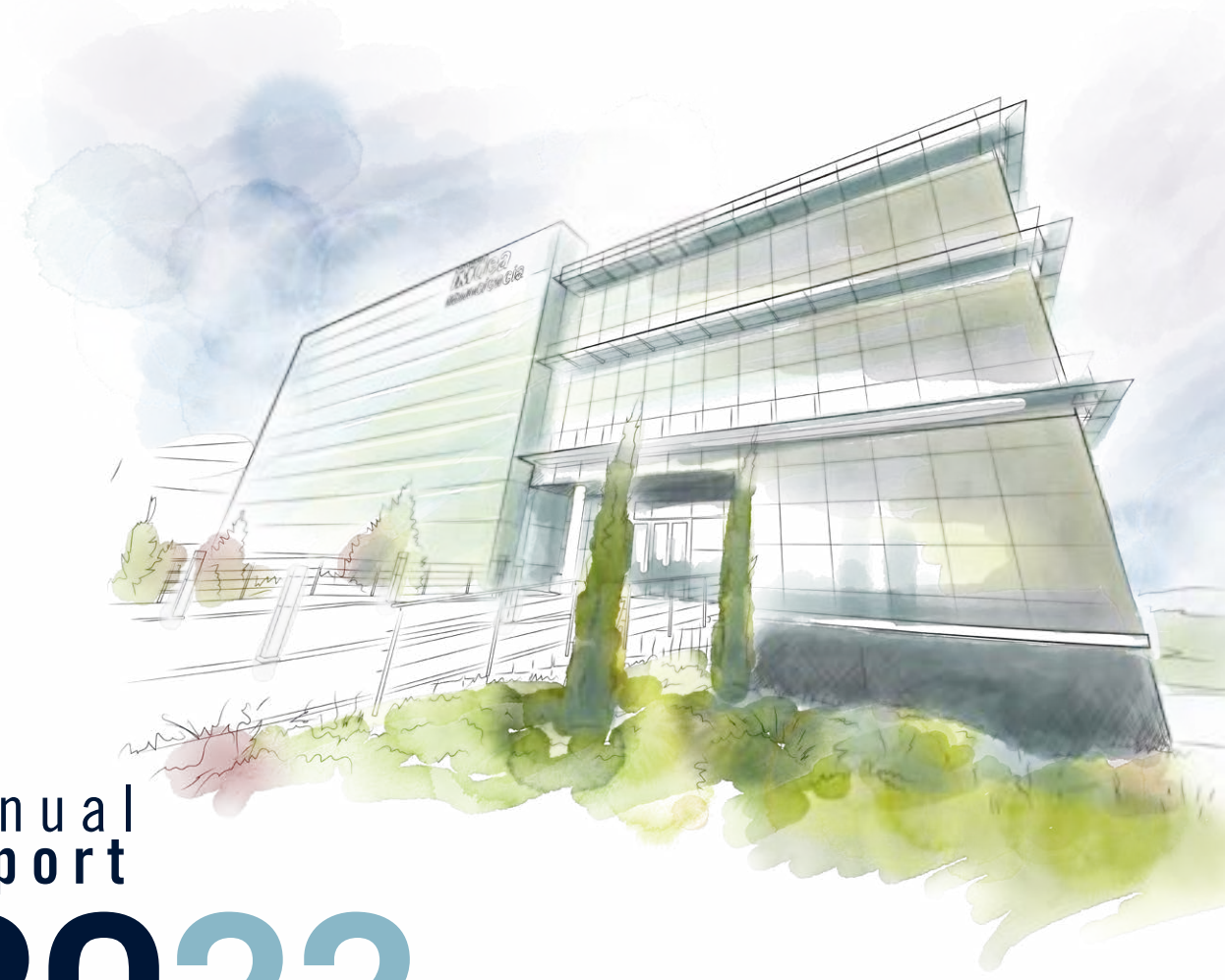
institute iMdea nanoscience

EXCELENCIA SEVERO OCHOA



annual report 2022

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nano

foreword

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2022

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Rodolfo Miranda
Director, IMDEA Nanociencia Institute
June 2023

During 2022 we started to unfold the Research Programmes defined in the proposal that led to the second Award as a "Severo Ochoa" Center of Excellence for the period 2022-2025. We continue attracting talent from abroad to develop the new research areas, install the new labs and move forward to establish leadership in fields such as ultrafast time-resolved spectroscopies and microscopies, spin-polarized angle-resolved photoelectron spectroscopy, nanostructured functional surfaces or additive manufacturing of nanomagnetic materials.

In terms of quantitative output, we have published in 2022 more 200 papers, with 80% of them in Q1 and 30% in D1 journals. The accumulated number of citations of the papers produced by IMDEA Nanociencia researchers has reached more than 83000 by the end of the year. The institutional h index amounts to 122. This gives us a hint as to why IMDEA Nanociencia appears systematically among the highest-ranked research organizations in Spain.

We have achieved in 2022 the amazing figure of 75% of our budget being obtained from external, competitive sources, with only 25% coming directly from the administration. It is worth remembering that in 2012 the fraction of competitive funds obtained was below 50% of the total. In spite of these unusual figures, I claim that, more than ever, it is necessary to increase the basal financial support, in order to ensure the long term competitiveness of the Institute. The administration of the Regional Government in Madrid should show commitment in this direction.

I feel particularly proud of the fact that in 2022 (finally) we have being able to offer stability to most of our employees, with a balanced representation of researchers, technicians, managers and administrators, i.e. all the relevant areas of our Institute. This was very well deserved, considering the talent, dedication and strength that they have shown over the years. I am convinced that this action will be followed in years to come by new opportunities to complete the "skeleton" of our personnel of staff.

Since the creation of IMDEA Nanociencia, the commitment of scientists, technicians, managers and administrators to give their best is what made the Institute successful. May this be also true in the future. It is an immense honor for me to be still part of this adventure.

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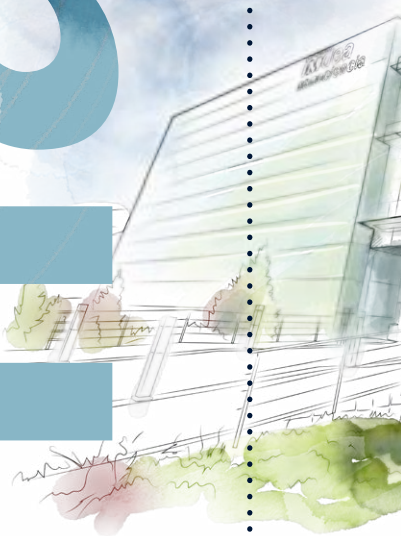

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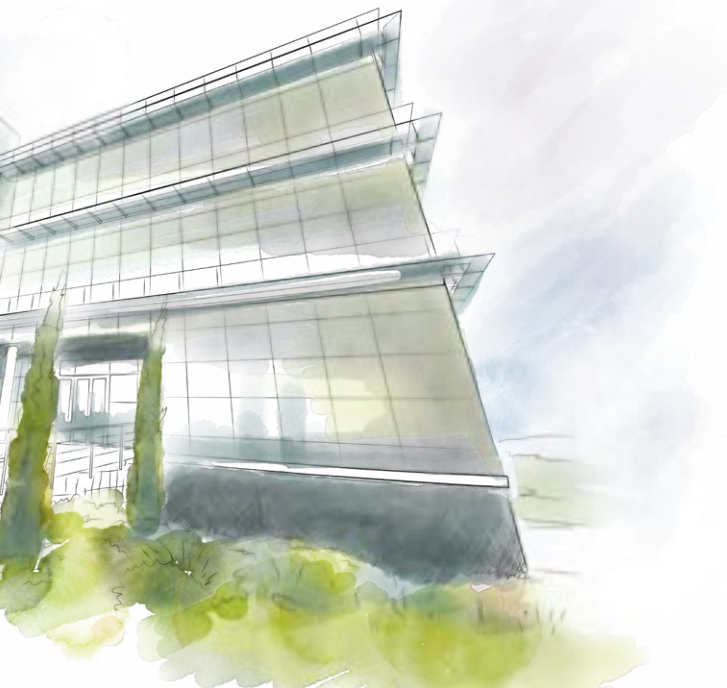

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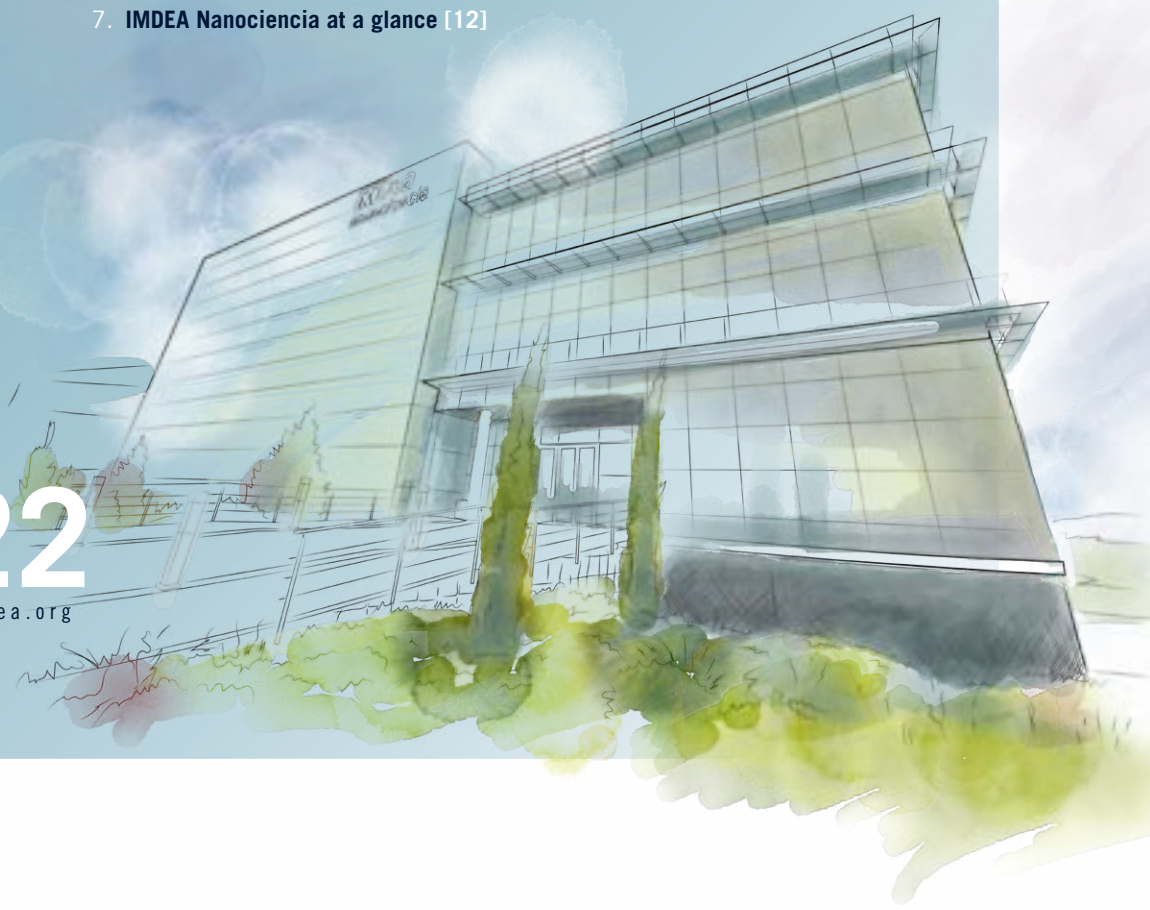
overview



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1. Legal Status

IMDEA Nanociencia is a private non profit Foundation created by initiative of the Madrid Regional Government in November 2006, in order to shorten the distance between the research and society in the Madrid region and provide new capacity for research, technological development and innovation in the field of Nanoscience, Nanotechnology and Molecular Design. In 2007 the former Ministry of Education and Science of the Government of Spain decided to also fund part of the creation and equipment of an institute of Nanoscience in the Madrid autonomous region.

The Foundation is governed by a Board of Trustees, which has representatives of the national and regional administration, the Academic Institutions (Complutense, Autónoma and Politécnica Universities, Consejo Superior de Investigaciones Cientificas), industries, members of the Scientific Advisory Council, and experts in societal implications of nanoscience and technology transfer.

The Foundation governs the IMDEA Nanociencia Institute, a new interdisciplinary research centre dedicated to the exploration of basic nanoscience and the development of applications of nanotechnology in connection with innovative industries. The IMDEA Nanociencia Institute is part of one of the strategic lines of the Campus of International Excellence (CEI) UAM+CSIC.

2. Strategic Goals

In the Madrid region there is a large community of physicists, chemists and biologists working actively on diverse aspects of Nanoscience. Many of these groups have a recognized international prestige in their respective fields.

In spite of this, a new step forward is needed for the future international competitiveness of R+D in Nanoscience and Nanotechnology. A suitable organizational and working environment needs to be created with the aim to promote the continuous interdisciplinary interaction between specialists in physics, chemistry, molecular biology, computer sciences, etc., that the very nature of this new discipline demands.

Most importantly, it is essential to be able to recruit and retain new talent and to repatriate young scientists working abroad, to train a new generation of technicians and scientists in a genuine interdisciplinary field, and to create and maintain new experimental equipment and advanced infrastructures.

All this must be done by coordinating efforts with the groups and institutions that already exist, thanks to a flexible structure based on research programmes, which will have to undergo periodic evaluations. IMDEA Nanociencia aims at becoming an internationally recognized research centre, whilst maintaining a clear support from the existing scientific community in Madrid.

3. Management Structure

LEGALLY BINDING GOVERNING STRUCTURE

INTERNAL GOVERNING STRUCTURE


EXECUTIVE COMMISION
Rodolfo Miranda
DIRECTOR
Emilio Pérez
Deputy Director
Scientific Outreach
Nazario Martín
Vice Director
EXECUTIVE COMMISSION
Daniel Granados
Deputy Director
Scientific Infraestructure
Julio Camarero
Deputy Director
Scientific Strategy
Bonifacio Vega
Executive Manager
MANAGEMENT COMMITEE
Executive Manager
Bonifacio Vega
Projects & HR
Maria Jesús Villa
MANAGEMENT COMMITEE
Administration & Finances
Facilities & Infrastructures
Jose Luis Casillas

4. Severo Ochoa

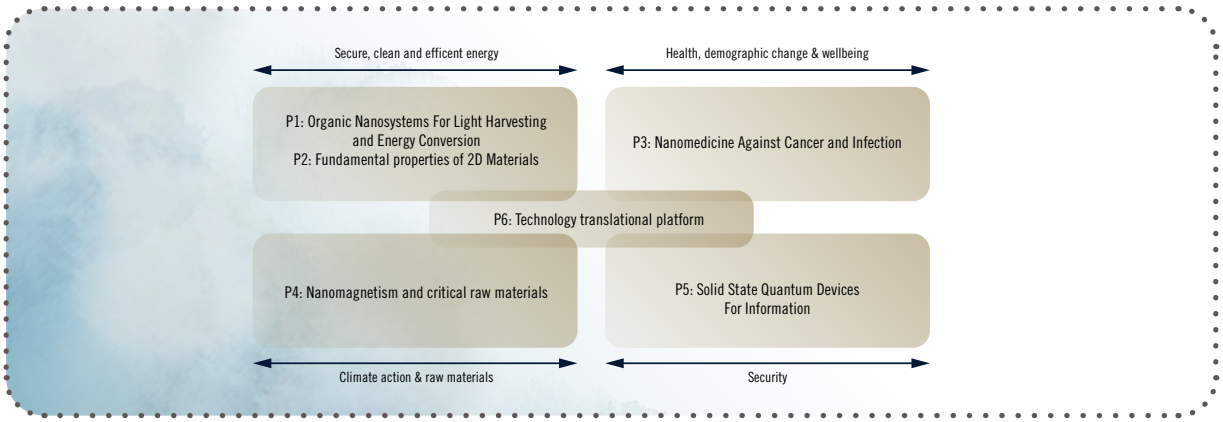
IMDEA Nanociencia became an accredited Severo Ochoa Centre of Excellence in 2017 (Spanish Ministry of Economy, Industry and Competitiveness) contributing towards the national and international leadership of the Institute in the areas of Nanoscience and Nanotechnology. This award is the highest national recognition for centres in Spain, granted after a rigorous evaluation process carried out by an international scientific committee.

The funding provided by the Severo Ochoa award supports the strengthening of the existing interdisciplinary character of the centre and combines different types of expertise to find innovative solutions for social and economic challenges.

The focus under the Severo Ochoa programme are shown below where the research groups can make real contributions to the advancement of knowledge and technology innovation. The creation of a Translational Platform to encourage cross-programme collaboration for prototyping, proof-of-concept testing, scaling-up and implementation of technologies developed in order to bridge the gap between our labs and society.

In terms of the support provided for our researchers, a key part of the project allows the strengthening of both the Competitive Projects and Dissemination and Communication offices. Additionally the opening of two new offices for Research Support and Strategic International Partnerships has greatly strengthening the Institute on an international platform.

IMDEA Nanociencia is part of the SOMM alliance (https://www.somma.es/) and supports its goals and objectives. The SOMMa mission is to internationally promote, strengthen and maximise the value of the groundbreaking research produced by the Spanish 'Severo Ochoa' Centres and 'María de Maeztu' Units of Excellence and the scientific, social and economic impact it generates.



5. Board of Trustees

PRESIDENT OF THE BOARD OF TRUSTEES

Prof. Ivan K. Schuller
Expert on transfer of knowledge and nanotechnology. Advisor of the State of California and the National Nanotechnology Initiative, USA

MADRID REGIONAL GOVERNMENT

Mr. Enrique Ossorio Crespo
Regional Minister for Education, Universities, Science and the Arts C.M.

Mr. Fidel Rodríguez Batalla
Deputy Regional Minister for Universities, Science and Innovation

Ms. Ana Isabel Cremades Rodríguez
General Director for Research and Technological Innovation

Ms. Bárbara Fernández-Revuelta Fernández-Durán
Deputy Director General for Research of the Consejeria de Educación, Universidades, Ciencia y Portavocia C.M.

Mr. Ricardo Díaz Martín
Director General de Universidades y Enseñanzas Artísticas Superiores

D. Fernando Prados Roa
Deputy Regional Minister for the Humanisation of Health Care

Mr. José de la Sota Rius
Madri+d's Scientific-Technical Coordinator

SPAIN NATIONAL GOVERNMENT

General Direction of Research, Ministry of Science

Dr. Ángela Fernández Curto
General Subdirectorate for Scientific and Technical Facilities

IMDEA INSTITUTES TRUSTEES

Dr. Fernando Temprano Posada
Appointed by IMDEA Software

Dr. Jerry B. Torrance
Appointed by IMDEA Materiales

SCIENTISTS

Prof. Ivan K. Schuller
Expert on transfer of knowledge and nanotechnology. Advisor of the State of California and the National Nanotechnology Initiative, USA

Prof. Cayetano López
CIEMAT, Madrid, Spain

Prof. Luis Echegoyen
University of Texas El Paso, USA

Prof. Hector Abruña
Ithaca Cornell University New York, USA

Prof. Miquel Salmerón
University of California, Berkeley, USA

UNIVERSITIES AND PUBLIC RESEARCH ORGANIZATIONS

Prof. Mª Soledad Martín González
Spanish National Research Council (CSIC), Spain

Prof. Margarita San Andrés Moya
Complutense University of Madrid. Spain

Prof. Daniel Jaque Garcia
Autónoma University of Madrid. Spain

Prof. Fernando Calle
Polytechnic University of Madrid. Spain

INDUSTRY

Mr. Emilio Ramiro Arcas
Ramem, S.A

Mr. Manuel Pérez Cortes (substitute: Mr. Pedro Golmayor)
GMV Aerospace and Defense

6. Scientific Advisory Committee

Chairman: Prof. Ivan Schuller
Center for Advanced Nanoscience, University of California-San Diego, USA

Prof. Héctor Abruña
Department of Chemistry & Chemical Biology, Baker Laboratory, Cornell University, USA

Prof. Miquel Salmerón
Department of Materials Science and Engineering, University of California, Berkeley, USA

Prof. Harald Brune
Ecole Polytechnique Féderale de Lausanne (EPFL). Switzerland

Prof. Luis Echegoyen
University of Texas at El Paso, USA

Prof. Johannes Barth
Department of Physics, Technische Universität München, Germany

Prof. Rasmita Raval
Department of Chemistry. University of Liverpool, United Kingdom

Prof. Christoph Gerber
Department of Physics, University of Basel. Switzerland

Prof. Yvan Bruynserade
Department of Physics and Astronomy, Katholieke Universiteit Leuven, Belgium

7. IMDEA Nanociencia at a Glance

SCIENTIFIC PRODUCTION

Total No. of publications **2,602**

Times cited **83,225**

Ave citation per item **31.99**

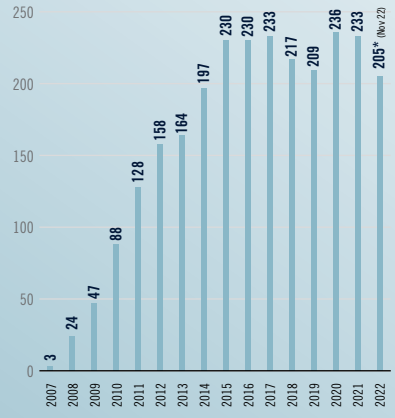
h index **122.00**

No of Publications **205**

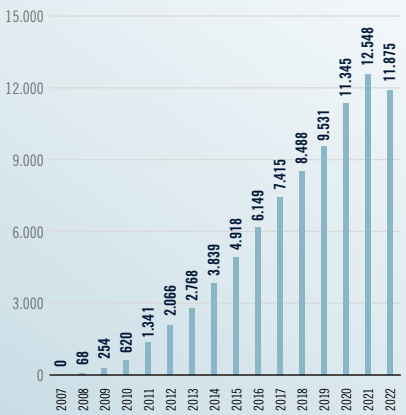
Q1 **80%**

D1 **30%**

Publications in each year



Citations in each year



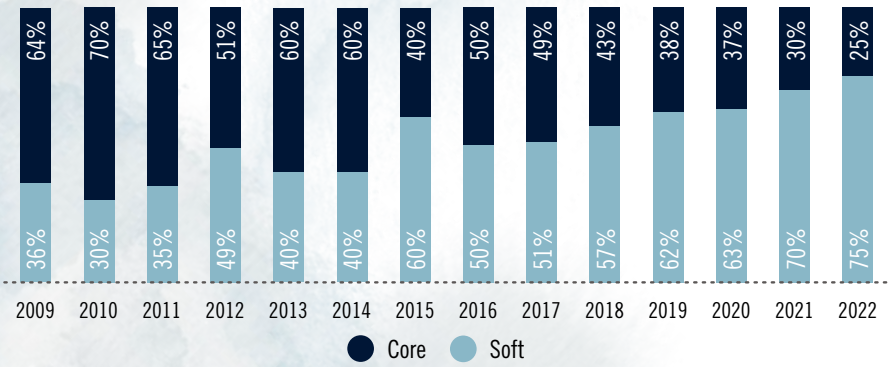
HUMAN RESOURCES

HR EXCELLENCE IN RESEARCH
"HR Excellence in Research" Award in 2022

Staff	Researchers	Nationalities	Average age	Gender balance (M/F)
248	229	18	36	58/42

PERCENTAGE OF FUNDING FROM CORE VS OTHER SOFT SOURCES

CORE funding: Stable and secured yearly funds from Madrid Regional Government (Comunidad de Madrid Funds Transfer).
SOFT funding: Non-stable funds, financing and competitive grants from EU, national and regional sources, grants from private non-profits, collaboration with institutions and industry and R&D contracts.



NATURE INDEX

For a national picture, IMDEA Nanociencia is ranked third by Share in the Nature Index for Governmental funded (non-University) Research Institutions in Spain:

Rank	Institution	Count	Share
1	Spanish National Research Council (CSIC)	1087	183.69
2	Institute of Health Carlos III (ISCIII)	241	25.31
3	Basque Research and Technology Alliance (BRTA)	70	10.58
4	IMDEA Nanociencia	47	10.57
5	ALBA Synchrotron	32	5.13
6	National Geographic Institute (IGN)	16	4.52
7	Basque Center for Macromolecular Design and Engineering	25	4.52
8	Xunta de Galicia	67	4.48
9	National Institute for Aerospace Technology (INTA)	33	2.99
10	Centre for Energy, Environment and Technology (CIEMAT)	89	2.51

2

research programmes and scientists

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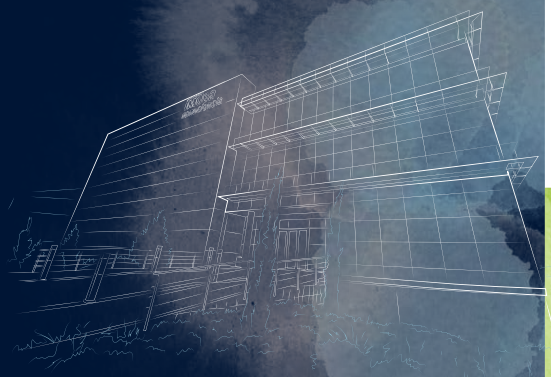
P1
Nanotechnology for energy harvesting
[16]
P2
Quantum materials at the nanoscale
[28]
P3
Nanotechnology for Health-care
[44]
P4
Nanomagnetism for Information and Communication Technologies
[60]
P5
Ultrafast phenomena at the nanoscale
[70]
P6
Nanotechnology for Critical Raw Materials and Sustainability
[80]
Horizontal Platform
Disruptive Innovation and Technology
[84]



P1 programme

Nanotechnology for energy harvesting

Programme Manager: **Prof. Nazario Martín**

Research lines

Nanocarbons and Organic Photovoltaics
Prof. Nazario Martín

Chemistry of Low-Dimensional Materials
Prof. Emilio M. Pérez

Switchable Nanomaterials
Dr. José Sánchez Costa

Functional Nanoscale Materials and Devices
Dr. Enrique Burzuri

Molecular Electronics
Dr. Edmund Leary

Functional Organic Materials
Prof. Tomás Torres

Electrochemical Biosensors
Prof. Encarnación Lorenzo

Biosensors
Prof. José Manuel Pingarrón

About the programme

Among the available energy harvesting techniques, and according to the outlook by the International Energy Agency, photovoltaics (PV) is considered as a mainstream technology for the next decade. Solar energy has undergone the largest growth of all renewable energies, being on track to reach the Sustainable Development Scenario level by 2030. Furthermore, future demand for ground-breaking solar technologies looks for easily accessible skin like solar cells adaptable for building integration in smart cities, cars and portable devices.

This programme deals with the design and synthesis of molecular nanostructures and nanomaterials, their spectroscopic characterization, in particular, their time-resolved optical response, and their self-assembly at surfaces. The expertise required includes the functionalization of different nanoforms of carbon, namely fullerenes, carbon nanotubes and graphene, metal-organic frameworks, spin-cross over architectures, organometallic compounds and semiconducting quantum dots to be self-organized on surfaces by means of covalent or supramolecular approaches and the implementation of various spectroscopic techniques, including spectroscopy of single molecules. Among the objectives of the Programme in basic science one may cite the characterization (and understanding) of the interaction light-organic molecules and the properties of of (model) solar cells. The practical objective is the use of this information, if possible, for the corresponding optimization of functional organic devices, such as (prototype) organic solar cells, as well as the preparation of a variety of materials for hole and electron transport, respectively, in perovskite- based solar cells.

In the Programme we search for new nanomaterials for the clean, sustainable production and storage of energy, and for the valorisation of waste chemicals, en route to a zero-waste energy cycle. To address this ambitious goal, we will employ a judicious combination of chemical synthesis, advanced time-resolved spectroscopy (see also P5), theory and device fabrication. It is worth noting that all these issues can be addressed from resources and capabilities at IMDEA-Nano and, quite naturally, involve a close collaboration with other strategic research programmes, specifically P2, P5 and P6.

Nanocarbons and Organic Photovoltaics

Webpage: https://nanociencia.imdea.org/nanocarbons-and-organic-photovoltaics/group-home

Prof. Nazario Martín
Associate Research Prof.

PhD: Universidad Complutense de Madrid, Spain
Double Affiliation: Universidad Complutense de Madrid, Spain

ORCID:
0000-0002-5355-1477
Researcher ID:
B-4329-2008

RESEARCHERS

Dr. Agustín Molina
University of Texas at El Paso, USA

Dr. José Santos
Durham University, UK

Dr. Inés García Benito
Ecole polytechnique fédérale de Lausanne, Swiss

POSTDOC

Dr. Javier Urieta
Universidad Complutense de Madrid, Spain

Dr. Diego Jiménez
Universidad Complutense de Madrid

Dr. Estefanía Fernández Bartolomé
IMDEA Nanociencia, Spain

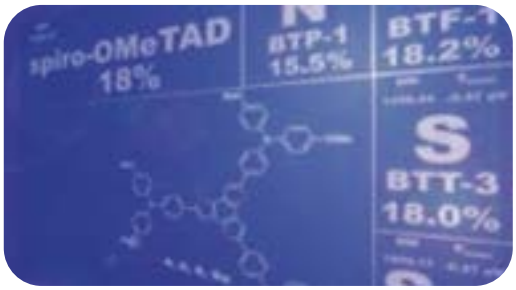
PhD STUDENTS

Jesus Galán

Research lines

The Organic Molecular Materials group at the Complutense University of Madrid and IMDEA Nanociencia is led by Prof. Nazario Martín. The research activity is mainly focused on Carbon Nanostructures as materials for the preparation of photo- and electroactive Functional Organic Molecular Systems. In particular, the covalent and supramolecular chemistry of carbon nanoforms in the context of chirality and asymmetric catalysis (bottom-up nanographenes, graphene quantum dots, carbon nanodots, and pulsed laser synthesis of carbon nanoparticles), electron transfer processes, photovoltaic applications (organic and perovskite solar cells), supramolecular functional assemblies and nanoscience.

At IMDEA Nanociencia, the group is involved in two main research: (1) “on-surface” synthesis, which consists on the preparation of new type of semiconductive polymers from tailored monomers synthesized in our lab; (2) Perovskite solar cells (PSCs), one of the most highlighted technologies nowadays, based on the preparation of organic compounds for the different layer of the perovskite devices, such as hole and electron-transporting layers or organic spacers for low-dimensional perovskite materials.



Chemistry of Low-Dimensional Materials

Webpage: http://nanociencia.imdea.org/chemistry-of-low-dimensional-materials/home

Prof. Emilio M. Pérez
Senior Research Prof.

PhD: University of Edinburgh, UK
Previous Position: Universidad Complutense de Madrid, Spain

ORCID:
0000-0002-8739-2777
Researcher ID:
B-1870-2008

RESEARCHER

Dr. Alejandro López
CiQUS - Centro Singular de Investigación en Química Biolóxica e Materiais Moleculares, Santiago de Compostela, Spain

POSTDOCS

Dr. Matthew Eaton
Northern University, Illinois, USA

Dr. Natalia Martín
Johannes Gutenberg University, Mainz, Germany

Dr. Carmen García
University of Göttingen, Germany

Dr. María Lourdes González
University of Southampton, UK

Dr. Marta González
University Carlos III, Madrid, Spain

Dr. Marina Garrido
Università degli Studi di Trieste, Italy

PhD STUDENTS

Sara Moreno
Alicia Naranjo
Tomás Nicolás
Ion Isasti
Marisol Rivas

TECHNICIANS

Dr. Silvia Miranda
Christine Marie Arenas

Research lines

Our group has interests in three main research lines:

1. Novel methods for the chemical modification of carbon nanotubes: We have developed methods for the synthesis of rotaxane-type derivatives of SWNTs, the first example of mechanically interlocked derivatives of SWNTs. MINTs show fundamentally different properties from other types of SWNT derivatives, which might have implications in the reinforcement of polymers, catalysis, and sensing.

2. Chemistry of 2D materials: We are developing improved methods for production of ultrathin 2D materials and van der Waals heterostructures through liquid phase exfoliation from their bulk sources. From these suspensions, we build functioning (opto)electronic devices using dielecrophoresis. Finally, we are interested in fundamental problems in the chemistry of 2D materials, such as chemoselectivity.

3. Fundamental principles of supramolecular chemistry: Lastly, we are very interested in measuring and understanding noncovalent forces, which underlie all the results of the previous two lines. For example, we have developed a method for the determination of association constants of small molecules towards SWNTs and unveiled the different contributions to the stability of the complexes. Optical tweezers (OT) are one of the most successful single-molecule force spectroscopy techniques, to the point of Arthur Ashkin being awarded with the Nobel Prize for Physics 2018, for their use to study biophyisics. In these two papers, we use OT to study synthetic supramolecular systems for the first time.

Switchable Nanomaterials

Webpage: http://www.nanociencia.imdea.org/switchable-nanomaterials-group/group-home

Dr. José Sánchez Costa
Assistant Research Prof.

PhD: University of Bordeaux 1, France
Previous Position: LCC-CNRS, Toulouse, France

ORCID:
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Research ID:
N-9085-2014

POSTDOCS

Dr. Lucía Piñeiro
Laboratoire de Chimie de Coordination LCC -CNRS, Toulouse, France

Dr. Esther Resines
IMDEA Nanociencia, Spain

PhD STUDENTS

Ana Martínez

Jorge Sangrador

Research lines

At the Switchable NanoMaterials group (SNM) we are mainly focused on the development of coordination complexes at the macro- and nanoscopic scale for their technological application in the fields of quantum computing, spintronic, thermal regulation and environmental science. In addition, we are interested in developing responsive molecules to act as porous materials for energy storage. Our multidisciplinary approach is based on three major themes:

1. **Iron-based Spin Crossover (SCO) Switchable coordination complexes:** Spintronics and memory storage (*Nat. Comms.* **2021**, 12, 1578); as anticancer drug (*Antioxidants* **2021**, 10, 66), as selective sensor of pollutants (*Advanced Science*, **2021**, 8, 2102619; *Dalton Trans,* **2020**, 49, 7315)
2. **Functional Metal-Organic Frameworks, MOFs:** MOFs are extended molecular materials formed by metal ions bridged by ligands, thus creating voids to absorb guest molecules. We are interested on increasing the selectivity of the MOF through tuning the shape and size of the pores and/or through the inclusion of specific receptors (*Chem.Commun.*, **2018**, 54, 5526).
3. **Non-porous crystalline architectures acting as porous compounds:** In some cases, non-porous systems can act as porous materials and absorb target molecules remarkably (*Advanced Science*, **2021**, 8, 210002619; *Chemical Science*, **2021**, 12, 8682-8688; *Chemical Science*, **2019**, 10, 6612-6616; *ACIE*, **2019**, 131, 8, 2332-2337).

