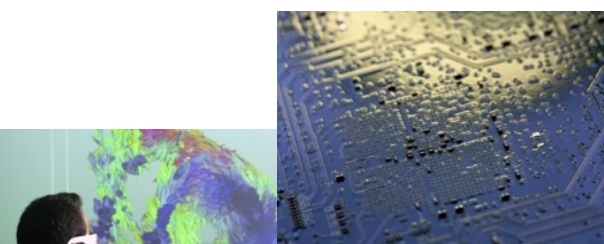
3- Five Strategies for Research

4- Examples

5- Conclusion

CNRS : AN ESSENTIAL RESEARCH CONTRIBUTOR FOR THE BENEFIT OF SOCIETY WITH AN AMBITIOUS RESEARCH POLICY

- | CNRS is a scientific and technological public organization
- | The largest fundamental research organization in Europe
- | It generates knowledge which it uses for the benefit of society
 - | Very large-scale research infrastructure
 - | Key commitment in the setting up of a European research area
 - | Active international policy



RESOURCES AND RESULTS UP TO OBJECTIVES

The CNRS :

- Nearly **34,000** people including **25,600** permanent personnel, **11,400** researchers and **14,200** engineers, technicians and administrative staff
- Nearly **1,100** research units
- **90% of research** is performed in partnership with universities, national, european and international research institutes as well as private companies within **joint research units**
- **28,500** publications each year on average in high-caliber international magazines, of which half are published jointly with an external organization
- **21** Nobel prizes and **12** Fields Medals winners



Jules HOFFMANN - 2012
IBM Strasbourg



Serge HAROCHE - 2012
CdF - Orsay



Martin KARPLUS - 2013
ISIS Strasbourg & Harvard



Jean TIROLE - 2014
GREMAQ Toulouse



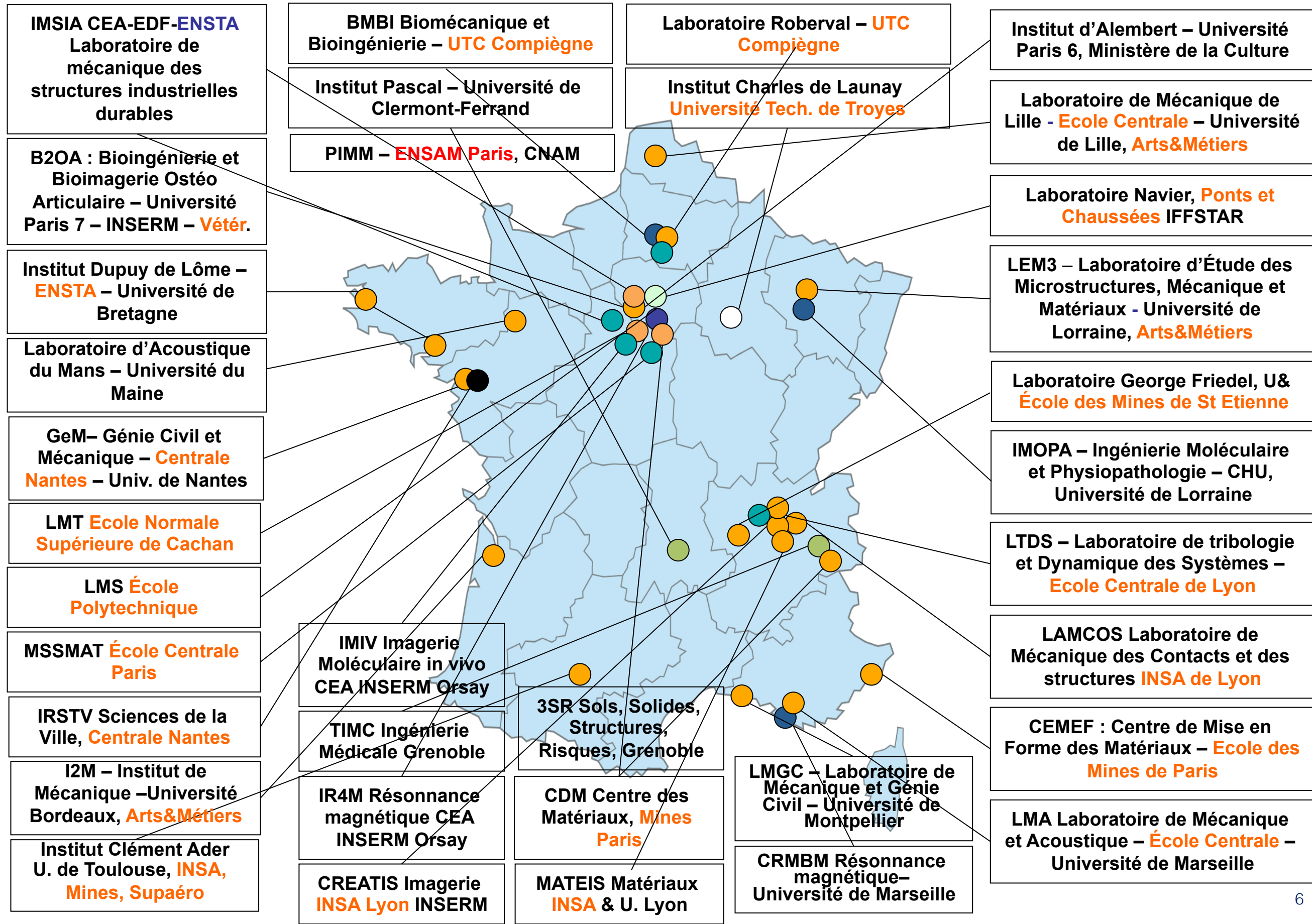
Jean-Pierre SAUVAGE –
2016 Chimie Strasbourg

