

Benefits/challenges of International Research Activities and Strategies

The value/challenges of international research collaborations



MSU: CASE of the UMI-What's NEW, What's Next?

Mohammed Cherkaoui,
Professor and Endowed Chair
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Mohammed's bright idea!

Fall 2016



Mohammed Cherkaoui

**Professor and CAVS Endowed Chair in
Micromechanics and Material by Design**

Ph.D., Material Science, University of Metz,
France

M.S., Material Science, University of Metz,
France

B.S. University Mohammed V, Morocco

Research interests: Micromechanics of
Materials, Computational Mechanics,
Nanostructured Materials, Nanofilled
Composites

Former CNRS Program Manager

A Globally Intentional, Forward Thinking VPR Office and Reporting Structure



Dr. David Shaw

Vice President for Research and
Economic Development



Ms. Shauncey Hill

Director
Global Research Development



Dr. Richard Nader

Associate Vice President for
International Programs

Open-minded, Globally Engaged College of Engineering



Jason Keith, Ph.D.

Dean of the Bagley College of Engineering

Professor of Chemical Engineering

Earnest W. and Mary Ann Deavenport, Jr. Chair



Kari Babski-Reeves, Ph.D., CPE

*Associate Dean for Research &
Graduate Studies*

*Professor of Industrial and
Systems Engineering*

Bagley College of Engineering

New: GLOBAL SWOT ANALYSIS TOOL

G-SWOT ANALYSIS	Strengths	Weaknesses	Opportunities	Threats/Challenges
IM/BI (innovativeness, capacity to carry out, mgt plan, prelim data and requisite resources) collaboration, competition, innovation, integrated inquiry, and assessing value				
ALIGNMENT (UNIV) college, department, Strategic plan, research network and International Affairs and bilateral relations	<h2>Fall-Spring 2016-17</h2>			
FUNDING leverage potential (US/global) including students, reputational value				
PARTNER Attributes (mutual contribution, uniquely positioned, priority, infrastructure)				

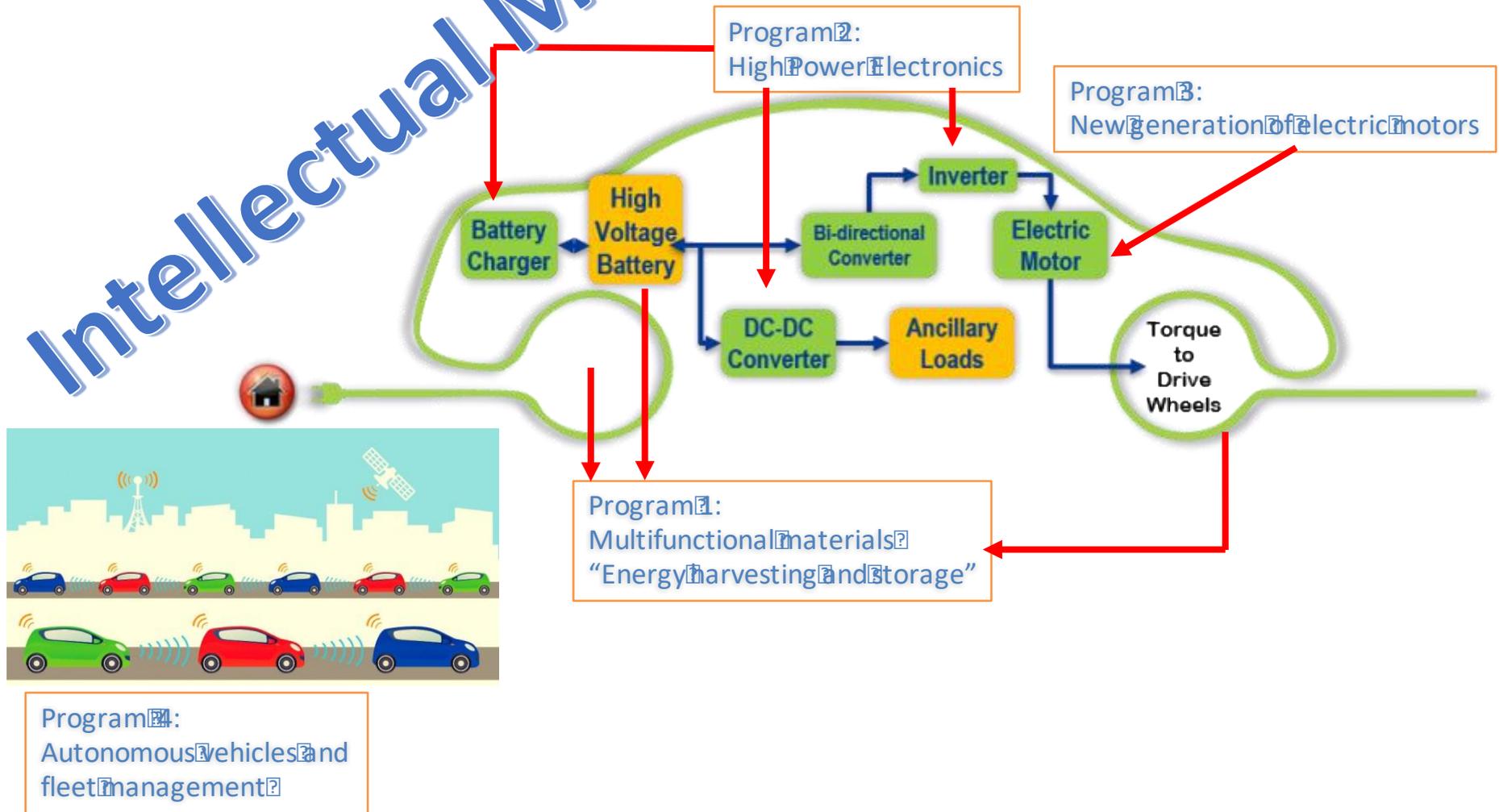
New: Screening, Consultation, Joint Review & Report out to faculty