Functional Nanoscale Materials and Devices

Webpage: http://nanociencia.imdea.org/functional-nanoscale-materials-and-devices/home

Dr. Enrique Burzurí
Associate Research Prof.

Double Affiliation: Universidad Autónoma de Madrid, Spain

ORCID:
0000-0001-7906-7192

Researcher ID:
M-3501-2015

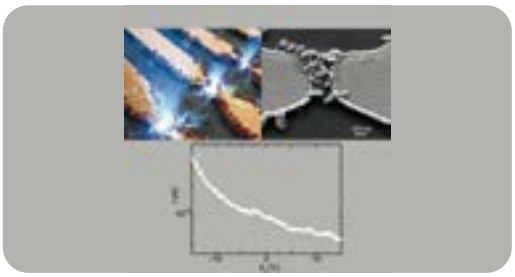
PhD STUDENTS
Aysegul Develioglu
Lucía Martín

Research lines

1. **2D and 1D materials:** We are interested in the fundamental properties of 2D materials and their integration into (opto) electronics and spintronics devices. We have assembled scalable nano-transistors based on franckeite heterostructures obtained by liquid-phase exfoliation. We are also involved in the controlled positioning of 1D SWNTs in complex devices. We have fabricated Physically Unclonable Functions (PUFS) and field-effect transistors with chemically modified SWNTs selectively positioned by dielectrophoresis.

2. **Magnetism of molecular materials:** We are also very interested in fundamental studies of the magnetism of molecules and other nanoscale materials (coordination polymers, 2D materials, mechanically interlocked magnetic molecules). For example, we have studied the magnetism of cylindrite van der Waals heterostructures down to the 2D limit. We have also studied the magneto-electronic response of Fe-based coordination polymers to volatile organic molecules.

3. **Molecular spin QBits:** Finally, we are exploring the incorporation of SWNT-magnetic molecule hybrids into superconducting circuits as spin QBits for quantum computation.



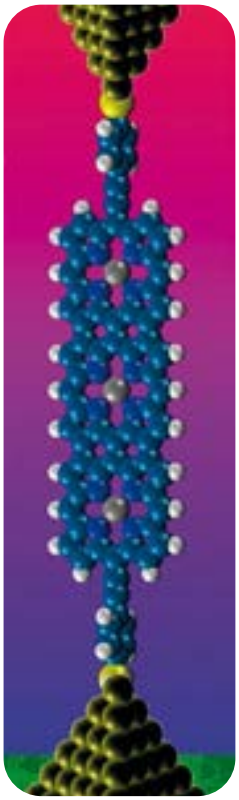
Molecular Electronics

Dr. Edmund Leary
Assistant Research Prof. (tenure track)

PhD: University of Liverpool, UK
Previous Position: University of Liverpool, UK

ORCID:
0000-0001-7541-5997
Researcher ID:
L-1066-2018

RESEARCH ASSISTANT
Lydia Abellán



Research lines

The molecular electronics group at IMDEA Nanociencia studies a wide variety of molecules for use in future molecule-based electronic devices. Our goal is to develop a deep understanding of electron transport at the nanoscale through individual molecules wired between a pair of electrodes. In particular, we are interested in the following areas: high-conductance molecular junctions; highly-conjugated molecular wires; thermopower at the molecular level; the role of aromaticity and antiaromaticity on electron transport; molecular spintronics; developing molecular switches; molecules under high bias voltages; chiral molecular junctions.

Cover images from: Chemical Society Reviews 21 February 2015, Issue 4 (10.1039/C4CS00264D)

Functional Organic Materials

Webpage: http://www.phthalocyanines.es

Prof. Tomás Torres Cebada
Associate Research Prof.

PhD: Universidad Autónoma de Madrid, Spain
Double Affiliation: Universidad Autónoma de Madrid, Spain

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0000-0001-9335-6935
Research ID:
H-9796-2014

ASSOCIATE RESEARCHER

Dr. Giovanni Bottari
Associate Researcher
PhD: University of Edinburgh, United Kingdom
Double Affiliation: Universidad Autonoma de Madrid, Spain
ORCID:
0000-0001-6141-7027
Researcher ID:
A-8957-2013

PhD STUDENTS

Álvaro Corrochano
Luis M. Mateo
Miguel Martínez

TECHNICIAN

Dr. Maxence Urbani

Research lines

Our research focuses on the preparation and study of molecular materials based on porphyrinoids like phthalocyanines (Pcs), subphthalocyanines (SubPcs) and porphyrins (Por), among others. See for example: *Angew. Chem. Int. Ed.* **2021**, 60,1474–1481; *Coord. Chem. Rev.* **2021**, 428, 213605.

1. One research line deals with the use of porphyrinoids as active components in solar cells. See for example: *Adv. Ener. Mater.* **2021**, 2101598; *J. Mater. Chem. C,* **2021**, 9, 16298-16303

2. We are also active in the preparation of photosensitizers for photodynamic therapy of cancer. See for example: *J. Med. Chem.* **2021**, 17436-17447; *Chem. Commun.* **2022**, 58, 669-672.

3. Finally our group is researching on the use of porphyrinoids in "On-surface synthesis". See for example: *Angew. Chem. Int. Ed.* **2021**, 60, 16208-16214; *Adv. Sci.* **2022**, 2105906.

Electrochemical Nanobiosensors

Webpage: https://nanociencia.imdea.org/home-en/people/item/maria-encarnacion-lorenzo

Prof. María Encarnación Lorenzo Abad
Associate Research Prof.

PhD: Universidad Autónoma de Madrid, Spain
Double Affiliation: Universidad Autónoma de Madrid, Spain

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Researcher ID:
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PhD STUDENT
Estefanía Enebral

Research lines

The Chemical Sensors and Biosensors Group of the Department of Analytical Chemistry and Instrumental Analysis at UAM is a consolidated research group whose research focuses on the design, construction, characterization and validation of electrochemical sensing platforms, based on efficient, reliable, low cost and easily transferable to the productive sector for direct application in clinical, environmental and food analysis. Currently, the nanoanalytical area is a priority line in the group that focuses on the incorporation of low-dimensional nanomaterials for the development of new, improved and highly efficient (bio)sensors of the sample to result type.

Biosensors

Webpage: http://www.imdeananociencia.org/home-en/people/item/dr-jose-manuel-pingarron

Prof. José Manuel Pingarrón
Associate Research Prof.

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Double Affiliation: Universidad Complutense de Madrid, Spain

ORCID:
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Researcher ID:
M-9402-2014
Scopus Author ID:
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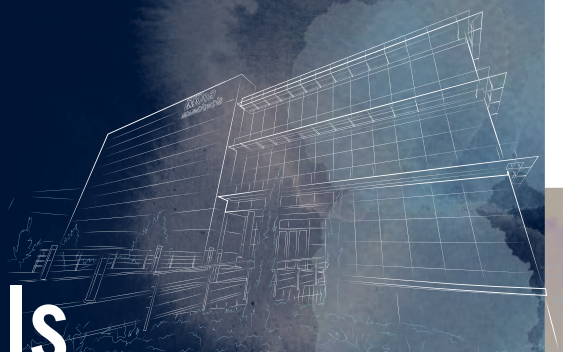
Research lines

1. **Fundamental Research:** Synthesis, characterization and application of latest generation nanomaterials, redox polymers/electronic conductors and modern electroanalytical techniques in electrochemical (bio)sensing.

2. **Applied Research:** Development and application of advanced electrochemical (bio)sensors for the determination of relevant (bio)markers in the environmental, clinical and food fields in response to current demands of society.

P2
programme
Quantum materials at the nanoscale



Programme Manager: **Prof. Rodolfo Miranda**

Research lines

Scanning Probe Microscopies and Surfaces
Prof. Rodolfo Miranda

Theoretical Modelling
Prof. Francisco Guinea

Quantum Devices and Photonics
Dr. Daniel Granados

Nanoarchitectures at Surfaces
Dr. David Écija

Spin-Polarized low T STM
Dr. Fabián Calleja

Topological Surfaces States in Quantum Materials
Dr. Manuela Garnica

Applied Nanoelectronics
Dr. Ramón Bernardo

Topological Surfaces States in Quantum Materials
Dr. José Ángel Silva

Imaging of 2D Materials
Prof. Amadeo L. Vázquez de Parga

Photonic STM
Dr. Roberto Otero

Transport in 2D Systems
Prof. José Luis Vicent

Thermopower at the Nanoscale
Prof. Nicolas Agrait

Theoretical Study of Molecules on Surfaces
Prof. Manuel Alcamí

About the programme

Quantum Technologies play a cornerstone role in the future European economy and competitiveness. They will impact security, counterfeit prevention, drug discovery, material sciences, complex-network optimisation, information storage, artificial intelligence, sensing, weather or stock market forecasts, or metrology.

The programme combines advanced microscopies and spectroscopies with atomic resolution -essential to characterize matter at the nanoscale- with multi-scale theoretical modelling to design, synthesize and characterize quantum materials. With our expertise in scanning probe microscopies we visualize exotic quantum states and build a theoretical framework to correlate structural properties and quantum behaviour. This enable us to design materials ad-hoc, optimized for specific functionality. In-house access to nanofabrication tools will empower us to manufacture devices exploiting these quantum phenomena.

The scientists involved in this programme develop at IMDEA advanced Scanning Probe Microscopes, mostly STM, AFM and Photoelectron Microscopy to investigate problems such as the epitaxial growth of graphene, the chemical functionalization of graphene, the design of metal-intercalated graphene heterostructures, the characterization of topological insulators, the self-assembly of molecules at surfaces, the on-surface synthesis of nanomaterials from molecular precursors, the design of surface-confined metal-organic architectures, the in-situ fabrication and response of nano-catalysts, the realization of scanning tunnelling spectroscopy and inelastic scanning tunnelling spectroscopy at the level of single molecules, the investigation of tip-induced electroluminescence or the spin polarized imaging of magnetic nanostructures. Friction at the nanoscale and theoretical modelling are also involved. Activities of this programme have implications for aeronautics, electronic, magnetic, sensory, and energy applications. This programme is in close collaboration with research programmes P1 and P4.

Scanning Probe Microscopies and Surfaces

Webpage: http://nanociencia.imdea.org/rodolfomiranda/index.php/en

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Associate Research Professor

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Double Affiliation: Universidad Autónoma de Madrid, Spain

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0000-0002-1064-6724
Researcher ID:
7102041777

EMERITUS
Prof. Juan M. Rojo
Universidad Complutense de Madrid, Spain

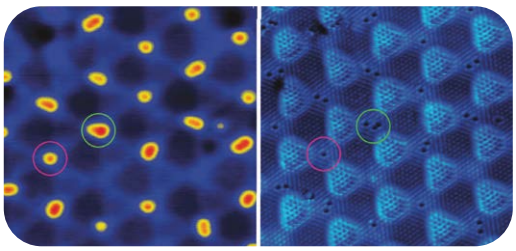
RESEARCHER
Dr. Jaime Sanchez-Barriga
Helmholtz-Zentrum Berlin (HZB), Germany

Research lines

The use of advanced microscopies and spectroscopies with atomic resolution is essential to characterize matter at the nanoscale. Our main tool for studying nanostructures at the atomic scale is low temperature scanning probe microscopy. The microscopes enable us to image, manipulate, and detect the local properties of nanoscale objects with picometer resolution under extreme conditions, i.e. in ultra-high vacuum, at temperatures down to 700mK and in magnetic fields up to 3T. We measure electronic, vibrational and optical excitations, magnetic interactions and forces, manipulate single atoms and molecules to assemble functional nanostructures.

We investigate problems such as the epitaxial growth of graphene, its spatially-resolved electronic structure or its chemical functionalization, the investigation of tip-induced electroluminescence of molecules, its Kondo response or the spin polarized imaging of magnetic nanostructures.

- Atomic scale tunneling microscopy and spectroscopy.
- Dynamics at surfaces.
- Fundamental properties of low dimensional systems and quantum materials.
- Magnetism of nanostructures.
- Molecular nanoscience at surfaces.



Theoretical Modelling

Webpage: http://www.imdeananociencia.org/graphene/group-home

Prof. Francisco Guinea
Senior Research Prof.

PhD: Universidad Autónoma de Madrid
Previous Position: Instituto de Ciencia de Materiales de Madrid-CSIC, Spain

Researcher ID:
A-7122-2008

POSTDOCS

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Dr. Yago Ferreiros
KTH Royal Institute of Technology, Stockholm, Sweden

Dr. Pierre A. Pantaleón
University of Manchester, UK

Dr. Andreas Sinner
University of Augsburg, Germany

Dr. Adrian Ceferino
University of Manchester, Great Britain

PhD STUDENTS

Alejandro Jimeno

Héctor Sainz

VISITORS

Ziyan Li
Wuhan University

Min Long
Wuhan University

Research lines

The main goal of the research done within the group is the development of models which describe the properties of novel two dimensional materials. The best known case is graphene, which permits the fabrication of films of widths comparable to the radius of a single atom. After the synthesis of graphene, many other two dimensional materials have been fabricated, with a broad range of properties.

Finally, layers of different materials can be combined, leading to "metamaterials" with pre-designed features.

The models developed in the group emphasize those properties which are unique to these materials, and they include geometrical and structural features, electronic properties, and the possible formation of superconducting and magnetic phases. The group also considers devices based on these materials, highlighting those with functionalities which cannot be achieved in devices fabricated using other materials.

The research being carried out is expected to be useful for descriptions of these materials at the atomic scale, and also in samples of sizes much larger than the separation between atoms. A wide variety of techniques in theoretical physics are applied, from numerical calculations to the use of topological arguments, or methods based on the renormalization group.

The models developed in the group are checked against experimental results, and they attribute to their interpretation. A significant fraction of the research done by the group is carried out in collaboration with experimental teams.

Quantum Devices and Photonics

Webpage: http://www.nanoscience.imdea.org/quantum-nanodevices/group-home

Prof. Daniel Granados
Senior Research Prof.

PhD: Universidad Autónoma de Madrid. Spain and IMM-CNM-CSIC
Previous Position: Toshiba Research Europe Ltd. (TREL), Cambridge, UK

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Scopus Author ID:
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POSTDOC

Dr. Jorge Trasobares
National University of Singapore

PhD STUDENTS

Victor Marzoa
(co-supervised with Dr. Ramón Bernardo)

Cristina García
(co-supervised with Dr. Ramón Bernardo)

Gabriel Caballero
(co-supervised with Dr. Mariela Menghini)

RESEARCH ASSISTANT

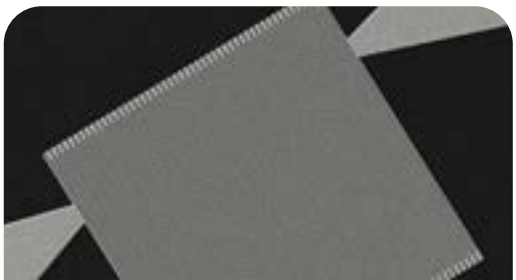
Julia García

TECHNICIAN

Patricia Cancho

Research lines

The information society is experiencing a global challenge, with the amount of information to be stored, transmitted or processed growing continuously every year. Quantum technologies are expected to become crucial to address this challenge, with the second quantum revolution blasting off. The Quantum nano-Devices Group (QnDG) was created in 2015 with the purpose of contributing to this revolution. It focuses on micro and nanofabrication of electronic and photonic hybrid devices for quantum information technologies. A solid-state approach is fostered towards the realization of single photon emitters (SPEs), cavity quantum electrodynamics (CQED), single photon detectors (SPDs), random number generators (RNDs) and physically unclonable functions (PUFs). The Quantum Nano Devices Group also collaborates tightly with the Centre of Astrobiology (CAB-INTA-CSIC) in the development of Kinetic Inductance Superconducting Detectors (KIDs) for space exploration. KIDs are expected to become the next generation technologies for the forthcoming missions in the GHz to THz bands. Recently (2018) we have also started working together on the development of hybrid superconducting devices for quantum technologies mixing traditional superconductors with low dimensional quantum confined materials. The group as a long tradition on the development of novel micro and nanofabrication techniques, with emphasis on the tailoring and engineering of low dimensional material via direct nano-patterning methods.



Superconducting nanowire single-photon detector made of NbTiN manufactured at IMDEA-Nanociencia quantum nanodevices group in collaboration with the Superconducting tecnologies group of the CAB

Nanoarchitectures at Surfaces

Webpage: https://nanociencia.imdea.org/nanoarchitectonics-on-surfaces/group-home

Dr. David Écija
Senior Research Prof.

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Previous Position: Technical University of Munich, Germany

Researcher ID:
I-2207-2012

RESEARCHERS

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Technische Universität München, Germany

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Universidade Federal de Minas Gerais, Brazil

Dr. Koen Lauwaet
Researcher
ICMM-CSIC, Spain

POSTDOCS

Dr. Ana Isabel Barragán
Centro de Física de Materiales, CFM / Donostia, Spain

Dr. Daniel Moreno
IMDEA Nanociencia, Spain

Dr. María Tenorio
ICN2, Spain

Dr. Aurelio Gallardo
Czech Academy of Sciences, Prague, Czech Republic

PhD STUDENTS

Cristina Martin
Kalyan Biswas
Kotapalayam Mathialagan Shanmugasibi
Elena Perez Elvira
Lenka Cerna

VISITOR

Dr. Jose Maria Gallego
ICMM-CSIC, Spain

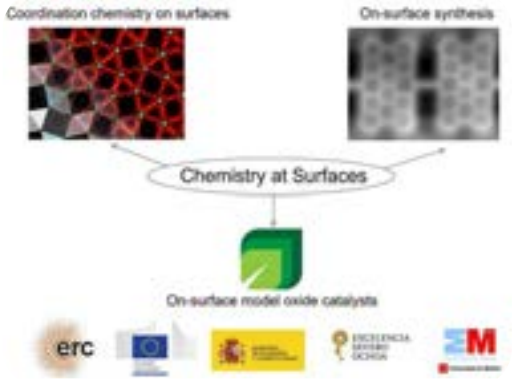
Research lines

Our group is focused on the design of organic products and nanomaterials on surfaces, including three main lines of research:

1. **Surface-confined metal-organic materials.** Our main interest is to rationalize the coordination chemistry of functional metals like lanthanides on surfaces, creating unique architectures with advanced functionalities for sensing, catalysis, light emission and nanomagnetism.

2. **On-surface synthesis of functional nanomaterials.** We focus on the design of unprecented organic complexes and nanomaterials, paving the way for modern organic optoelectronics, nanomagnetism and non-trivial quantum phases of matter.

3. **Nanocatalysis for energy applications.** We pursue the on-surface design and atomistic characterization of metal-oxide nanocatalysts of relevance for water splitting and CO_2 reduction.



Spin-Polarized low T STM

Webpage: http://www.imdeananociencia.org/nanoscale-imaging-of-2d-materials/group-home

Dr. Fabián Calleja
Assistant Research Prof.

PhD: Universidad Autónoma de Madrid, Spain
Previous Position: Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland

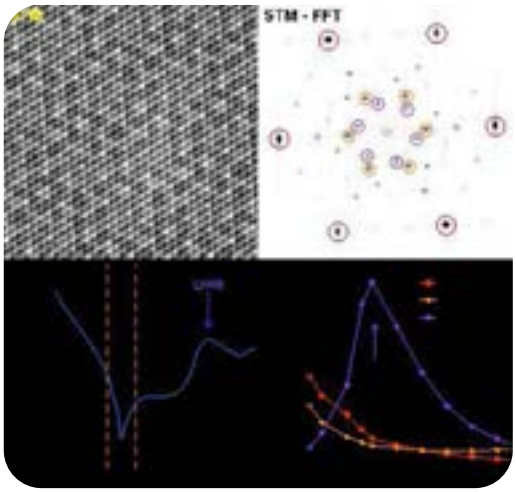
Researcher ID:
I-7964-2012

PhD STUDENT
Ivan Martínez
(co-supervised with Dr. A. L.Vazquez de Parga)

Research lines

1. Electronic and magnetic properties of graphene-based systems at the atomic level.
2. Modification, functionalization and development of chemical reactions on graphene.
3. Electronic correlation effects on transition metal dichalcogenide 2D systems.

The transparency effect in 1H/1T TaS2, by which the charge density wave (CDW) of the underlying 1T layer appears overimposed on the 1H surface, has intrigued the scientific community since it was first reported in the 90s. In this work we quantify this effect by following the relative intensities of both CDWs (2H in orange and 1T in purple) as a function of the STM bias voltage and we trace back its origin to the upper Hubbard band (UHB) of the underlying 1T layer.



Topological Surfaces States in Quantum Materials

Webpage: http://nanociencia.imdea.org/nanoscale-imaging-of-2d-materials/group-home

Dr. Manuela Garnica
Assistant Research Prof. (tenure track)

PhD: Universidad Autónoma de Madrid, Spain
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ORCID:
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AAG-8254-2019

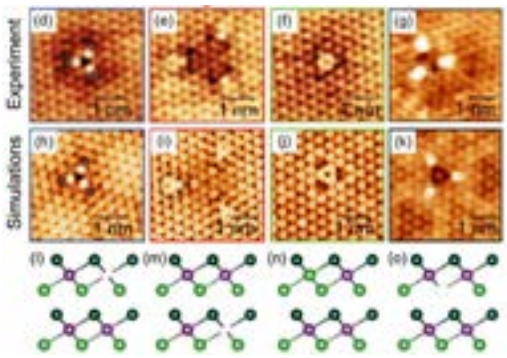
PhD STUDENTS
Joan Ripoll
Alireza Amiri

Research lines

Our research interests deal with quantum materials and new topological states of matter. In recent years, quantum materials have attracted a wide range of attention not only for the possibility to study many aspects of fundamental physics but also because of their potential applications.

- Epitaxial growth of 2D quantum materials
- Phase engineering of transition metal dichalcogenides (TMDs)
- Correlation of the crystalline, electronic and topological structure of quantum materials at atomic scale to macroscopic properties

"Atomic-scale study of Type-II Dirac semimetal $PtTe_2$ surface" P. Casado Aguilar, F. Calleja, C-N. Kuo, C.S. Lue, B. Ghosh, A. Agarwal, A. Politano, A.L. Vázquez de Parga, R. Miranda, J.A. Silva-Guillén, M. Garnica*. *JPhys Materials* 5, 044003 (2022). Invited article in special issue "Women perspective in Quantum Materials".



Applied Nanoelectronics

Prof. Ramón Bernardo
Assistant Research Prof. (tenure track)

PhD: Universidad Autónoma de Madrid, Spain
Previous Position: Lancaster University, UK

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N-3945-2019
Scopus Author ID:
55922273000

PHD STUDENTS

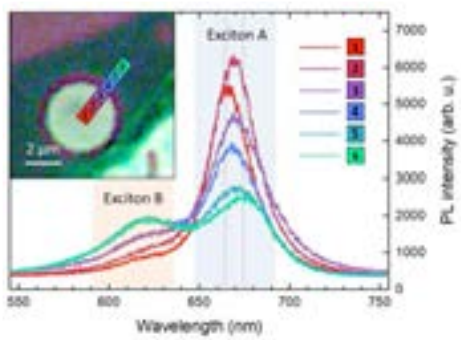
Víctor Marzoa
co-supervised with Dr. D. Daniel Granados)

Cristina García
(co-supervised with Dr. D. Daniel Granados)

Julieta Baciredo
(co-supervised with Dr. M. Milagros Castellanos)

Research lines

1. We are focused on the development of practical electronic and optical devices by exploring new routes to exploit physical phenomena traditionally difficult to harness.
2. Physical cryptoprimitives from non-linear electronic devices. Information security is crucial in an interconnected society. We are developing cryptographic primitives based on the atomic imperfections in the interfaces of semiconductor devices for unique identification in local and network authentication schemes.
3. Lateral two-dimensional and hybrid devices. We are working on band-gap engineering via high-vacuum chemical etching of two dimensional materials to fabricate in-plane junction field effect transistors and designing hybrid tunneling devices combining 2D semiconductors with the quantum confined electronic structures of colloidal nanocrystals.
4. Two-dimensional optomechanical resonators. We are fabricating single- and few-layer electro-mechanical resonators from two-dimensional semiconductors to obtain tunable and spatially modulated light emitters.



Topological Surfaces States in Quantum Materials

Dr. José Ángel Silva Guillén
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PhD: PhD: Universitat Autònoma de Barcelona, Spain.
Previous position: Wuhan University, China.

ORCID:
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Researcher ID:
J-8636-2017

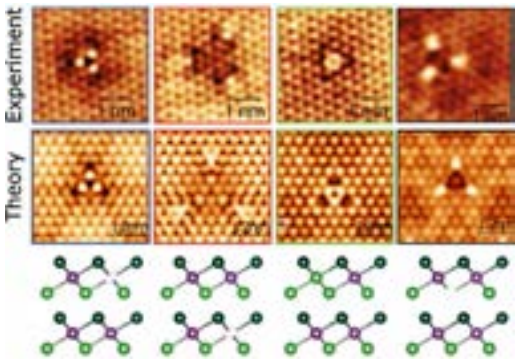
PHD STUDENT
Guillermo Parra

VISITOR
Xueheng Kuang
Wuhan University

Research lines

We are interested in the electronic properties of different two-dimensional materials. Our goal is to understand their structural and electronic properties from a fundamental point of view so we can tune those properties in a desired way by applying different stimuli to the materials, for example, by changing the number of layers, applying strain or twist. To achieve this, we mainly use first-principles calculations. We also work closely with experimental colleagues.

Defects on the 1T-$PtTe_2$ surface. Top row: Experimental STM images of different defects found in the sample. Middle row: Simulated STM images for a Pt vacancy in the first layer, a Pt vacancy in the second layer, a substitutional Te of a Pt of the first layer and a Te bottom vacancy in the first layer. Bottom row: Model of the identified defects.



Imaging of 2D Materials

Webpage: http://www.imdeananociencia.org/nanoscale-imaging-of-2d-materials/group-home

Prof. Amadeo L. Vázquez de Parga
Associate Research Prof.

PhD: Universidad Autónoma de Madrid, Spain
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L-2418-2013

POSTDOCS

Dr. Marc G. Cuxart
Technical University of Munich, Germany

Dr. Iolanda di Bernardo
Monash University, Australia

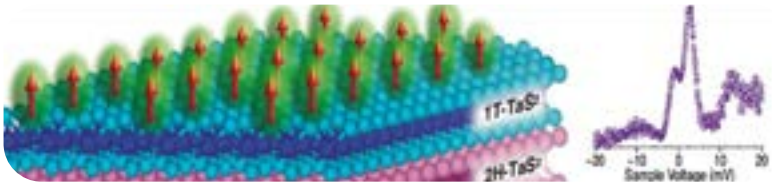
PhD STUDENT

Iván Martínez
(co-supervised with Dr. F. Calleja)

Research lines

1. Electronic structure of 2D materials.
2. Chemical functionalization of 2D materials.
3. Highly correlated electrons.
4. Superconductivity in low dimensions

A 2D Kondo lattice is detected in a 1T/2H-TaS2 polymorphic heterostructure by means of low temperature STM-STS. The resulting quantum-coherent electronic state is demonstrated by the appearance of a gap-like structure within a Kondo resonance below a characteristic temperature lower than the Kondo temperature of the system.



Photonic STM

Webpage: http://www.imdeananociencia.org/home-en/people/item/roberto-otero-martin

Prof. Roberto Otero
Associate Research Prof.

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Double Affiliation: Universidad Autónoma de Madrid, Spain

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Researcher ID:
E-4516-2011

POSTDOC
Dr. Alberto Martín
Max Planck Institute for Solid State Research in Stuttgart, Germany

PhD STUDENT
Óscar Jover
David Mateos

Research lines

In our group we fabricate low-dimensional materials and quantum systems by deposition of organic and inorganic materials on solid surfaces, and investigate their unique properties by Low-Temperature Scanning Tunnelling Microscopy, Spectroscopy and Luminescence. In particular, we are interested in:

1. Effects of quantum confinement within nanostructures (discretization of energy levels, quantization of effective masses). Our recent investigations have unraveled the discretization of energy levels in graphene quantum boxes and the origin of the finite mass of electrons confined in such nanostructures.

2. Luminescence of single molecules excited by STM. We have added to our STM a system to collect the light emitted from the tunneling junction due to the injection of hot carriers. The experimental setup has already been tested with individual fullerene nanocrystals *(in preparation)*, and we are now moving to individual molecules.

3. Interaction of spin polarized electrons with organic nanostructures. The interaction between organic molecules and the electron sea at solid surfaces leads to interesting electronic phenomena such as the existence of Kondo resonances or the existence of 1D electronic channels for interfacial electrons. We intend to explore the new effects that be expected when such organic molecules are supported by substrates with a non-trivial spin texture.

Transport in 2D Systems

Webpage: http://www.imdeananociencia.org/home-en/people/item/jose-luis-vicent-lopez

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Researcher ID:
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Double Affiliation: CSIC-INTA, Torrejon de Ardoz

Dr. Álvaro Muñoz
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Double Affiliation: Universidad Complutense de Madrid
ORCID: 0000-0003-3236-5509

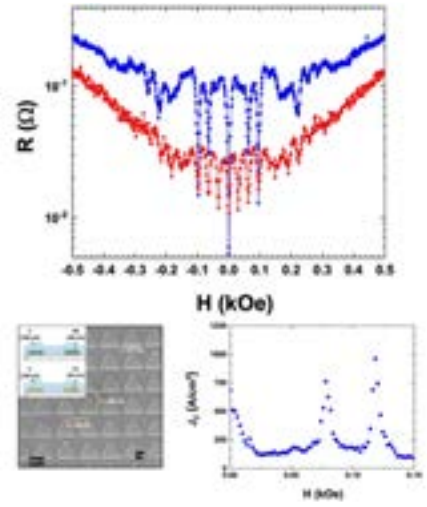
Research lines

1. Nanostructured superconductor-ferromagnetic hybrid systems and superconductor-2D heterostructures.

2. Quantum Hall effect in graphene-based devices and resistive switching phenomena in 2D materials.

3. Metal-insulator transition in strongly correlated materials.

Vortex dynamics controlled by local superconducting enhancement; *New J. Phys.* 21, 113059 (**2019**); https://doi.org/10.1088/1367-2630/ab5994; Open Access



Thermopower at the Nanoscale

Webpage: http://www.nanociencia.imdea.org/home-en/people/item/nicolas-agrait-de-la-puente

Prof. Nicolás Agraït
Associate Research Prof.

PhD: UNED, Spain
Double Affiliation: Universidad Autónoma de Madrid. Spain

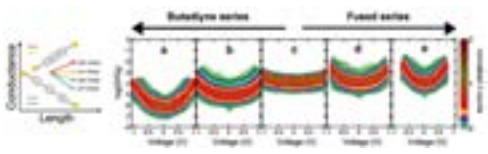
ORCID ID:
0000-0001-8177-7919
Researcher ID:
I-2207-2012

Research lines

Using scanning tunneling microscopes (STMs) made in house, we assemble and study circuits formed by a single organic molecule chemically bond to two metallic electrodes. We work mainly in ambient conditions, and explore the electrical properties of these molecular circuits, including their thermopower, this is the electrical voltage created between the extremes of the molecule under a thermal gradient.

More specifically, we study:

1. Electrical properties of organic molecule families: oligo(phenyl ethynylene)s,oligoynes, phthalocyanines, porphyrins... (*JACS* **2013**, *JACS* **2014**, *JACS* **2015**, *JACS* **2018**).
2. Thermo power of single-molecule junctions: we explore to ability to a single molecule of different compounds to generate an electrical potential when they are under a thermal gradient (*Nano Lett.* **2013**, *Nature Mater.* **2016**, *Chem. Soc. Rev.* **2016**).
3. Key factors involved in the formation and stability of molecular junctions (*J. Chem. Phys. C* **2013**, J. *Am. Soc.* **2013**, *Chem. Soc. Rev.* **2015**, *J. Phys. Chem. C* **2018**).
4. Graphene-like molecules containing non-hexagonal rings (*Chem. Sci.* **2017**).
5. Other electrode materials different from gold.



Theoretical Study of Molecules on Surfaces

Webpage: http://www.imdeananociencia.org/home-en/people/item/manuel-alcami-pertejo

Prof. Manuel Alcamí
Associate Research Prof.

PhD: Universidad Autónoma de Madrid, Spain
Double Affiliation: Universidad Autónoma de Madrid, Spain

Research lines

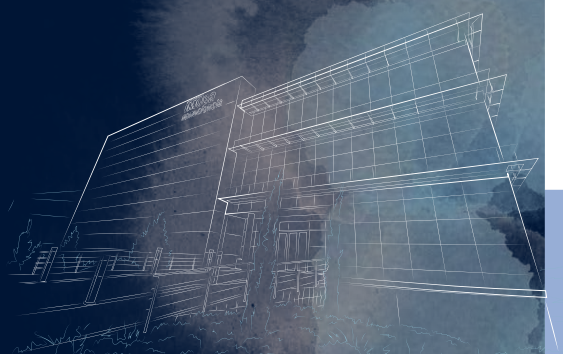
His field of expertise is the theoretical study of molecules both in gas phase and deposited on surfaces.

His current research lines are:

1. Theoretical study of self-assembly and charge transfer processes of molecules deposited on surfaces. We have focused our research in this topic in donor or acceptor organic molecules as TCNQ or TTF deposited on metal surfaces.
2. Carbon nanostructures (fullerenes, nanotubes and graphene), in the last years we have developed simplify models to understand the stability of charged fullerenes, fullerene derivatives *(J. Am. Chem. Soc.* 139, 1609, **2017**) or He-decorated fullerenes.
3. Fragmentation and stability of highly charged and highly excited molecules, in his field we have performed Molecular Dynamic simulations on excited states to describe the coupling between nuclear and electronic dynamics, or to determine the energy deposit in ion collisions with biomolecules.

