Hydrogen in Europe's energy transition: EU partnerships, national ecosystems and the skills pipeline.

# A4U - R&I for H2 Skills

















Office for the Promotion of European Research Activities 28/oct/2025



# What is Alliance 4 Universities?

A strategic partnership of 4 research leading Spanish Public Universities... **since 2009** 

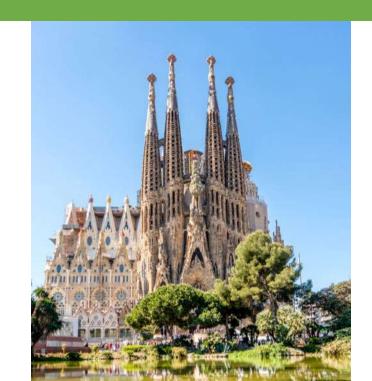
4 Universities
2 Cities
1 Alliance



#### **MADRID**

Universidad Autónoma de Madrid

Universidad Carlos III de Madrid



#### **BARCELONA**

Universitat Autònoma de Barcelona

Universitat Pompeu Fabra de Barcelona



### A-4U Objectives and Joint Actions





1. Promotion of European research activities through a permanent office in Brussels (OPERA), which facilitates participation of A-4U researchers in European programmes and decision-



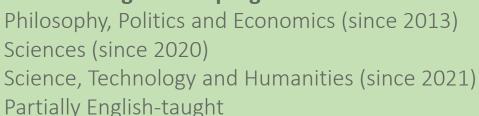
2. **IUNE Observatory** 

making

an information database for the evaluation of research in Spanish universities, recognised by the Ministry of Education of Spain **3. Common strategy of internationalisation**Africa (South, West), India



4. Joint undergraduate programmes





**OPERA:** Office for the Promotion of European Research Activities



# Research at Alliance 4 Universities

A-4U enhances the strategic collaboration between Madrid and Barcelona as the two most R&D intensive regions in Spain



6%

of the Permanent Research and Teaching Staff in the Spanish University System



17%

of the scientific production (papers) in the Spanish University System



63%

Open Access Publications (2013-2022)



59%

of the sci papers with
International Collaboration



600 H2020

projects with a total EU-funding of **273 M €** 



12%

funding from Spanish R&I National Program



456 HE

projects with a total EU-funding of **210 M €** 



### H2 Researchers and Training









<u>Eva Pellicer</u>
Full Professor – Chemistry
<u>Group of smart nanoengineered materials, nanomechanics and nanomagnetism (Gnm3)</u>

<u>Magnetic field-enhanced hydrogen electrocatalysis: Unveiling the role of electrolyte concentration</u>



#### **Carolina Gimbert**.

Associate Professor and co-leader of the CatSyNanoMat group in the Chemistry Department of UAB working in the field of photocatalysis as well as organic and hybrid materials with application to artificial photosynthesis.

High Solar-to-Hydrogen Conversion Efficiency at pH 7 Based on a PV-EC Cell with an Oligomeric Molecular Anode



#### **Albert Rimola.**

Full Professor. His research focuses on atomistic simulations of chemical processes with accurate quantum chemical methods using molecular and periodic modelling approaches. His expertise covers the atomistic modeling of physicochemical surface phenomena directed to Astrochemistry field, specifically the formation of interstellar species on grain surfaces, receiveing funding from national and international agencies (e.g., ERC-QUANTUMGRAIN project).



#### Laia Francàs

Ramon y Cajal fellowship at UAB. She is currently leading projects devoted to the design of ligand functionalized (photo)electrodes for solar fuels applications to study their activity, properties, and mechanism by means of electrochemistry and UV–vis spectroelectrochemistry







#### **Xavier Solans Monfort**

He is working on applying computational models based on quantum mechanics to understand and design new electrocatalyst for energy conversion and storage.



#### Lluís Escriche Martínez

**Associate Professor** 

His primary research interests focus on coordination chemistry, nanomaterials, and selective oxidation catalysis, particularly in the development of catalytic processes for energy conversion and oxidative transformations.

<u>Insights into the light-driven hydrogen evolution reaction of mesoporous graphitic carbon nitride decorated</u> with Pt or Ru nanoparticles.



#### **Albert Guisasola**

The topic of his research was to gain understanding on the biological nutrient removal processes via an engineering approach based on experimental assays, on-line monitoring through respirometry and titrimery and modelling.

Scale-up of novel configurations for energy (**hydrogen**) and resource (P as struvite and N as ammonium salts) recovery from real wastewater.

Bioelectrochemical hydrogen production







## TRAMPOLINe-: A training programme to promote the industrial adoption of microbial electrochemical technologies

#### Use of microorganisms for sustainable applications

Microbial electrochemical technologies (METs) use microorganisms to drive electrochemical reactions, offering innovative solutions for environmental and **energy applications**. These technologies harness the metabolic activities of microorganisms to convert organic waste into electrical energy or chemicals, or to treat wastewater. With the support of the Marie Skłodowska-Curie Actions programme, **the TRAMPOLINe project will enhance METs towards pressing environmental issues such as freshwater contamination, anthropogenic CO2 emissions, and renewable energy.** In collaboration with companies, the consortium will train young researchers on cutting-edge MET-based technologies for bioremediation, desalination and resource recovery. By promoting the utilisation of METs in industry, the project envisions a more sustainable future.