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ALIGNMENT (UNIV) college, department, Strategic plan, research network and International Affairs and bilateral relations				
FUNDING leverage potential (US/global) including students, reputational value				
PARTNER Attributes (mutual contribution, uniquely positioned, priority, infrastructure)				
LANG/CULT				
RISK				
IP or Proprietary				
ETHICS				
RCR RES Integrity				
Export Control				
Legal/Contractual				
Health & Safety				
International affairs Consideration				

REPORT AND DISCUSSION OF NEXT STEPS- Spring 2017...

Integrated R&D program for innovative powertrains and propulsion systems

Intellectual Merit/BI



MSU launches the UMI initiative *in medias res*

- MSU through its Center of Advanced Vehicles and Systems (CAVS) strives to be a world-class center of excellence in Automotive and Smart Mobility,
- In May 2015, the Federal Aviation Administration selected MSU to lead and operate a new National Center of Excellence for Unmanned Aircraft Systems,
- Boeing, has selected MSU flagship research university to host its Stitched Resin Infused Composite Research Center,
- MSU, the State of Mississippi, and the U.S. Army Corps of Engineers signed an agreement to create the Institute for Systems Engineering Research

NEWS: Mississippi State selected to lead Homeland Security UAS test site...

April 19, 2017 [Jim Laird](#)

- STARKVILLE, Miss. — Mississippi State University will lead a major research and development project for the Department of Homeland Security (DHS) after a rigorous and highly competitive review process.
- The DHS Science and Technology Directorate (S&T) has selected Mississippi as the new base of operations for small unmanned aircraft systems (sUAS), commonly known as drones, and a Mississippi State-led partnership will oversee the initiative.
- The new DHS S&T Small Unmanned Aircraft Systems Demonstration Range Facility will support homeland security operations and training by providing UAS flight and exercise support facilities that will support operational evaluation of UAS in a variety of applications and scenarios.

Incentives for EU-US collaborations

- Horizon 2020 (2nd round for 5 years)
- New interdisciplinary platforms (such as UMI)
- Multinational industries seeking global research collaborations between U.S. and Europe
- Prestigious Scholarships for International Graduate programs (Marie-Curie and Chateaubriand)
- Erasmus *Mundus* funds for joint Master Degree (300 M Euros)
- Erasmus and E+ Program for undergraduate students
- New EU education reforms to match U.S. education system (BS – MS - PhD) driven by new engineering curricula taught in English
- U.S. incentives to foster collaborations with Europe (NSF-EU Agreement, NSF, DARPA, DoE, Industry)

The CNRS' international cooperation tools:

- [Joint Research Projects \(PRC\)](#) make it possible to set up co-financed collaboration between teams from the CNRS and specific international partners.
- [International Programs for Scientific Cooperation \(PICS\)](#) deal with financing initiatives between teams that have already established links through joint publications or student training programs.
- [International Research Networks \(GDRI\)](#) allow teams from two or more countries to collaborate on a joint scientific project.
- [International Associated Laboratories \(LIA\)](#) lay the bases of cooperation around a joint project, mostly between one or several French teams and a main partner abroad. They sometimes foreshadow the creation of an International Joint Unit.
- [International Joint Units \(UMI\)](#)...