P3 programme

Nanotechnology for Health-care



Programme Manager: **Prof. Rodolfo Miranda**

Research lines

Nucleic Acids and Nanoparticles in Nanomedicine
Prof. Álvaro Somoza

Advanced Fluorescence Nanoscopy
Dr. Cristina Flors

Molecular Motors Manipulation Lab
Dr. Borja Ibarra

Metallodrugs
Dr. Ana Pizarro

Magnetic Nanoparticles
Dr. Gorka Salas

Neural Interfaces
Dr. Mª Teresa González

Biosensors in Neuroscience
Dr. Valle Palomo

Mechanical Properties of Biostructures
Dr. Johann Mertens

Intracellular Temperature Measurements
Dr. S. Thompson

Protein Engineering
Dr. Begoña Sot

Engineering Biofunctional Nanostructures
Dr. Aitziber L. Cortajarena

Applied Nanomagnetics
Dr. Daniel Ortega

Magnetic Nanoparticles in Biomedicine. Cell-particle Interactions
Prof. Ángeles Villanueva

About the programme

This programme is focused on the development of novel nanotechnologies for medical applications on three different areas: NanoOncology (Translational developments for cancer treatment and diagnosis), NanoDiagnosis (development of new colorimetric tests for biological threats), and NanoNeurology (Nanotech-based developments for neurodegenerative diseases). The programme is highly multi- and interdisciplinary character, combining the concerted effort of biologists, chemists, physicists and medical doctors pursuing a common objective, which is only possible in few places worldwide, among them IMDEA Nano. We build on the translational aspects of some of our technologies to bring them closer to the clinic with the aim for better, more efficient, and cost-effective therapeutic and diagnostic tools. The programme is in close collaboration with research programmes P1 and P4.

One of the important areas is the preparation and use of multifunctional nanoparticles (NPs) in Oncology, in particular for cancer treatment and diagnosis. Magnetic NPs selectively target tumours for multimodal treatment as drug nanocarriers and heating inductors. In search of efficiency in the fight against cancer, the need to reduce toxic side effects associated with cancer therapies is investigated by using different strategies, (i) self-immolative linkers that attach drugs to nanoparticles and release a drug once in target cells and (ii) design of new pH-sensitive chemotherapeutic agents that can be activated by the tumor micro-environment. The development and utilisation of nanotechnology can further the search for new cancer therapies and this knowledge will impact across this multidisciplinary community.

The generation of sensors based on nanoparticles for detection of targets of medical interest aims to exploit the higher sensitivity and specificity of nanostructure-based diagnostics platforms for Biological Threats (including emergent viruses). One example is the use of nucleic acid conjugated gold nanoparticles to detect different biomarkers involved in diseases such as uveal melanoma, pancreatic cancer, Duchenne muscular dystrophy, and virus SARS COV-2. Another area of interest is the use of nanotechnology-based solutions to the growing problem of antibiotic-resistant bacteria. Nanostructures and NPs with antibacterial properties that rely on different antibacterial mechanisms are being investigated as promising alternatives to antibiotics. Selective bacterial entrapping nanotextures are also under development as bacteria sensor platforms.

NanoNeurology investigations face the challenges related to neurological disorders from two fundamental complementary approaches: pharmacological and technological, with a special focus on the advantages of nanoscopic systems and nanodevice fabrication in the search for solutions that help understand, alleviate and/or prevent these disorders. The activities are basis on the development of sensors for the precise measurement of pharmacological action of tailored multi-target compounds as well as on the development of neural interfaces based on nanotechnology that allow monitoring and stimulating the activity of the nervous tissue. We focus in particular on neurodegenerative diseases, which are increasingly prevalent in developed countries due to increased life expectancy.

Nucleic Acids and Nanoparticles in Nanomedicine

Webpage: https://nanociencia.imdea.org/nanobiotechnology/group-home

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RESEARCH ASSISTANTS

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Research lines

Our research group employs modified oligonucleotides and drugs to develop nanostructures for pancreatic cancer, uveal melanoma, COVID-19, and Duchenne muscular dystrophy. We utilize nanoparticles like albumin, gold, and iron oxide for therapeutic and diagnostic purposes. Oligonucleotides are designed to mimic or inhibit mRNA, miRNAs, and lncRNAs, to reprogram the target cells. These Molecules are conjugated to nanoparticles using cleavage linkers to better control their release. Our interdisciplinary approach aims to personalize medicine and advance precise therapeutics and diagnostics.

Temperatura de los lisosomas para el diagnóstico y tratamiento del cáncer.

Advanced Fluorescence Nanoscopy

Webpage: https://nanociencia.imdea.org/advanced-fluorescence-nanoscopy/group-home

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Dr. Joaquim Torrá
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Ingrid Ortega

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Mar Alcaraz
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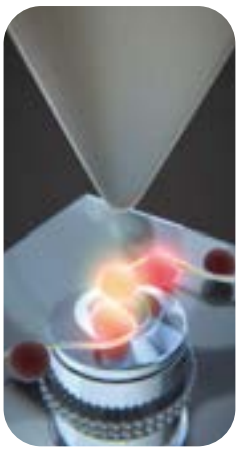

Research lines

We develop novel methods, typically based on light, to study biology and biomaterials at the nanoscale. Our current research lines are:

1. **Novel methods for super-resolution fluorescence imaging:** Super-resolution fluorescence microscopy techniques are able to image (biological) structures with a spatial resolution of tens of nm, one order of magnitude better than standard fluorescence microscopy. In our group we develop novel methods that extend the application of super-resolution microscopy. A few years ago we were able to image for the first time directly-labelled DNA with a spatial resolution below 40 nm. Currently, we use correlative super-resolution fluorescence imaging and atomic force microscopy (AFM) to develop and validate novel labelling methods in super-resolution microscopy, most recently for amyloids.

2. **Single-cell real-time imaging of bacterial death processes:** We are also interested in using advanced microscopy to study bacterial death processes at the single-cell level and with temporal resolution. We have developed labelling strategies to follow the effects of antimicrobial treatments in bacteria in real-time. Moreover, using combined fluorescence and AFM, we have studied mechanically-induced bacterial death, which is relevant in the context of mechano-bactericidal nanomaterials, and quantified the forces involved in this process. The mechanistic understanding provided by these advanced microscopy methods may help in the design and implementation of improved bactericidal strategies.

Molecular Motors Nanomanipulation Lab

Webpage: www.borjaibarralab.com

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PhD STUDENTS
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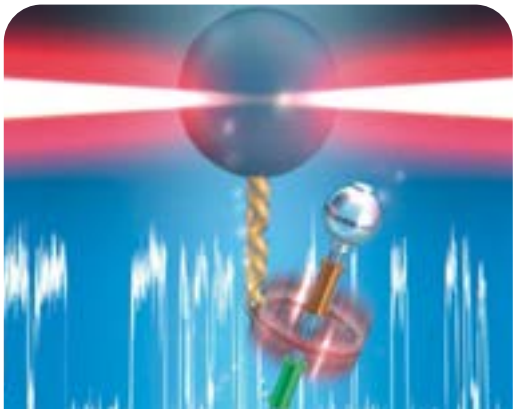
Research lines

1. **Biological machinery involved in nucleic acids metabolism.** We are measuring the operational dynamics of the biological machinery involved in: i) mitochondrial DNA replication (*NAR* **2020**; *NAR* **2019**; *NAR* **2017**) and ii) transcription of Influenza A viral genome.

2. **Cell membrane nanomechanics.** We have developed a single-molecule method to measure the dynamics of motor proteins involved in remodeling of cell membranes (*Nature Comms* **2019**).

3. **Synthetic molecular motors:** We have developed new methods to measure the mechanical strength of non-covalent interactions (*Chem. Science* **2017**) and the dynamics and mechanistic principles of operation of individual synthetic molecular switches (*Nature Comms* **2018**).

4. **Technology development.** We are working to combine optical manipulation with RAMAN (TERS). This exciting marriage of techniques will open up a wealth of new promising applications.



Metallodrugs

Webpage: http://nanociencia.imdea.org/metallodrugs-to-modulate-cancer-cell-machinery/group-home

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TECHNICIANS
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Research lines

1. Exploit metal coordination and organometallic chemistry principles to design potent metallodrugs.
2. Organometallic and coordination chemistry inside the human cell.
3. Transition metal chemistry to interfere mitochondrial function.
4. Nanoimaging of location and chemical reactivity of metallodrugs inside cells.

Metallodrug aqueous-speciation drives the chemistry of transition metals inside the cancer cell. Osmium(II) complexes bearing labile ligands are prone to produce inert species due to the high acidity of the resulting Os-aqua adducts. Furnishing the complexes with a tethered alcohol group inhibits the formation of inert species, resulting in Os-complexes unexpectedly reactive in water, and strikingly, also inside the tumour cell. See: **Osmium(II) Tethered Half-Sandwich Complexes: pH-dependent Aqueous Speciation and Transfer Hydrogenation in Cells.** *Chem. Sci.* **2021**, 12, 9287–9297.

Magnetic Nanoparticles

Webpage: http://www.imdeananociencia.org/magnetic-nanoparticles/group-home

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RESEARCH ASSISTANTS
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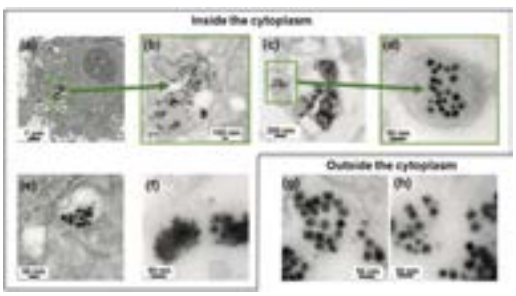
Research lines

Our research deals with the preparation of magnetic hybrid nanostructures for biomedicine and other technologically relevant applications. Magnetic nanoparticles can be used for medical imaging and treatment of different diseases. Many intrinsic and extrinsic factors (e. g. size, crystallinity, magnetism, aggregation, colloidal stability, dispersion medium, applied field, interactions with biological media) can influence the efficiency of nanoparticles and they can be designed to respond to different stimuli.

Stimuli-responsive nanomaterials are very attractive for biomedical applications. They can be activated through external stimuli or by the physicochemical conditions present in cells or tissues. Iron oxide-manganese oxide core-satellite shell nanostructures that change their contrast mode in magnetic resonance imaging (MRI) from T2 to T1, after being internalized by cells. This occurs by the dissolution of the MnO2 of the shell, preserving intact the iron oxide at the core.

García-Soriano, D. et al. *J. Colloid Interface Sci.* **2022**, 613, 447-460. https://doi.org/10.1016/j.jcis.2022.01.070



Neural Interfaces

Webpage: http://nanociencia.imdea.org/molecular-electronics-laboratory/group-home

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Research lines

We fabricate and characterize nanostructured devices to be used as neural interfaces of enhanced performance. We follow two parallel approaches:

1. **Electrical electrodes covered by vertical metallic nanowires:** We fabricate improved electrodes to be used for **neural electrical stimulation**. By giving nanostructure to the electrodes, we aim to achieve reduced impedance and enhanced biocompatibility.

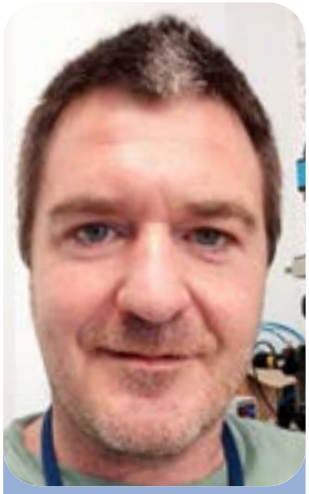
- Using template-assisted electrochemical deposition, we explore different materials to prepare conductive electrodes covered by vertical nanowires.
- Using IMDEA-Nanociencia clean room facilities, we pattern electrode heads to prepare ready-to-use electrodes whose biocompatibility and performance can then be tested by our collaborators.

2. **Sensors of neural activity based on magnetoresistive materials:**
We aim to demonstrate that anisotropic magnetoresistive materials can be used to **sense neural activity** at body temperature.

- Starting from LSMO thin films grown over vicinal substrates and lithographed into Wheatstone-bridges by our colleagues at CNRS-GREYC, we characterize their detectivity at temperatures in the range of the body temperature.
- We develop a differential architecture to test the sensing ability of our devices in vitro and in vivo.

Mechanical Properties of Biostructures

Webpage: http://www.imdeananociencia.org/home-en/people/item/johann-mertens



Dr. Johann Mertens
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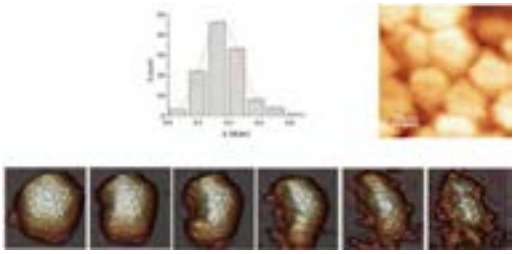
Research lines

The group has varied interests in the mechanical properties of macromolecular assembly of proteins.

1. We have implemented Atomic Force Microscopy (AFM) measurements in physiological conditions to study both structural and mechanical properties of individual viral particles. We have recently showed that ribonucleoprotein complexes establish strong interactions with the inner surface of the viral shell in IBDV mature virions (Scientific Reports 2015). We are also developing news tools for the combined study of the nano-mechanical properties of biomolecules using atomic force microscopy and spectroscopy.

2. We use microcantilevers as tools in biomedical applications of biosensor technology or molecular biophysics. In relation with our previous work in the field, we are developing a line related to protein and DNA biosensors as well as the study of mechanical properties 2D-systems (Nature Nanotechnology 2008, Nanotechnology 2012).



Intracellular Temperature Measurements

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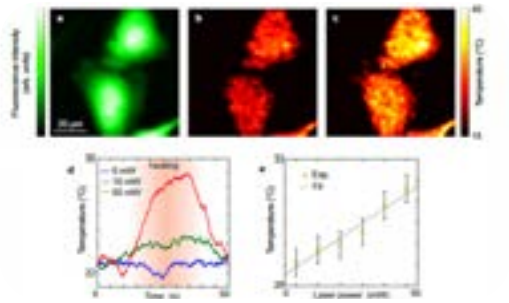
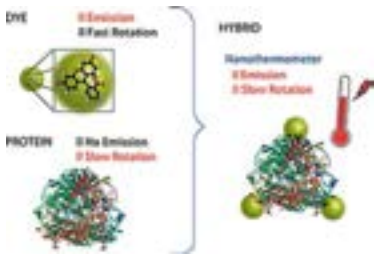
Research lines

1. Intracellular temperature measurements for cancer theranostics.
2. Next-generation of nanothermometers.
3. Photothermal & Photodynamic therapies.

Mapping Intracellular Temperature Using Green Fluorescent Protein Nano Letters. *American Chemical Society,* **2012**, 12, pp.2107 - 2111.



Plug and play anisotropy-based nanothermometers. *ACS Photonics* **2018**, 5, 7, 2676–2681.



Biosensors in Neuroscience

Webpage: https://nanociencia.imdea.org/research/research-programs

Dr. Valle Palomo
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PhD STUDENTS
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Research lines

Our lab is focused in discovering new drugs for neurodegenerative diseases and unveil their mechanism of action and potential in modifying or reversing the progression of the pathology. We focus in three different research lines:

- **Quantum Dots for the Understanding of Neurodegenerative Diseases.** We are working in establishing a semiconductor Quantum Dot (QD) platform to study neurodegenerative diseases in human models. We work with conjugates of QD and monoclonal antibodies and with dynamic sensor to monitor key enzymes in living cells.
- **Design and Discovery of New Drugs for Neurodegenerative Diseases.** We use the combination of biosensors and nanotechnological tools to select and optimize drug candidates, or to select drugs with fewer neurological side effects. We also develop multitarget compounds with synergistic activities towards the treatment of these diseases.
- **Study of extracellular vesicles and their role in disease.** We characterize the extracellular vesicles of our human models of disease and develop tools to phenotype them and quantify their molecular cargo.

From Kinase Inhibitors to Multitarget Ligands as Powerful Drug Leads for Alzheimer's Disease using Protein-Templated Synthesis. Nozal V, García-Rubia A, Cuevas EP, Pérez C, Tosat-Bitrián C, Bartolomé F, Carro E, Ramírez D, Palomo V*, Martínez A*. *Angew Chem Int Ed Engl.* **2021**, 60, 19344-19354.

CdSe Quantum Dots in Human Models Derived from ALS Patients: Characterization, Nuclear Penetration Studies and Multiplexing. Tosat-Bitrián C, Avis-Bodas A, Porras G, Borrego-Hernández D, García-Redondo A, Martín-Requero A, Palomo V. *Nanomaterials* **2021**, 11, 671

Engineering Biofunctional Nanostructures

Webpage: http://www.nanociencia.imdea.org/research/research-programs/nanomedicine/engineering-biofunctional-nanostructures

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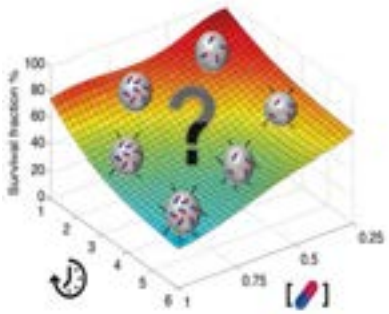
Research lines

The group has varied interests at the interface of biochemistry, bioconjugation, functional materials and nanomedicine. The two main research lines of the group are:

1. Bio-functionalization of nanoparticles for biomedical applications The objective of this research line is the generation of versatile functional nanoparticles with a selection of biomolecules and optimized properties for targeting and diagnosis of several diseases. In this context, multifunctional nanoparticles are utilized as drug carries and as sensors for in vivo and ex-vivo applications (*Sci Reports* **2016** doi: 10.1038/srep35786; *ChemNanoMat* **2017** doi: 10.1002/cnma.201600333; *Nanoscale* **2017** doi: 10.1039/c7nr04475e).

2. Biomolecular design for functional nanostructures and biomaterials In this research line we use mainly proteins as platforms for the fabrication of multiple protein-based hybrid functional nanostructures and biomaterials for their use in different technological and biomedical applications. (*Nanoscale* **2014** doi: 10.1039/c4nr01210k, *Biomacromolecules* **2015** doi: 10.1021/acs.biomac.5b01147; *ACS Applied Mat Interfaces* **2017**).



Applied Nanomagnetics

Webpage: http://nanociencia.imdea.org/applied-nanomagnetics-group/group-home

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Research lines

Our group is focused on nanomagnetism applied to medical technology, and our research activities are distributed in the following lines:

1. Computational electromagnetism for in silico testing. Starting from animal and human computable phantoms, we perform computer simulations of therapies and diagnostic techniques based on the interaction of electromagnetic fields and magnetic and optical nanomaterials in the frequency range of kHz. Our mission is to provide clinicians with powerful tools to choose the best therapeutical conditions by predicting body response. The group collaborates closely with hospitals and medical devices manufacturers on treating localised tumours through magnetic hyperthermia. We also aim to a wider validation of in silico temperature predictions with dedicated experimental measurements at the nanoscale.

2. Design of multifunctional magnetic nanomaterials. We design and synthesise a wide range of magnetic nanomaterials applied to biomedicine; for example, magnetic hyperthermia (MH), brain imaging contrasts, and magnetic particle imaging (MPI) tracers. Within this research line, the combination of magnetic hyperthermia and MPI is our current priority.

3. Development of point-of-care sensors. We design nanotechnology-enabled point-of-care tests for early diagnostic purposes, with special emphasis on immunology and oncology.

Protein Engineering

Webpage: www.nanociencia.imdea.org/protein-engineering-and-nanobiotechnology/group-home

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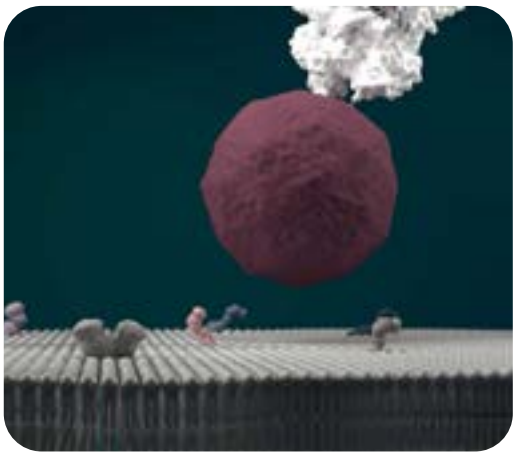
María López Valls

Research lines

1. The design of new strategies for an efficient delivery of CRISPR proteins. CRISPR/Cas system is a promising therapeutic tool. But its efficient delivery is a bottle neck of this strategy. We combine protein engineering and nanotechnology to deliver CRISPR proteins (Cpf1, Cas9 or Cas13) to specific tissues.

2. Antibacterial activity of Ag-Fe inorganic nanoparticles. The bacterial antibiotic resistance makes essential the design of new bactericides.

3. Characterization of α-synuclein amyloid assembly, responsible of Parkinson´s Disease.



Magnetic Nanoparticles In Biomedicine. Cell-Particle Interactions

Webpage: http://www.imdeananociencia.org/home-en/people/item/angeles-villanueva

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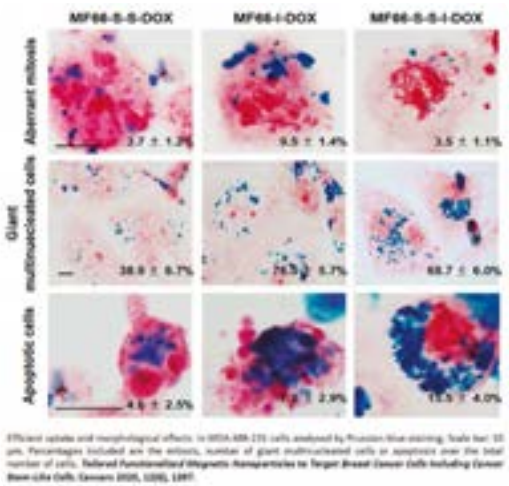
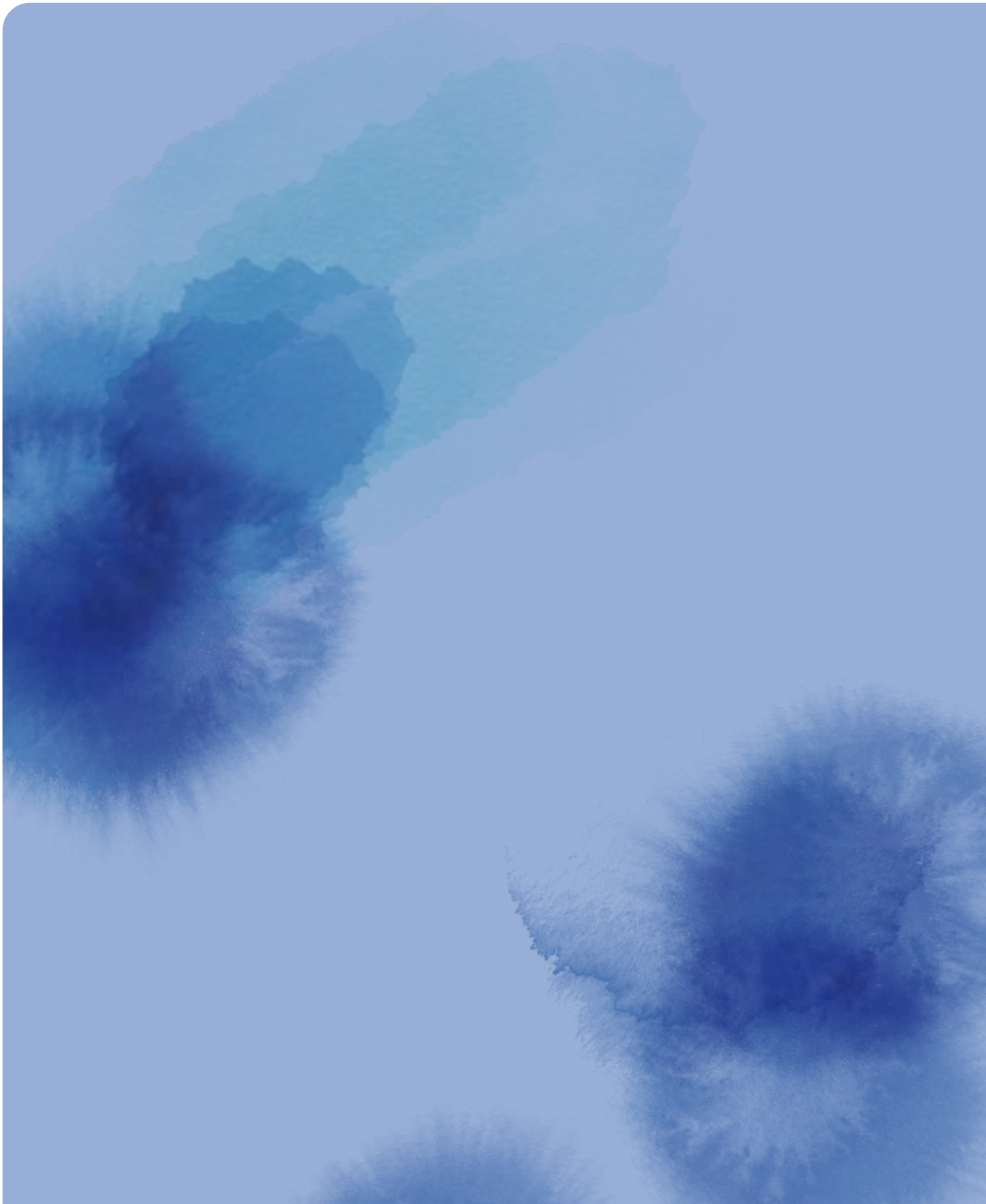
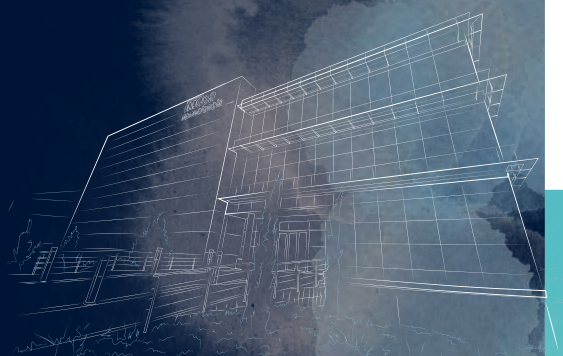
Research lines

1. Medical applications of nanoparticles. Cell cultures.
2. Biocompatibilty of magnetic nanoparticles.
3. Mechanisms of cell death.
4. Alterations in adhesion and cytoskeletal proteins.
5. Liposomal drug delivery.
6. Evaluation in cell cultures and in vivo experimental models of new antitumor agents.
7. Signaling pathways involved in cell death.







P4
programme
Nanomagnetism for Information and Communication Technologies

Programme Manager: **Prof. Julio Camarero**

Research lines

Advanced Magneto-Optics
Prof. Julio Camarero

Technological and Biomedical Applications of Magnetic Nanoparticles
Dr. Francisco Terán

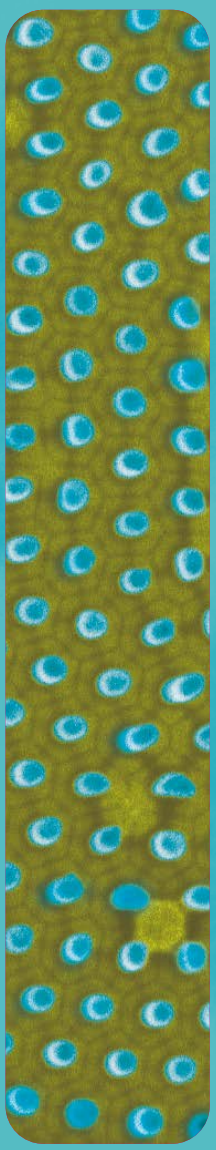
SpinOrbitronics
Dr. Paolo Perna

Magneto-photothermia
Dr. A. Espinosa

Transport in Quantum Materials
Dr. Mariela Menghini

Spin-resolved ARPES
Dr. Miguel Ángel Valbuena

3D Nanomagnetism
Dr. Lucas Pérez



About the programme

The scientific activity of the Nanomagnetism Programme is at the forefront of both fundamental and applied research on magnetic nanostructures, dealing with the preparation and characterization of advanced multifunctional magnetic nanomaterials with enormous impact for our society, including sensing & information storage (spintronic & spin-orbitronic), energy production & conversion (permanent magnets), and biomedical (magnetic nanoparticles) applications. The programme addresses important and interrelated societal challenges: a) Reducing energy consumption by exploiting spin-orbitronic systems in the information era; b) Developing efficient, spintronic-based, hardware brains, or neuro-inspired circuits; c) Developing efficient, magnetic-based, devices for bioapplications. This programme is in close collaboration with research programmes P2, P3, and P6.

We are equipped with a powerful battery of techniques that enable the investigation of many properties of multifunctional magnetic nanostructures, including both inorganic and organic materials, grown by Molecular Beam Epitaxy (MBE) or sputtering in ultra-high vacuum environment, as well as by chemical synthesis routes. These are ultrathin films, superlattices, or nanoparticles and their properties are characterized by morphological, chemical, structural, electronic, transport, and (mostly optic-based) advanced vectorial magnetometry techniques. Particular emphasis is paid to the growth, the magnetization reversal processes (in both quasi-static and dynamic regimes), their magnetoresistance responses, and their spin-resolved band structures (spin-ARPES). Additionally, external large scale experimental facilities (i.e., synchrotron, neutron, or ion-accelerator sources) are often used to elucidate some fundamental aspects.

We aim at a better understanding of fabrication processes and physical properties of new materials and functionalities as a first step towards the development of devices with custom- chosen properties, with potential for sensing, information storage, energy, and biomedical technologies.

Advanced Magneto-Optics

Webpage: http://www.nanociencia.imdea.org/research/research-programs/nanomagnetism/group-of-advanced-magneto-optics

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Research lines

We design and take use of advanced magneto-optic based instrumentation for nanotechnology research and development. Research is focused on low-dimensional artificial magnetic structures, such as ultrathin magnetic films and multilayers, magnetic nanostructures, magnetic nanoparticles and adsorbed molecules, with a particular emphasis on magnetization reversal processes and magnetoresitive responses.

We aim at probing and understanding both magnetization reversal and transport properties of magnetic nanostructures by systematically tuning intrinsic parameters, such as magnetic anisotropy and magnetic coupling, and extrinsic ones, like temperature and external fields (including dynamic effects). The current activities are focused on:

Magnetization reversal and magnetoresistive studies:

- Influence of anisotropies (in-plane vs. perpendicular) & nanostructuration.
- Static vs. dynamic and thermal effects; superparamagnetism.
- Exchange bias, spin-valves, tunnel-junctions, multiferroics, nanoparticles, molecules.

Polarization dependent element-resolved x-ray spectroscopy and microscopy studies:

- X-ray magnetic circular/linear dichroism, (XMCD/XMLD).
- X-ray photoemission electron microscopy, X-PEEM.
- Soft x-ray resonant magnetic scattering & Magnetic holography imaging.

Technological and Biomedical Applications of Magnetic Nanoparticles

Webpage: http://www.nanociencia.imdea.org/nanomagnetics-for-biomedical-and-tecnological-applications/group-home

Dr. Francisco J. Terán
Assistant Research Prof.

PhD: Université Josep Fourier - Grenoble 1, France
Previous Position: Fundación Gaiker, Spain

ORCID:
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Researcher ID:
F-1285-2010

PhD STUDENTS

Claudia Lozano

Shams Mohamed Mamdouh Mohamed Hussein

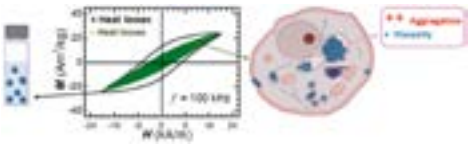
Alejandro Venegas

RESEARCH ASSISTANT

Pablo Palacios

Research lines

1. The study of the influence of intrinsic (size, chemical composition) and extrinsic (field conditions, aggregation, concentration, viscosity, etc..) parameters on the AC magnetic response (including magnetic heating) of magnetic nanoparticles.
2. The study of the influence of biological matrices and fluids on the AC magnetic response of magnetic nanoparticles. We are highly interested on understanding the effects of cell processing on the intracellular magnetic response of magnetic nanoparticles in order to find solutions for its preservation.
3. The use of magnetic nanoparticles as magnetic transducer for sensing molecular markers in biological fluids. We have developed a novel methodology for detection of biomolecules dispersed in blood based on variation of AC hysteresis loops of magnetic nanoparticles after interacting with the targeted biomolecule.
4. Heating losses of iron oxide nanoparticles activated by optical means. We are interested on probing the parameters that influence the heat loses of magnetic nanoparticles subjected to laser irradiation.
5. The development and validation of instrumentation for advanced magnetic measurements. In the last 5 years, the Advanced Instrumentation Unit has developed high-tech instrumentation for reliable characterization of magnetic nanoparticles in colloidal dispersions or inside biological matrices.



Spinorbitronics

Webpage: https://sites.google.com/site/spinorbitronics/;
http://nanociencia.imdea.org/spinorbitronics/group-home

Dr. Paolo Perna
Assistant Research Prof.

PhD: University of Caen Basse- Normandie, France & University of Cassino, Italy
Previous Position: CNR-SPIN, Italy

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Researcher ID: C-3862-2012
Google scholar: https://scholar.google.com/citations?user=FL0BE08AAAAJ&hl=it&oi=ao
Research Gate: https://www.researchgate.net/profile/Paolo_Perna

POSTDOCS

Dr. Iciar Arnay
Universidad Complutense de Madrid, Spain

Dr. Pablo Olleros
IMDEA NAnociencia, Spain

Dr. Adrián Gudin
IMDEA NAnociencia, Spain

PhD STUDENT

Raúl Solis
(co-supervised with Prof Stéphane Flament de Universite de Normandie ENSICAEN - GREYC UMR 6072)

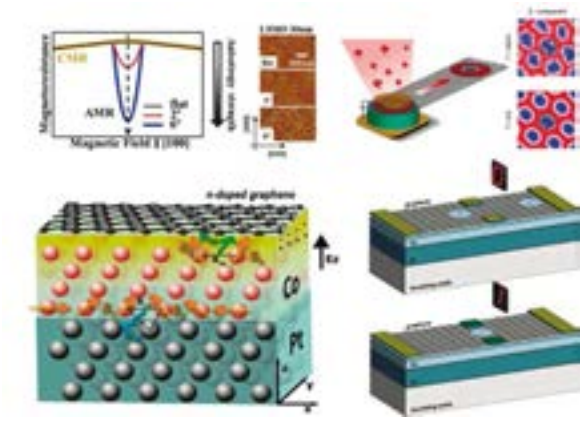
TECHNICIAN

Sergio de las Heras

Research lines

1. The group explores novel concepts in spintronics based on spin-dependent transport in low dimensional magnetic materials in which spin-orbit coupling plays an important role. These include thin films and multilayer stacks, combining ferromagnetic (FM), antiferromagnetic (AFM), perovskite oxides and 2D materials.

2. We resort to epitaxial growth, surface/interface and magneto-transport (including synchrotron-based) investigations, as well as nanofabrication, to engineer, characterize and design novel architectures and merge in a single device the functionalities of their individual constituents.