CNRS IS REPRESENTED IN ALL FIELDS OF KNOWLEDGE

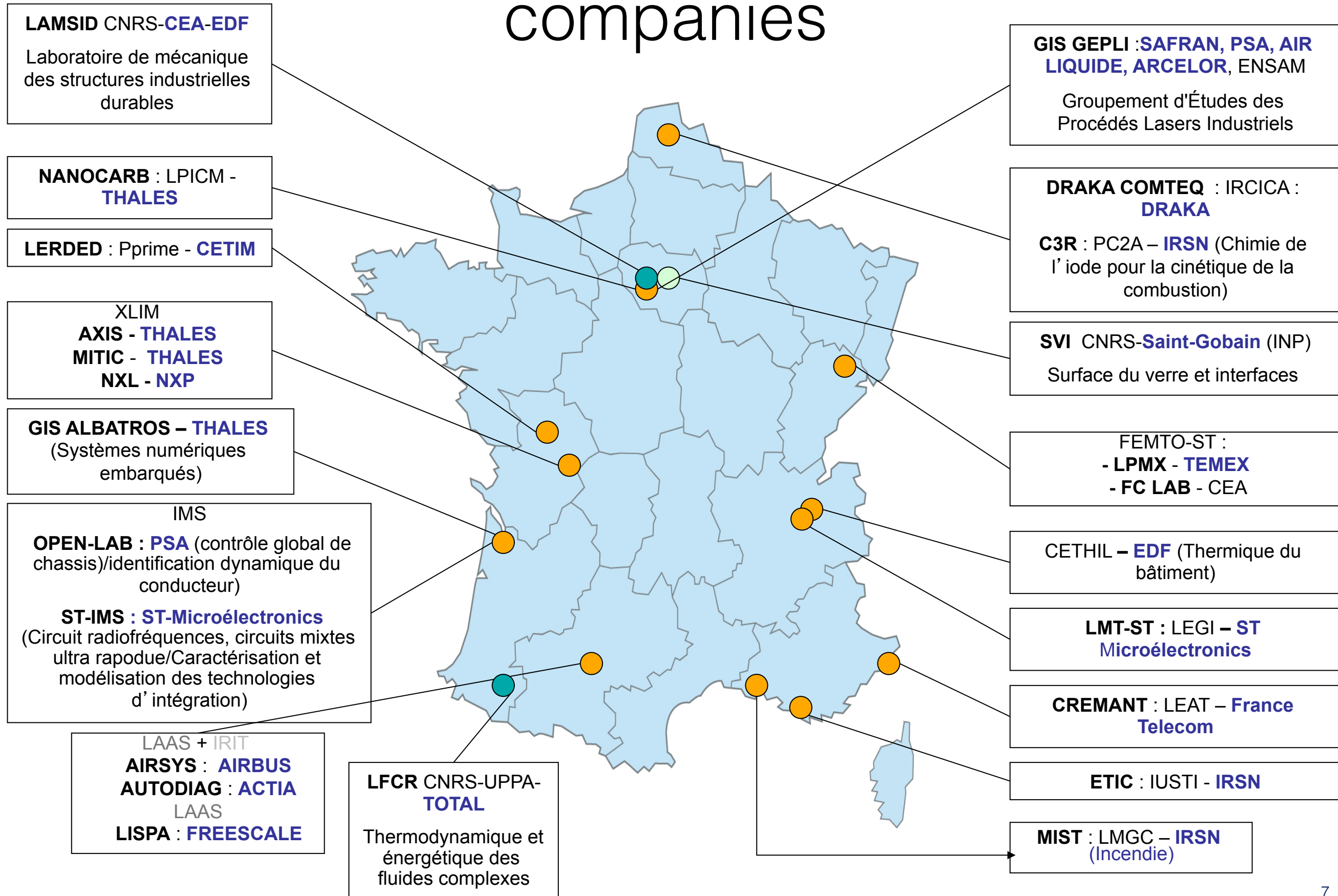


- | CNRS covers all scientific disciplines
 - | mathematics
 - | chemistry
 - | physics
 - | engineering
 - | biology
 - | information technology
 - | nuclear and particle physics
 - | earth sciences and astronomy
 - | human and social sciences
 - | ecology and the environment
- | It carries out research in all fields of knowledge through 10 thematic institutes

