

## Section 2. News from CCTH

### Days of Interdisciplinary Science and Technology

The CCTH organized a workshop on *Interdisciplinary Science and Technology* at the University campus “El Carmen” on November 14-16, 2017.

During the event, the PIs of CCTH research groups and three internationally recognized scientists were invited to give a seminar on their research activities and future plans. The main objective was to promote interdisciplinary collaborations between the local groups and to generate alliances with other research centres.

These meetings fostered the exchange of knowledge, the dissemination of research results and the different scientific activities developed by the members of the CCTH.

During the first day, IPs of the different research groups presented recent works and achievements: J.A. Grande, J.M. Andújar, F. Córdoba, E.J. Mayoral, F. Gómez, J. Sánchez, and I. Martel.

During the second day, the invited speakers presented their latest research results: Ana Luis, a postdoctoral researcher at the University of Aveiro (Portugal) on “Acid mine drainage”; Yacine Kadi, from the European Organization for Nuclear Research – CERN (Switzerland), on “Particle accelerators”; and Francisco Rodríguez Panadero, Honorary Researcher at the Laboratory of Respiratory Diseases at the Institute of Biomedicine of Seville (IBIS) (Spain), on “Respiratory diseases and tumours”.

Finally, in the morning of 16th of November there was a roundtable where the participants exchanged ideas and initiatives for potential interdisciplinary research projects. The discussion also focussed on how to deal with

the new challenges and objectives of social interest using an interdisciplinary approach.

Another important topic of the workshop was the activity of CCTH on cancer research. During his presentation, J. Sánchez Segovia presented several research lines for future projects focussed on the early diagnosis of cancer disease and therapy, including the establishment of a dedicated cancer therapy centre in Huelva. In addition, he described one the most recent research advances achieved by his group, particularly on the identification of a new blood marker that could be a key element in the early detection of breast cancer.

**Jornadas de I+D+i:  
Ciencia Interdisciplinaria y  
Tecnología**

Días 14, 15 y 16 de noviembre

CENTRO CIENTÍFICO TECNOLÓGICO DE HUELVA

LUGAR: Seminario 3, Facultad de Derecho, Campus El Carmen, Universidad de Huelva

	14 de noviembre MARTES	15 de noviembre MIÉRCOLES	16 de noviembre JUEVES
9:00-09.30	RNM 925 J.A. Grande	Drenaje ácido de minas A. Luis	Mesa redonda E. Durán
9:30-10.00	TEP 192 J.M. Andújar	U. Aveiro, Portugal	
10:30-11.00	BIO 282 F. Córdoba	Aceleradores de partículas Y. Kadi	Mesa redonda J.M. Enrique
11:00-11.30	RMN 276 E.J. Mayoral	CERN, Suiza	
11:30-12.00	TIC 165 F. Gómez	Afecciones respir. tumorales F. Rodríguez	Conclusiones I. Martel
12:00-12.30	CTS 616 J. Sánchez	IBIS, Sevilla	
12:30-13.00	FQM 318 I. Martel	Discusión I. Martel	Reunión de centro CCTH

Poster of the CCTH- workshop “Interdisciplinary Science and Technology”, University of Huelva, campus “El Carmen”, November 14-16, 2017.

## Research groups

### Research Group CTS616 on Comprehensive Care for Oncology Patients

**PI:** Eloisa Bayo Lozano

**Date:** 2003

**Brief description:** This research group is concerned with care and medical issues, such as the following:

1. Cancer patient care from both clinical and human perspectives.
2. New technologies in diagnosis and treatment, such as:
  - Oncological treatments with drugs.
  - Theragnosis.
  - Diagnostic imaging.
  - Radiation therapy with protons and new radiopharmaceuticals for diagnosis.
3. Early detection of cancer.

#### **National and international relationships:**

The research group actively collaborates with teams from different centres, both at national and international levels. A recent collaboration has been consolidated with CERN-MEDICIS, a new facility at CERN (Geneva, Switzerland) to develop new radioisotopes for cancer treatment.

### Research Group FQM269 on Applied Electrochemistry

**PI:** Professor José de la Coronada Carbajo Timoteo

**Date:** 1995

**Brief description:** Their research is focused on the study of the electrochemical, thermodynamic and kinetic behaviour of

several compounds at heterogeneous molecular-level environments. Apart from this, new auxiliary and flow analytical systems instrumentation are being developed in our lab.

Detailed information on the activities in progress is displayed on the Group's website: <http://www.uhu.es/giea/wordpress/>

#### **National and international relationships:**

The research group actively collaborates with teams from different centres, both at national and international levels. The most active collaborations are with the CiPRex Group of the Faculty of Chemical and Pharmaceutical Sciences at the University of Chile and with the group of Colloidal Chemistry and Micellar Catalysis at the Faculty of Chemistry of the University of Seville.

Currently, this research group is part of the Specialized Electrochemistry Team of the Junta de Andalucía, which includes the research groups "Electrodynamic Kinetics and Instrumentation" (FQM 128) and "Molecular Electrochemistry" (FQM 198). They are based at the Universities of Seville and Cordoba respectively.