Magneto-Photothermia

Dr. Ana Espinosa
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Previous Position: Université Paris VII, France (MSCA Fellow) and ICMM-CSIC, Madrid

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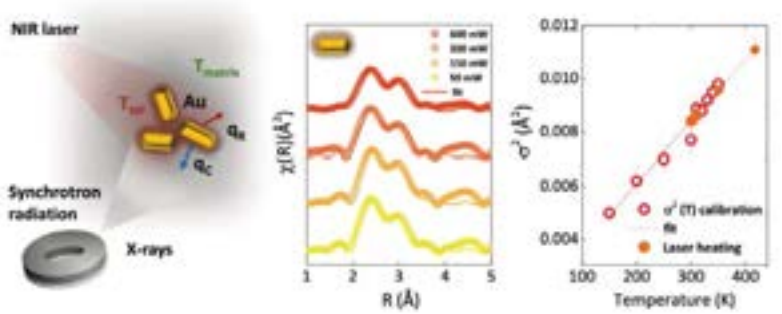
Researcher ID:
G-9162-2011

PhD STUDENT
Rosalía López

Research lines

1. New nanothermal strategies based on multifunctional materials for cancer treatment.
2. Physical biotransformations of therapeutic nanoparticles.
3. Combined synergy of thermal nanotherapies and other nano-based multimodal associations.
4. Nanothermometry based on X-ray spectroscopies.

A. Espinosa, G. R. Castro, J. Reguera, C. Castellano, J. Castillo, J. Camarero, C. Wilhelm, M. A. García, Á. Muñoz-Noval. **Photo-activated Nanoscale Temperature Gradient Detection Using X-ray Absorption Spectroscopy as a Direct Nanothermometry Method**. *Nano Letters* 21, 769 (2021) (Q1) (IF: 12.3).



Transport in Quantum Materials

Dr. Mariela Menghini
Assistant Research Prof. (tenure track)

PhD: Instituto Balseiro,Universidad Nacional de Cuyo, Argentina
Previous position: Department of Physics and Astronomy, KU Leuven, Leuven, Belgium

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ASSOCIATED RESEARCHERS

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Universidad Complutense de Madrid

Prof. Jose L. Vicent
Universidad Complutense de Madrid

Dr. Álvaro Muñoz
Universidad Complutense de Madrid

PhD STUDENTS

Ignacio Figueruelo

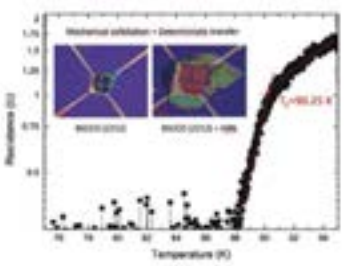
Gabriel Caballero
(cosupervised with Prof. D. Daniel Granados)

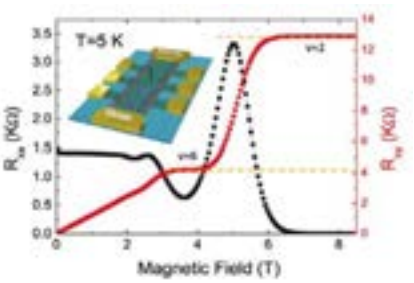
Sandra Martínez
(co-supervised with Dr. E. Cánovas)

Research lines

Quantum materials are in the spotlight of condensed matter physics research as they offer an exceptional venue to uncover the role of interactions associated with spin, charge, lattice and orbital degrees of freedom and their effect in macroscopic properties. The Transport in Quantum Materials group focuses on studying:

1. Vortex dynamics and magneto-transport in nanostructured superconductor-ferromagnetic systems.
2. Novel phenomena in superconductor-2D materials heterostructures.
3. Quantum Hall effect in graphene-based devices.
4. Memristors based on 2D materials.
5. Metal-insulator transition in strongly correlated materials using synchrotron-based techniques.





Spin-Resolved ARPES

Dr. Miguel Ángel Valbuena
Assistant Research Prof. (tenure track)

PhD: Laboratoire, pour l'Utilitation du Rayonement Eléctromangnétique (LURE, Orsay, France)
Previous position: Catalan Institute of Nanoscience and Nanotechnology (ICN2, Barcelona), Spain

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Researcher ID:
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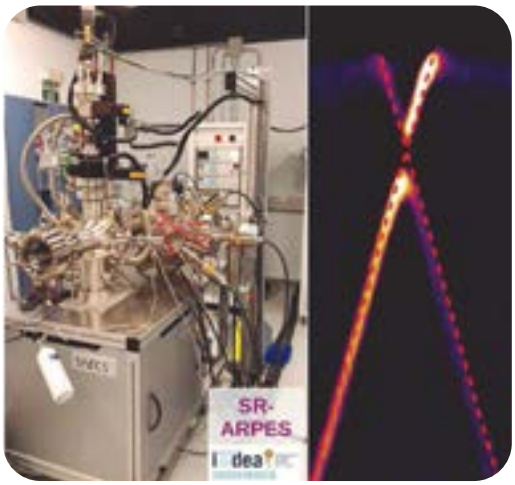
Scopus Author ID:
12785881400

PhD STUDENT
Beatriz Muñiz

Research lines

The new Spin and Angle Resolved Photoemission Spectroscopy (SR-ARPES) setup is dedicated to the study of the electronic structure of two-dimensional materials, with special interest in the study on new emergent phenomena based on the reduced dimensionality and spin-orbit coupling which may result in exotic phases of matter as quantum topological phases. This instrument was installed and put into operation during the first semester of 2021 and it is currently operating at 100% of its capacities, being the first operative system of this kind in Spain.



SR-ARPES setup at IMDEA Nanociencia. Band-gap opening at the Dirac point of Grephene/Tellurium heterostructure.

3D Nanomagnetism

Webpage: http://nanociencia.imdea.org/electrodeposited-nanowires/group-home

Dr. Lucas Pérez
Associate Research Prof.

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Researcher ID: C-2362-2011

PhD STUDENT
Claudia Fernández

RESEARCH ASSISTANT
Laura Álvaro

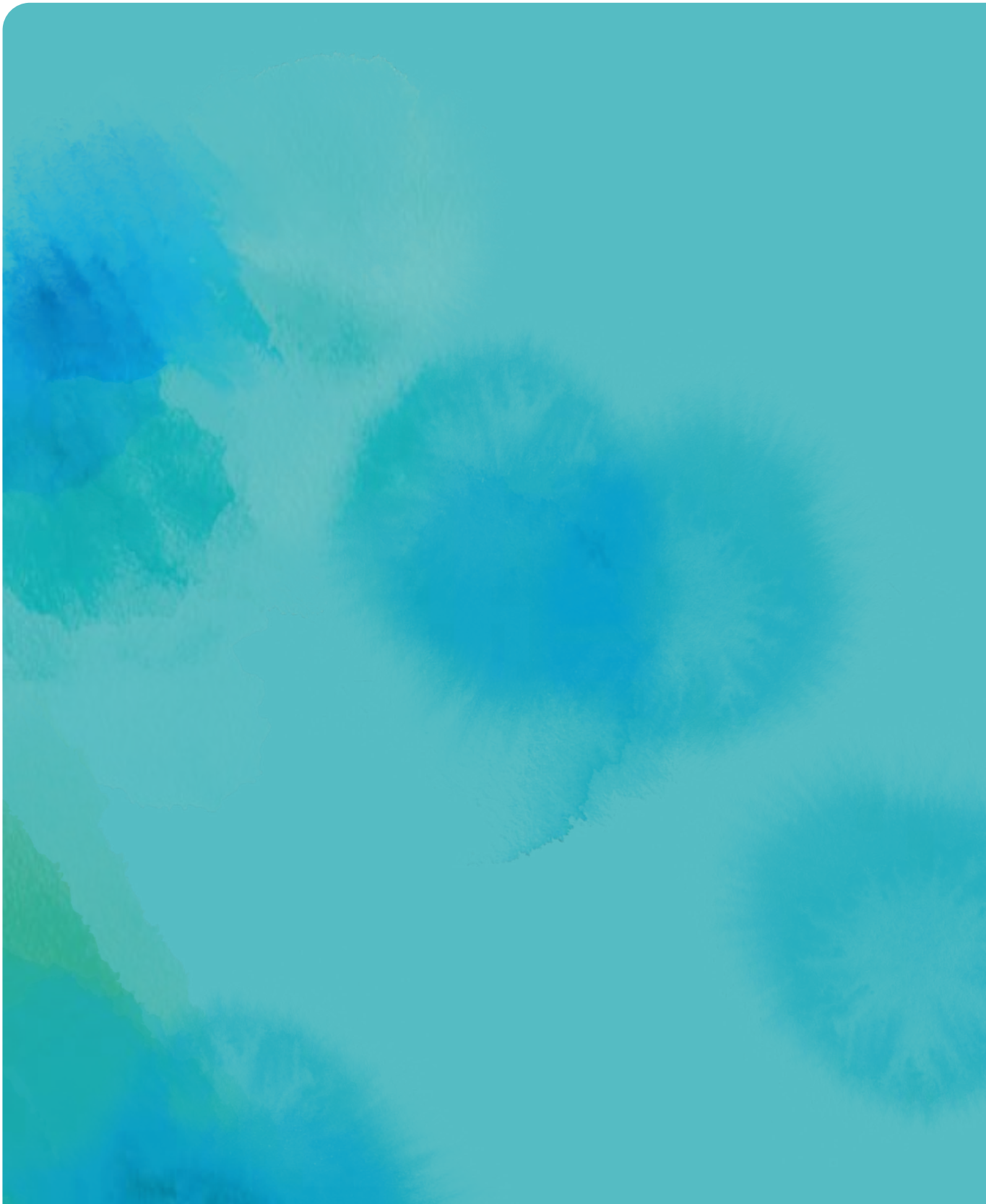
Research lines

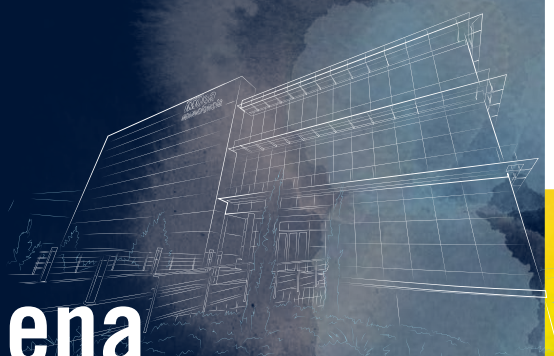
We have interests in three main research lines, mainly focused on the study of the fundamental properties and applications of electrodeposited nanowires.

1. **Domain wall spintronics.** We study the domain wall structure and the magnetization processes of low dimensional systems – mainly cylindrical nanowires. We are interested in stabilizing domain walls in artificially created defects and in controlling the deppining of the different domain walls, induced by magnetic fields and by spin-polarized currents. Understanding the dynamics of the domain walls in individual nanowires as well as the global magnetization dynamics in arrays of nanowires would allow us to incorporate these nanostructures in spintronics devices. Part of this research is carried out in synchrotron radiation facilities.

2. **Transport properties of Bi-based materials.** Bi-based metallic nanowires provide an attractive scenario for fundamental investigation of finite-size effects due to the unusual electronic structure of Bi and the large spin-orbit coupling of Bi atoms. We have already synthesized single-crystal Bi nanowires and reported weak antilocalization effects in the magnetotransport properties. Now, we focus our interest on the synthesis of Bi-doped metallic nanowires. This system is expected to show large spin mixing conductance, as we have already reported in thin films.

3. **Nanowires for applications.** We prepare nanowires in solution for different applications, from chemical sensors to biomedical applications. We are also developing arrays of metallic nanowires that can be used as active part of nanostructured electrodes in neural interfaces.





P5
programme
Ultrafast phenomena at the nanoscale

Programme Manager: **Prof. Johannes Gierschner**

Research lines

Photophysics of Organic and Hybrid Supramolecular Nanosystems
Prof. Johannes Gierschner

Pump-probe Photoinduced Absorption Spectroscopy
Dr. Juan Cabanillas

Nanooptics and Nanoacoustics
Prof. Reinhold Wannemacher

Nanostructured Photovoltaics
Dr. Enrique Cánovas

Modelling Physical Properties of Nanostructures
Prof. Fernando Martín

Femtochemistry
Prof. Luis Bañares

Ultrafast X-ray Science
Prof. Wojciech Gawelda

About the programme

Photoinduced Exciton and Charge Transport (ET and CT) controls fundamental processes occurring in plants and bacteria, such as photosynthesis, photo-oxidation, electronic transport and molecular damage. They are also at the heart of emerging technologies, such as those based on photovoltaic and optoelectronic devices, molecular wires, molecular junctions, polymer-based transistors, photocatalysis and artificial photosynthesis, all of them the object of thorough investigations at IMDEA Nano. The common denominator for ET/CT processes is the absorption of light, which produces electron-hole pairs (or excitons) that can separate along the material, thus generating an electric current. The initial electron-hole dynamics is very fast: it occurs on a time scale ranging from hundreds of attoseconds to a few femtoseconds. At longer times, from several tens of fs to picoseconds or even nanoseconds, the coupling with nuclear motion can substantially alter the generated electric current and even suppress it due to decoherence effects.

The Programme focuses on the study of ultrafast phenomena with simultaneous high temporal and spatial resolutions. This is achieved by the combination of in-house scanning tunnelling microscopes, transient absorption set ups, and femto-chemistry using ultrashort pulses with extend theoretical tools (to interpret and guide the new experiments). Additionally, extremely intense X-ray flashes at European XFEL are used to elucidate some fundamental aspects. This programme is in close collaboration with research programmes P1,P2, and P4. Our goal is to understand the mechanisms of ET/CT and eventually control them, tracking electronic motion from the very first femtosecond to the picosecond, and this with, ideally, subfemtosecond time resolution. The access to both the nanometer length scale – small enough to see the motion of small molecules – and the femtosecond time scale – fast enough to resolve the vibration of molecular bonds- be able to watch structural changes and electronic energy shifts, as chemical reactions take place in solution or on catalytic surfaces, resulting in the long-sought ‘molecular movie’.

Photophysics of Organic & Hybrid Supramolecular Nanosystems

Webpage: http://www.nanociencia.imdea.org/photophysics-of-organic-and-hybrid-supramolecular-nanosystems/group-home

Prof. Johannes Gierschner
Senior Research Prof.

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Previous Position: Univ. Mons, Belgium

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Researcher ID:
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VISITING RESEARCHER

Dr. Begoña Milian
Universidad de Valencia, Spain

POSTDOC

Dr. Indranil Bhattarcharjee
The University of Electro-Communications, Japan PhD

STUDENTS

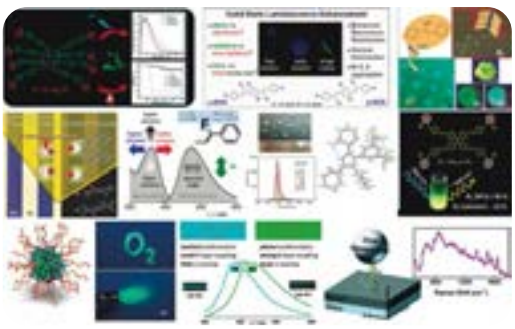
Juan Carlos Roldao

Liangxuan Wang
(co-supervised with Prof. Alfred Meixner, University of Tübingen)

Research lines

Our research is dedicated to the understanding of the photophysics of organic and hybrid supramolecular nanosystems. The ultimate goal, i.e. unbiased, targeted design of tailormade systems for optoelectronics or fife science, can only be reached in an inter-disciplinary manner, which we tackle in an integrative spectro-scopic & computational approach, based on a strong background in chemistry & materials science.

1. **Energy Conversion:** The use of organics in solar cells and as photocatalysts for water-splitting or polymerization reactions requires a profound understanding of the generation and fate of excited states; i.e. singlet and triplet state manifolds, charge transfer and localized excitons.
2. **Luminescent Organic Materials:** The understanding or even prediction of non-/occurrence of luminescence in solution and in the crystalline state is of crucial importance for targeted molecular design, where we achieve a systematic understand-ing using libraries of well-defined materials.
3. **Artificial Light-Harvesting** in Supramolecular Polymers for light harvesting applications requires understanding and control of molecular localized and charge-transfer excitons and their dynamics, in particular investigated by polarized techniques.



Pump-probe Photoinduced Absorption Spectroscopy

Webpage: http://nanociencia.imdea.org/organic-photophysics-and-photonics/group-home

Dr. Juan Cabanillas Gonzalez
Assistant Research Prof.

PhD: Imperial College London, UK
Previous Position: Politecnico di Milano, Italy

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POSTDOCS

Dr. Víctor Vega
Jožef Stefan Institute, Ljubljana, Slovenia

Dr. Sara Hernández
University of Uppsala, Sweden

PhD STUDENTS

Alejandro Martín Merinero

Saúl García

RESEARCH ASSISTANT

Jorge González
(co-supervised with Dr. R. Wannemacher)

TECHNICIANS

Luis Colmenar

Alejandro Martin
(co-supervised with Dr. A. Bollero)

Research lines

1. **Organic lasers.** We study optical gain and stimulated emission properties of conjugated polymers with femtosecond transient absorption spectroscopy (TAS) to understand the relation between chemical structure and exciton dynamics. Based on this information, we develop optically-pumped laser cavities by soft-nanoimprint lithography, or by polymer self-assembly into optical microresonators.

2. **Photophysics of light emitting nanomateriales.** We perform variable temperature TAS and time-resolved photoluminescence on thermally activated delayed fluorescence complexes or luminescent nanographenes. We are also interested in few atoms metal nanoclusters (MNCs) (< 2 nm size), which possess a molecular-like electronic structure with discrete levels arising from strong quantum confinement. These levels are optically coupled and can be exploited for bioimaging or photocatalysis.

3. **Photophysics of luminescent metal-organic frameworks (MOFs).** We investigate the nature of excited-state interactions in MOFs in the presence of different gas analytes and explore their potential as transduction signal for specific chemosensing.

Nanooptics and Nanoacoustics

Webpage: http://www.imdeananociencia.org/home-en/people/item/reinhold-wannemacher

Prof. Reinhold Wannemacher
Senior Research Prof.

PhD: University of Darmstadt, Germany
Previous Position: University of Leipzig, Germany

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Researcher ID:
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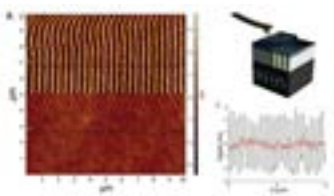
PhD STUDENT
Sergio Ramírez

RESEARCH ASSISTANT
Jorge González
(co-supervised with Dr. J. Cabanillas)

Research lines

1. We are studying the photocatalytic, charge and energy transfer properties of carbon-based nanomaterials (carbon dots, nanographenes, graphene) in close collaboration with the groups of Isabel Rodriguez, Feng Luo, Johannes Gierschner and Nazario Martin, IMDEA Nanociencia
2. We study amplified spontaneous emission and lasing and perform low-temperature spectroscopy down to 1.5 K of crystalline and amorphous conjugated organic and hybrid organic/inorganic materials in close collaboration with the groups of Juan Cabanillas, José Sánchez Costa and Johannes Gierschner, IMDEA Nanociencia. We also investigate the low-temperature homogeneous linewidth of carbon nanomaterials.
3. We investigate fluorescent and electrochemical sensors in close collaboration with the groups of Encarnación Lorenzo and Juan Cabanillas, IMDEA Nanociencia
4. We employ high-frequency ultrasonic waves (20-500MHz) for sensing using coaxial probes and combine ultrasonic vibrations (100 kHz-6 MHz) with force microscopy for imaging and manipulation of friction on the nanoscale.

Mechanical wear is often evidenced by the formation of ripples on surfaces of contacting bodies. Using an atomic force microscope (AFM) we have shown that, on the nanoscale, this wear process can be suppressed by the application of ultrasonic vibrations. At the same time the friction coefficient is strongly reduced compared to its value without applying any vibrations. See: *ACS Nano* **2015**, 9, 8859-8868



Nanostructured Photovoltaics

Webpage: https://ecanovas6.wixsite.com/nanopv

Dr. Enrique Cánovas
Assistant Research Prof. (tenure track)

PhD: Universidad Politécnica de Madrid (UPM)
Previous Position: Group Leader at Max Planck for Polymer Research (MPIP).

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POSTDOCS

Dr. Vasileios Balos
Fritz Haber Institute-Max Planck. Berlin, Germany

Dr. Marco Ballabio
University of Amsterdam, The Netherlands

PhD STUDENTS

Sergio Revuelta

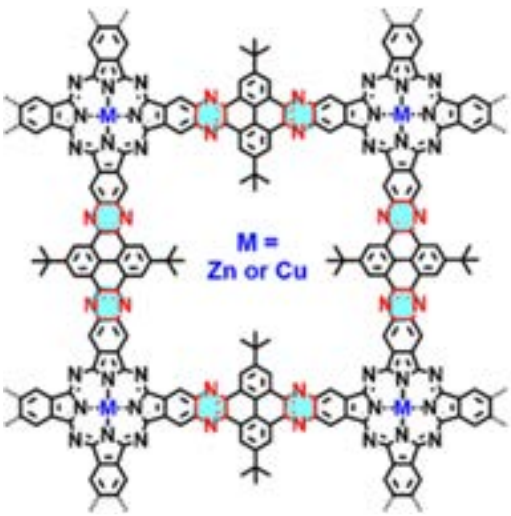
Miguel Ángel Pulido

Sandra Martínez
(co-supervised with Dr. M. Menghini)

Research lines

1. Charge carrier dyanmics in bulk materials and at interfaces.
2. Charge transport in organic, inorganic and hybrid materials.
3. Time resolved THz spectroscopy.
4. Solar energy conversion: photovoltaics and photocatalysis.
5. Nanoscience and nanotechnology.

Unveiling Electronic Properties in Metal–Phthalocyanine-Based Pyrazine-Linked Conjugated Two-Dimensional Covalent Organic Frameworks. *J. Am. Chem. Soc.* **2019**, 141, 42, 16810–16816, https://pubs.acs.org/doi/abs/10.1021/jacs.9b07644



Modelling Physical Properties of Nanostructures

Webpage: http://nanociencia.imdea.org/fernando-martin-s-group/group-home

Prof. Fernando Martín
Associate Research Prof.

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Double affiliation: Universidad Autónoma de Madrid. Spain

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POSTDOCS

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PhD STUDENTS

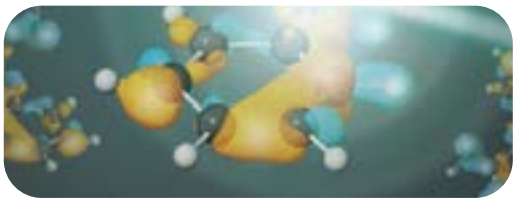
Kilian Arteaga
Jorge Delgado
Francisco Fernández
Joel Gabriel Fallaque
Juan Reino
Pranjal Prateek

Research lines

The research carried out by the group has mainly focused on:

1. The theoretical and computational modeling of photoexcitation and photoionization processes in atomic, molecular and solid-state systems induced by synchrotron radiation and ultrashort laser pulses with femto- and attosecond duration, with the aim, of imaging and controlling ultrafast electron and nuclear dynamics occurring in these systems.
2. The study and theoretical prediction of properties of materials and nano-objects of complex molecular systems, aggregates and fullerenes, isolated or deposited on metallic and nonmetallic surfaces, with emphasis on problems with potential interest in chemistry and biology and the design of novel two-dimensional materials, including graphene.

Advances in attosecond science have led to a wealth of important discoveries in atomic, molecular, and solid-state physics and are progressively directing their footsteps toward problems of chemical interest. In this review, we detail the application of attosecond methods to the investigation of ultrafast processes in molecules, with emphasis in molecules of chemical and biological interest. The measurement and control of electronic motion in complex molecular structures is a formidable challenge, for both theory and experiment, but will indubitably have a tremendous impact on chemistry in the years to come. *Chemical Reviews 117, 10760.* DOI: 10.1021/acs.chemrev.6b00453



Femtochemistry

Webpage: http://webs.ucm.es/info/dinalaser

Prof. Luis Bañares
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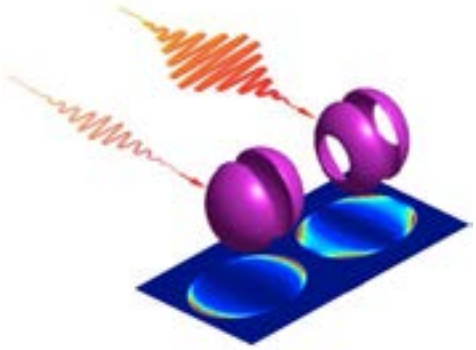
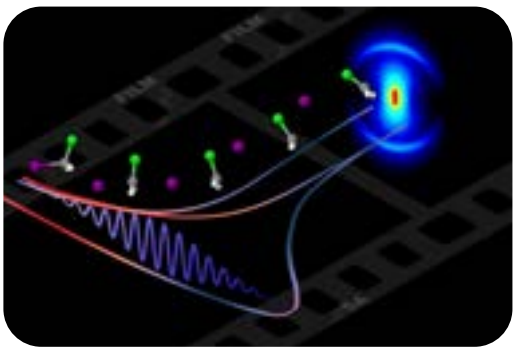
PhD STUDENT
Shaw Kushal Kumar

Research lines

1. Dynamics of Photodissociation of Molecules and Radicals.
2. Femtosecond Time-resolved Photodissociation Dynamics.
3. Imaging of Chemical Reactions.
4. Strong Laser Field Control of Reaction Dynamics.





Ultrafast X-Ray Science

Webpage: http://www.nanociencia.imdea.org/ultrafast-xray-science/home

Prof. Wojciech Gawelda
Associate Research Prof.

PhD: Ecole Polytechnique Fédérale de Lausanne, Switzerland
Double Affiliation: Distinguished "Beatriz Galindo" Professor, Department of Chemistry, Universidad Autónoma de Madrid
Previous Position: European XFEL, Schenefeld, Germany

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POSTDOC

Dr. Andrés Burgos
Universidad Autonoma de Madrid, Spain

PHD STUDENTS

Tae Kyu Choi
University of Hamburg/ European XFEL, Germany

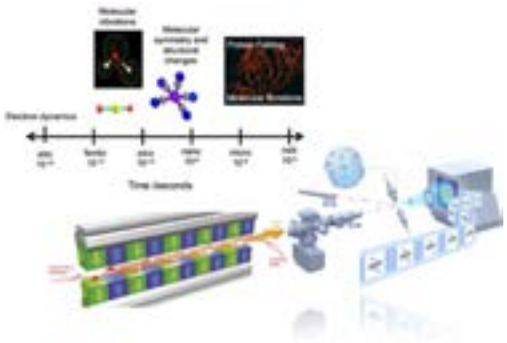
Juan Francisco Hidalgo

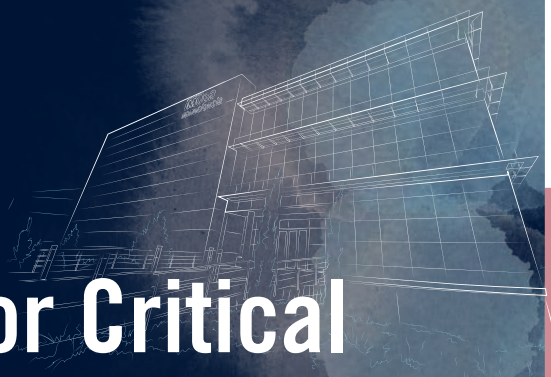
Research lines

The Ultrafast X-ray Science (UXS) group focuses its research on the applications of advanced ultrafast X-ray techniques, in combination with femtosecond optical spectroscopies, to study photoinduced structural dynamics in condensed-phase systems. The combined optical and X-ray pump-probe methodologies utilize the state-of-the-art X-ray free electron lasers (XFELs), such as European XFEL (Germany), SACLA (Japan) or LCLS (USA), which are the world's brightest and most powerful sources of pulsed X-rays.

Among diverse research activities within the UXS, we can highlight 3 main targeted science areas:

1. Mechanistic understanding of the excited-state chemical reaction dynamics in functional molecular assemblies, e.g. light-harvesting photosensitizers, photocatalytic assemblies, MOFs, etc.
2. Disentangling the coupled electronic and molecular dynamics in liquid-phase molecular systems, including the role of the local environment (solvation dynamics)
3. Understanding and controlling excited-state charge carrier dynamics in semiconductor and metallic colloidal nanoparticles





P6 programme

Nanotechnology for Critical Raw Materials and Sustainability

Programme Manager: **Prof. Alberto Bollero**

Research lines

Permanent Magnets and Applications
Prof. Alberto Bollero

Functional Surfaces
Prof. Isabel Rodríguez

About the programme

This Programme addresses key challenges indicated by the European Commission on climate actions, environment, resource efficiency and raw materials. Critical Raw Materials (CRMs) are used in environmental technologies, consumer electronics, health, defense, space exploration, aviation… these materials are not only "critical" for key industry sectors and future applications, but also for the sustainable functioning of the European economy. For instance, the EU estimates that the demand for rare-earths (over 90% controlled by China) will rise ten-fold by 2050, boosted by the needs of key industries (energy, transport, aerospace).

The activities of this new programme are fostered toward the development of alternatives based on elements widely available in Europe and it has been created with two specific scientific lines: a) the development of advanced and novel permanent magnets; b) the development of (smart) bioinspired functional surfaces. All under premises of sustainability and reduced CO_2 emissions to achieve the European Green Deal objectives. This programme is in close collaboration with all research programmes.

A top priority for Europe is to develop permanent magnets free of rare earths. We fill the enormous performance gap existing between ferrites and NdFeB magnets. Among them, we are exploring: a) Improved nanostructured ferrites for electromobility; b) Novel manganese-based nanostructures combining physics, chemistry and metallurgy to synthesize engineered L10-MnAlC; c) synthesis of record magnets inspired by findings in meteorites: creation of the L10-FeNi phase. In addition, we explore additive manufacturing and 4D printing of multimaterials with new properties/functionalities, which permits the fabrication of objects with no restriction in shape, allowing for highly efficient devices and minimizing the use of critical raw materials.

In a transition towards a sustainable production, the demands on efficient surfaces treatments are increasing, specifically targeting and enabling end-products with the purpose of reducing the end-products' energy usage and/or environmental footprint. Our activities on Functional Surfaces take advantage on nanofabrication technologies and particularly emphasizes on cost-effective scalable process to develop surface structured materials with new functionalities or with improved ones. Much of the work in the program is inspired on natural functional surface structures. The special competencies of the program include surface patterning techniques such as nano-imprint lithography, soft lithography and molecular patterning.

Permanent Magnets and Applications

Webpage: http://nanociencia.imdea.org/division-permanent-magnets-applications

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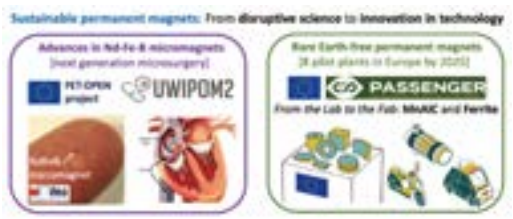
Research lines

1. Fundamental and applied aspects of permanent magnets (PMs): rare earth-based (Nd-Fe-B and Pr-Fe-B) and rare earth-free (MnAlC, MnBi, L10-FeNi, ferrites).
   - Industrial collaborations: Höganäs (Sweden), IMA (Barcelona), RAMEM (Madrid)…
   - Projects under international Calls: H2020 Innovation Action, H2020 FET-OPEN, M-ERA.NET.
2. Nanostructured PMs (powders and bulk).
3. Additive manufacturing of PMs.
4. Growth of magnetic thin films.
5. Nanoparticle engineering, and electrochemical synthesis of PM nanostructures.
6. Development of micromagnets for microdevices (e.g., microrobots in microsurgery).
7. Recycling and sustainability of PMs.

Development of advanced and novel permanent magnets under premises of sustainability and reduced CO2 emissions to achieve the European Green Deal objectives: EU H2020 project "PASSENGER" (20 partners; 13 industry partners; 8 European countries. Coordinated by IMDEA Nanociencia).



Nanostructured Functional Surfaces

Webpage: http://nanociencia.imdea.org/nanostructured-functional-surfaces-program/group-home

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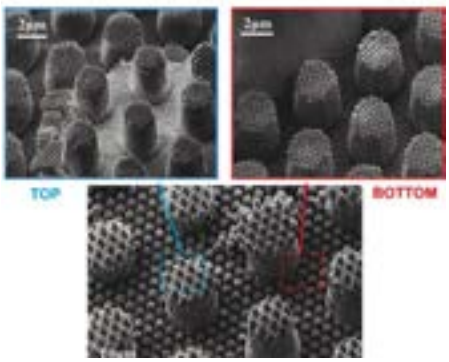
Research lines

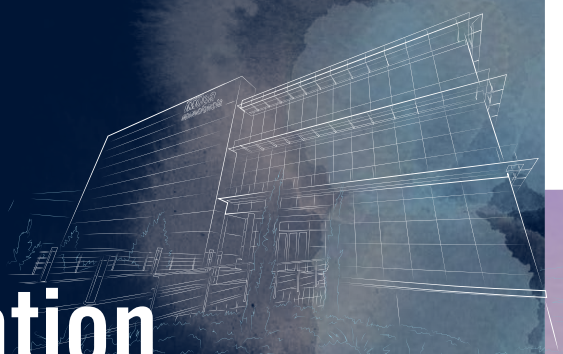
The Nanostructured Functional Surfaces group leverages on nanofabrication technologies and particularly emphasizes on cost-effective scalable process to develop surface structured materials with new functionalities or with improved ones. Much of the work in the group is inspired on natural functional surface structures.

The special competencies of the group include surface patterning techniques such as nano-imprint lithography, soft lithography and molecular patterning.

Presently the group is active on the following research areas:

1. Nano-engineering functional surfaces for biomedical applications.
2. Development of tumor-on-a-chip microfluidic devices.
3. Nanoimprinting multifunctional biomimetic surfaces and process up-scaling using roll to roll technology.
4. Polymer nanoimprinting for optical applications such as antireflective surfaces and Fresnel lenses in collaboration with other groups.





Horizontal Platform

Disruptive Innovation and Technology

Dr. Mark William Davies
Industrial Liaison

Dr. Héctor Guerrero
Strategic Industrial Partnerships

The objective of the **Horizontal Platform** is to foster disruptive innovation from nanoscience and nanotechnology to boost industrial developments. This initiative is an evolution of the Translational Technology Platform established under the previous SO Programme. The new focus has gained momentum thanks to the European Innovation Council (EIC) leadership.