Research Units : Solid Mechanics – Materials – Acoustics



18 common research units with companies



Five Strategies in Engineering Sciences

1- Composite Materials

2- Tailored Materials and New Materials

3- Reduce Order Modeling

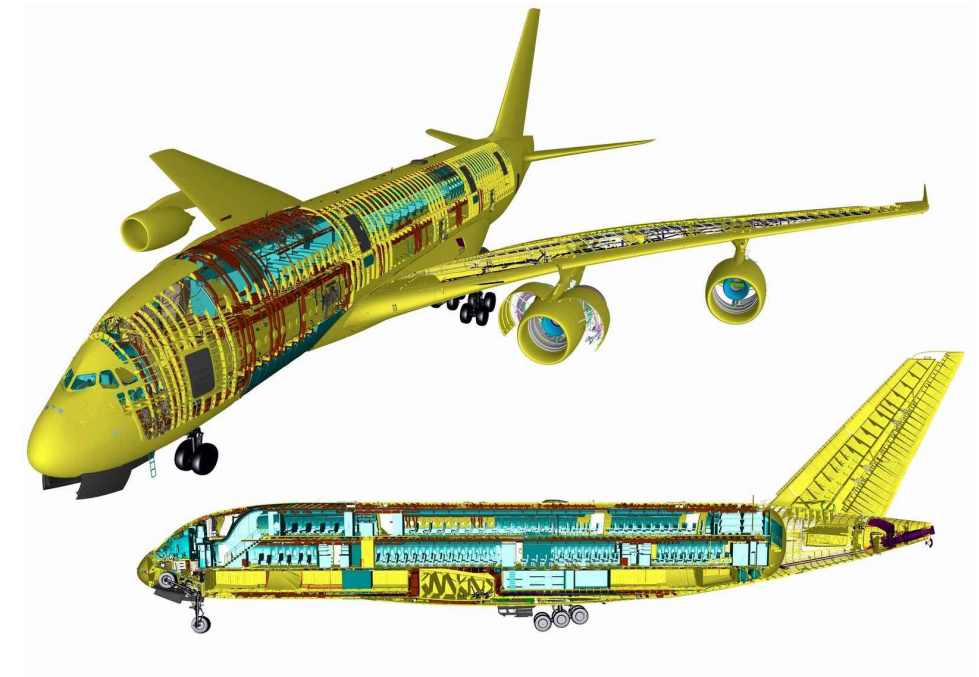
4- Acoustics and Sensors

5- Manufacturing

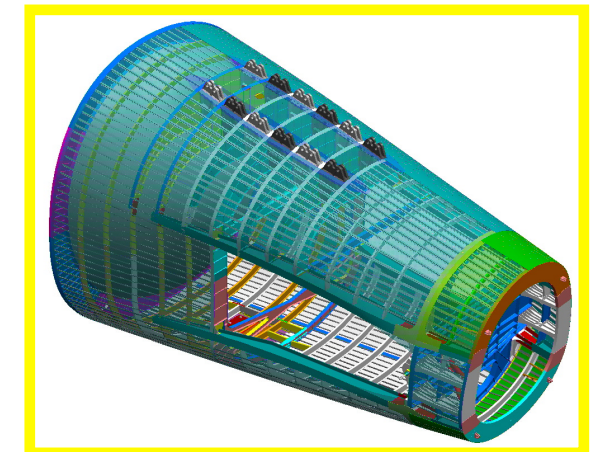
Composite Materials

Key Points :

- Fibers, Matrix ?
 - Carbon Fibres, national production, New formulation for polymers
 - Ceramic matrix, metal matrix
- Architecture, Woven composite
 - 2D, 2D ½, 3D, 4D, more, woven
- Damage, Modeling
 - Complex behavior, prediction, new experimental procedures
