UPM’s Direction for North America

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International Rankings

QS-2018
#1 university in the engineering field among Spanish-speaking countries

#31 in architecture
#46 in civil and structural engineering, 
#76 in Engineering and Technology, 
#51-100 in Agriculture&Forestry, 
Art&Design, Mechanical Engineering, and 
Electrical and Electronic Engineering, 
#101-150 in Computer Science and 
Information Systems

#92 in graduate employability (2019)

ARWU-SHANGHAI (2018)
#5 in civil engineering 
#47 in aerospace engineering

#51-75 in Instruments Science & Technology 
#76-100 in Transportation Science & Technology 
#76-100 in Agricultural Science 
#76-100 in Transportation Science & Technology 
#101-150 in Mechanical Engineering 
#101-150 in Automation & Control 
#101-150 in Water Resources 
#151-200 in Telecommunication Engineering
Vision

MISSIONS

Mission-Oriented Research & Innovation in the European Union

A problem-solving approach to fuel innovation-led growth

by Mariana MAZZUCATO

Figure 1 below illustrates the movement from broad challenges to specific missions.

Figure 1. From Challenges to Missions Image: RTD - A.1 based on Mazzucato (2017)
Vision

5 key criteria for the selection of missions at EU level:

• Be bold and **inspirational**, with wide societal relevance

• Be ambitious, but with **realistic** research & innovation actions

• Foster **cross-disciplinary**, cross-sectoral and cross-actor innovation

• Set a **clear direction**: targeted, measureable and time-bound

• Require **multiple, bottom-up solutions**
Mission oriented research = Universities

- Profesores
- Doctores
- Estructuras de investigación
- public sector
- citizens
- private sector
- civil society

Vision

[Additional text or diagram elements related to sustainability goals could be present, but not explicitly shown in this description.]
UPM research groups contribution to SDGs
Vision

Global Challenges

Increasing world population (ageing, pandemics, migrations)

Climate Change

Need of basic services (food, water, energy, basic habitability)

New governance and new social contract

Global Security
To develop and accelerate solutions based on knowledge, technology and collective intelligence.
Strategic partnerships in USA

PRIVATE COMPANIES
- Internships
- Summer school

PUBLIC SECTOR
- Living Lab
- Test bed

STUDENTS
- Dual programs
- Seed Funds
- Shared courses
- Visits

FACULTY

PRIVATE COMPANIES
- ferrovial
- REPSOL
- Santander
- IBERDROLA
- Gestamp

PUBLIC SECTOR
- I.MADRID!
- MIT CENTER FOR COLLECTIVE INTELLIGENCE

STUDENTS
- MIT
- HARVARD UNIVERSITY
- GEORGE MASON UNIVERSITY
- BERKELEY UNIVERSITY OF CALIFORNIA
- PURDUE UNIVERSITY
- ILLINOIS INSTITUTE OF TECHNOLOGY
- SMITH COLLEGE
- CORNELL UNIVERSITY
Strategic partnerships

<table>
<thead>
<tr>
<th>UNIVERSITY</th>
<th>PRIORITIES</th>
</tr>
</thead>
</table>
| HARVARD UNIVERSITY  | • Sustainable cities  
                     • Higher education  
                     • Design engineering  |
| MIT                 | • City Sciences  
                     • Tech-based innovation and entrepreneurship  
                     • Biomedicine engineering and genomics  
                     • Advance semiconductor devices  |
| CORNELL UNIVERSITY  | • Sustainable transportation  
                     • Digital agriculture  
                     • Innovation and leadership in emerging markets  |
| PURDUE UNIVERSITY   | • Climate  
                     • Nanotech  
                     • Engineering for the fourth industrial revolution  |
| MICHIGAN UNIVERSITY | • Gov-tech  
                     • Public policies for sustainable transformations  |
| ILLINOIS INSTITUTE OF TECHNOLOGY | • New materials  |
| BERKELEY UNIVERSITY OF CALIFORNIA | • Student exchange  
                             • Research focus to be defined  |
|                     | • Clean Tech  
                     • Architecture  
                     • Leadership and engineering  |
<table>
<thead>
<tr>
<th>PRIORITIES</th>
<th>INSTRUMENTS</th>
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<tbody>
<tr>
<td>Materials (with a broad vision including mechanical engineering, nanotech, etc.)</td>
<td>• Purdue Faculty to visit UPM in June 2019</td>
</tr>
<tr>
<td>Health (including complex networks, complex systems, and biomedical engineering)</td>
<td>• Grants for PhD and Faculty visits during 2019-2020.</td>
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<tr>
<td>Nuclear Engineering (including security and cybersecurity)</td>
<td>• Students exchange on the Aerospace, Chemical Engineering, and Material Science Engineering programs</td>
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<td>Nexus Food, Energy, Water, and Environment</td>
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<tr>
<td>Transversal topics of Artificial Intelligence, Robotics, and Visualization</td>
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### PRIORITIES

<table>
<thead>
<tr>
<th>Priorities</th>
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<tr>
<td>Sustainable transportation</td>
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<tr>
<td>Digital agriculture</td>
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<tr>
<td>Innovation and Leadership in emerging markets</td>
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<tr>
<td>Sustainable Development Goals</td>
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</tbody>
</table>

### INSTRUMENTS

- Pair UPM Faculty with Cornell Faculty in each priority to organize online and in-person **workshops**
- UPM Faculty to **visit** Cornell in summer 2019
- **Grants** for PhD and Faculty visits during 2019-2020.
<table>
<thead>
<tr>
<th>PRIORITIES</th>
<th>INSTRUMENTS</th>
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<tbody>
<tr>
<td>Energy with specific focus on power grids</td>
<td>• <strong>TFM</strong> program for UPM students at IIT</td>
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<td></td>
<td>• IIT Faculty to <strong>visit</strong> UPM in May 2019</td>
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<td></td>
<td>• <strong>Grants</strong> for PhD and Faculty visits during 2019-2020.</td>
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<td></td>
<td>• <strong>Decatech UPM</strong> International Summer School</td>
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<td>Living labs both infrastructure-oriented and community-oriented</td>
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<tr>
<td>Sustainable cities and communities</td>
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<td>Health with specific focus on brain</td>
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## Examples of current collaborations

<table>
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<tr>
<th>TARGET</th>
<th>PROGRAM</th>
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<tbody>
<tr>
<td>Undergrad. students</td>
<td>Internships in Madrid</td>
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<td>Shared courses</td>
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<td></td>
<td>Summer program</td>
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<td>Graduate students</td>
<td>PhD. Research stays</td>
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<td></td>
<td>Visiting students</td>
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<td>Double-degree agreements</td>
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<td>Joint program</td>
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<tr>
<td>Faculty</td>
<td>Visiting scholars</td>
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<td>Seed Fund</td>
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<td>Applied research program</td>
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Escribe en un post-it tu línea de investigación.

Colócalo en aquellas temáticas en las que consideres que podrías colaborar.
Dinámica 2.1: Micro-Debate (20 min)

• De las alternativas que se han presentado antes, ¿qué ideas te atraen más?

• ¿Cómo contribuirías a los distintos instrumentos? ¿Se te ocurren otros instrumentos?
Dinámica 2.2: Encuesta sli.do (10 min)

¿En qué instrumentos te gustaría participar?