According to the European Commission the EIC aims to identify and scale-up breakthrough and disruptive innovation. IMDEA Nano is working at the frontier of knowledge, in cutting-edge research that will allow in a natural way the connection with relevant industries for achieving disruptive innovations based on nanotechnology solutions.

About the Horizontal Platform

IMDEA Nanociencia foundational goals include the service to Society and the support to the Industry. Reaching final applications from interdisciplinary frontier research takes a long way, normally in connection with other academic, institutional and business actors. By its very nature, research at the nanoscale is consubstantial with the generation of disruptive innovation, something that cannot be anticipated but can be propitiated through an instrument conceived at IMDEA Nanociencia to advance in areas with potential to generate disruptive applications.

The Horizontal Platform provides the specialized framework for the development of new proof-of-concept applications and products based on the cutting-edge research from all Scientific Programmes. The understanding, analysis and manipulation of nanoscale physical, chemical and biological phenomena, challenged from the six priority Scientific Programmes, will bring to new developments and advanced applications of nanotechnology for key sectors of the economy. We taking advantag of the advanced research services as well as the possibility of directly developing for companies systems and applications focused on the challenges. In parallel, we multiply efforts and increase critical mass at all stages of the value chain, from research to final application establishing strategic alliances with complementary public institutions, close to technology and/or end users designing a suitable path, establishing a common language and, without a doubt, choosing the best travel companions.

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AFM Service

Dr. Patricia Pedraz
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Dr. Cintia Vequi-Suplicy
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Cell Cultures

Dr. Adriana Arnaiz
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Dr. Vanessa Rodríguez
PhD: Universidad Autónoma de Madrid, Spain

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Ms. Fabiola Mogollón
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Ms. Laura Lorente
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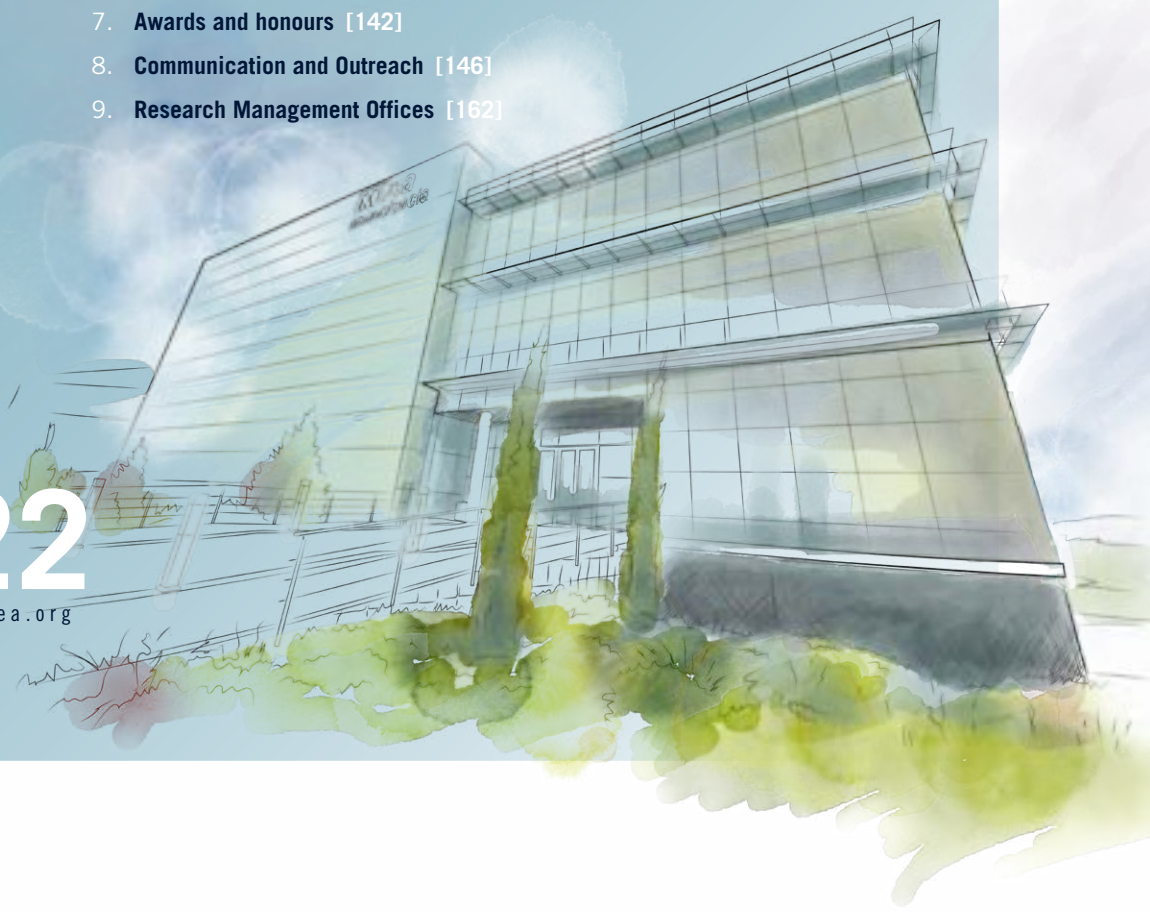
3

scientific report



annual report 2022

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1. Publications (as of 08-05-2023)

1. **The role of the diyne bond on the excited state deactivation of diyne-bridged 7-azaindoles in solution and solid state;** Álvarez-Conde J., Garzón-Ruiz A., Navarro A., Jiménez-Pulido S.B., González-Rodríguez P., Cabanillas-González J., García-Frutos E.M.; *J Mol Liq*; 2022; **368**, 120728; DOI: 10.1016/j.molliq.2022.120728

2. **2D Materials towards sensing technology: From fundamentals to applications;** Sulleiro M.V., Dominguez-Alfaro A., Alegret N., Silvestri A., Gómez I.J.; *Sens. Bio-Sens. Res.*; 2022; **38**, 100540 ; DOI: 10.1016/j.sbsr.2022.100540

3. **High cooperativity coupling to nuclear spins on a circuit quantum electrodynamics architecture;** Rollano V., de Ory M.C., Buch C.D., Rubín-Osanz M., Zueco D., Sánchez-Azqueta C., Chiesa A., Granados D., Carretta S., Gomez A., Piligkos S., Luis F.; *Commun. Phys.* ; 2022; **5**, 1, 246; DOI: 10.1038/s42005-022-01017-8

4. **Layered metal-organic frameworks and metal-organic nanosheets as functional materials;** Sakamoto R., Fukui N., Maeda H., Toyoda R., Takaishi S., Tanabe T., Komeda J., Amo-Ochoa P., Zamora F., Nishihara H.; *Coord. Chem. Rev.*; 2022; **472**, 214787; DOI: 10.1016/j.ccr.2022.214787

5. **Hidden spin-orbital texture at the Γ^{-}-located valence band maximum of a transition metal dichalcogenide semiconductor;** Clark O.J., Dowinton O., Bahramy M.S., Sánchez-Barriga J.; *Nat. Commun.*; 2022; **13**, 1, 4147; DOI: 10.1038/s41467-022-31539-2

6. **Fermi surface tomography;** Borisenko S., Fedorov A., Kuibarov A., Bianchi M., Bezguba V., Majchrzak P., Hofmann P., Baumgärtel P., Voroshnin V., Kushnirenko Y., Sánchez-Barriga J., Varykhalov A., Ovsyannikov R., Morozov I., Aswartham S., Feia O., Harnagea L., Wurmehl S., Kordyuk A., Yaresko A., Berger H., Büchner B.; *Nat. Commun.*; 2022; **13**, 1, 4132; DOI: 10.1038/s41467-022-31841-z

7. **Nanoscale self-organization and metastable non-thermal metallicity in Mott insulators;** Ronchi A., Franceschini P., De Poli A., Homm P., Fitzpatrick A., Maccherozzi F., Ferrini G., Banfi F., Dhesi S.S., Menghini M., Fabrizio M., Locquet J.-P., Giannetti C.; *Nat. Commun.*; 2022 ; **13**, 1, 3730 ; DOI: 10.1038/s41467-022-31298-0

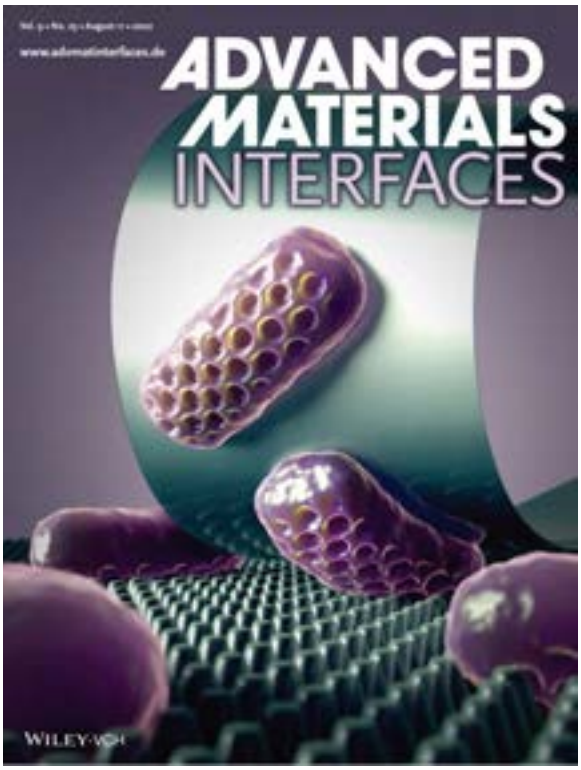
8. **Terahertz displacive excitation of a coherent Raman-active phonon in V2O3;** Giorgianni F., Udina M., Cea T., Paris E., Caputo M., Radovic M., Boie L., Sakai J., Schneider C.W., Johnson S.L.; *Commun. Phys.*; 2022 ; **5**, 1, 103; DOI: 10.1038/s42005-022-00882-7

9. **An atomistic approach for the structural and electronic properties of twisted bilayer graphene-boron nitride heterostructures;** Long M., Pantaleón P.A., Zhan Z., Guinea F., Silva-Guillén J.Á., Yuan S.; *npj Computational Mater.*; 2022; **8**, 1, 73; DOI: 10.1038/s41524-022-00763-1

10. **Attosecond photoionisation time delays reveal the anisotropy of the molecular potential in the recoil frame;** Ahmadi H., Plésiat E., Moioli M., Frassetto F., Poletto L., Decleva P., Schröter C.D., Pfeifer T., Moshammer R., Palacios A., Martin F., Sansone G.; *Nat. Commun.* ; 2022; **13**, 1, 1242; DOI: 10.1038/s41467-022-28783-x

11. **On-surface synthesis and characterization of nitrogen-substituted undecacenes;** Eimre K., Urgel J.I., Hayashi H., Di Giovannantonio M., Ruffieux P., Sato S., Otomo S., Chan Y.S., Aratani N., Passerone D., Gröning O., Yamada H., Fasel R., Pignedoli C.A.; *Nat. Commun.*; 2022; **13**, 1, 511; DOI: 10.1038/s41467-022-27961-1

12. **Native point defects and their implications for the Dirac point gap at MnBi2Te4(0001);** Garnica M., Otrokov M.M., Aguilar P.C., Klimovskikh I.I., Estyunin D., Aliev Z.S., Amiraslanov I.R., Abdullayev N.A., Zverev V.N., Babanly M.B., Mamedov N.T., Shikin A.M., Arnau A., de Parga A.L.V., Chulkov E.V., Miranda R.; *npj Quantum Mater.*; 2022; **7**, 1, 7; DOI: 10.1038/s41535-021-00414-6



13. **Diffused magnetic transitions in NiFe2O4/SrTiO3(0 0 1) epitaxial heterostructures;** Krichevtsov B.B., Suturin S.M., Korovin A.M., Kaveev A.K., Bursian V.E., Cuñado J.L.F., Sokolov N.S.; *J Magn Magn Mater*; 2022; **562**, 169754; DOI: 10.1016/j.jmmm.2022.169754

14. **Activatable iodinated BODIPYs for selective imaging and photodynamic disruption of amyloid structures in pathogenic bacterial biofilms;** Torra J., Sawazaki T., Bondia P., Nonell S., Kanai M., Sohma Y., Flors C.; *Sens Actuators, B Chem*; 2022; **371**, 132475; DOI: 10.1016/j.snb.2022.132475

15. **Comment on "calculation of an Enhanced A1g Symmetry Mode Induced by Higgs Oscillations in the Raman Spectrum of High-Temperature Cuprate Superconductors";** Benfatto L., Castellani C., Cea T.; *Phys Rev Lett*; 2022; **129**, 19, 199701; DOI: 10.1103/PhysRevLett.129.199701

16. **Growth of magnesium nitride thin films on various surfaces via atomic-nitrogen-assisted molecular beam epitaxy at moderate substrate temperatures;** Schouteden K., Ceccon L., Recaman Payo M., Sun Y., Hsu W.-F., Rangasamy V.S., Derluyn J., Menghini M., Seo J.W., Locquet J.-P. ; *Appl Phys A*; 2022; **128**, 11, 995; DOI: 10.1007/s00339-022-06135-2

17. **Controlling Electronic Events Through Rational Structural Design in Subphthalocyanine–Corrole Dyads: Synthesis, Characterization, and Photophysical Properties;** Mariñas V., Platzer B., Labella J., Caroleo F., Nardis S., Paolesse R., Guldi D.M., Torres T. ; *Chem. Eur. J.*; 2022; **28**, 60, e202201552; DOI: 10.1002/chem.202201552

18. **Self-energy corrected DFT-NEGF for conductance in molecular junctions: an accurate and efficient implementation for TRANSIESTA package applied to Au electrodes;** Fallaque J.G., Rodríguez-González S., Martín F., Díaz C.; *J Phys Condens Matter*; 2022; **34**, 43, 435901; DOI: 10.1088/1361-648X/ac89c4

19. **Supramolecular Assembly of Edge Functionalized Top-Down Chiral Graphene Quantum Dots;** Vázquez-Nakagawa M., Rodríguez-Pérez L., Martín N., Herranz M.Á. ; *Angew. Chem. Int. Ed.*; 2022; **61**, 43 , e202211365; DOI: 10.1002/anie.202211365

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21. **Optomagnetic nanofluids for controlled brain hyperthermia: a critical study ;**Mendez-Gonzalez D., Lifante J., Zabala Gutierrez I., Marin R., Ximendes E., Sanz-De Diego E., Iglesias-De la Cruz M.C., Teran F.J., Rubio-Retama J., Jaque D.; *Nanoscale;* 2022; **78;** DOI: 10.1039/d2nr03413a

22. **Interaction-enhanced topological Hall effects in strained twisted bilayer graphene;** Pantaleón P.A., Phong V.T., Naumis G.G., Guinea F. ; *Phys. Rev. B*; 2022 ; **106**, 16, L161101; DOI: 10.1103/PhysRevB.106.L161101

23. **Methylene Blue functionalized carbon nanodots combined with different shape gold nanostructures for sensitive and selective SARS-CoV-2 sensing;** Pina-Coronado C., Martínez-Sobrino Á., Gutiérrez-Gálvez L., Del Caño R., Martínez-Periñán E., García-Nieto D., Rodríguez-Peña M., Luna M., Milán-Rois P., Castellanos M., Abreu M., Cantón R., Galán J.C., Pineda T., Pariente F., Somoza Á., García-Mendiola T., Miranda R., Lorenzo E.; *Sens Actuators, B Chem*; 2022; **369**, 132217; DOI: 10.1016/j.snb.2022.132217

24. **A 3D Peptide/[60]Fullerene Hybrid for Multivalent Recognition;** Gallego I., Ramos-Soriano J., Méndez-Ardoy A., Cabrera-González J., Lostalé-Seijo I., Illescas B.M., Reina J.J., Martín N., Montenegro J.; *Angew. Chem. Int. Ed.;* 2022 ; **61**, 41 , e202210043; DOI: 10.1002/anie.202210043

25. **Electronic coherences in argon through interfering one- and two-photon ionization processes in the vicinity of Feshbach resonances ;** Bello R.Y., Borràs V.J., González-Vázquez J., Martín F.; *Phys. Rev. Res.*; 2022; **4**, 4, 43028; DOI: 10.1103/PhysRevResearch.4.043028

26. **Study of an Energy-Harvesting Damper Based on Magnetic Interaction;** Aberturas S., Hernando A., Olazagoitia J.L., García M.Á. ; *Sensors*; 2022; **22**, 20, 7865; DOI: 10.3390/s22207865

27. **Real-Time Monitoring of Breath Biomarkers with A Magnetoelastic Contactless Gas Sensor: A Proof of Concept;** Peña A., Aguilera J.D., Matatagui D., de la Presa P., Horrillo C., Hernando A., Marín P.; *Biosensors*; 2022; **12**, 10, 871; DOI: 10.3390/bios12100871

28. **Tailoring the Magnetic and Structural Properties of Manganese/Zinc Doped Iron Oxide Nanoparticles through Microwaves-Assisted Polyol Synthesis;** Porru M., Morales M.D.P., Gallo-Cordova A., Espinosa A., Moros M., Brero F., Mariani M., Lascialfari A., Ovejero J.G.; *Nanomaterials*; 2022; **12**, 19 , 3304; DOI: 10.3390/nano1219330

29. **Atomic-scale study of type-II Dirac semimetal PtTe2surface;** Casado Aguilar P., Calleja F., Kuo C.-N., Lue C.S., Ghosh B., Agarwal A., Politano A., Vázquez De Parga A.L., Miranda R., Silva-Guillén J.A., Garnica M.; *JPhys mater.*; 2022; **5**, 4, 4400; DOI: 10.1088/2515-7639/ac92a

30. **Observation of Superconducting Collective Modes from Competing Pairing Instabilities in Single-Layer NbSe2;** Wan W., Dreher P., Muñoz-Segovia D., Harsh R., Guo H., Martínez-Galera A.J., Guinea F., de Juan F., Ugeda M.M.; *Adv Mater*; 2022; **34,** 41, 2206078; DOI: 10.1002/adma.202206078

31. **Enhancement and Saturation of Near-Field Radiative Heat Transfer in Nanogaps between Metallic Surfaces;**Rincón-García L., Thompson D., Mittapally R., Agraït N., Meyhofer E., Reddy P.; *Phys Rev Lett*; 2022; **129**, 14, 145901; DOI: 10.1103/PhysRevLett.129.145901

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33. **Lifetime of quasiparticles in the nearly free electron metal sodium;** Potorochin D.V., Kurleto R., Clark O.J., Rienks E.D.L., Sánchez-Barriga J., Roth F., Voroshnin V., Fedorov A., Eberhardt W., Büchner B., fink J.; *Phys. Rev. B;* 2022; **106**, 12, 125138; DOI: 10.1103/PhysRevB.106.125138

34. **Preparation, Supramolecular Organization, and On-Surface Reactivity of Enantiopure Subphthalocyanines: From Bulk to 2D-Polymerization;** Labella J., Lavarda G., Hernández-López L., Aguilar-Galindo F., Díaz-Tendero S., Lobo-Checa J., Torres T.; *J. Am. Chem. Soc.*; 2022; **144**, 36, 16579, 16587; DOI: 10.1021/jacs.2c06377

35. **Accurate Calculation of Excited-State Absorption for Small-to-Medium-Sized Conjugated Oligomers: Multiconfigurational Treatment vs Quadratic Response TD-DFT;** Roldao J.C., Oliveira E.F., Milián-Medina B., Gierschner J., Roca-Sanjuán D.; *J. Chem. Theory Comput.*; 2022; **18**, 9, 5449, 5458; DOI: 10.1021/acs.jctc.2c00302

36. **Thermal transport, geometry, and anomalies;** Chernodub M.N., Ferreiros Y., Grushin A.G., Landsteiner K., Vozmediano M.A.H.; *Phys. Rep.*; 2022; **977**, 1, 58; DOI: 10.1016/j.physrep.2022.06.002

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38. **Predictability of Population Fluctuations;** Crespo-Miguel R., Cao-García F.J.; *Mathematics*; 2022; **10**, 17 , 3176; DOI: 10.3390/math10173176

39. **Time-resolved terahertz–Raman spectroscopy reveals that cations and anions distinctly modify intermolecular interactions of water;** Balos V., Kaliannan N.K., Elgabarty H., Wolf M., Kühne T.D., Sajadi M.; *Nat. Chem.*; 2022; **14,** 9, 1031, 1037; DOI: 10.1038/s41557-022-00977-2

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41. **Fluorescent enzymatic assay for direct total polyphenol determination in food-related samples;** Mediavilla M., Revenga-Parra M., Gutiérrez-Sánchez C., Hernández-Apaolaza L., Pariente F., Lorenzo E.; *Talanta*; 2022; **247**, 123576; DOI: 10.1016/j.talanta.2022.123576

42. **Sensitive SARS-CoV-2 detection in wastewaters using a carbon nanodot-amplified electrochemiluminescence immunosensor;** Guerrero-Esteban T., Gutiérrez-Sánchez C., Villa-Manso A.M., Revenga-Parra M., Pariente F., Lorenzo E.; *Talanta*; 2022; **247**, 123543; DOI: 10.1016/j.talanta.2022.123543

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44. **Single-Walled Carbon Nanotubes Encapsulated within Metallacycles;** López-Moreno A., Ibáñez S., Moreno-Da Silva S., Ruiz-González L., Sabanés N.M., Peris E., Pérez E.M.; *Angew. Chem. Int. Ed.*; 2022; **61**, 35, e202208189; DOI: 10.1002/anie.202208189

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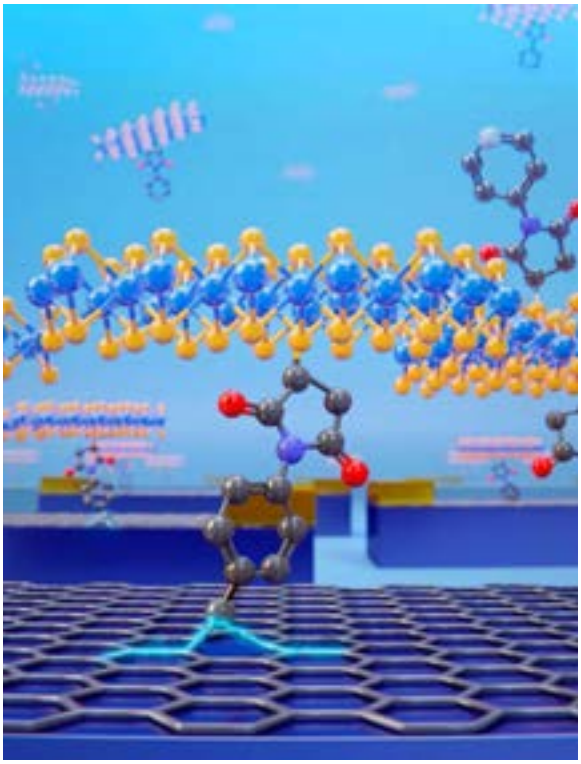

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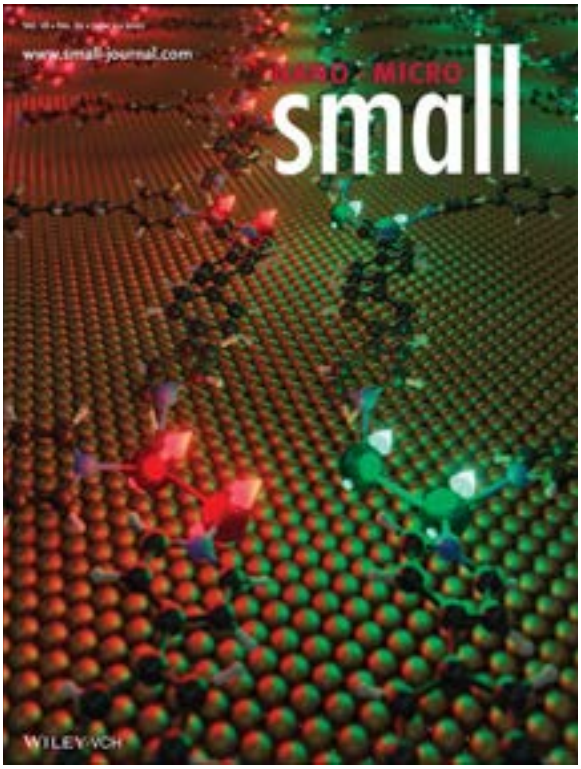

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187. **Tracking structural solvent reorganization and recombination dynamics following e-photoabstraction from aqueous I-with femtosecond x-ray spectroscopy and scattering;** Vester P., Kubicek K., Alonso-Mori R., Assefa T., Biasin E., Christensen M., Dohn A.O., Van Driel T.B., Galler A., Gawelda W., Harlang T.C.B., Henriksen N.E., Kjær K.S., Kuhlman T.S., Németh Z., Nurekeyev Z., Pápai M., Rittman J., Vankó G., Yavas H., Zederkof D.B., Bergmann U., Nielsen M.M., Møller K.B., Haldrup K., Bressler C.; *J Chem Phys*; 2022; **157,** 22, 224201; DOI: 10.1063/5.0107224

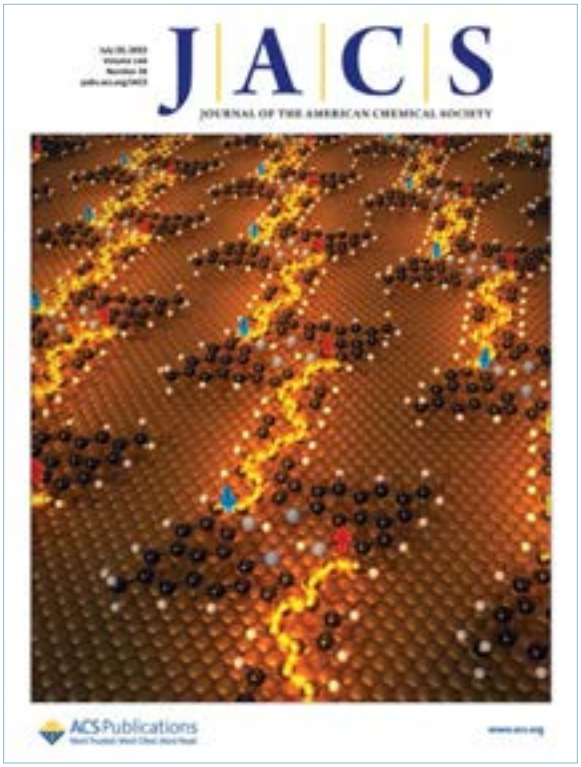
188. **Unusual Magnetic Hysteresis and Transition between Vortex and Double Pole States Arising from Interlayer Coupling in Diamond-Shaped Nanostructures;** Parente A., Navarro H., Vargas N.M., Lapa P., Basaran A.C., González E.M., Redondo C., Morales R., Munoz Noval A., Schuller I.K., Vicent J.L.; *ACS Appl. Mater. Interfaces*; 2022; **14**, 49, 54968; DOI: 10.1021/acsami.2c16950

189. **Selectively Addressing Plasmonic Modes and Excitonic States in a Nanocavity Hosting a Quantum Emitter;** Martín-Jiménez A., Jover Ó., Lauwaet K., Granados D., Miranda R., Otero R.; *Nano Lett.*; 2022; **22**, 23, 9289; DOI: 10.1021/acs.nanolett.2c02758

190. **Vapochromic effect in switchable molecular-based spin crossover compounds;** Resines-Urien E., Fernandez-Bartolome E., Martinez-Martinez A., Gamonal A., Piñeiro-López L., Costa J.S.; *Chem. Soc. Rev.*; 2022; **52**, 2, 727; DOI: 10.1039/d2cs00790h

191. **MOF-Based Materials with Sensing Potential: Pyrrolidine-Fused Chlorin at UiO-66(Hf) for Enhanced NO2 Detection;** Queirós C., Moscoso F.G., Almeida J., Silva A.M.G., Sousaraei A., Cabanillas-González J., Ribeiro Carrott M., Lopes-Costa T., Pedrosa J.M., Cunha-Silva L.; *Chemosensors*; 2022; **10**, 12, 511; DOI: 10.3390/chemosensors10120511

192. **Photophysical properties of novel tetra-3-substituted phthalocyanines of Zn(II), Cu(II) and Pd(II);** Rahali A., De La Escosura A., Torres T., Abderrahim R.; *J. Porphyrins Phthalocyanines*; 2022; **26**, 12, 852; DOI: 10.1142/S1088424622500614



193. **Precise tuning of interlayer electronic coupling in layered conductive metal-organic frameworks**; Lu Y., Zhang Y., Yang C.-Y., Revuelta S., Qi H., Huang C., Jin W., Li Z., Vega-Mayoral V., Liu Y., Huang X., Pohl D., Položij M., Zhou S., Cánovas E., Heine T., Fabiano S., Feng X., Dong R.; *Nat. Commun.*; 2022; **13**, 1, 7240; DOI: 10.1038/s41467-022-34820-6

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195. **Wavelength dependence of the multiphoton ionization of CH3I by intense femtosecond laser pulses through Freeman resonances**; Casasús I.M., Corrales M.E., Bañares L.; *Phys. Chem. Chem. Phys.*; 2022; **24**, 48, 29628; DOI: 10.1039/d2cp04308d

196. **Recent advances in subphthalocyanines and related subporphyrinoids**; Lavarda G., Labella J., Martínez-Díaz M.V., Rodríguez-Morgade M.S., Osuka A., Torres T.; *Chem. Soc. Rev.*; 2022; **51**, 23, 9619; DOI: 10.1039/d2cs00280a

197. **Erratum: Hidden ordered structure in the archetypical Fe(pyrazine)[Pt(CN)4] spin-crossover porous coordination compound**; Fernández-Blanco I., Mariano L.A., Piñeiro-López L., Real J.A., Costa J.S., Poloni R., Rodríguez-Velamazán J.A.; *Crystengcomm*; 2022; **24**, 44, 7870; DOI: 10.1039/d2ce90151j

198. **A 1D Cu(i)-I-pyrazine coordination polymer with controlled pressure-induced phase transition and opto-electronic response depending on mechanical stimuli, temperature, and CuI content**; Murillo M., Álvarez-Conde J., Wannemacher R., Cabanillas-González J., González-Platas J., Rodríguez-Mendoza U.R., Liang A., Turnbull R., Errandonea D., Martínez J.I., Amo-Ochoa P.; *J. Mater. Chem. C*; 2022; **10**, 47, 18016; DOI: 10.1039/d2tc04127h

199. **Crystal size dependence of dipolar ferromagnetic order between Mn6 molecular nanomagnets**; Burzurí E., Martínez-Pérez M.J., Muntó M., Barrios L.A., Ventosa N., Roubeau O., Veciana J., Aromí G., Luis F.; *Phys. Rev. B*; 2022; **106**, 18, L180407; DOI: 10.1103/PhysRevB.106.L180407

200. **Eukaryotic CRFK Cells Motion Characterized with Atomic Force Microscopy**; Zamora-Ceballos M., Bárcena J., Mertens J.; *Int. J. Mol. Sci.*; 2022; **23**, 22, 14369; DOI: 10.3390/ijms232214369

201. **The Canfranc Axion Detection Experiment (CADEx): search for axions at 90 GHz with Kinetic Inductance Detectors**; Aja B., Arguedas Cuendis S., Arregui I., Artal E., Barreiro R., Casas F., de Ory M., Díaz-Morcillo A., de la Fuente L., Gallego J., García-Barceló J., Gimeno B., Gomez A., Granados D., Kavanagh B., Laso M., Lopetegi T., Lozano-Guerrero A., Magaz M., Martín-Pintado J., Martínez-González E., Miralda-Escudé J., Monzó-Cabrera J., Najarro de la Parra F., Navarro-Madrid J., Nuñez Chico A., Pascual J., Pelegrin J., Peña Garay C., Rodriguez D., Socuéllamos J., Teberio F., Teniente J., Vielva P., Vila I., Vilar R., Villa E.; *J. Cosmol. Astroparticle Phys.*; 2022; **2022**, 11, 44; DOI: 10.1088/1475-7516/2022/11/044

202. **Alpha-Germanium Nanolayers for High-Performance Li-ion Batteries**; Sierra L., Gibaja C., Torres I., Salagre E., Avilés Moreno J.R., Michel E.G., Ocón P., Zamora F.; *Nanomaterials*; 2022; **12**, 21, 3760; DOI: 10.3390/nano12213760

203. **Dual-Functionalized Nanoliposomes Achieve a Synergistic Chemo-Phototherapeutic Effect**; Lazaro-Carrillo A., Rodríguez-Amigo B., Mora M., Sagristá M.L., Cañete M., Nonell S., Villanueva A.; *Int. J. Mol. Sci.*; 2022; **23**, 21, 12817; DOI: 10.3390/ijms232112817

204. **The Rashba Splitting in SmB6**; Rader O., Hlawenka P., Siemensmeyer K., Weschke E., Varykhalov A., Sanchez-Barriga J., Shitsevalova N.Y., Filipov V.B., Gabáni S., Flachbart K., Rienks E.D.L.; *J. Exp. Theor. Phys.*; 2022; **135**, 4, 603; DOI: 10.1134/S1063776122100090

205. **Sensitized Singlet Fission in Rigidly Linked Axial and Peripheral Pentacene-Subphthalocyanine Conjugates**; Gotfredsen H., Thiel D., Greißel P.M., Chen L., Krug M., Papadopoulos I., Ferguson M.J., Nielsen M.B., Torres T., Clark T., Guldi D.M., Tykwinski R.R.; *J. Am. Chem. Soc.*; 2022; DOI: 10.1021/jacs.2c13353

206. **Boost in THz mobility in UMG silicon treated by phosphorous diffusion gettering**; Revuelta S., Dasilva N., Marrón D.F., Del Cañizo C., Cánovas E.; *Opt. InfoBase Conf. Pap*; 2022; JTu2A.14; DOI: 10.1364/BGPPM.2022.JTu2A.14

207. **Microwave-assisted NixFe1−x nanoclusters ultra-stable to oxidation in aqueous media**; Santana-Otero A., Fortes Brollo M.E., Morales M.D.P., Ortega D.; *Nanoscale*; 2022; **2**; DOI: 10.1039/d2nr03629k

BOOK CHAPTER

1. **Editorial: Neurodegeneration, cell signaling and neuroreparative strategies;** Vaz A.R., Falcão A.S., Palomo V.; *Front. Pharmacol.*; 2022; **13**, 1059923; DOI: 10.3389/fphar.2022.1059923

2. **Editorial for a special issue on graphene and 2D alternative materials: From preparation to potential applications;** Ares P., Zamora F.; *Nano. Mater. Sci.*; 2022; **4** , 1, 1-2; DOI: 10.1016/j.nanoms.2022.02.002