The group is also included in the catalogue of the Specialized Electrochemistry Group of the Spanish Royal Society of Chemistry and the Huelva Scientific and Technological Centre.

Some members of this research group are also founder of the Open Source Hardware Group of the University of Huelva and of the NANO EIP-AGRI Operational Group of the European Association of Innovation (EAI).

#### **Research lines:**

- Thermodynamic and kinetic study of ligand-receptor interactions
- Elimination and / or recovery of organic pollutants through electrochemical techniques.
- Electrochemical study of herbicides and pesticides.

- Electrochemical behaviour of compounds of pharmacological interest.
- Application of electrochemical techniques for the detection of heavy metal traces.

### Research Group FQM318 on Structure of Matter

**PI:** Professor Ismael Martel Bravo

**Date:** 1999

**Brief description:** The basic research is focused on the nuclear structure and reaction dynamics of stable and radioactive nuclei. This includes R&D for the development of nuclear instruments, mainly particle detectors and accelerators. The research in nuclear technology is focused on nuclear medicine. The group has the capacity for building relatively complex scientific instruments, providing engineering support as well as constructing and testing prototypes at the University laboratory and at the Nuclear Technology laboratory.

**National and international relationships:** The main research activity is carried out at a number of international Nuclear & Particle Physics Laboratories: ANL (Argonne, USA), MSU (Michigan, USA), TRIUMF (Vancouver, Canada), RIKEN (Tokyo, Japan), CERN (Geneva, Switzerland), GSI (Frankfurt, Germany), GANIL (Caen, France), IPNO (Orsay, Paris), LNS (Catania, Italy), LNL (Legnaro, Italy), amongst others. The research group also holds partnerships in research projects with the Universities of Liverpool, Birmingham, Surrey, Edinburgh, Manchester and Belfast in UK; the Instituut voor Kern-en Stralingsfysica-IKS (Leuven) in Belgium; the Rudjer Boskovic Institute (Zagreb) in Croatia; the University of Ioannina in Greece; the University of Warsaw, the Heavy Ion Laboratory (Warsaw), the National Centre for Nuclear Research (Warsaw) and the Henryk Niewodniczanski Institute of Nuclear Physics PAS (Krakow) in Poland; the University of

Lisbon in Portugal; the Universidad Nacional Autónoma in Mexico; the Joint Institute for Nuclear Research in Dubna (Russia) and the Bhabha Atomic Research Centre in Mumbai (India). The main collaborations in Spain are with the Institute of "Structure of Matter" (IEM-CSIC, Madrid), the Beturia Andalusian Foundation for Health Research (FABIS, Huelva) and the various nuclear physics groups of the Spanish Universities.

#### Research lines:

- Nuclear structure and reaction dynamics.
- R&D in nuclear instruments (detectors & accelerators).
- Nuclear medicine.

### Research Group RNM276 on Applied Geosciences and Environmental Engineering

**PI:** Professor Eduardo Jesús Mayoral Alfaro

**Date:** 2012

**Brief description:** This is a very diverse and multidisciplinary group, as it is the result of the fusion of two previous research groups: the RNM276 on Coastal Geology and Water Resources and the RNM316 Tectonics and Palaeontology. This research group is, therefore, integrated by a team of geologists from areas that include Stratigraphy-Sedimentology, Palaeontology and Geodynamics, both Internal and External.

**National and international relationships:** The broad spectrum of our research makes relationships with other groups and/or Research Centres, at both national and international levels, a significant feature. In relation to national institutions, we have close collaborations with groups from the universities of Zaragoza, Barcelona, Vigo, Salamanca, Valencia, Seville, Cadiz and Granada. Regarding international links, the Group has collaborations with researchers from the Williams College (Williamstown, Massachusetts, USA), the Department of

Geology and the Dom Luiz Institute of Geosciences, the Faculty of Sciences of the University of Lisbon, (Portugal), the Faculty of Marine Sciences, the Autonomous University of Baja California, (Ensenada, Mexico) and the Department of Geosciences of the University Teknologi PETRONAS (UTP), (Ridzuan, Malaysia), among others.

Research lines:

- Dynamics and anthropic alterations in coastal environments.
- Palaeontology of marine resources and Paleontological Heritage.
- Tectonics and Structural Geology.
- Geological risks - Environmental Geology.

### Research Group RNM965 on Sustainable Mining (GIMSO)

PI: Professor José Antonio Grande Gil

Date: 2017

**Brief description:** This is a multidisciplinary group characterized by its strong scientific-technological vocation in the areas of engineering, hence we have the "know how" to go from the formalization of scientific studies to the implementation of a laboratory prototype, going through the design phases based on specifications, development, practical implementation and experimentation.

#### National and international relationships:

This research group collaborates actively with different university groups and research centres, both at national and international levels. Regarding collaborations with national institutions, this research group works jointly with the Polytechnic University of Madrid, the University of Oviedo and ITMA Oviedo. Regarding international collaborations, the group has close relationships with the University of Aveiro (Portugal), the University Paul Sabatier (France) and the CNRS (France).

