



**UNIVERSITY: Public University of Navarre (UPNA)**

**WIT PROGRAMME'S RESEARCH LINE NAME:**

Advanced fuel cell manufacturing

**DOCTORAL PROGRAMME:** Doctorate in Synthetic and Industrial Chemistry  
<https://www.unavarra.es/escuela-doctorado/doctorate-programs/current-plan/science/doctorate-in-synthetic-and-industrial-chemistry?languageId=1>

**COMPLETE DESCRIPTION OF THE LINE**

Rapid growth in the market for electric vehicles is imperative, to meet global targets for reducing greenhouse gas emissions, to improve air quality in urban centres and to meet the needs of consumers, with whom electric vehicles are increasingly popular. However, growing numbers of electric vehicles present a serious waste-management challenge for recyclers at end-of-life. Nevertheless, spent batteries may also present an opportunity as manufacturers require access to strategic elements and critical materials for key components in electric-vehicle manufacture: recycled lithium-ion batteries from electric vehicles could provide a valuable secondary source of materials. The proposed line of research would precisely encompass the recycling and recovery of electric car batteries, with a clear idea of positioning ourselves ahead of the research challenges that lie ahead in the next 20 years.

**RESEARCH GROUP NAME:**

Environmental Technologies and Applications (TAMA)



## COORDINATOR:

- Last and first name; link to the “Portal of scientific production”: Gil, Antonio  
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## MEMBERS OF THE LINE RESEARCH:

Dr Antonio Gil, Full Professor. Chemical Engineering.

Dr Sophia A. Korili, Associate Professor, Chemical Engineering.

Dr Leticia Santamaría Arana, Post-doctoral researcher.

Dr M<sup>a</sup> Iris Sancho Sanz, Post-doctoral researcher.

Jonathan Josué Torrez Herrera, PhD student (Public University of Navarra).

Yaneth Cardona Rodríguez, PhD student (Public University of Navarra, IberusTalent, European Union's H2020 MSCA-COFUND).

Helir Joseph Muñoz, PhD student (Public University of Navarra).

Iván Pedroarena Apezteguia, Researcher

Lucia Grande López, Researcher

## ANOTHER RESEARCH LINES OF THE GROUP: list of them



Development of organo-inorganic hybrid materials with environmental applications as adsorbents and catalysts.

Development of new photocatalysts to obtain H<sub>2</sub>O<sub>2</sub>.

Advanced oxidation processes for urban wastewater treatment.

UV-visible photodegradation processes of emerging organic pollutants present in wastewater.

Capture, storage and recovery of CO<sub>2</sub> through methane reforming and reduction.

Separation and purification processes of liquid streams.

Development of ceramic filters with antibacterial applications.

Valorization of industrial waste.

▪ Entities involved in research lines and contact person:

✓ Academic entities:

\* Grupo Sol-Gel, Universidade de Franca (Brasil): Prof. Katia J. Ciuffi.

\* Boreskov Institute of Catalysis (Rusia): Dra. Maria N. Timofeeva.

\* Grupo Materiales Funcionales y Catálisis, Universidad de Nariño (Colombia): Dr. Luis A. Galeano.

\* Institute of Condensed Matter and Nanosciences. Université Catholique de Louvain (Bélgica): Prof. Eric Gaigneaux.

\* Université Hassan II de Mohammedia (Marruecos). Prof. A. Elmchaouri.

\* Université Ferhat Abbas (Argelia). Prof. M. Boutahala.

\* University of Limerick (Irlanda). Dr Teresa Curtin.

\* Fasa University (Iran). Dr M.J. Amiri.

\* Universidad Nacional Pedro Ruiz Gallo (Peru). Dr. S. Huangal.