3. **Recent advances in hard -ferrite magnets;** Bollero A., Palmero E.M.; *Modern Permanent Magnets*; 2022; **65**, 112; DOI: 10.1016/B978-0-323-88658-1.00013-3

4. **Conjugation of Nucleic Acids and Drugs to Gold Nanoparticles;** Milán-Rois P., Rodriguez-Diaz C., Castellanos M., Somoza Á. ; *Methods Mol. Biol.*; 2022; **2434**, 103- 116; DOI:10.1007/978-1-0716-2010-6_6

5. **Fast-Folding Kinetics Using Nanosecond Laser-Induced Temperature-Jump Methods ;** Cerminara M.; Methods Mol. Biol.; 2022; **2376**, 117-134; DOI:10.1007/978-1-0716-1716-8_6

6. **NMR Relaxation Dispersion Methods for the Structural and Dynamic Analysis of Quickly Interconverting, Low-Populated Conformational Substates;** Veeramuthu Natarajan S., D'Amelio N., Muñoz V.; *Methods Mol. Biol.*; 2022; **2376**, 187-203; DOI: 10.1007/978-1-0716-1716-8_11

7. **Mechanochemical Evolution of Disulfide Bonds in Proteins;** Schönfelder J., Alonso-Caballero A., Perez-Jimenez R.; *Methods Mol. Biol.*; 2022; **2376**, 283-300; DOI: 10.1007/978-1-0716-1716-8_15

8. **Molecular Simulations of Intrinsically Disordered Proteins and Their Binding Mechanisms;** Chu X., Nagpal S., Muñoz V.; *Methods Mol. Biol.*; 2022; **2376** , 343-362; DOI: 10.1007/978-1-0716-1716-8_19

2. Patents

Nº	Title	Applicants	Publication number
1	Position-sensitive photodetector, method for obtaining same and method for measuring the response from the photodetector	Fundación IMDEA Nanociencia [Es] Consejo Superior Investigación [Es]	EP2650939A1
2	Position-sensitive photodetector, method for obtaining same and method for measuring the response from the photodetector	Fundación IMDEA Nanociencia [Es] Consejo Superior Investigación [Es] Fundación IMDEA Nanociencia Consejo Superior Investigación	ES2384766A1 ES2384766B1
3	Modified solid support for the synthesis of oligonucleotides	Fundación IMDEA Nanociencia [Es] Fundación IMDEA Nanociencia [Es]	US2016075680A1
4	Graphene dried powder and method for its preparation	Fundación IMDEA Nanociencia [Es] Univ. Autónoma de Madrid [Es] Abengoa Research [Es]	WO2015014862A1
5	Method for the synthesis of covalent organic frameworks	Fundación IMDEA Nanociencia [Es] Univ. Autónoma de Madrid [Es] Univ. Madrid Complutense [Es]	WO2015015035A1
6	Preparation of corrugated and porous graphene from cof for use as supercapacitors (Machine-translation by Google Translate, not legally binding)	Univ. De València [Es] Univ. Madrid Autónoma [Es] Fundación IMDEA Nanociencia [Es] Univ. de València Univ. Madrid Autónoma Fundación IMDEA Nanociencia	ES2538604A1 ES2538604B1
7	Detection and treatment of gnaq mutant uveal melanoma cells with gold nanoparticles	Univ. California [US] Fundación IMDEA Nanociencia [Es]	WO2015116502A1
8	Functionalized metal nanoparticles and uses thereof for detecting nucleic acids	Fundación IMDEA Nanociencia [Es] Univ. California [US]	WO2015114127A1
9	Graphene covalently modified (Machine-translation by Google Translate, not legally binding)	Fundación IMDEA Nanociencia [Es] Univ. Madrid Autónoma [Es]	ES2578997A1 ES2578997B2
10	Functionalised magnetic nanoparticle	Fundación IMDEA Nanociencia [Es]	WO2016150521A1
11	Polymeric composites with functional surfaces	Fundación IMDEA Nanociencia [Es]	WO2017167909A1

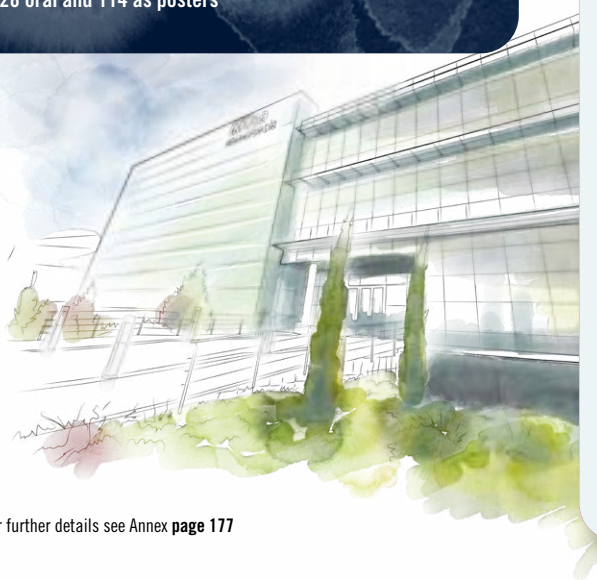
Nº	Title	Applicants	Publication number
12	Systems and methods for obtaining unique identifiers and measuring displacements by sensing and analyzing spatial magnetic field variations	Fundación IMDEA Nanociencia [Es] Fundación IMDEA Nanociencia [Es]	EP3246722A1 EP3246722B1
13	Ferrite type materials and process for the production thereof	Inst Energiteknik [No] Fundación IMDEA Nanociencia [Es]	WO2018211121A1
14	Method for detection of an analyte	Fundación IMDEA Nanociencia [Es]	WO2019092131A1
15	Method for detection of marked structures	Univ. Madrid Autónoma [Es] Fundación IMDEA Nanociencia [Es] Consejo Superior Investigación [Es]	WO2020021154A1
16	Anticancer compositions containing mirna mimics and uses thereof	Fundación IMDEA Nanociencia [Es]	EP3626820A1
17	Colorimetric detector	Fundación IMDEA Nanociencia [Es]	EP3789761A1
18	Substrates for culturing and stimulating cells	Fundación IMDEA Nanociencia [Es]	EP4041871A1
19	Periacene biradical polymers	Fundación IMDEA Nanociencia [Es] Univ. Madrid Complutense [Es] Fyzikalni UStav Av Cr V V I [Cz]	EP3843109A1
20	Bidirectional medical devices for monitoring and stimulating neurons	Fundación IMDEA Nanociencia [Es] Centre Nat Rech Scient [Fr] Scuola Int Superiore Di Studi Avanzati [It] Consejo Superior Investigación [Es] Servicio de Salud de Castilla La Mancha Sescam [Es]	EP3939497A1
21	Catalyst anchoring method, oligomeric ruthenium-ligand compositions therefromland their USe in water oxidation	Fundación Inst. Catala Dinvestigacio Quim [Es] Fundación IMDEA Nanociencia [Es] Univ. Wuerzburg J Maximilians [De] Univ. Autònoma De Barcelona Uab [Es]	WO2022018243A1
22	Miniaturized electromagnetic rotary actuator	Univ. De Alcala Uah [Es] Advanced Hall Sensors Ltd Ahs [Gb] Politechnika Warszawska Wut [Pl] Fundación IMDEA Nanociencia IMDEA [Es] Boston Scient Limited Bsl [Ie]	EP4142125A1

3. Congresses

121 events
11 on line

302
contributions

60 invited lectures
and **242 regular contributions,**
128 oral and 114 as posters



imdea **nanoscience** institute

5. Annexes

1. National and international Congresses: invited lectures and regular contributions

121 events
11 on line

302 contributions

60 invited lectures
and 242 regular contributions,
128 oral and 114 as posters

10/01/2022
15th Joint 'Magnetism and Magnetic Materials' and 'International Magnetic' Conference (MMM-INTERMAG)
New Orleans, USA
Oral contributions
A Sustainable Route for Permanent Magnets Fabrication: Additive Manufacturing Applied to Recycled Ferrite Residues
D. Casaleiz*, E.M. Palmero, J. de Vicente, A. Seoane, R. Altimira, A. Bollero
Antibacterial activity of γ-Fe2O3/Ag nanocomposites under alternating magnetic fields
Yurena Luengo, Begoña Sot, Gorka Salas
Charge-spin current interconversion in high-quality epitaxial Cu/Pt systems
Gudín Holgado, Adrián; Anadon, Alberto; Arnay, Iciar, Guerrero, Ruben, Petit-Watelot, Sebastien, Camarero, Julio; Miranda, Rodolfo; Perna, Paolo; Rojas-Sanchez, Juan-Carlos; Perna, Paolo
Direct X-ray detection of the spin Hall effect in CuBi
S. Ruiz Gómez; R. Guerrero; W. Khaliq; C. Fdez-Gonzalez; S. Finizio; P. Perna; J. Camarero; L. Perez; L. Aballe; M. Foerster
Effect of Dopants (Mo, Cr, V) on the Magnetic Properties of Mn-Al-C nanostructured by Flash-Milling
C. Muñoz-Rodríguez*, J. Soler-Morala, E.M. Palmero, B. Skårman, H. Vidarsson, P.-O. Larsson, A. Bollero
Engineering functional graphene-based systems by thermally assisted metal intercalation
I. Arnay; A. Gudín; A. Guedeja-Marron; J.M. Diez; A. Anadón; R. Guerrero; M. Varela; J. Camarero; R. Miranda; P. Perna
Homogenization of heating in magnetic hyperthermia through exploitation of magnetization dynamics of interacting particles
J. Leliaert, J. Ortega-Julia, D. Ortega
In silico safety analysis of magnetic hyperthermia treatments of implant-bearing patients
I. Rubia-Rodríguez, L. Ziberti, A. Arduino, O. Bottauscio, M. Chiampi, D. Ortega
Optimizing the Particle Size Distribution in Permanent Magnet Composites to Extrude Flexible Filaments for Additive Manufacturing
E.M. Palmero*, D. Casaleiz, J. de Vicente, A. Bollero
Scalable Synthesis of CoFe and NiFe Nanoparticles from Ferrite Precursors with Tailored Magneto-Thermal Properties by a Combined Co-Precipitation, Milling and Reduction Process
D. Casaleiz*, M. Villanueva, A.J. Campos, J. Castillo, J. Camarero, E.M. Palmero, A. Espinosa, G. Salas, A. Bollero
Spin-charge interconversion in 111 oriented epitaxial Pt thin films
Anadón, Alberto; Gudín, Adrián; Arnay, Iciar, Guerrero, Ruben; Petit-Watelot, Sebastien; Camarero, Julio; Miranda, Rodolfo; Perna, Paolo; Rojas-Sanchez, Juan-Carlos
Unravelling exchange bias phenomena in V2O3/Co bilayers
J. M. Diez; J.L.F. Cuñado; P. Perna; P.N. Lapa; A. Bollero; R. Miranda; I. K. Schuller; J. Camarero

25/01/2022
2nd Workshop on Recent Developments in High-Power Impulse Magnetron Sputtering (HiPIMS Today)
Online
Poster contributions
Thin film coated moth-eye nanostructured arrays with improved mechanical and thermal stability
Daniel F. Fernandes, Tomas Kubart, Alejandra Jacobo-Martín, Jaime J. Hernández, Isabel Rodriguez

27/02/2022
Single Molecule Biophysics 2022
Les Houches, France
Poster contributions
Single-stranded dna-binding protein kinetics: theory and experiments
JP G-Villaluenga, B. Ibarra, FJ Cao-García*

01/03/2022
FLAGERA Workshop 2022
Online
Invited talks
SOgraphMEM
Paolo Perna

International School on Quantum Electronics: "The Frontiers of Attosecond and Ultrafast X-ray Science"
Online
Oral contributions
Molecular physics with attosecond pulses
Fernando Martín
School on New Computational Methods for Attosecond Molecular Processes
Zaragoza, Spain

For further details see Annex **page 177**


ATTO
8th International Conference On Attosecond Science And Technology


NanoSpain
Conf
2022
May 17-20, 2022 • Madrid (Spain)


XXXVIII REUNION BIENAL
RSEQ
GRANADA 2022
27 - 30 DE JUNIO 2022
REAL SOCIEDAD ESPAÑOLA DE QUÍMICA
RSEQ
ugr Universidad de Granada


Shift'22
TENERIFE


ECOSS 35
European Conference on Surface Science

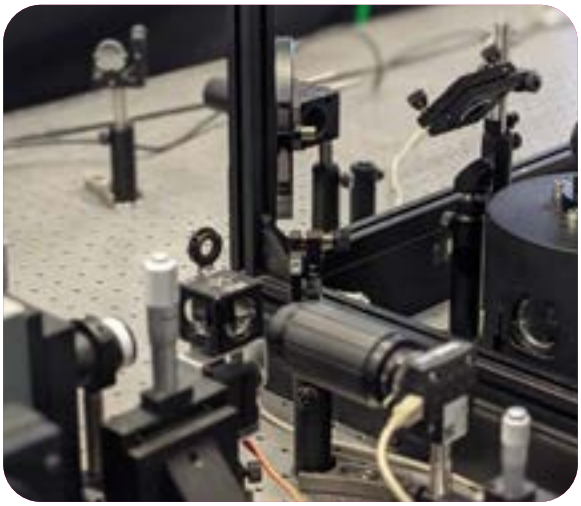

INTERMAG 2022
January 10-14 2022


EuChemS
Chemistry Congress
28 August to 1 September
2022 · LISBON.PT


2022 MRS
FALL MEETING & EXHIBIT
November 27–December 2, 2022 | Boston, Massachusetts
December 6–8, 2022 | Virtual

4. Funding

We include all research grants that were active during the whole part of 2022 funded by the European Commission, national and regional governments and other public and private agencies.



4.1. International programmes

EUROPEAN PROJECTS

ERC GRANTS

ERC SYNERGY GRANTS

TOMATTO

The ultimate Time scale in Organic Molecular opto-electronics, the ATTOsecond
Grant Agreement number: 951224
From 2021 to 2027
Principal Investigator: Dr. Fernando Martín, Fundación IMDEA Nanociencia (CHI)
Other Principal Investigators: Dr. Nazario Martín (Universidad Complutense de Madrid), Dr. Mauro Nisoli (Politecnico di Milano)
Additional Beneficiaries: Universidad Autónoma de Madrid

ERC CONSOLIDATOR GRANT

ELECNANO

Electrically Tunable Functional Lanthanide Nanoarchitectures on Surfaces
Grant Agreement number: 766555
From 2018 to 2023
Principal Investigator: Dr. David Écija

COLLABORATIVE PROJECTS

EVO-NANO

Evolvable platform for programmable nanoparticle based cancer therapies
H2020-FETOPEN-2016-2017
Grant Agreement number: 800983
From 2018 to 2022
Principal Investigator: Dr. Mª Isabel Rodríguez
http://evonano.eu/

PASSENGER

Pilot Action for Securing a Sustainable European Next Generation of Efficient RE-free magnets
H2020-SC5-2020-2
Grant Agreement number: 101003914
From 2021 to 2025
Coordinated by IMDEA Nanociencia
Principal Investigator: Dr. Alberto Bollero
https://passenger-project.eu/

GRAPHENECORE2

Graphene-based disruptive technologies
GRAPHENECORE 3
Graphene Flagship Core Project 3
H2020-SGA-FET-GRAPHENE-2019
Grant Agreement number: 881603
From 2020 to 2023
Principal Investigator: Dr. Francisco Guinea

UWIPOM2

Ultra-efficient wireless powered micro-robotic joint for health applications
H2020-FETOPEN-2018-2020
Grant Agreement number: 857654
From 2019 to 2022
Principal Investigator: Dr. Alberto Bollero

MARIE SKLODOWSKA-CURIE ACTIONS (MSCA) | H2020

IDEAL

IMDEA Nanociencia Postdoctoral Training Programme in Nanoscience
H2020-MSCA-COFUND-2020
Grant Agreement number: 101034431
From 2021 to 2026
Principal Investigator: Dr. M. J. Villa (Projects, Communication and Research Support Offices)
http://www.idealcofund-project.eu/

IMDEA Nanociencia PhD Training Programme in Nanoscience
H2020-MSCA-COFUND-2020
Grant Agreement number: 101081615
From 2022 to 2027
Principal Investigator: Dr. M. Davies (Projects, Communication and Research Support Offices)
http://www.idealcofund-project.eu/

EURAMET – EMPIR

ISO-G-Scope

Standardisation of structural and chemical properties of graphene
H2020-EMPIR-2019-Normative
Reference: JRP-N10 / 19NRM04
From 2020 to 2022 (36 months)
IMDEA Nanociencia is Partner in a consortium of 10 coordinated by the National Physics Laboratory / NPL (UK)
Principal Investigator: Dr. Emilio Perez

MEMQuD

Memristive devices as quantum standard for nanometrology
H2020-EMPIR-2020-Normative
Reference: 20FUN06
From 2021 to 2024 (36 months)
IMDEA Nanociencia is Partner in a consortium of 15 coordinated by the Instituto Nazionale di Ricerca Metrologica (INRIM) / NMI (Italy) Principal Investigator: Dr. Mariela Menghini

COMET

Two dimensional lattices of covalent- and metal-organic frameworks for the Quantum Hall resistance standard
H2020-EMPIR-2020-Normative
Reference: 20FUN03
From 2021 to 2024 (36 months)
IMDEA Nanociencia is Partner in a consortium of 10 coordinated by the Centro Español de Metrología (CEM) / (Spain) Principal Investigator: Dr. Enrique Cánovas

European Cooperation in Science and Technology (COST Actions)

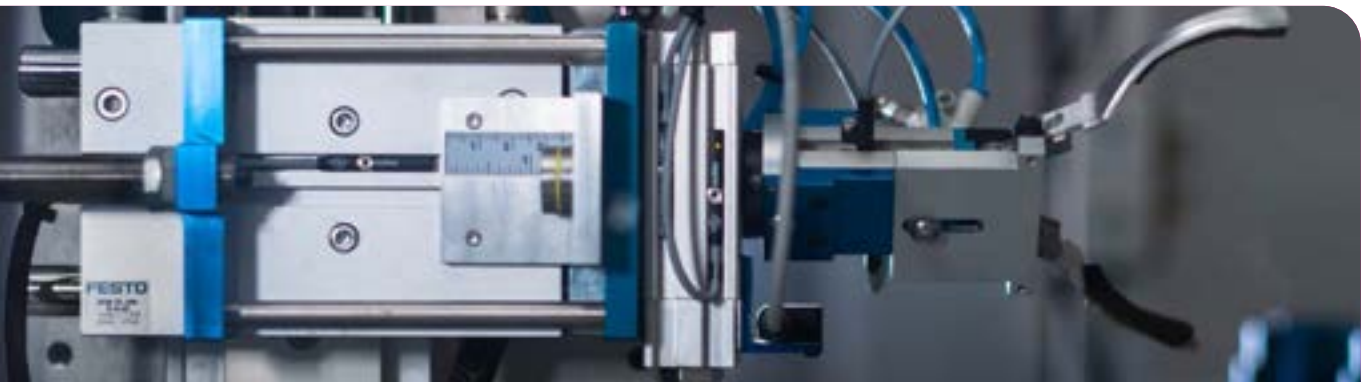
ATTOCHEM

Attosecond Chemistry (CA18222)
From 2019 to 2023
Chair: Prof. Fernando MARTÍN
https://www.cost.eu/actions/CA18222/#tabsName:overview

OTHER INTERNATIONAL PROGRAMMES

DEFROST

Development of hybrid graphene-superconductor detectors for quantum and space applications
Funding: Office of Naval Research (United States)
From 2019 to 2022
Principal Investigator: Dr. Daniel Granados



4.2. National Programmes

PROYECTOS DE I+D+I EN LÍNEAS ESTRATÉGICAS 2022

Call 2022

NEUMOSENSOR

Diagnóstico rápido de neumonía mediante marcado con nanopartículas magnéticas: NEUMOSENSOR
Ref.: PLEC2022-009490
From: 2022 to 2025
Coordinator: Fundacion Instituto de Investigación Sanitaria de Santiago de Compostela, Spain
Principal Investigator: Drs. Gorka Salas and Álvaro Somoza

PROYECTOS DE GENERACIÓN DE CONOCIMIENTO

Call 2021

SEMICON

Conjugated microlaser sensors
Ref.: PID2021-128313OB-I00
From 2022 to 2025
Principal Investigators: Drs. Juan Cabanillas and Reinhold Wannemacher

FLUOMECBAC

Advanced fluorescence microscopy to understand and improve mechano-bactericidal nanomaterials
Ref.: PID2021-122231NB-I00
From 2022 to 2025
Principal Investigator: Dr. Cristina Flors

CONPHASETM

Epitaxial growth, doping engineering and characterization of transition metal ditellurides
Ref.: PID2021-123776NB-C21
From 2022 to 2025
Principal Investigator: Dr. Manuela Garnica

MITO-DYN

In vitro single-molecule characterization of mitochondrial replisome dynamics in human health and disease
Ref.: PID2021-126755NB-I00
From 2022 to 2025
Principal Investigator: Dr. Borja Ibarra

BIINTEL

Birradicales para Espintrónica y Aplicaciones Termoeléctricas
Ref.: PID2021-127964NB-C21
From 2022 to 2025
Principal Investigator: Dr. Edmund Leary

QDs4ALS

Improved biosensors for better drug asessment in amyotrophic lateral sclerosis
Ref.: PID2021-128340OA-I00
From 2022 to 2025
Principal Investigator: Dr. Valle Palomo

ECoSOx

Electric COntrol of Spin Orbit interactions and magnetic nanoteXtures
Ref.: PID2021-122980OB-C52
From 2022 to 2025
Principal Investigator: Dr. Paolo Perna

PROYECTOS ESTRATÉGICOS ORIENTADOS A LA TRANSICIÓN ECOLÓGICA Y A LA TRANSICIÓN DIGITAL

Call 2021

RESILIENS

RECYCLING OF SILICON FOR NEW SOLAR GENERATION: Non-contact time resolved electrical characterization of recycled silicon
Ref.: TED2021-129624B-C44
From 2022 to 2024
Principal Investigator: Dr. Enrique Cánovas

FUNWIN

Manufacturing of funtionalized optical devices for photovoltaic smart windows
Ref.: TED2021-130920B-C22
From 2022 to 2024
Principal Investigators: Drs. Maria Isabel Rodriguez and Maria Teresa González

INTERPLAY

Design, Synthesis, and Characterization of Rigid Layered Perovskites
Ref.: TED2021-131018B-C22
From 2022 to 2024
Principal Investigators: Drs. José Sánchez Costa and Reinhold Wannemacher

PERSOLAR

Disruptive Photo and Electroactive Materials for highly-stable hybrid 2D perovskite solar cells
Ref.: TED2021-131255B-C41
From 2022 to 2024
Principal Investigators: Dr. Nazario Martín

RETAIN

Recycling through an affordable implementation of nanoscience: sustainable production of permanent magnets in Europe
Ref.: TED2021-132490B-I00
From 2022 to 2024
Principal Investigators: Drs. Alberto Bollero and Estar Maria Palmero

MOSES

Sustainable H2 production with new 2D bio-hybrid photocatalysts based on Earth abundant and environmentally friendly resources
Ref.: TED2021-131906A-I00
From 2022 to 2024
Principal Investigators: Drs. Victor Vega and Sara Hernández

PROYECTOS I+D+I» - MODALIDADES «RETOS INVESTIGACIÓN» Y «GENERACIÓN DE CONOCIMIENTO

Call 2020

NEXUS

Síntesis de Nanoestructuras L10-MNALC Monofásicas Diseñadas y de la Fase Cosmológica L10-FENI para la fabricación de Imanes L10 mediante Impresión 2D
Ref.: PID2020-115215RB
From 2021 to 2024
Principal Investigator: Dr. Alberto Bollero

PICANTE

Polímeros mecánicamente enlazados con nanotubos de carbono para electrodos de baterías
Ref.: PID2020-116661RB-I00
From 2021 to 2024
Principal Investigator: Dr. Emilio M. Pérez

NANORARE

Herramientas nanobiotecnológicas para detección y tratamiento de enfermedades raras: cáncer pancreático, melanoma de uvea y distrofia muscular de Duchenne
Ref.: PID2020-119352RB-I00
From 2021 to 2024
Principal Investigator: Dr. Álvaro Somoza

THEXP

Propiedades magnéticas y coloidales de nano-ensamblados formados tras la interacción específica entre nanopartículas magnéticas y biomarcadores
Ref.: PID2020-117080RB-C53
From 2021 to 2024
Principal Investigator: Dr. Francisco Terán

POMELO

Diseño de potentes metalofármacos y su seguimiento en el nanoespacio intracelular
Ref.: PID2020-117766GB-I00
From 2021 to 2024
Principal Investigator: Dr. Ana M. Pizarro

REGINNA

Nanomateriales Innovadores Regenerativos
Ref.: PID2020-120202RB-I00
From 2021 to 2024
Principal Investigator: Dr. María Isabel Rodríguez

Call 2019

MADE

Fabricación de detectores superconductores mul- ti-frecuencia para futuras misiones espaciales en el FIR/sub-mm/mm
Ref.: PID2019-105552RB-C44
From 2020 to 2023
Principal Investigator: Dr. Daniel. Granados

NAISMAHT

Nanoestructuras para imagen, detección y calentamien- to magnético de células tumorales
Ref.: PID2019-106301RB-I00
From 2020 to 2023
Principal Investigators: Dr. Gorka Salas

NEO-CHEM

Química Orgánica fuera del equilibrio: sistemas químicos compartimentalizados hacia la construcción de una protocélula sintética
Ref.: PID2019-106327GA-I00
From 2020 to 2023
Principal Investigators: Dr. I. Colomer

ERA-SOLAR

Dinámica de electrones en interfaces punto cuánti-co-óxido metálico: estudios fundamentales y desarrollo de dipositivos de alta eficiencia para la conversión de energía solar
Ref.: PID2019-107808RA-I00
From 2020 to 2023
Principal Investigators: Dr. Enrique Canovas

pi-CONJUNANO

Diseño en superficies y propiedades fisico-químicas de polímeros pi-conjugados
Ref.: PID2019-108532GB-I00
From 2020 to 2023
Principal Investigators: Dr. David Écija

CATDesign

Hacia la comprensión de requisitos electrónicos y atómicos de catalizadores económicos para la división de la molécula de agua
Ref.: PID2019-111086RA-I00
From 2020 to 2023
Principal Investigators: Dr. D Moonshiram

AIRE

Arquitecturas Conmutables Avanzadas para detección molecular
Ref.: PID2019-111479GB-I00
From 2020 to 2023
Principal Investigators: Dr. J. Sanchez-Costa

SUBPROGRAMA ESTATAL DE GENERACIÓN DE CONOCIMIENTO Y FORTALECIMIENTO CIENTÍFICO Y TECNOLÓGICO DE I+D+I

Proyectos I+D+i «Generación de Conocimiento»

Call 2018

MICRUNC

Microscopia de super-resolución con fluoroforos no convencionales
Ref.: PGC2018-094802-B-I00
From 2019 to 2022
Principal Investigator: Dr. Cristina Flors

TOPSURF

Investigando los estados de superficie topológicos de materiales cuánticos
Ref.: PGC2018-097028-A-I00
From 2019 to 2022
Principal Investigator: Dr. Manuela Garnica

SpOrQuMat

Spin-orbit driven physics at surfaces and interfaces of quantum materials
Ref.: PGC2018-098613-B-C21 / PGC2018-098613-B-C22
From 2019 to 2022
Principal Investigators: Drs.. Rodolfo Miranda and Francisco Guinea

MECAVIRINF

Caracterización nano-mecánica y detección en tiempo real de la infección de células eucariotas con calicivirus
Ref.: PGC2018-099713-B-I00
From 2019 to 2022
Principal Investigator: Dr. Johann Mertens

Centros de Excelencia «Severo Ochoa»

Severo Ochoa Centre of Excellence (Call 2017)

Ref.: CEX2020-001039-S
From 2022 to 2025
Scientific Director: Dr. Fernando Martin

IMDEA Nanociencia became an accredited Severo Ochoa Centre of Excellence by the Spanish Ministry of Economy, Industry and Competitiveness 2017 and in 2021. This award is the highest national recognition for centres of excellence in Spain and is granted after a rigorous evaluation process carried out by an independent international committee of prestigious scientists.

Acciones de Dinamización "Redes de Investigación"

Materiales orgánicos disruptivos para energía fotovoltaica
Ref.:RED2018-102815-T
From 2020 to 2022
Principal Investigator: Dr. Nazario Martin

Nanotecnología en hipertermia traslacional
Ref.:RED2018-102626-T
From 2020 to 2022
Principal Investigator: Dr. D. Ortega

Europa Redes y Gestores - Europa Centros Tecnológicos 2020

IM-PULSA

Plan estratégico para el impulso de la participación de IMDEA Nanociencia en Horizonte Europa (IM-PULSA)
Ref: ECT2020-000746
From 2021 to 2023
Principal Investigator: Dr.M.J.Villa (Projects, Communication and Research Support Offices)

SUBPROGRAMA ESTATAL DE I+D+I ORIENTADA A LOS RETOS DE LA SOCIEDAD

Proyectos I+D+i «Retos Investigación»

Call 2018

SMS-QUTE

Espintronica molecular aplicada a tecnologías cuánticas
Ref.: RTI2018-096075-A-C22
From 2019 to 2022
Principal Investigator: Dr. Enrique Burzuri

AMAPOLA

Materiales avanzados para la optimización de láseres orgánicos y aplicaciones nanotecnológicas
Ref.: RTI2018-097508-B-I00
From 2019 to 2022
Principal Investigators: Dr. Juan Cabanillas and Dr. Rein- hold Wannemacher

FUN-SOC: FEST

Nuevas funcionalidades dirigidas por interacciones espin-orbita: texturas de espines quirales rápidas y eficientes
Ref.: RTI2018-097895-B-C42
From 2019 to 2022
Principal Investigator: Dr. Paolo Perna

INTRA_TEMP

Interpretación de la temperatura intracelular para el diagnóstico y tratamiento del cáncer
Ref.: RTI2018-101050-J-I00
From 2019 to 2022
Principal Investigator: Dr. Sebastian Thompson

Call 2017

OptoCT

Espectroscopia óptica de estado estacionario y resuelto en el tiempo de sistemas orgánicos de transferencia de carga innovadores
Ref.: CTQ2017-87054-C2-1-P
From 2018 to 2022
Principal Investigators: Dr. Johannes Gierschner and Dr. Larry Luer

Programación Conjunta Internacional

Call 2021

Understanding the phase diagram of the magic angle twisted bilayer graphene
Ref.: PCI2021-122057-2B
From 2022 to 2024
Principal Investigator: D. Francisco Guinea
Hired Researcher: Dr. Andreas Sinner

Call 2020

COSMAG

From the cosmos to the lab: Development of the L10-FeNi phase as a disruptive permanent magnet alternative
Funding: M-ERANET 2019
Ref.: PCI2020-112143
From 2020 to 2023
Principal Investigator: D. Alberto Bollero
Coordinated by IMDEA Nanociencia

Call 2019

SOgraphMEM

Spin Orbit functionalized GRAPHene for resistive-magnetic MEMories
Funding: FLAG ERA 3
Ref.: PCI2019-111867-2
From 2020 to 2022
Principal Investigator: Dr. Paolo Perna
Coordinated by IMDEA Nanociencia

BIOMAG

Advanced magnetic nanoparticles for detection and quantification of biomarkers in biological fluids
Funding: M-ERANET 2018
Ref.: PCI2019-103600
From 2019 to 2022
Principal Investigator: Dr. Francisco J. Terán
Coordinated by IMDEA Nanociencia

Call 2018

AMYLIGHT

Desarrollo de estrategias fototerapéuticas para la amiloidosis mediante visión nanoscopica del daño fotoinducido al material amiloide
Funding: Japan-Spain 2018
Ref.: PCI2018-093064
From 2019 to 2022
Principal Investigator: Dr. Cristina Flors

Acciones de Dinamización "Europa Investigación"

Call 2020

2DTONIC

Materiales topológicos 2d para valleytronic
Ayudas del ERC "Starting Grants" (StG)
Ref.: EIN2020-112223
From 2020 to 2022
Principal Investigator: Dr. Manuela Garnica

METALpHACT

Metalofarmacos para modular el flujo de protones en las células cancerosas
Ayudas del ERC "Consolidator Grants"(CoG)
Ref.: EIN2020-112423
From 2020 to 2022
Principal Investigator: Dr. Ana M. Pizarro

Intra_Temp

Temperatura intracelular para el diagnóstico y tratamiento del cáncer
Ayudas del ERC "Consolidator Grants"(CoG)
Ref.: EIN2020-112419
From 2020 to 2022
Principal Investigator: Dr. Sebastian Thompson

Call 2019

Multicolour Molecular Profiling OF Neurodegenerative Diseases With Quantum Dots
Ayudas del ERC "Starting Grants" (StG)
Ref.: EIN2019-103140
From 2019 to 2022
Principal Investigator: Dr. Valle Palomo

CONVOCATORIA DE AYUDAS PARA EL FOMENTO DE LA CULTURA CIENTÍFICA

Nanociencia para contar

Ref.: FCT-20-16224
From 2021-2022
Principal Investigator: Dr. M.J.Villa (Projects, Communication and Research Support Offices)

CONVOCATORIA DE AYUDAS MARÍA DE GUZMÁN PARA EL FOMENTO DE LA INVESTIGACIÓN CIENTÍFICA DE EXCELENCIA

Call 2020-21

Nanociencia Abierta

Ref.: MDG-20-11189
From 2022-2024
Principal Investigator: Dr. Mark Davies (Projects, Communication and Research Support Offices)

OTHER PROJECTS

ASOCIACIÓN ESPAÑOLA CONTRA EL CÁNCER

PROYECTOS COORDINADOS 2022

Reactivation of anti-tumor immune cell responses by functionalized nanoparticles in melanoma

From 2022-2027
Coordinator: Dr. Héctor Peinado (CNIO, Spain)
Principal Investigator: Dr. Alvaro Somoza

IDEAS SEMILLA 2019

AECC Semilla 2021

Nuevo tratamiento de Glioblastoma basado en dual termonanopartículas
From 2021-2023
Principal Investigator: Dr. Sebastian Thompson

AECC Semilla 2019

Enhancement of tumor radiation dose response via magnetophotothermal nanostructures for effective cancer treatment
From 2020-2022
Principal Investigator: Dr. Ana Espinosa de los Monteros