- Extreme conditions
 - Extreme temperature, High Strain rate, Environment
- Functionalization?
 - What to do for the improvement of fibers interfaces
- Processing
 - New process? Cost? New Geometries? Material/Structure
- Ageing
 - How to decrease and predict the ageing of composites structures, oxydation, etc.

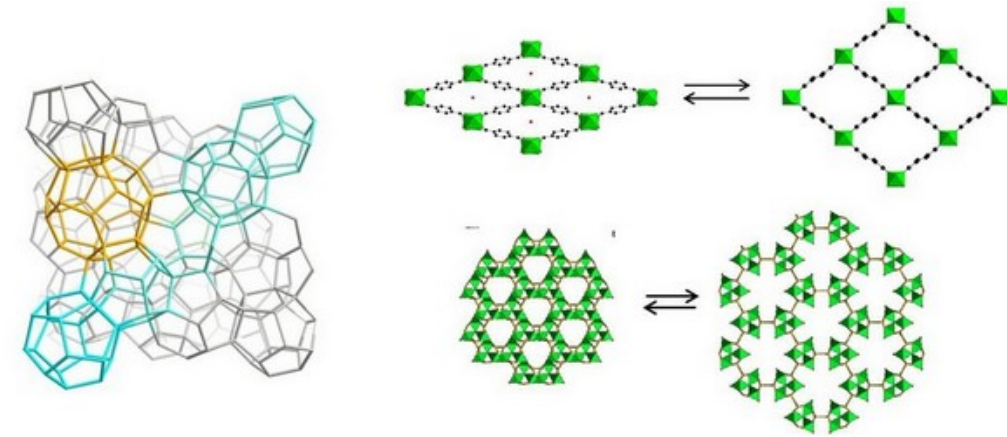


<http://www.amac-composites.org>



Key Points

- From supramolecular chemistry to materials
- Fonctionnalization
- Biomimetic materials
- 3D printing for nano/micro architecture
- New alloys, High entropy steels, etc.
- Behavior under extreme conditions
- Prediction and structures