Research lines:

- Acid Mine Drainage.

- Pollution of water.
- Environmental analysis of water resources.
- Modelling of pollutant processes.
- Fuzzy logic and data mining.
- Mining waste.
- Circular mining.
- Remediation mining areas.

### Research Group TEP165 on Electronic Systems and Mechatronics

PI: Professor Juan Antonio Gómez Galán

Date: 1999

**Brief description:** This is a multidisciplinary group addressing projects related to the electronic design of circuits, both discrete and integrated, for their application in communication systems, industrial control and radiation detectors, including digital blocks of information processing and low consumption. It also engages in work related to intelligent control and the design of robotic and mechatronic systems.

#### National and international relationships:

This research group is integrated in two research centres of the University of Huelva: on the one hand, the Science and Technology Research Centre (CCTH) and, on the other, the Campus of International Agri-food Excellence (CEIA 3). It also collaborates with different university groups and research centres, both at national and international levels: the University of the State of New Mexico (USA); the Institute of Mechanics of the University of Graz (Austria); the Institute of Plasma and Nuclear Fusion in Lisbon (Portugal), and the University of Cassino (Italy), among others.

Research lines:

- Electronic Instrumentation for particle detectors.
- Design of analogue, digital and mixed circuits.
- Adaptation of signal for sensors and the design of embedded systems,

mechatronics, robotics, intelligent control and perception systems: communications, nuclear and particle physics, applications for the agri-food sector, industrial and environmental control.

- Modelling and Simulation.
- Engineering Control.

### Research Group TEP192 on Control and Robotic

**PI:** Professor José Manuel Andújar Márquez

**Date:** 2001

**Brief description:** This is a multidisciplinary group characterized by its strong scientific-technological vocation in the areas of engineering, hence we have the "know how" to go from the formalization of scientific studies to the implementation of a laboratory prototype, going through the design phases based on specifications, development, practical implementation and experimentation.

#### National and international relationships:

This research group collaborates actively with different university groups and research centres, both at national and international levels. Regarding national institutions the research group works jointly with the Polytechnic University of Madrid, the University of La Rioja, the University of Cantabria, and the University of Extremadura. Regarding international links, this research group has close relationships with the University of Nancy (France), the Studi Guglielmo Marconi University (Italy), the University of Cyprus (Cyprus), the International University of Rabat (Morocco) or the University of Drexel (US).

#### Research lines:

- Computational Vision.
- Automation and Robotics.
- Engineering Education.
- Energy Efficiency in Building.
- Hybrid Systems of Renewable Energy.
- Artificial Intelligence applied to Engineering.

- Modelling and Simulation.
- Engineering Control.

### Research Group TEP-952 on Computer Vision, Prediction, Optimization and Control Systems

**PI:** Professor Manuel Emilio Gegúndez Arias

**Date:** 2014

**Brief description:** In recent years, members of this group have worked on research projects in areas such as automatic control, modelling, identification and prediction, optimization, fault detection and diagnosis, as well as digital image processing. In the last 10 years, they have published more than 20 JCR papers, participated in more than 30 national and international conferences and have been research members in more than 10 research projects, subsidized both by the state administration and by projects funded by private companies.

#### Research lines:

- Prediction, Control and Optimization of Renewable Energy Systems.
- Design and Development of Automation and Control Systems.
- Design and Development of Estimation and Prediction Systems.
- Fault Detection in Dynamic Systems.
- Artificial Vision / Digital Image Processing

### Research Group TEP964 on Applied Multidisciplinary Engineering

**PI:** Professor María Reyes Sánchez Herrera

**Date:** 2018

**Brief description:** This is a young and multidisciplinary group which comprises experts on power systems and microgrids, renewable energies and their integration in the microgrids, energy efficiency, the quality associated to the voltage and current wave, and the design of active filters and different

facts (flexible alternating current transmission) to improve the quality, the remote access and the physics of accelerators and particle detectors.

**National and international relationships:**

The research group is integrated in two research centres of the University of Huelva: on the one hand, the Energy Research Centre (CIE) and, on the other, the Centre for Advanced Studies in Mathematical and Computer Physics. It also actively collaborates with different private companies (Endesa, CEPSA, Atlantic Copper, Gabitel Ingenieros, Magtel, etc), as well as with university groups and research centres, both at national and international levels: the Instituto Superior de Engenharia of the University of the Algarve in

Portugal, the Higher Technical Institute (IST) of Lisbon, the University of Strathclyde in Glasgow, the Autonomous University of Chile and the National Institute of Nuclear Physics Italian (INFN).

**Research lines:**

- Design of Active Power Conditioners.
- Analysis and Measurement of the Quality of Electric Power.
- Energy efficiency.
- Renewable energy.
- Microgrids.
- Environmental engineering.
- Physics of accelerators.
- Particle detectors
- Remote access.