LA CAIXA HEALTH RESEARCH 2021

Drugs4ALS

Targeting TDP-43 with protein kinase inhibitors: an effective and measurable therapy for ALS
Principal Investigator: Dr. Valle Palomo

ASSOCIATION FRANÇAISE CONTRE LES MYOPATHIES

AFM-Téléthon

Functionalized nanoparticles for targeted genome editing in Duchenne Muscular Dystrophy
From 2022-2024
Coordinator: Dr. Daniela Palacios (Università Cattolica del Sacro Cuore, Milan, Italy)
Principal Investigator: Dr. Alvaro Somoza

4.3. Regional programmes

Plan de Recuperación, Transformación y Resiliencia – Recursos NEXT GENERATION-EU

LÍNEA DE ACTUACIÓN DE PROYECTOS DE I+D+I MATERIALES CON FUNCIONALIDADES AVANZADAS PARA LA NUEVA TRANSFORMACIÓN TECNOLÓGICA

Materiales Disruptivos Bidimensionales (2d)

From 2022-225
Coordinator: Universidad Complutense de Madrid, Spain
Principal Investigators: Drs. Francisco Guinea, Emilio M, Pérez, D. Ecija, Manuela Garnica, Jose S. Costa

Fondo Europeo De Desarrollo Regional – Recursos REACT-UE Programa Operativo de Madrid 2014-2020

LÍNEA DE ACTUACIÓN DE PROYECTOS DE I+D+I EN MATERIA DE RESPUESTA A COVID 19

NANOCOV-CM

Nanotecnología para detección del SARS-CoV-2 y sus variantes
Coordinator: IMDEA Nanociencia
From 2020 to 2022
Principal Investigator: Dr Rodolfo Miranda

Programas de Actividades de I+ D entre grupos de investigación de la Comunidad de Madrid

SINERGIAS 2018

FULMATEN-CM

fulMATEN

Fotónica ultrarrápida para el diseño de nuevos materia- les y la captura eficiente de energía
Coordinator: IMDEA Nanociencia
From 2019 to 2022
Principal Investigator: Dr. Fernando Martin

QUIMTRONIC-CM

Química disruptiva en la nanoescala par electrónica y flexibles
Coordinator: Universidad Complutense de Madrid
From 2019 to 2022
Principal Investigators: Drs. Nazario Martin and David Ecija

CONVOCATORIA TECNOLOGÍAS 2018

NMAT2D-CM

Nmat2D
nuevos materiales bidimensionales
caracterización, propiedades y aplicaciones

Nuevos materiales bidimensionales: caracterización, propiedades y aplicaciones
Coordinator: IMDEA Nanociencia
From 2019 to 2023
Principal Investigator: Dr. Francisco Guinea

NanomagCOST-CM

Soluciones del nanomagnetismo a los retos sociales
From 2019 to 2023
Coordinator: Universidad Autónoma de Madrid
Principal Investigators: Drs. Rodolfo Miranda, Alberto Bollero and Paolo Perna

TEC2SPACE-CM

Desarrollo y explotación de nuevas tecnologías para instrumentación espacial en la Comunidad de Madrid
Coordinator: Centro de Astrobiología (CAB)
From 2019 to 2023
Principal Investigator: Dr. Daniel Granados

MADRID-PV2-CM

Materiales, dispositivos y tecnologías para el desarrollo de la industria fotovoltaica
Coordinator: Instituto Energía Solar (Universidad Politéc- nica de Madrid)
From 2019 to 2023
Principal Investigator: Dr. Isabel Rodríguez

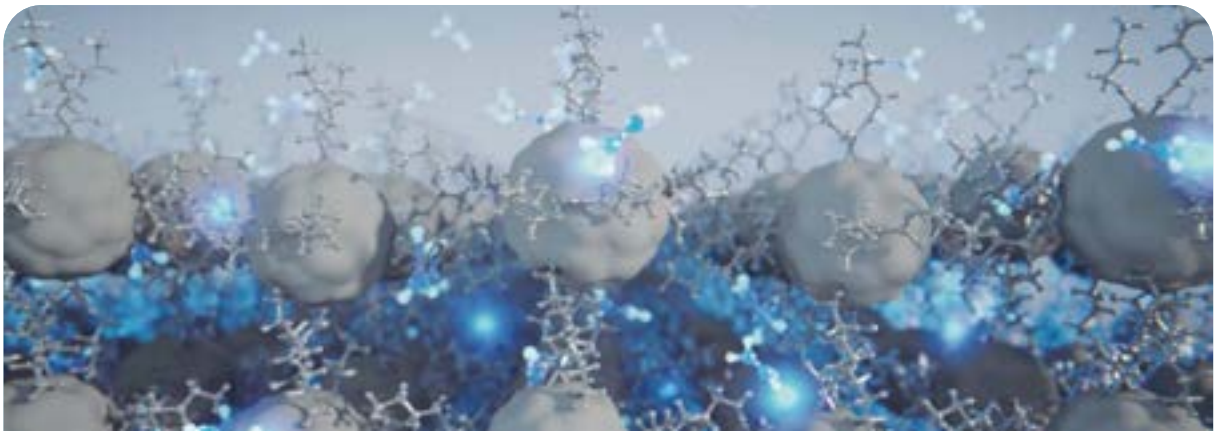
FotoArt-CM

Nueva generación de materiales multifuncionales para fotosíntesis artificial
From 2019 to 2023 Coordinator: IMDEA Energía
Principal Investigators: Drs. Emilio M. Pérez and Cristina Navío

CONVOCATORIA BIOMEDICINA 2017

RENIM-CM

Red Madrileña de Nanomedicina en Imagen Molecular
Ref.: B2017/BMD-3867
From 2018 to 2022
Coordinator: Fundación para la Investigación Biomédica Hospital Gregorio Marañón
Principal Investigators: Dr. Cristina Flors



4.4. Industrial projects

The Strategic Industrial Partnership Office (SIPO) plays a key role in establishing new strategic alliances, partnerships and collaborations with the private sector. The office also fosters collaboration with strategically important institutional partners.

A system has been introduced to manage all the contacts and monitor the maturity of the relationships using a proprietary set of metrics Partnership Readiness Level (PRL). 35 of these companies represents for IMDEA Nanociencia an Indus- trial opportunity. These are spread across several research areas: Aerospace, Security & Defence; Health & Food; Na- nomaterials, Sensors & Metrology; Transport / Logistics; Information (Artificial Intelligence); Energy & Environment are now part of the IMDEA Nanociencia eco-system, with 19% of these contacts coming from outside of Spain.

SYLENTIS

From 2021 to 2022
Principal Investigator: Dr. Álvaro Somoza

Nanocore Aps (Denmark)

TSUNAMI
From 2020-2023
Principal Investigator: Dr. Emilio M. Pérez

Airbus Defence and Space SAU (Spain)

GONDOLA
From 2021-2024
Principal Investigators: Drs. Maria Isabel Rodriguez and Gorka Hernández

Bosch (Germany)

Future Rare-Earth-Free Permanent Magnet Materials
From 2022 to 2025
Principal Investigators: Dr. Alberto Bollero

TECNICAS REUNIDAS + IMA S.L.U.

CELSA

4.5. Fellowships

4.5.1. International

MARIE SKŁODOWSKA-CURIE ACTIONS (MSCA) | H2020

STORM

Synthesis of Transition metal dichalcogenides Optimized for MRAMs
HORIZON-MSCA-2021-PF-01
Grant Agreement number: 101063547
Duration: 2022-2024
Fellow: Dr. Iolanda di Bernardo

PhoMOFs

Accessing Electron-Phonon interactions of two-dimensional Metal Organic Frameworks by Ultrabroadband Terahertz Spectroscopy based on the Spintronic Trilayer Emitter
H2020-MSCA-IF-2020
Grant Agreement number: 101030872
Duration: 2021-2023
Fellow: Dr. Vasileios Balos

OssCaNa

On-Surface Synthesis, Transfer and Device Fabrication of Novel Carbon-based Nanomaterials
H2020-MSCA-IF-2019 MSCA-IF-EF-ST
Grant Agreement number: 886314
Duration: 2021-2023
Fellow: Dr. Jose Ignacio Urgel

4f-Mag

On-surface design of lanthanide coordinated networks featuring single atom magnetism
H2020-MSCA-IF-2019 MSCA-IF-EF-ST
Grant Agreement number: 894924
Duration: 2021-2022
Fellow: Dr. Sofia de Oliveira

TweeTERS

Coupling of Optical tweezers with Tip-enhanced Raman Spectroscopy for single-molecule investigation of supramolecular systems
H2020-MSCA-IF-2019 MSCA-IF-EF-ST
Grant Agreement number: 892667
Duration: 2020-2022
Fellow: Dr. Natalia Martín

4.5.2. National

PROGRAMA ESTATAL DE PROMOCIÓN DEL TALENTO Y SU EMPLEABILIDAD EN I+D+I

Ayudas para la contratación de doctores «Ramón y Cajal»
Call 2021 Dr. Allan Johnson
Call 2020 Dr. Manuela Garnica
Call 2019 Dr. Valle Palomo

Ayudas para la contratación de doctores «Juan de la Cierva»
Incorporación
Call 2020 Dr. Ester María Palmero
Formación
Call 2021 Drs. Ana Isabel Barragan, Carmen Garcia, Mario Martinez

Ayudas para la contratación de personal técnico de apoyo a la I+D+i
Call 2019 Sergio de las Heras
Call 2018 Patricia Pedraz, Cintia de Vequi
Call 2017 Silvia Miranda

Contratos predoctorales para la formación de doctores (FPI Programme)
Call 2021 Alejandro Martin, Noelia Rodriguez, Alireza Amiri, Alejandro Venegas
Call 2020 Luis Calahorra, Ignacio Figueruelo, Rosalía López, Héctor Sainz, Miguel Ángel Pulido
Call 2019 Claudia, Cardozo, Alberto Martin Asencio, Saúl Garcia-Orrit, Ana Martínez, Ismael Plaza
Call 2018 Alicia Naranjo, Ana Arché , Jesús Galán, Alejandro Jimeno, Joel Gabriel Fallaque, Ingrid Ortega
Call 2017 Paula Milian, Daniel Moreno, Tomás Nicolas

Contratos predoctorales para la formación del profesorado universitario (FPU Programme)
Call 2020 Cristina Garcia, Alejandro López
Call 2018 Nuria Lafuente

Programa "INVESTIGO" (Plan de Recuperación, Transformación y Resiliencia) (Servicio Público de Empleo Estatal)
Total 21
Call 2022 (19 Ayu & 2 Tech)

4.5.3. Regional (Comunidad de Madrid)

Comunidad de Madrid

PROGRAMA DE ATRACCIÓN DE TALENTO INVESTIGADOR

Ayudas para la contratación de doctores con experiencia (Modalidad 1)
Call 2021 Drs. Fernando Ajejas and Jose Garcia Calvo
Call 2019 Dr. Edmund Leary
Call 2018 Dr. Ana Espinosa
Call 2017 Dr. Enrique Cánovas

Ayudas para la contratación de jóvenes doctores (Modalidad 2)
Call 2020 Dr. Sra Hernandez
Call 2019 Dr. Ramón Bernardo, Dr. Víctor Vega
Call 2018 Dr. Yago Ferreirós, Dr. Alberto González

Ayudas para la Contratación de Doctorados Industriales
Call 2020 Alodia Farmacéutica S.L. (IND2020/IND- 17517). Arturo López (Dr. Alvaro Somoza)

Programa Operativo de Empleo Juvenil y la Iniciativa de Empleo Juvenil (YEI). Contratación de Investigadores predoctorales y postdoctorales (cofunded)
Total 4:
2019 (3 Predocs & 1 PostDoc)

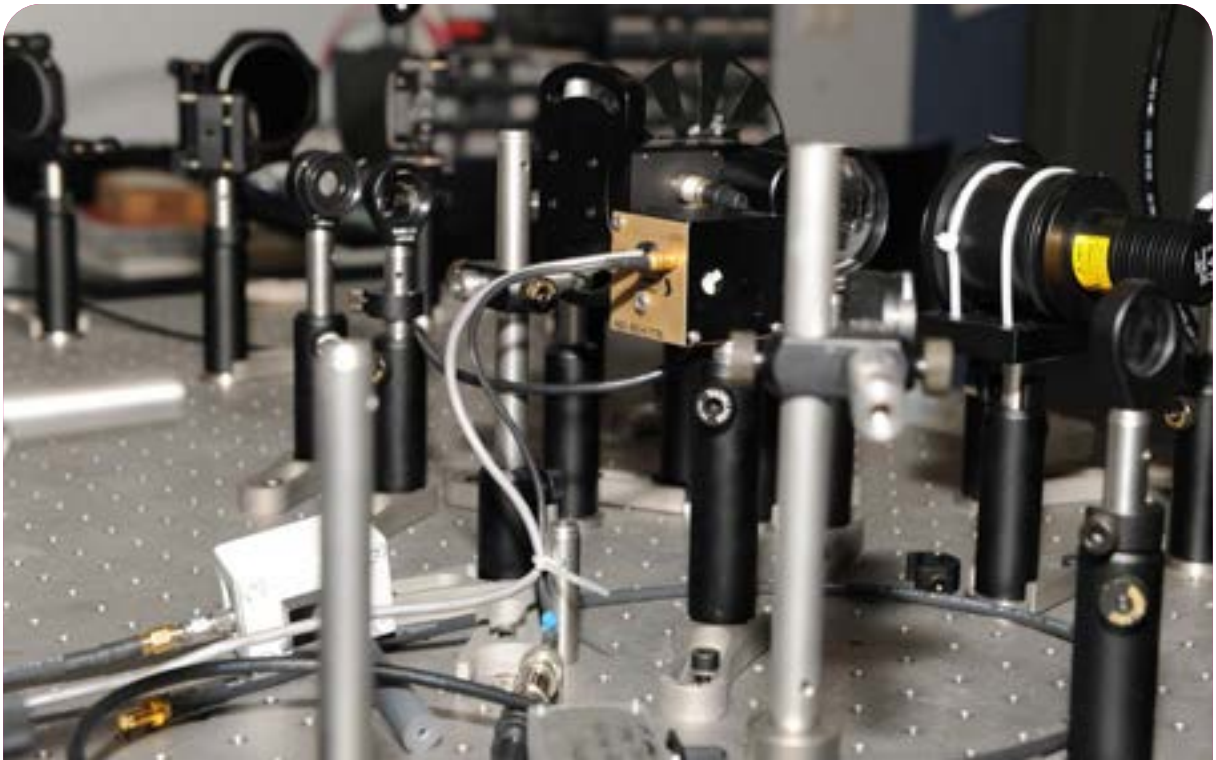
Programa Operativo de Empleo Juvenil y la Iniciativa de Empleo Juvenil (YEI). Realización de contratos de Ayudantes de investigación/ Técnicos de Laboratorio
Total 14:
2021 (3 Ayu. & 1 Tec.)
2020 (4 Ayu. & 1 Tec.)
2019 (3 Ayu. & 2 Tec.)

4.5.4. Others Programmes

Becas postdoctorales en Centros de Investigación y Universidades Españolas (Junior Leader)
Call 2021 Dr. Sara Hernandez
Call 2018 Dr. Manuela Garnica

Programa de Becas de Doctorado InPhINIT
Call 2020 Alonso Jose Campos

Ayudas Predoctorales en Oncología (APRO)
Call 2019 Dr. Catarina Coutinho



5. Training

1. Seminars

08/02/2022
Dr. José Ignacio Urgel
IMDEA Nanociencia. Spain
On-surface synthesis of novel carbon-based nanomaterials.

22/02/2022
Prof. Nazario Martín
IMDEA Nanociencia, Universidad Complutense de Madrid. Spain
Glycosylated carbon nanostructures for emergent viruses.

07/03/2022
Prof. Umberto Celano
IMEC. Belgium
Electrical AFM for Nanoelectronics

08/03/2022
Dr. Elena Ávila
University of Cambridge. UK
Materials discovery and molecular engineering of monolithic MOFs

11/03/2022
Dr. Paolo Perna
IMDEA Nanociencia. Spain
Spin orbitronics in graphene ferromagnet systems

22/03/2022
Dr. Valle Palomo
IMDEA Nanociencia. Spain
Chemical tools and nanoparticles for the fight against neurodegenerative diseases.

25/03/2022
Dr. Cristian Svetina
Paul Scherrer Institut. Switzerland
X-ray transient grating spectroscopy at X-ray free electron lasers

31/03/2022
Dr. José Requejo
Centro Nacional de Biotecnología - CSIC. Spain
Physical determinants of molecular events at biomembranes at the single-molecule level.

05/04/2022
Dr. Adriana Ávila
Auburn University. US
Breaking into cells: Intracellular delivery of double stranded (dsRNA) mediated by nanoparticles.
Prof. Feng Gao
Linköping University. Sweden
High-efficiency perovskite LEDs and their applications

06/04/2022
Dr. María Tenorio
Institut Català de Nanociència i Nanotecnologia. Spain
Atomically sharp lateral superlattice heterojunctions built-in nitrogen-doped nanoporous graphene

19/04/2022
Dr. Alberto Martín-Jimenez
Max Planck Institute for Solid State Research. Germany
Visualizing electrons in real-space and real-time

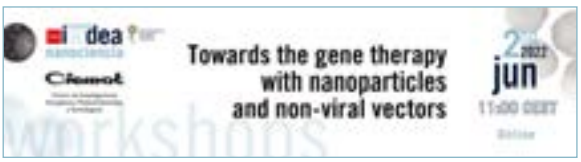
03/05/2022
Prof. María Antonia Herrero Chamorro
Universidad de Castilla La-Mancha. Spain
Smart materials: Characterization, application and self-healing

19/05/2022
Dr. Ana M. García Fernández
Universidad de Castilla La-Mancha. Spain
Heterochirality in peptides self-assembly: the situation beyond the mirror

25/05/2022
Prof. Richard Hildner
University of Groningen. Netherlands
Energy Transport in Supramolecular (Super-)Structures with Tailored Excited-State Energy Landscapes

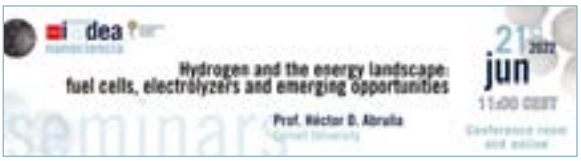
26/05/2022
Dr. Ilia Valov
Research Centre Juelich and RWTH-Aachen, Germany
Nanoionic-based memristive devices – a new perspective

31/05/2022
Prof. Dr. Wolfgang Kuch
Freie Universität Berlin. Germany
Ultrafast spin transfer in layered magnetic heterostructures



07/06/2022
Dr. Celia Herrera-Rincon
Universidad Complutense de Madrid. Spain
From microbes to minds: using a Brain-Bacteria Interface to discover a universal code for information-processing across scales of biological organization

21/06/2022
Prof. Héctor D. Abruña
Department of Chemistry and Chemical Biology Director, Center for Alkaline Based Energy Solutions Baker Lab., Cornell University. US
Hydrogen and the energy landscape: fuel cells, electrolyzers and emerging opportunities



08/07/2022
Prof. Dr. Sapun Parekh
University of Texas - Austin. US
Visualizing molecular structure and function in soft matter using vibrational microscopy

15/07/2022
Dr. Alberto Anadón
Université de Lorraine. France
Thermo-spin effects in multifunctional materials and interfaces

18/07/2022
Prof. Avi Schroeder
Technion – Israel Institute of Technology. Israel
Barcoded nanoparticles for precision cancer medicine: effects of metastasis and patient sex on anticancer efficacy
Yulia Maximenko
National Institute of Standards and Technology. US
Tunable bands and correlations in twisted double bilayer graphene in magnetic fields

19/07/2022
Prof. Michael S. Fuhrer
Monash University. Australia
The Topological Transistor as a Low-Voltage Switch

27/07/2022
Dr. Luis Cerdán
Instituto de Óptica "Daza de Valdés" (CSIC). Spain
Using the Variable Pump Intensity method to measure optical gains and unveil photophysical and photonic phenomena in active waveguides

29/07/2022
Dr. Renhao Dong
Technische Universität Dresden. Germany
Organic 2D crystalline materials: chemistry and functions

09/09/2022
Benjamin Lowe
Monash University. Australia
Strong correlations in a two-dimensional kagome metal-organic framework

20/09/2022
Colin Nuckolls
Columbia University. US
Superatomic 2D materials

11/10/2022
Dr. Allan Johnson
Institute of Photonic Sciences (ICFO). Spain
Imaging and spectroscopy of ultrafast phase transitions

20/10/2022
Monika Schied
Elettra Sincrotrone, Trieste. Italy
Molecular motors on surfaces studied by scanning tunnelling microscopy

15/11/2022
Dr. Sebastian Thompson
IMDEA Nanociencia. Spain
From intracellular temperature measurements to cell activity measurements

2. Conferences and Courses

23 courses in academic education

11 lectures in research institutions

3. Training programmes

As part of the Severo Ochoa programme a series of new training programmes have been launched over the past year:

IMDEA Nano Postdoctoral Programme in Nanoscience – a 2 year training plan developed to provide technical excellence in the multidisciplinary fields on offer at IMDEA Nanociencia.

IMDEA Nano Doctoral Programme in Nanomedicine – a 3 year programmes that allows our doctoral students in nanomedicine to gain a cutting-edge education in the developing area of nanomedicine.

IMDEA Nano Bachelor and Graduate Education in Nanotechnology – the aim of this particular programme is to engage undergraduate students from local Universities at an early stage and encourage them to gain experience in the IMDEA Nanociencia laboratories.

Transferable Skills Courses – the aim of this programme is to provide transversal training support in both research derived needs and non-scientific skills, these courses are open to all IMDEA Nanociencia staff.

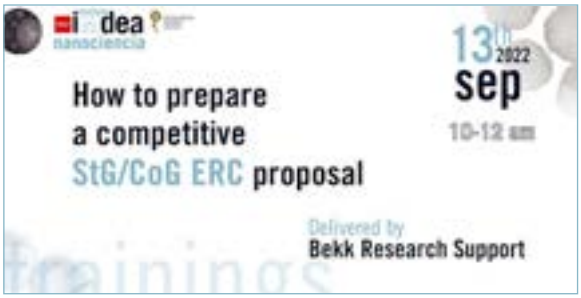
01-08/07/2022

Dr. Juliane Sauer

How to write a successful MSCA Postdoctoral Fellowship proposal

Oxygeneum

22/07/2022
Dr. Mercedes Hernández
IMDEA Nano Coffee Break Training: EIC 2022
IMDEA Nanociencia



22/11/2022
Dr. Alberto Bollero
IMDEA Nano Coffee Break Training: Horizon Europe Pillar II
IMDEA Nanociencia

4. PhD theses

21/02/2022
Esther Resines Urien
Switchable iron(II) coordination polymers for multifunctional applications
Supervisor: José Sánchez Costa

07/04/2022
Beatriz Loreto Rodilla González
Fabrication and characterization of nanostructures electrodes for more efficient low-invasiveness neural interfaces
Supervisor: Prof. Lucas Perez y Dr. Maria Teresa González

Beatriz Rodilla González
Fabrication and characterization of nanostructured electrodes for more efficient low invasiveness neural interfaces
Supervisor: Lucas Pérez, Teresa González

Vanesa Nozal
Modulación de la neurodegeneración con nuevas aproximaciones multidiana: diseño y síntesis de compuestos innovadores
Supervisor: Ana Martínez, Valle Palomo

06/05/2022
Cosme González Ayani
Study of TaS2 polymorphic van der Waals heterostructures by means of low temperature scanning tunneling microscopy/spectrocopy
Supervisor: Amadeo L. Vázquez de Parga, Fabián Calleja

31/05/2022
Irene Rubia Rodríguez
In silico testing strategies for translational magnetic hyperthermia
Supervisor: Daniel Ortega Ponce

09/06/2022
Juan Carlos Roldao
Quantum-chemical treatment of photophysical properties and processes in organic compounds for applications in energy and materials conversion
Supervisor: Johannes Gierschner, B. Milian-Medina, Rodolfo Miranda

13/06/2022
Aysegul Develioglu
Electron Transport in Mixed-Dimensional Heterostructures Based on Molecules
Supervisor: Enrique Burzurí

18/07/2022
Nuria Lafuente Gómez
Functionalised magnetic nanoparticles for cancer diagnosis and treatment
Supervisor: Álvaro Somoza

22/09/2022
Ciro Rodríguez Díaz
Modified gold nanostructures for biological applications
Supervisor: Álvaro Somoza

23/09/2022
Eider Rodríguez Sánchez
Moléculas orgánicas funcionalizadas para el diseño de materiales con propiedades avanzadas
Supervisor: Nazario Martín León, José Santos Barahona

07/10/2022
Cristina Martín Fuentes
On-surface design of nanomaterials based on ϖ-conjugated backbones
Supervisor: David Écija (IMDEA Nanociencia), José María Gallego (ICMM), Julio Camarero (IMDEA Nanociencia)

13/10/2022
Elena Sanz de Diego
Assessing the parameters modulating transducing capacity of magnetic nanoparticles based on ac magnetometry for bio sensing
Supervisor: Francisco J. Terán (IMDEA Nanociencia) y Aitziber López Cortajarena (CIC biomaGUNE)

11/11/2022
Javier Alvarez Conde
Synthesis and photophysical properties of novel azaindole derivatives in solution and self-assembled crystals
Supervisor: Juan Cabanillas (IMDEA Nanociencia)

24/11/2022
Adrián Gudín Holgado
Interfacial spin-orbit driven effects in perpendicular magnetic anisotropy stacks
Supervisor: Paolo Perna

01/12/2022
Demian Pardo
Preparation and scaling of flow-modified gold nanoparticles
Supervisor: Álvaro Somoza

14/12/2022
Rodrigo Crespo Miguel
Statistical Physics applied to population dynamics
Supervisor: Francisco Javier Cao García

16/12/2022
Claudia Fernández González
Nanoestructuras magnéticas electrodepositadas: nuevas geometrías y aplicaciones
Supervisor: Dr. Sandra Ruiz-Gómez (Max Planck Institute for Chemical Physics of Solids) Prof. Lucas Pérez (UCM / IMDEA Nanociencia)

Sergio Ramírez Barroso
Carbon nanodots: compositions, structure and photophysics
Supervisor: R. Wannemacher, D. García-Fresnadillo, N. Martín

5. Master

15/06/2022
Lucía Gómez Cruz
Interacciones magnéticas en Nanohilos
Supervisor: Prof.Lucas Pérez y Dr. Sandra Ruiz Gómez

28/06/2022
Jesús Alejandro Bueso de Barrio
Extracellular vesicles in ALS patients' cells: Characterization and study of their modulation upon pharmacological treatment
Supervisor: Valle Palomo, Peter Fojan

29/06/2022
Noelia Rodríguez Díez
Efecto de la composición de la matriz extracelular en la penetración de nanopartículas en el microentorno tumoral
Supervisor: Isabel Rodríguez

11/07/2022
Clara Pina Coronado
Biosensor de ADN basado en bismuteno y BODIPYs para la detección de SARS-CoV-2
Supervisor: Tania García Mendiola

Hanaa El Hajioui
Aptasensor electroquimioluminiscente nanoestructurado con disulfuro de molibdeno funcionalizado (f-MoS2) para la detección de SARS-CoV-2
Supervisor: Tania García Mendiola/Laura Gutiérrez Gálvez

16/07/2022
Pablo Pérez García
Materiales nanoestructurados para interfaces neuronales y medicina regenerativa
Supervisor: M. Teresa González y Lucas Pérez

21/07/2022
Estefanía Enebral Romero
Development of a nanostructured aptasensor for SARS-CoV-2 detection
Supervisor: Tania García Mendiola

08/09/2022
Patricia Caño Rebollar
Recubrimientos de nanocompuestos poliméricos para aplicaciones aeronáuticas
Supervisor: Jaime J. Hernández Rueda

16/09/2022
Zaida Curbelo Cano
Development of compounds based on permanent magnet particles and hydrogel matrix for 3D printing technology
Supervisor: E.M. Palmero, A. Bollero

01/09/2022
Lydia Abellán Vicente
Tuning the conductance of antiaromatic dibenzopentalene single molecule junction
Supervisor: Edmund Leary

6. Degree

01/06/2022
Ana Márquez
Desarrollo de nuevas plataformas sensoras modificadas con nanopuntos de carbono dopados para la determinación de hidroxicloroquina
Supervisor: Emiliano Martinez Periñán/Cristina Gutiérrez Sánchez

Daniel García Fernandez
Desarollo de un biosensor para la detección del SARS-CoV-2 basado en nanotetraedros de ADN y bismuteno
Supervisor: Tania García Mendiola/Laura Gutiérrez Gálvez

David Martín Gómez
Desarrollo de plataformas sensoras nanoestructuradas para la determinación electroquímica de disruptores endocrinos
Supervisor: Mónica Revenga Parra/Cristina Gutiérrez Sánchez

Lucía Expósito Tribaldos
Desarrollo de un sensor electroquimioluminiscente para la determinación de tiramina
Supervisor: Tamara Guerro Esteban/Cristina Gutiérrez Sánchez

06/06/2022
Paula Crespo
Temperatura de los lisosomas para el diagnóstico y tratamiento del cáncer
Supervisor: Sebastián Thompson

21/07/2022
Rafael Ramos Uña
Análisis de propiedades ópticas y mecánicas de Diamond Like Carbon sobre una nanoestructura anti reflectante en PMMA
Supervisor: Jaime J. Hernández Rueda

7. 4ESO + Empresa Programme. Comunidad de Madrid Program for training stays in companies

IES Rosa Chacel, Colmenar Viejo
1 week in April 2022
Students: Carmen Ramírez, Iker González
Supervisors: Dr. Alberto Bollero

IES Ramiro de Maeztu, Madrid
1 week in April 2022
Students: Manuel Eymar, Marco Matilla, Patrick Cimadevila
Supervisors: Drs. Ana Mª Pizarro, David Écija

IES Josefina Aldecoa, Alcorcón
1 week in April 2022
Students: Inés Vizcaíno, Eva Hernando, Lorenzo M. Briz
Supervisors: Drs. Valle Palomo, Cristina Flors, Mariela Menghini

Colegio Vallmont, Villanueva del Pardillo
1 week in April 2022
Students: Mateo Domínguez, Daniel Bona, Marcos Arellano, Marcos Trueba
Supervisors: Enrique Cánovas, Fabián Calleja, Borja Ibarra

University Student Internships - Agreement with Fundación Dádoris
1 month: July 2022
Students: Muad Mohand, Amina Ashkhat, Alejandra Escudero, María Victoria Pérez
Supervisors: Drs. Julio Camarero, Lucas Pérez, David Écija, Alberto Bollero, Francisco Terán, Emilio M. Pérez, Milagros Castellanos, Ramón Bernardo, Gorka Salas

8. Scientific Conferences (co-organized)

19/04/2022

Encuentro RIA TEC2SPACE - Instrumentación Astronómica en España

Daniel Granados, Mark Davies

https://nanociencia.imdea.org/es/imdea-nanociencia/seminarios/item/encuentro-ria-tec2space-instrumentacion-astronomica-en-espana

27/04/2022

3rd International Conference on Nanomaterials Applied to Life Sciences (NALS 2022)

Daniel Ortega

27/04/2022

Reunión de la Red Materiales Orgánicos Disruptivos para Energía Fotovoltaica (MODE-Fotovoltaica)

Nazario Martín León, Agustín Molina

12/05/2022

Final workshop of the project NoCanTher: magnetic nanoparticle-based approaches towards the clinic

17/05/2022

Magnetic nanoparticle-based approaches towards the clinic

Álvaro Somoza, Mark Davies

19/05/2022

Final workshop of the project NoCanTher: magnetic nanoparticle-based approaches towards the clinic

Alvaro Somoza, Mark Davies

25/05/2022

Raw Materials Summit. Moderator in the debate "Critical but not rare: Building European rare earth and permanent magnets value chain".