What is a “UMI” ?

INTERNATIONAL JOINT UNITS (UMI)

- A UMI is a full-fledged laboratory, as found in universities and research organizations. It is based in a single location, in France or abroad, and brings together researchers, students, postdocs, and support staff from CNRS and the partner institution(s). The Director of the UMI is jointly named by CNRS and the foreign partner institution(s)
- UMIs are most often backed by one or several French laboratories, making up a “mirror UMI”.
- UMIs have the same status as CNRS units, decisions concerning their creation must be ratified by the President of CNRS. Once the decision to create a UMI has been made, a contract, with research project description, consolidated provisional budget, management rules and intellectual property provisions is signed by the President of CNRS and by the heads of the foreign partner institution

<https://www.cnrs.fr/derci/spip.php?article885&lang=en>

CNRS provides a unique operational structure for International research (Governance, IP, financing)

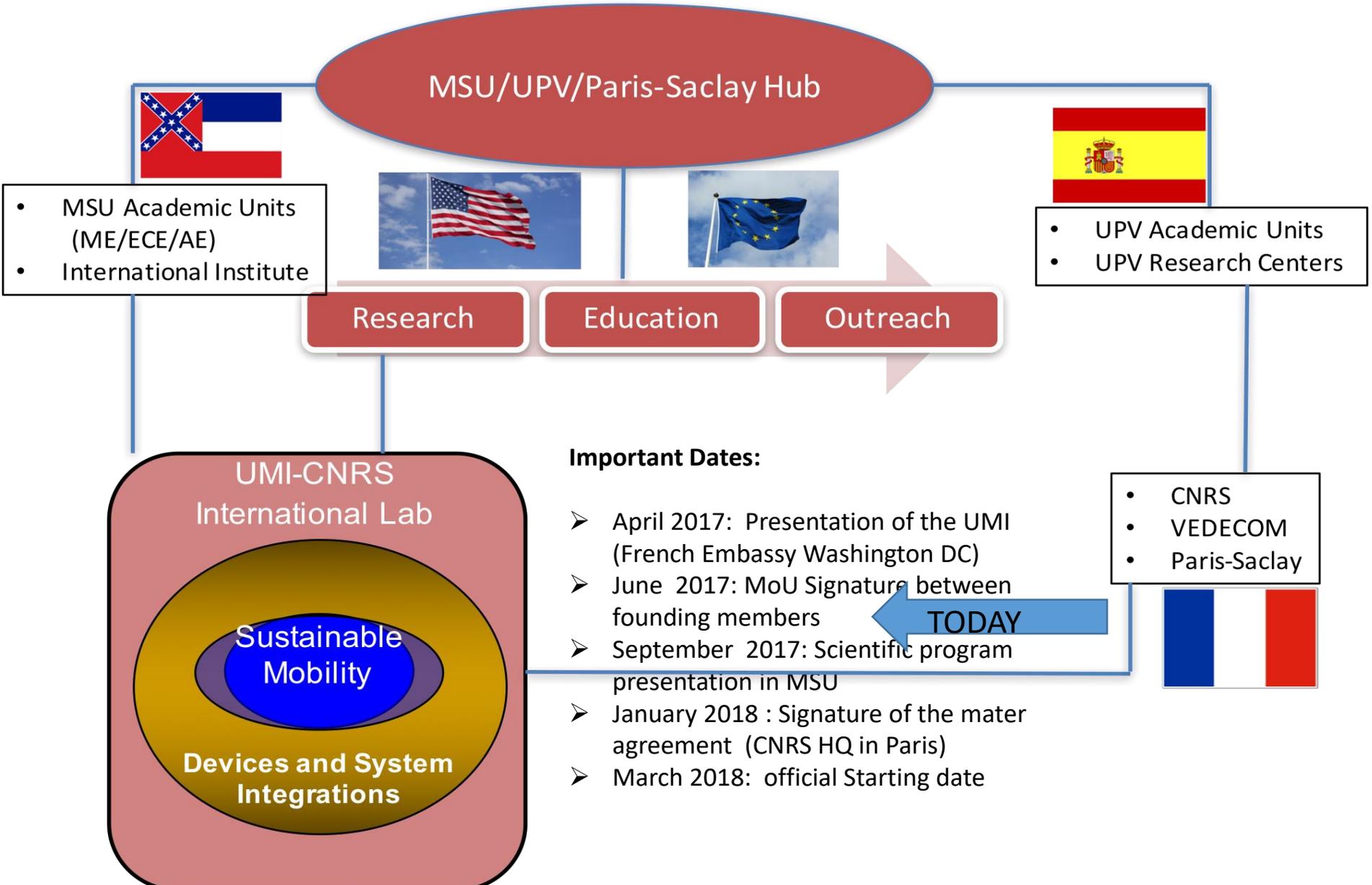
The UMI structure will operate as an open system designed to optimize flexibility of operations.