✓ Industrial entities:

\* IDALSA, S.L. Fernando Lou

\* Micromeritics Instrument Corporation (EE.UU.). Dr S. Yunes

▪ Joint supervision of doctoral thesis with international universities or non academic institutions:

1. *Contribución al estudio de la modificación de las propiedades texturales de una saponita pilarizada con Al<sub>13</sub> como soporte de catalizadores de Pt y Pt-Ce.* Mario Barrera Vargas (Colombia). 11/12/2006. Universidad Nacional de Colombia (Colombia). Co-dirección.

2. *Peroxidación catalítica de contaminantes orgánicos en medio acuoso utilizando una bentonita modificada con Al y Fe, Cu o Mn.* Luis Alejandro Galeano (Colombia). 21/12/2011. Universidad de Salamanca. Co-dirección.

3. *Implementación de metodologías de producción más limpia en el área de Salcajá, Cuenca alta del río Samalá, en el occidente de Guatemala.* Eddie Omar Flores Aceituno (Guatemala). 15/06/2012. Universidad Pública de Navarra. Co-dirección.

4. *Eliminación y valorización de CO<sub>2</sub> presente en efluentes gaseosos mediante adsorción y reformado seco de metano.* Siby Inés Garcés Polo (Colombia). 03/02/2016. Universidad Pública de Navarra. Co-dirección.

5. *Separación electrostática de una emulsión de glicerina en biodiesel con aplicación de diferentes voltajes y distancias entre electrodos.* Sebastián Huangal Scheineder (Peru). 17/01/2019. Universidad Nacional Pedro Ruíz Gallo (Perú). Co-dirección.

6. *Elaboration de matériaux par imprégnation de charbon actif par le dioxyde de titane en utilisant la méthode sol-gel. Application à l'élimination des polluants organiques émergents et inorganiques en milieux aqueux.* Nawal Taoufik (Marruecos). 13/12/2019. Université Hassan II de Casablanca. Co-dirección. Co-tutela.

7. Hexaaluminates based catalysts from aluminum saline slags applied in the dry reforming of methane. Jonathan Josué Torrez Herrera (Nicaragua). En realización. Universidad Pública de Navarra. Co-dirección.

8. Control of antibiotics and drugs in Surface waters through adsorption and photocatalytic processes. Yaneth Cardona Rodríguez (Colombia). En realización. Universidad Pública de Navarra. Co-dirección. Iberus-Talent.

9. *Valorización química de CO<sub>2</sub> mediante hidrogenación para la obtención de metanol y productos derivados.* Helir Joseph Muñoz Alvear (Colombia). En realización. Universidad Pública de Navarra. Co-dirección.

10. *Etude des propriétés physicochimiques des matériaux composites: Elaboration, caractérisation pour des applications dans la dépollution par adsorption et de stockage d'énergie. Etude thermodynamique et texturale.* Soufiane El Mahmoudi (Marruecos). Universidad Pública de Navarra/Universitè Hassan II de Mohammedia (Marruecos). Co-tutela académica. Co-dirección. En realización.

11. *Synthèses et caractérisations des matériaux composites magnétiques/structure lamellaires encapsulés par des biopolymères. Investigation théorique et expérimentale.* Imene Kecir (Argelia). Universidad Pública de Navarra-Université Ferhat Abbas Sétif 1 (Argelia). Co-dirección. En realización.

- Brief group overview

The research group of Environmental Technologies and Applications (TAMA) of the Public University of Navarra works on research lines dealing with porous and surface properties of solids; pillared clays; gas adsorption; energy storage; pollutants adsorption and removal by photodegradation; preparation, characterization and catalytic performance of metal supported nanocatalysts. Research is related to industrial waste management and valorization for environmental technologies and management.



Research interests of the group: Porous and surface properties of solids; Clays; Gas adsorption; Energy storage; Pollutants adsorption; Environmental technologies; Environmental management; Preparation, characterization and catalytic activity of metal supported nanocatalysts. Industrial waste management and valorization.

## **REQUIREMENTS**

Academic requirements: Chemistry, Engineering

Additional requirements: basic knowledge of Spanish. English and/or French