Doctoral Networks

Marie Skłodowska-Curie Actions Developing talents, advancina research

MSCA







We are an alliance of 13 universities united by a joint goal to make an impact. Here, learners, teachers, and researchers work with cities, communities, and businesses to solve real-life challenges – and foster change.



#### MICRO-MODULE

Closed for application

## Geopolitics of Hydrogen

ONLINE MICRO-MODULE ABOUT HOW GEOPOLITICS
INFLUENCES THE EMERGING HYDROGEN ECONOMY AND HOW
HYDROGEN SHAPES THAT GEOPOLITICS





#### All seats filled

There are no available seats for this learning opportunity.

### Description

This course examines the emerging geopolitics of hydrogen. This involves political risks along with economic and power political competition among producer and consumer countries of hydrogen and related derivative fuels. This competition in turn influences the operating environment of firms in various sectors and value chains of hydrogen business. The course offers a global level outlook into these matters, scrutinising the key concepts of hydrogen geopolitics with illustrative case studies on the EU context, North America, and the Asian context, as well as on the role of fossil fuel producers and implications for energy security and energy diplomacy.

#### **Topics**

Energy and sustainability
Critical and innovative thinking

#### **Study format**

① Online

#### **Application period**

16 September - 9 October 2025

#### **Study period**

20 October - 7 December 2025

#### **Credits**

5 ECTS

#### **Hosting university**

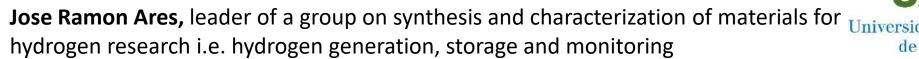
**Tampere University** 

@ Got questions?
Reach out to us via this
contact form





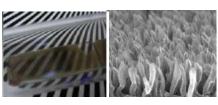


















#### **MASTER'S DEGREE IN ENERGY AND FUELS FOR THE FUTURE**

Category	
Professionalizing/Investigator	
Language of instruction	
Spanish	
Teaching modality type	
In-person teaching	
Number of places	
30	
Tuition fees (first enrollment)	
€2,736; non-resident non-EU ci	tizens: €5,079
Center	
Science Faculty	



31940 - HIDRÓGENO. PRODUCCIÓN ACUMULACIÓN Y USO. SISTEMA SOLAR- HIDRÓGENO







# Master's Programme in Transdisciplinary Studies of Climate, Environment and Energy (TRACEE)

Learn how to lead the charge against some of the world's most pressing challenges with a pioneering Master's programme







SEMESTER 1 · 30 ECTS **SEMESTER 4 · 30 ECTS** SEMESTERS 2-3 · 60 ECTS Building the foundations Customising your path Working on a real-world challenge **Environmental Humanities and Law** Salzburg and Bucharest **Environmental Social Sciences** Glasgow and Bucharest Energy and Matter
Madrid and Stockholm. Launched in 2026. **Environmental Chemistry and Toxicology** Climate, Energy  $\rightrightarrows$ Stockholm and Tübingen. Launched in 2026. and Environment Stockholm University Thesis At one of the CIVIS MULTIPLE **Environmental Geoscience** · Systems Thinking OR JOINT partner universities Glasgow and Aix-en-Provence/Marseille · Natural Science Perspective DEGREE of your study track · Social Science Perspective · Humanities Perspective Climate Change Science Transdisciplinary Methods Athens and Tübingen. Launched in 2026. **Environmental Risks and Mitigation** Lausanne and Rome Transdisciplinary Approaches to Climate Change Salzburg and Brussels Global Change Biology Rome and Aix-en-Provence/Marseille CONTINUOUS TRANSDISCIPLINARY STREAM Joint Kick-Off **Online Meetings** Conference





#### **MARIO SANCHEZ SANZ**



HyCoTec-CM - Quantitative Characterization Techniques for Hydrogenbased Fuel Combustion Projects

### MASTER IN RENEWABLE ENERGY IN THERMAL SYSTEMS

Masters / Programs / Master in Renewable Energy in Thermal Systems

Graduate School of Engineering and Basic Sciences

Direction: Prof. Andrés Anca Couce, Prof. Antonio Soria Verdugo

Language:Spanish

Attendance: On-campus

Credits:60

Campus:Leganes

Applications: **CLOSED** 

■ Places available: 40

Departments: Thermal and Fluids Engineering Departmenmt









# New Talent Generation for the Future of Hydrogen Research and Innovation in Catalonia and Baden-Württemberg

(TALENT H2 CAT-BW)

#### **Objectives:**

- Recruit and train the next generation of young researchers in H2.
- Address the challenges and needs related to hydrogen research and innovation in Catalonia and Baden Württemberg

- Strengthen cooperation on hydrogen between the two regions, as well as between

academic and non academic organizations.