1. Universities or research platform can become associate members as institutions and may assign permanent or part time researchers to become members of the UMI. Individual research membership from founding members and/or partner institutions is proposed according to the scientific profile and pro rata time contribution in one of the research themes;
2. Participation is project based: the goal is to leverage academic excellence and complementarities of background of researchers with a recognized expertise in order to achieve a global value chain that delivers outstanding results in reduced time;
3. Intellectual property management complies to international best practice: each institution is the owner of a pro rata of intellectual property on the basis of individual projects only and of both the partner pro rata contribution as defined in each project scientific appendix and innovative value to the project.

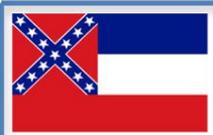
UMI-Energy Efficiency for a Sustainable Transportation

Proposed

Operational Structure



MSU/UPV/Paris-Saclay Hub



- MSU Academic Units (ME/ECE/AE)
- International Institute



Research

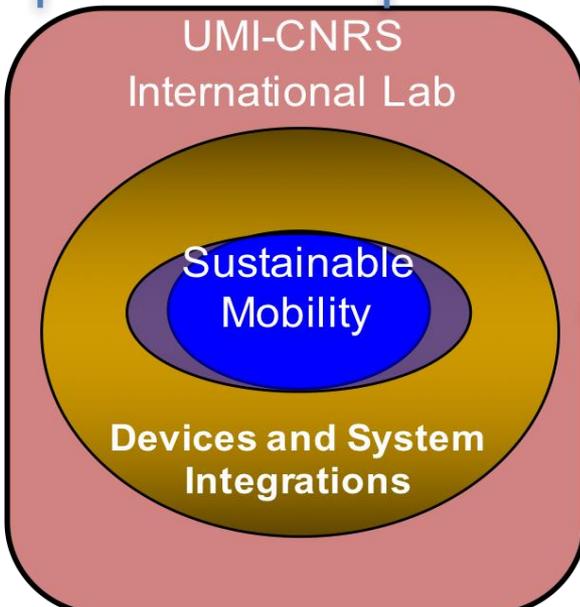


Education

Outreach



- UPV Academic Units
- UPV Research Centers



Important Dates:

- April 2017: Presentation of the UMI (French Embassy Washington DC)
- June 2017: MoU Signature between founding members
- September 2017: Scientific program presentation in MSU
- January 2018 : Signature of the mater agreement (CNRS HQ in Paris)
- March 2018: official Starting date

TODAY

- CNRS
- VEDECOM
- Paris-Saclay



UMI-Energy Efficiency for a Sustainable Transportation

Vision: Establish a European-US Hub destination for internationally-driven technological education, research, and innovation

Goals / Tactical Strategy/ Challenges & Opportunities:

- Grow globally integrated research & education programs within a multi-disciplinary setting:
 - Take full advantage of research opportunities in Europe and U.S.
 - Simultaneously*** overlaying international education and exchange opportunities
- Consolidate strategies to share facilities and secure European/U.S. funds
- Develop a clear and logical organizational and operational structure for research (Governance, IP, financing, ...)
- Develop planning, budgeting, and financial reporting mechanisms to promote long-term success.