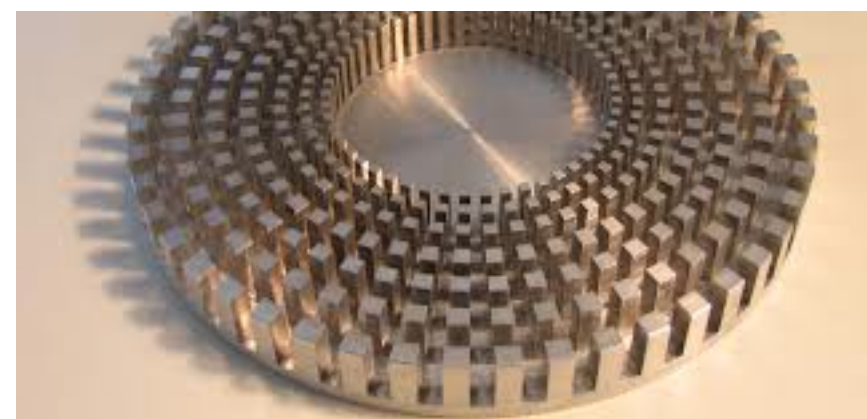
Key Points :

- How to take into account high level of complexity?
- The reduced order modeling
- How to take into account the variability, the uncertainty?
- Reducing the simulation time
- Experiment on mesostructures



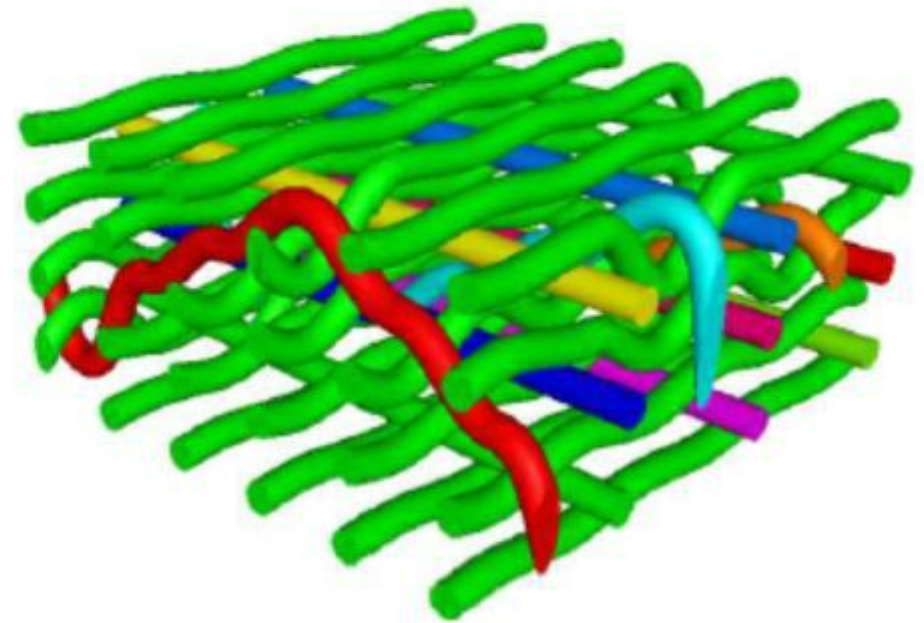
Key Points :

- New acoustic materials
- Acoustics for testing
- Underwater acoustics
- Acoustics modeling
- Acoustics and sensors



Key Points :

- New manufacturing methods
- New processing modeling
- New processing simulation
- 3D printing, for what ?



What to do ?

- To Build up new collaborations
- Complementarity – from basic science to applications
- Exchange of scientists / PhD Students
- Develop the benefit for the society

Conclusion

5 RESEARCH STRATEGIES PRESENTED

- To improve the Australian/french collaborations
- To connect scientists and companies
- To build up interactions and research projects

THANK YOU FOR LISTENING