#### Nº of fellows to be recruited:

40 fellows (20 each region)

#### **Duration of the project:**

5 years (fellows contract 36 months)









### PhD Topics

#### H2 value chain



#### **PRODUCTION**



### INFRASTRUCTURE, TRANSPORT & STORAGE



#### APPLICATIONS & USES

- Improvement in electrolyser production, including reduce raw materials, develops on new materials, such as organic materials, but also, improvements in electrolysers production (improve efficiency and reduce costs)
- Development on innovative electrolysis technologies (eq. AEM)
- Develop alternative production methods to the electrolysers (marine algae, solar water splitting, photochemistry or pyrolysis)
- Development of new catalysts for hydrogen production processes
- Manufacture of new materials, considering their recyclability

- Research and innovation in repurposing existing gas infrastructure for hydrogen transport & derivates like ammonia
- New methods of characterization, physical and chemical for pipelines and storage
- Durability and degradation analysis using long-cycle testing and modeling
- Development of liquid organic hydrogen carrier (LOHC) And other innovative transport and storage possibilities

- Develop large-scale industrial applications (steel-making, chemical and paper industries)
- Enhance hydrogen use in transport and mobility, including heavy-duty vehicles, rail, maritime, and aviation sectors.
- Uses in stationary services (Main focus on industrial use or back-up Power)
- Research neutral carbon and hydrogen for creating synthetic fuels and chemicals (including Fischer-Tropsch synthesis, methanol conversion, and formic acid production)
- Improved ways to integrate hydrogen processes into the renewable energy networks

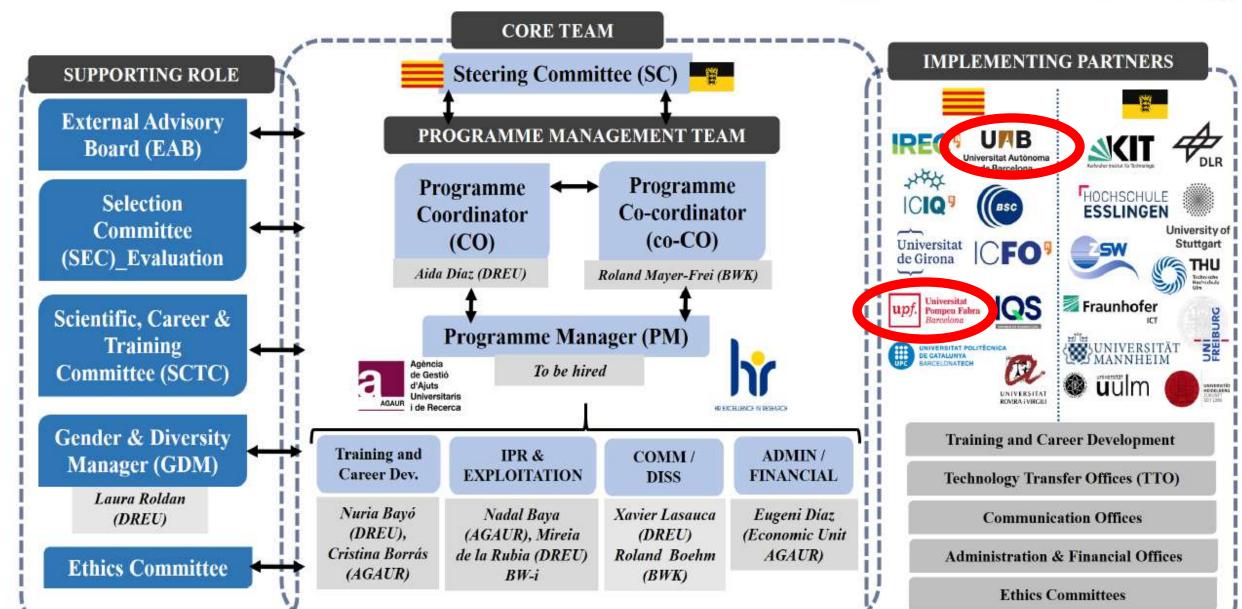
#### **III POLICY SUPPORT & CROSS-CUTING RESEARCH**

- 15. Support policy-making through research, especially for harmonized safety standards
- 16. Develop methods for assessing environmental impacts and lifecycle greenhouse gas emissions of hydrogen technologies
- 17. Ensure the security of critical raw materials, emphasizing sustainability through reduction, substitution, reuse, and recycling
- 18. Address economic and legislative aspects related to hydrogen technologies
- 19. Application of digitalization, automatization and advanced computation and artificial intelligence tools
- 20. Diagnosis, prognosis and preventive maintenance of hydrogen systems













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For more information:

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