NEW to MSU - UMI Partners

International Joint Research Unit between

- CNRS (France)
- MSU
- Paris – Saclay (France)
- VEDECOM (France)
- GERPISA (France)
- FAAR - Industry (France)
- UPV (Spain)

5 Primary Research Laboratories are involved:

CAVS and Raspert Flight Centers (MSU)

CNRS – LMT UMR CNRS 8535

CNRS – SATIE UMR CNRS 8029

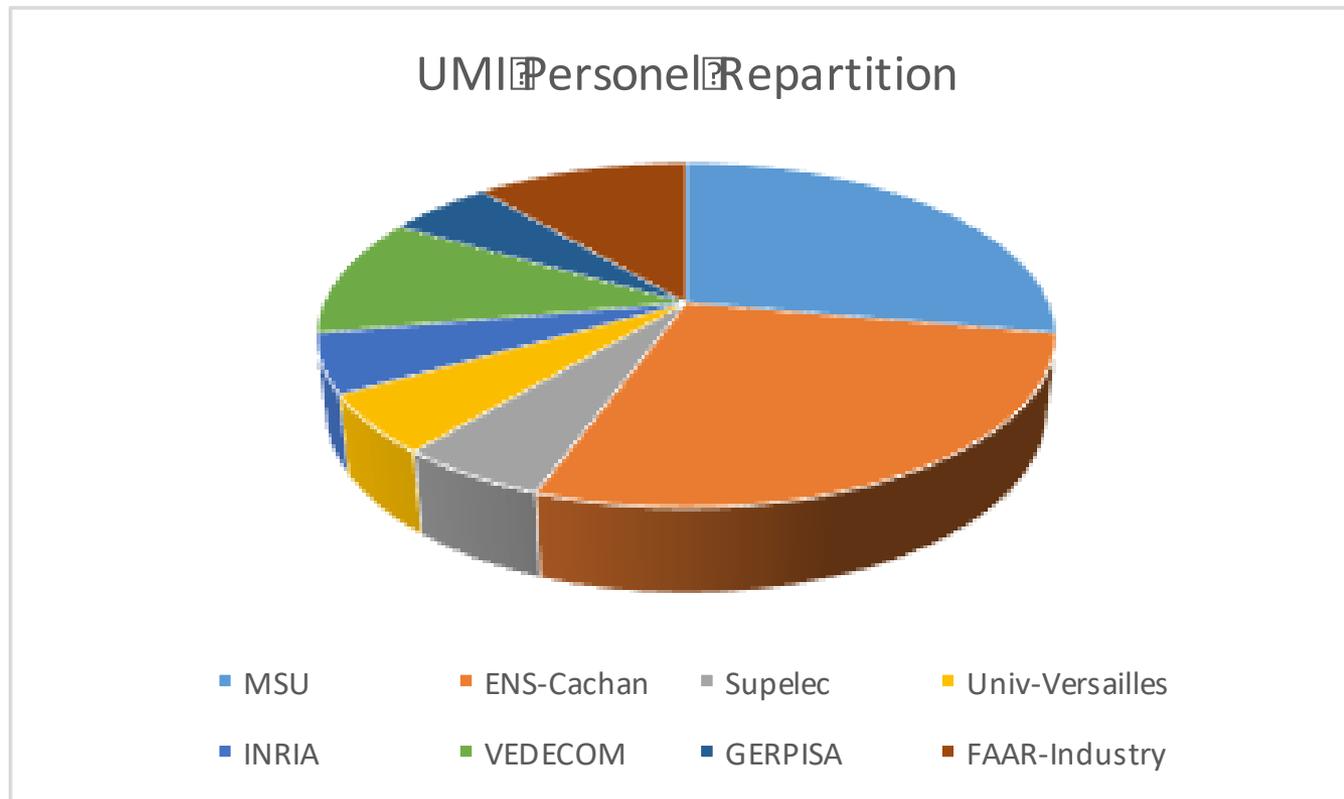
CNRS – GEEPS UMR 8507

VEDECOM Institute

NEW to MSU: UMI Personnel Structure

- « UMI Staff » if they work for more 50% of their time
- « UMI associated staff » if they work between 20 and 50% of their time
- « Collaborating staff » it is continued participation of less than 20% of their time

Proposed



European Commission invests €8.5 billion in research and innovation in 2017

- **Calls of great interest:**
- Almost €1.8 will be available through European Research Council calls, and ~1000 Fellowships will benefit from high-quality training and career development opportunities abroad thanks to Marie Skłodowska-Curie actions.
- A major ICT call (€625 million) to support key areas such as electronics, computing, networking, robotics and photonics.
- The Energy calls in 2017 will dedicate more than €84 million for developing energy storage systems.
- €300 million in calls for Smart Mobility.
- Autonomous vehicles in the fight against crime and terrorism, Security calls have a budget of €49 million.

U.S. Leverage



- **NSF Engineering** (PFI) Partnerships for Innovation: Building Innovation Capacity (PFI:BIC) supports academe-industry partnerships, which are led by an interdisciplinary academic research team collaborating with at least one industry partner to carry out research to advance, adapt, and integrate **technology(ies)** into a **specified, human-centered smart service system**. The selected service system should function as a technology test bed.
- **NSF IUCRC** enables industrially-relevant, pre-competitive research via a multi-member, sustained partnerships among industry, academe, and government
- **NSF Computer Information S&E**
 - Computing Network Systems- seeks to develop a better understanding of the fundamental properties of computer and network systems and to create better abstractions and tools for designing, building, analyzing, and measuring future systems.
- **NSF OISE** Co-Funding \$250,000

U.S. Leverage



[Office of Energy Efficiency & Renewable Energy](#)

Sustainable transportation

The Office of Energy Efficiency and Renewable Energy (EERE) leads U.S. researchers and other partners in making transportation cleaner and more efficient through solutions that put electric drive vehicles on the road and replace oil with clean domestic fuels. Through our Vehicle, Bioenergy, and Fuel Cell Technologies Offices, EERE advances the development of next-generation technologies to improve plug-in electric and other alternative-fuel vehicles, advanced combustion engine and vehicle efficiency, and produce low-carbon domestic transportation fuels.



International Leverage

Horizon 2020

Horizon 2020 is the European Union Framework Program for Research and Innovation from 2014 to 2020. Horizon 2020 offers a total budget of €77bn over 7 years

Societal challenges

Smart, Green & Integrated Transport ([link](#))

- Including the European Green Vehicles Initiative ([link](#))

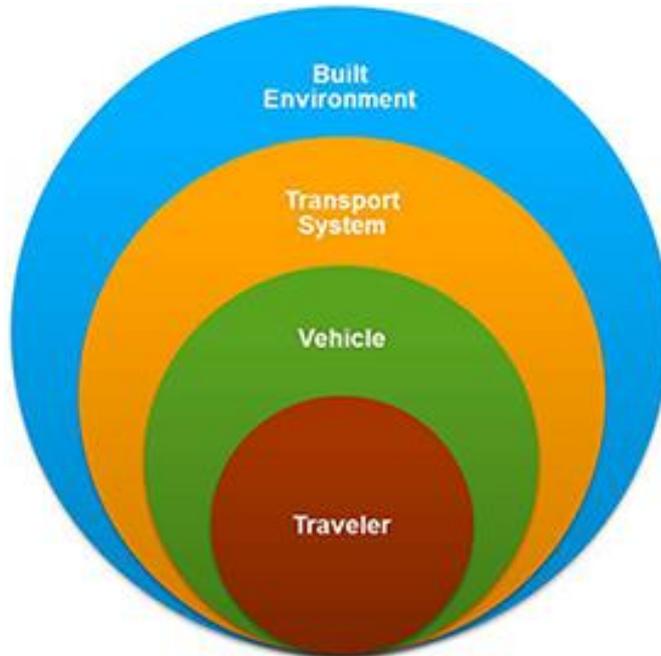
Secure, Clean & Efficient Energy ([link](#))

Climate Action, Environment, Resource Efficiency and Raw Materials ([link](#))



International Energy Agency

- Electric Vehicle Grid Integration
- Sustainable Mobility Initiative



GLOBAL Leverage

International Partnership
for Energy Efficiency Cooperation



E.g., The Electric Vehicles Initiative (EVI)
30% by 2030!

Lessons being learned...

- LANG/CULTURE- STILL #1 BARRIER TO OVERCOME
 - US-FRENCH FUNDING SYSTEMS
 - POLITICS
 - EATING HABITS
- MSU GLOBAL RESEARCH OPERATIONAL INFRASTRUCTURE or lack thereof
- COMPETING PRIORITIES FOR INTERNATIONAL ATTENTION
- SURPRISES
- PERSONNEL AND ADMINISTRATIVE CONTROL
- SUSTAINABILITY
- REALITY OF LEVERAGE
- Find common ground