Alberto Bollero

02/06/2022

Towards the Gene Therapy with Nanoparticles and Non-viral Vectors

Alvaro Somoza, Begoña Sot, José Sánchez Costa, Gorka Salas

https://nanociencia.imdea.org/home-en/events/item/towards-the-gene-therapy-with-nanoparticles-and-non-viral-vectors

23/06/2022

3rd Workshop of the Network of Excellence 'Electrochemical Sensors and Biosensors' (ELECTROBIONET): Electrochemical sensors and biosensors

Encarnación Lorenzo

28/06/2022

PASSENGER first year Project Meeting and Workshop 'Magnets Matter!' organized by PASSENGER project as a satellite event of the EIT Raw Materials Expert Forum

Alberto Bollero

10/07/2022

12th International Conference on Porphyrins and Phthalocyanines (ICPP-12)

Giovanni Bottari

11/07/2022

Bienal RSEF - Simposio 15 - Novel Frontiers and Challenges in Magnetism

Esther Palmero

Bienal RSEF - Simposium: New Trends in Superconductivity - División GEFES

Mariela Menghini

http://gefes-rsef.org/el-gefes-en-la-xxxviii-bienal-de-la-rsef-murcia-11-15-de-julio-2022/

17/07/2022

28th International Union of Pure and Applied Chemistry (IUPAC) Symposium on Photochemistry

Cristina Flors

20/07/2022

Photo- and Electrocatalysis at the Atomic Scale

David Écija

20-22/07/22

Cursos de Verano de El Escorial. Nanociencia multidisciplinar: materiales avanzados 2D

08/09/2022

5th Spanish Conference on Biomedical Applications of Nanomaterials (SBAN) Table on Open Science

Gorka Salas

http://sban.es/

SBAN
Spanish Conference on Biomedical Applications of Nanomaterials

15/09/2022

O2DMAT Organic 2D crystalline materials: Chemistry, Physics and Devices. Madrid, Spain
Co-organized: MPIP-Mainz, TU Dresden

07/10/2022

1st meeting Excellence Network of the Red HIPERNANO
Daniel Ortega

10/10/2022

Spectral sHapIng For biomedical and energy applicaTions (SHIFT 2022)
Nazario Martín Leoón

26/10/2022

New Trends in 2D Materials
Jose Ángel Silva

07/11/2022

Reunión del proyecto Materiales Disruptivos Bidimensionales (2D) para la nueva transformación tecnológica
Nazario Martín Leoón

08/11/2022

Oportunidades del PERTE de Microelectrónica y Semiconductores en los sectores de Defensa y Seguridad
Daniel Granados

23/11/2022

Spanish & Portuguese Advanced Optical Microscopy Meeting
Cristina Flors

25/11/2022

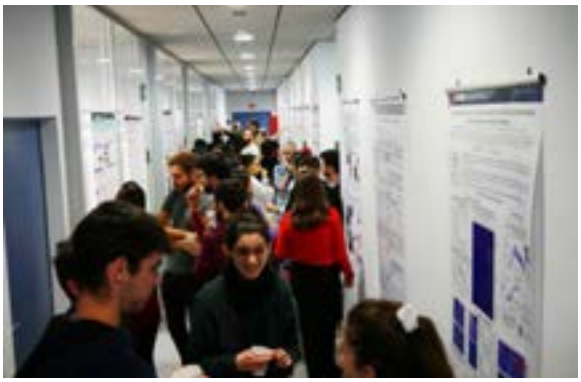
Jornada Científica Sobre Nuevas Plataformas Sensoras Miniaturizadas
Encarnación Lorenzo

12/12/2022

IDEAL PostDoc Welcome Day
Patricia López, Dr. Mark Davies, Dr. M.J.Villa (Project Management Offices)

15/12/2022

12th Early Stage Researchers workshop in Nanoscience
Dr. Ana M. Pizarro, Dr. Manuela Garnica, Dr. Gorka Salas, Dr. David Écija, Dr. Emilio M. Pérez, Patricia López



9. Alumni Programme events

26/05/2022

Career prospects with Patricia Bondía Raga

10. Collaborations with top Research Institutions

To increase our external collaborations (both national and international) we have supported our researchers at all levels to carry out placements in research institutes and industry >90 mobility months have been accumulated (incoming/outgoing) -funded by the SO, ERASMUS, EMBO etc. Some notable collaborations that have started this year are highlighted below

Quantum Technology Centre | Lancaster University

Collaboration between D Granados and R J Young (Programme 5)

iit ISTITUTO ITALIANO DI TECNOLOGIA

Equipment Development Agreement between F J Terán and T Pellegrino (Programme 3)

Max-Planck-Institut für Polymerforschung
Max Planck Institute for Polymer Research

Group of E Canovas has become an official Max Planck Partner Group, work will focus on a subclass of graphen-like 2D metal organic frameworks (Programme 1)

NAVWAR

D. Granados DEFROST Project (Programmes 1, 4, 5)

Strategic Alliance (Programmes 1, 4, 5)

Collaboration agreement between the European XFEL and IMDEA Nanociencia

11. Other collaborations

CENTRO ESPAÑOL DE METROLOGÍA (CEM) – A framework agreement was signed with IMDEA (issued in the BOE 30 March 2020). This agreement is focus in the areas of R&D, measurement methods and metrological traceability, education and outreach in Metrology. Thanks to this approach to CEM, IMDEA Nanociencia is participating in projects and proposals of EURAMET (the European Association of National Metrology Institutes) and its initiative EMPIR (European Metrology Programme for Innovation and Research) an initiative co-funded by the Horizon 2020 and the EMPIR participating states. EMPIR coordinates research projects to address grand challenges, while supporting and developing the SI system of measurement units.

NATO

Dr. Héctor Guerrero was selected in June 2020 by Secretary General of the North Atlantic Treaty Organization (NATO) as one of the twelve members of the high level Advisory Group on Emerging and Disruptive Technologies. His nomination was proposed by Spanish Ministry of Defence. The principal role of the Advisory Group will be to provide insights, advice and help challenge NATO approach on Emerging and Disruptive Technologies.

6. High-quality research infrastructure

1. Center for nanofabrication

The Centre for Nanofabrication is a joint proposal between the IMDEA Nanociencia and Campus of Excellence UAM+CSIC to create a facility of excellence for the fabrication of nanostructures and devices based on a wide range of nanosciences. The manufacturing of such nanostructures and devices is crucial for fundamental research, but also for the development of prospective nanotechnologies with commercial applications. The Centre for Nanofabrication is hosted in a latest generation clean room, with more than 200m^2 of clean room surface and more than 500m^2 in total, including the technical gray area. The clean room is divided in two main areas. The smaller section is approximately 60m^2 and has a certified air quality of ISO-5 (Class-100). This section is devoted to lithography processes. It is equipped with electron beam Lithography (e-Beam), Focused Ion Beam Lithography (FIB), Gas Assisted Ion/Electron beam lithography (Multi-GIS), Mask-less Optical lithography and Nano-Imprint Lithography. This section is also equipped with a small wet chemistry room for all the processes related to nano and micro lithography. The largest section of the clean room is about 140m^2 and has a certified air quality of ISO-6 (Class-1000). This part is dedicated to sample and device processing. It is equipped with several thin film evaporators (Thermal, eBeam), an unique Atomic Layer Deposition (ALD), inductively Coupled Plasma Reactive Ion etching (ICP-RIE) for deep cryo etching, Reactive Ion Etching for Metals and Insulators (RIE), Rapid thermal Processor (RTP), Profilometer (Dektak), Plasma Cleaner, Ozone Cleaner, Optical Microscopy, Wire Bonder, Diamond Scriber, Probe Satiation and Parameter analyzer. This section is also equipped with an encapsulation room and a large wet chemistry room.

The Centre for Nanofabrication provides the researches and users within the Cantoblanco campus of the UAM and in the framework of the Campus of Excellence project, with an efficient access to the necessary nanofabrication resources to be internationally competitive. Since IMDEA Nanociencia is an institute created and financed jointly by the regional Government of Madrid and the Government of Spain, the Centre for Nanofabrication is intentionally planned to be able to provide under demand services of nanofabrication to researchers of public institutions as well as to private companies.

2. New infrastructure

IMDEA Nanoscience's unique scientific-technical equipment broadens its competences, substantially improves the international competitiveness of its research groups and enhances the capabilities and resilience of the Madrid Region's R&D system.

- The spin-ARPES (spin & Angle Resolved Photoemission Spectroscopy) system has been fully operative during 2022. This equipment, unique in Spain, permit the characterisation of the electronic structure of spin polarised bands in surfaces and interfaces.

- The UHV e-beam evaporator was installed in the Centre of Nanofabrication as part of our framework collaboration with UAM, is available in the instrument's portfolio of the Center.

- A non-contact new STM laboratory in UHV at cryogenic temperaturas is also fully operative.

- The closed-circuit helium cryostat with ultra-low vibrations for optoelectronic cha-racterisation (AttoDry800) is fully operative since March 2020.

- Cell Culture and Microbiology Unit expansion to now host two laboratories working under BioSafety Level 2 are fully operative, enabling inhouse projects and encouraging transversal transfer of knowledge between programmes potentiating external collaborations.

- Laboratory for PhotoHyperthermia is assisting in the set-up of this unique facility.

- A laboratory focused on nanoparticles and chemical biology has been set-up

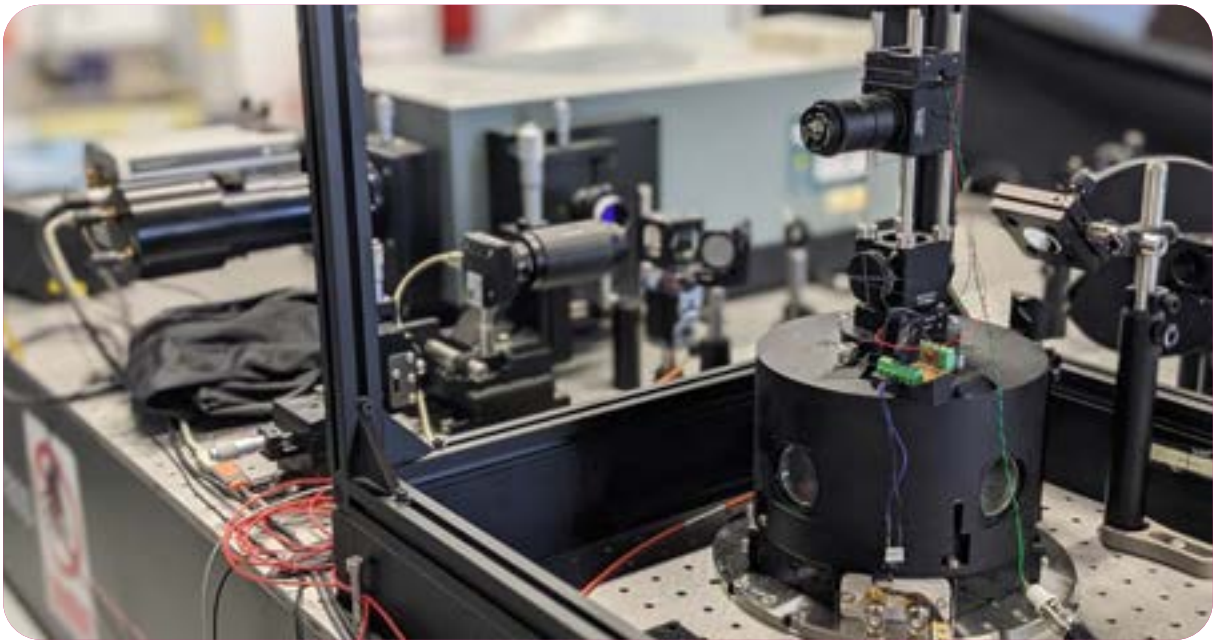
- The Biosensors in Neuroscience lab aims at developing tools to help find those drugs with the potential of making a difference in the treatment of rare and devastating neurodegenerative diseases, in particular amyotrophic lateral sclerosis (ALS), that currently lacks of effective therapy.

- Two complete laboratories associated with strategic projects of the institute have been implemented: Tsunami and Passenger.

The offer of these unique services is extended and complemented with the start-up of the different unique equipment acquired during 2022:

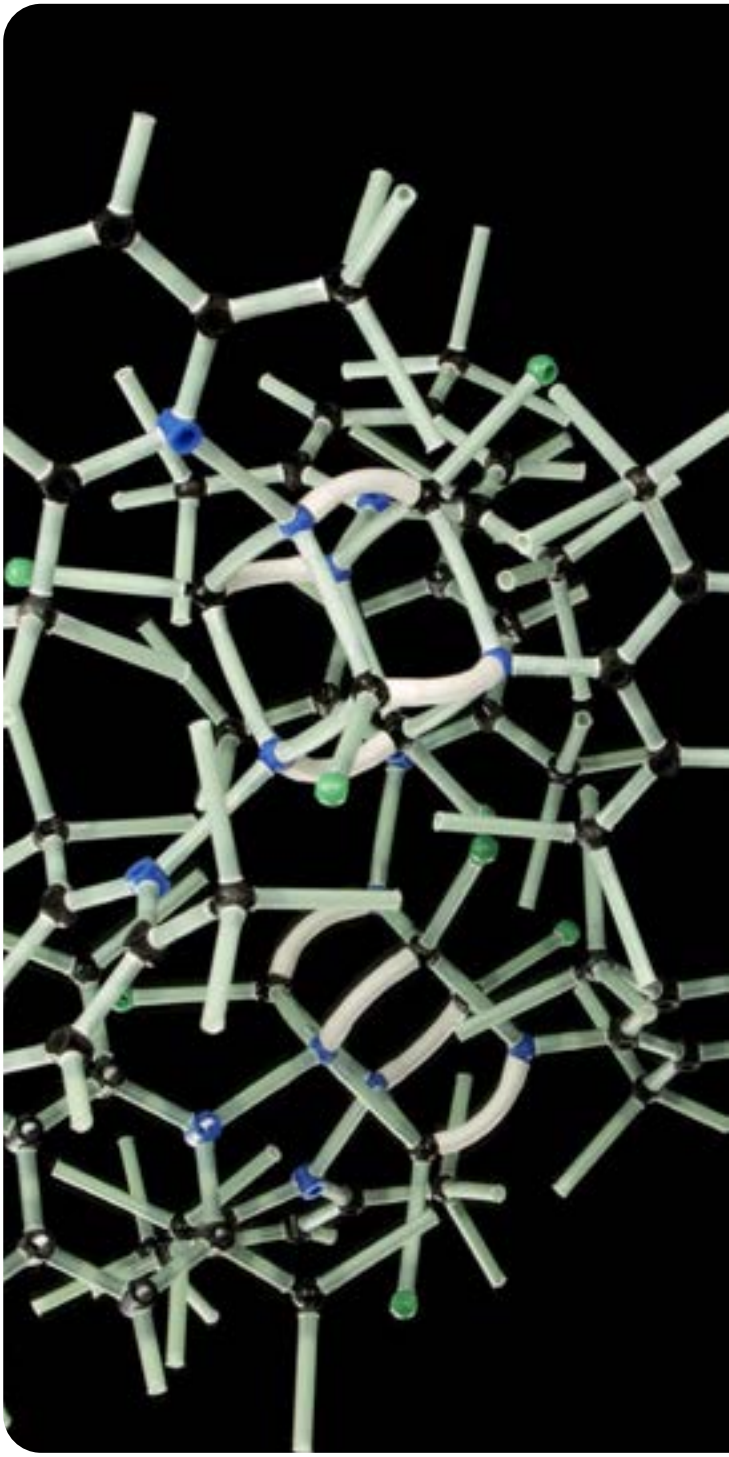
- JPK/Bruker Nanowizard 5 AFM equipment coupled to a fluorescence microscope, implemented in September 2022, is the first AFM of these characteristics installed in Europe. Its technical features allow access to size and structure quantification of viral nanoparticles, other pathogens, and nanostructures used in sensor development, as well as their dynamics.

- A femtosecond laser (7W) was installed in December 2022 in the Ultrafast Spectroscopy Laboratory. Its 7W of power will allow the development of several characterisation techniques with a high degree of complementarity between them. The equipment to be developed includes broadband,



time-resolved THz spectroscopy. This equipment links the microwave and far-infrared regions of the electromagnetic spectrum, a region rich in information about the presence of molecular bonds. In turn, this equipment can determine the temporal dynamics of other elementary processes (emission and absorption) crucial for the detection of pathogens and their possible mutations by means of optical techniques (such as time-resolved photoluminescence and time-resolved absorption).

- Optical tweezers + TERS, installed in December 2022, is unique in its class and will allow IMDEA Nanoscience to position itself as an international reference in the fields of Biophysics and Supramolecular Chemistry at the single molecule level. In addition, it allows the study of dynamic and mechano-chemical processes that determine the functioning of virus proteins essential for its replication. This information cannot be obtained with classical biochemical and structural methods and will contribute to the identification of new therapeutic targets for the treatment of viral infection. This equipment allows the manipulation and study of the dynamics of non-covalent chemical interactions in individual molecules, in real time and with unprecedented resolution



3. RedLab – Network of laboratories of the Regional Government of Madrid

278
Laboratory of Surfaces
Contact: F. Calleja

279
Laboratory of Advanced Optical Characterization
Contact: R. Wannemacher

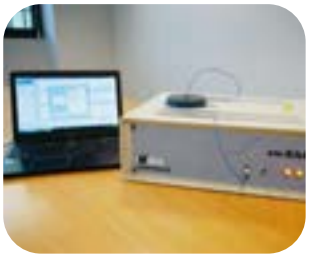
280
Laboratory of Femtosecond Spectroscopy
Contact: J. Cabanillas

282
Laboratory of Nanomagnetism
Contact: P. Perna

293
Laboratory of Atomic Force Microscopy
Contact: C. Flors

349
Laboratory of Cell Cultures
Contact: A. Pizarro

363
Laboratory of Nanofabrication
Contact: D. Granados



398
Laboratory of the Instrumentation Service
Contact: F. Terán

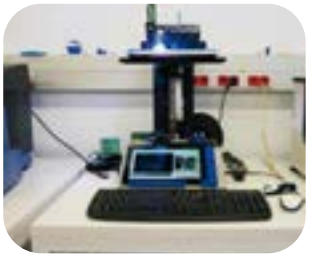
416
Laboratory of Molecular Motors Manipulation
Contact: B. Ibarra

417
Laboratory of Oligonuclecleotides and Modified Particles
Contact: Á. Somoza

432
Laboratory of Nanostructured Functional Surfaces
Contact: I. Rodríguez

433
Laboratory of Catalitic Surfaces Spectroscopy in Controlled Atmosphere
Contact: C. Navío

435
Laboratory of Nanomaterials Characterization
Contact: G. Salas



436
Laboratory of Processing and Characterization of Multifunctional Materials
Contact: E. Palmero

438
Laboratory of Biomolecules Preparation for Nanotechnological Applications
Contact: B. Sot

441
Laboratory of Photovoltaic Energy
Contact: A. Molina

447
Laboratory of Electromagnetic Trials in silico
Contact: D. Ortega

7. Awards and honours

IMDEA Nanociencia recognized with the "HR Excellence in Research" Award

HR EXCELLENCE IN RESEARCH

Prof. Rodolfo Miranda receives the National Nanotechnology Award

Prof. Fernando Martín is conferred his Honorary Doctor by Stockholm University

Francisco Guinea
Medalla Echegaray

Real Academia de Ciencias Exactas,
Naturales y Físicas

IMDEA Nanociencia

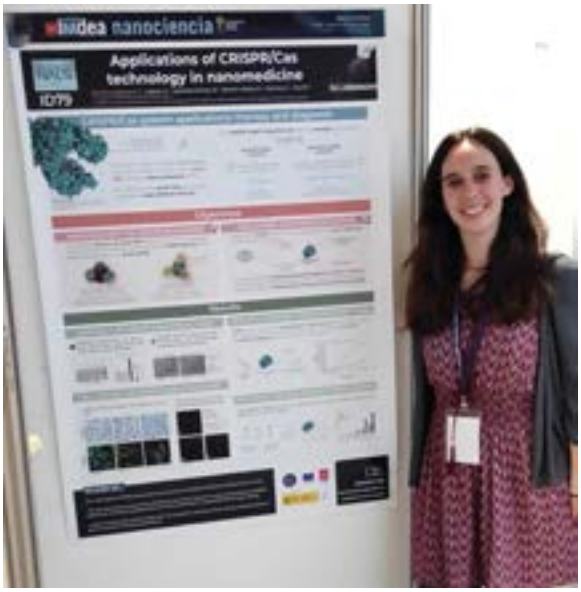
The IMDEA Nanociencia team takes the podium in the international Nanocar Race

Alejandra Jacobo

Doctoral Thesis Award Nanolito 2022

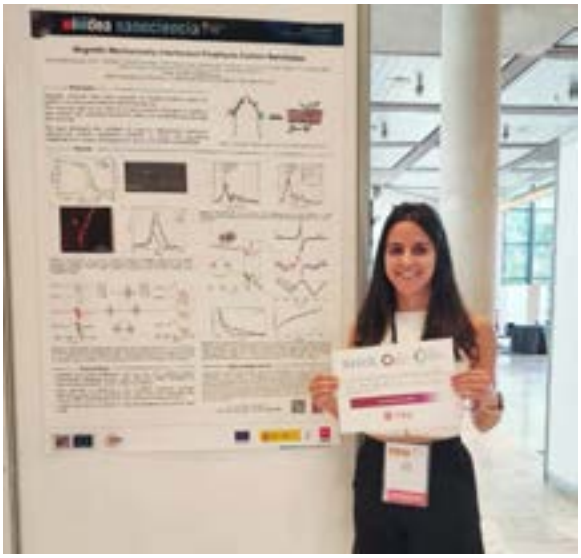
Carmen Escalona

Best poster award at the 3rd International Conference on Nanomaterials Applied to Life Sciences



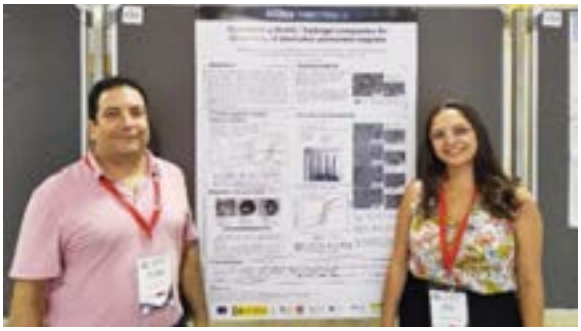
Sara Moreno

Best Poster Award at the XXXVIII Biennial Meeting of the Spanish Royal Society of Chemistry 2022



Zaida Curbelo

Best Poster Award at the Symposium "Novel frontiers and challenges in magnetism" in the framework of the Biennial Meeting of the Spanish Royal Society of Physics 2022



Saül García

Optica Student Paper Award at the 2022 Optica Advanced Photonics Congress

Vanesa Nozal

Most meritorious runner up of EFMC-YSN PhD Prize 2022 at the European Federation for Medicinal Chemistry and Chemical Biology

Marco Ballabio

Best Poster Presentation Award at the "nanoGe Conference: Organic 2D Cristalline Materials: Chemistry, Physics and Devices (O2DMAT)"

Sandra Ruiz Gómez y Vanesa Nozal

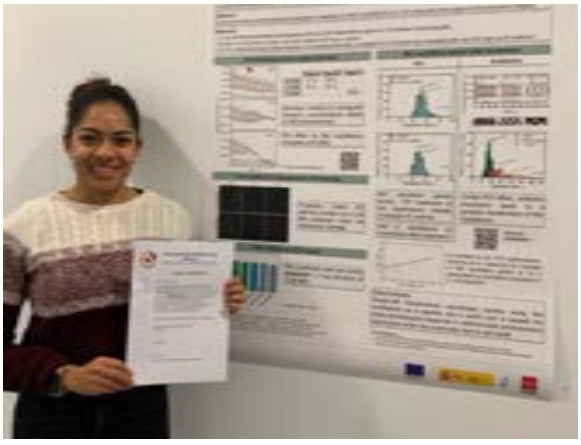
Accessit: Premios Margarita Salas de Investigación at the Ayuntamiento de Madrid

Mar Alcaraz

Best Flash Talk at the 5th edition of "Brain Wars: the future is in your hands" at the RSEQ (sección territorial Madrid), Student Chapter Madrid UCM

Ingrid V. Ortega

Best poster award (2nd prize) at the Spanish & Portuguese Advanced Optical Microscopy Meeting



Noelia Rodríguez Díez

Twitter Communication Award at the 12th Early Stage Researchers Workshop in Nanoscience at the Fundación IMDEA Nanociencia

Claudia Cardozo Yusti

Best Poster Communication Award at the 12th Early Stage Researchers Workshop in Nanoscience at the Fundación IMDEA Nanociencia

Saül García Orrit

Best Oral Communication Award at the 12th Early Stage Researchers Workshop in Nanoscience at the Fundación IMDEA Nanociencia

8. Communication and Outreach

1. Invited Lectures

20/01/2022
XVII Ciclo de conferencias de divulgación científica de la Real Academia de Ciencias Exactas, Físicas y Naturales
Nazario Martín
Nanociencia: la importancia de lo pequeño

16/02/2022
Real Academia de Doctores de España
Nazario Martín León
Bolas de carbono y azúcar para virus emergentes

11/04/2022
Seminarios del Departamento de Física de la Materia Condensada (FMC) de la Universidad Autonoma de Madrid
Julio Camarero, Paolo Perna
Spin-Orbitronics in graphene-ferromagnet systems

10/05/2022
Institute of Organic Chemistry and Biochemistry of the Czech Academy of Sciences
Nazario Martín León
Synthetic (Chiral) Molecular Nanographenes

16/05/2022
Congreso II Multimat para el intercambio y difusión de conocimientos entre el profesorado y personal investigador
Emilio M. Pérez

16/05/2022
Seminario de la Facultad de Ciencias de la USAL
Wojciech Gawelda
Tracking ultrafast structural dynamics in condensed phase matter using X-ray free electron lasers

25/05/2022
Instituto de Química Física Rocasolano (IQFR)
Isabel Rodriguez
Bioinspired Nanotechnology

07/06/2022
Ciamician-González Award Ceremony (Italian Chemical Society)
Nazario Martín León
Unveiling the Properties of Chiral Synthetic Molecular Nanographenes

13/07/2022
Physics Deparment of the Centro Atómico Bariloche
Ester M. Palmero
Novel routes for developing alternative permanent magnets: from the synthesis of tuned rare earth-free composites to additive manufacturing

17/11/2022
Center of Biophotonics Seminars, University of St Andrews
Cristina Flors
Advanced combinations of fluorescence and atomic force microscopy to study Biology at the nanoscale

16/12/2022
Invited Talk , Progarama Rdivendres, EURECAT
Isabel Rodriguez
Nanotechnologia Bioinspirada

2. Events

28/01/2022

Jornadas de Investigación del instituto Ventura Rodríguez, Boadilla del Monte, Madrid, Spain

"El espacio en la vida cotidiana"

Hector Guerrero

02/02/2022

Rodolfo Miranda

Discurso de Rodolfo Miranda en la entrega de Premios de Investigación de la Comunidad de Madrid

Madrid

https://www.youtube.com/watch?v=H6aFj7_avgY
https://www.youtube.com/watch?v=2wP6lPb27aQ

10/02/2022

Día Internacional de la Mujer y la Niña en la Ciencia

Alumnos del ciclo FP "Imagen para el Diagnóstico y Medicina Nuclear" de la Universidad Europea Online

https://11defebrero.org/2021/12/18/acercate-a-la-nanociencia-lo-pequeno-es-diferente-4/

14/02/2022

Día Internacional de la Mujer y la Niña en la Ciencia

Alumnos del IES Cervantes e IES Santa Teresa de Jesús, Madrid, Spain

Online

Cristina Martín Fuentes

16/02/2022

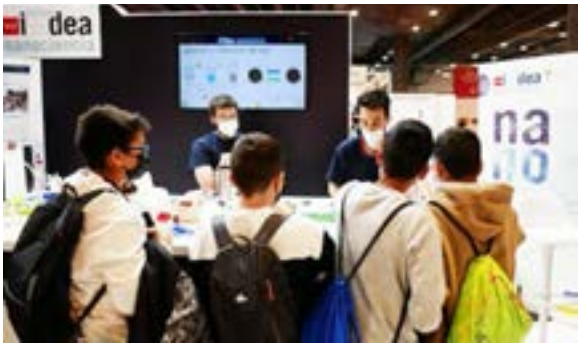
Stand de los Institutos IMDEA en la Feria Transfiere 2022, Málaga, Spain

https://fycma.com/evento/transfiere-2022/?lang=en

17/02/2022
José Ángel Silva-Guillén
La física de lo "pequeñico". Investigando materiales en el nanomundo.
Universidad de Alicante. Sede Universitaria de Villena.
Conferencias "Villena en la frontera del conocimiento"
https://web.ua.es/es/seus/villena/sede-universitaria-de-villena.html

25/02/2022
Rodolfo Miranda
Acto 15 aniversario Institutos IMDEA
Madrid
https://www.youtube.com/watch?v=cWIaCfU81jQ

02/03/2022
Feria Madrid es Ciencia, Madrid, Spain
https://www.madrimasd.org/feriamadridesciencia2022/



04/03/2022
Arturo González Camuñas, Carmen Escalona Noguero, Ciro Rodriguez Díaz, Eduardo García Garrido, Irene de la Iglesia del Pino, María López Valls, Nuria Lafuente Gómez, Paula Milán Rois
Visita al colegio Humanitas de Torrejón de Ardoz
https://twitter.com/NanoBioTube/status/1499747954525188107?s=20&t=ivwJCRyJKkbI-QYJvN3Mow

10/03/2022
Rodolfo Miranda
Visita de la Fundación Cellbitec y el Parque Científico-Tecnológico de Almería
Madrid

16/03/2022
Isabel Rodríguez
Use of nanoparticles and evolutionary AI in cancer therapies
Online
https://www.eventbrite.co.uk/e/ai-driven-cancer-nanotherapies-from-computation-to-clinic-tickets-272691225797

17/03/2022
Nazario Martín
Jornadas sobre la carrera investigadora de la Sociedad Española de Bioquímica y Biología Molecular (SEBBM- UCM)

21/03/2022
Cuenta la Ciencia: Charla en el marco del proyecto MAD Covid del CSIC
Valle Palomo

21/03/2022
Ciencia En El Barrio (CSIC, FECYT)
Valle Palomo visita el IES Ciudad de los Ángeles, Madrid
https://www.facebook.com/223039928061740/posts/1689917948040590/

23/03/2022

Nanocar Race II

David Écija, Emilio Pérez, Koen Lauwaet, Tomás Nicolás, Ignacio Urgel, Ana Barragán, Ana Sánchez

30/03/2022

Semana de la Ciencia 2022, Ávila

IES Vasco de la Zarza, Ávila

J. Sánchez Costa

http://www.vascodelazarza.com/Semana-de-la-Ciencia/menu/46/

31/03/2022

Vista divulgativa para estudiantes de segundo de bachillerato

J. Sánchez Costa

06/04/2022

Mercedes Hernández, Laura Lorente, Elena Alonso

11ª Conferencia del Programa Marco de Investigación e Innovación de la Unión Europea en España - Horizonte Europa

PASSENGER: Pilot Action for Securing a Sustainable European Next Generation of Efficient RE-free magnets

Valencia, Spain

Oral contribution

https://eventos.cdti.es/ES/Conferencia_HorizonteEuropa_2022/Programa

22/04/2022

Ciclo de conferencias divulgativas "Academia de Ciencias en las Aulas" de la Real Academia de Ciencias Exactas, Físicas y Naturales, para el IES Ribera del Tajo

Nazario Martín León

22/04/2022

Nanociencia to-go

Universidad de Mayores UAH, Madrid, Spain

Álvaro Somoza, Teresa González en la asignatura «Nanotecnología: una contribución a la mejora de la salud" impartida por Sandra García Gallego y Francisco Javier de la Mata

11/05/2022

Nanociencia to-go

Visita de los alumnos de la Universidad de Mayores de la UCM, Madrid, Spain Daniel Granados, Lucas Pérez, Isabel Rodríguez, Juan Cabanillas Emilio M. Perez,

https://twitter.com/IMDEA_Nano/status/1525037278766276611?s=20&t=6bzuVE_6SHSlxwqCvb4V4A

12/05/2022

José Sánchez Costa

Encuentro IMDEA - INDRA

16/05/2022

Emilio M. Pérez

Congreso II Multimat para el intercambio y difusión de conocimientos entre el profesorado y personal investigador

Almuñécar

http://multimat.everyware.es/

Wojciech Gawelda

Seminario de la Facultad de Ciencias de la USAL: "Tracking ultrafast structural dynamics in condensed phase matter using X-ray free electron lasers"

Salamanca

https://twitter.com/OpticaExtrema/status/1521416652746809345?s=20&t=6bzuVE_6SHSlxwqCvb4V4A

18/05/2022

Nazario Martín León

Diálogo grabado y organizado por la Fundación Rafael Del Pino, presentación por Vicente J. Montes Gan

18/05/2022

Julia García Pérez

IES Luis García Berlanga: "Nanociencia y nanotecnología: investigación en sala blanca"

18/05/2022

Fase previa del Concurso 'Tesis en 3 minutos', organizado por la UAM, Madrid

Arturo Villechenous

Desarrollo de fármacos anticancer y estudios de catálisis de complejos tipo 'medio-sándwich' de rodio(III) e iridio (III)

https://twitter.com/IMDEA_Nano/status/1526877205334220806?s=20&t=6bzuVE_6SHSlxwqCvb4V4A

Claudia Cardozo

Complejos de rutenio y osmio de medio sándwich tipo 'tether' como agentes anticancerígenos.

https://twitter.com/IMDEA_Nano/status/1526877198292078593?s=20&t=6bzuVE_6SHSlxwqCvb4V4A

25/05/2022

Alberto Bollero

Raw Materials Summit. Moderator in the debate "Critical but not rare: Building European rare earth and permanent magnets value chain"

Berlin, Germany

https://www.eitrmsummit.com/

25/05/2022
Isabel Rodríguez
Seminario IQFR-CSIC: Bioinspired Nanotechnology
Madrid
https://www.youtube.com/watch?v=4_5kOa-9D10

26/05/2022
Nazario Martín
Diálogos de Ciencia en Español: "La nanotecnología llega a la vida: cómo la nanotecnología está transformando la medicina y el futuro de la biología"
Online
https://frdelpino.es/conferencia-frdelpino/dialogo-online-de-ciencia-en-espanol-sonia-conteranazario-martin-y-antonio-garcia-guerra/

29/05/2022
José Sánchez Costa
Introducion a la nanociencia para Liceo Frances Saint Exupery

06/06/2022
Nanociencia to-go
Visita de los alumnos de la Universidad de Mayores de la UCM, Madrid, Spain
Emilio M. Pérez, Juan Cabanillas, Manuela Garnica

13/07/2022
Euroscience Open Forum ESOF-16. Manchester, UK
Alberto BolleroInvited by EU Commision to share stand: "Permanent magnets without critical raw materials"

15/09/2022
Rodolfo Miranda
Apertura del Curso Académico 2022-2023 de la Universidad Autónoma de Madrid con la charla titulada "El tsunami de la Nanotecnología"
Madrid
https://www.youtube.com/watch?v=R7vzwKzfZuY

21/09/2022
«Nanociencia entretenida» visita a los mayores de la Residencia Ciempozuelos, Madrid, Spain
Patricia Lopez, Mercedes Hernandez, Laura Lorente, Clara, Guille, Saül Orrit y Josefa Ros

Acto de inauguración de la Exposición «Investigación+Vida» de la Asociación Española Contra el Cáncer
Coslada
Sebastian Thompson
https://twitter.com/ContraCancerMAD/status/1572559864693510149?s=20&t=6BZreEY0I75exfjnwbOlBw

30/09/2022
Noche Europea de los Investigadores

Misión Investiga en el Círculo de Bellas Artes, Madrid, Spain
Alberto Martin Asensio, Álvaro Somoza, Milagros Castellanos, Nuria Lafuente, Catarina Coutinho
https://nanociencia.imdea.org/home-en/events/item/european-researchers-night-2022-circulo-de-bellas-artes

En la Universidad Autónoma de Madrid, Spain
Irene Pardo, Clara Escalona
https://twitter.com/NanoBioTube/status/1575562627262345216?s=20&t=J1dkPJj6lHsEQV-fleb-0Q

La investigación a escena en CaixaForum, Madrid, Spain
Sara Mejías, Alonso Campos
https://nanociencia.imdea.org/home-en/events/item/european-researchers-night-2022-caixaforum?category_id=47

5 misiones de la UE en la Residencia de Estudiantes, Madrid, Spain
Valle Palomo
https://nanociencia.imdea.org/home-en/events/item/european-researchers-night-2022-residencia-estudiantes

13/10/2022
SHIFT 2022, Tenerife: Roundtable on Critical and Strategical Raw Materials
https://shifttenerife.com/program-venue/critical-round-table/

19/10/2022
Cisco investors visit together with the Spanish National government in the framework of the Spanish PERTE-Chip and European Chip-Act

21/10/2022
Nazario Martín León
Charlas en la Facultad de Ciencias Químicas de la Universidad Complutense de Madrid. Carrera investigadora: ¿Cómo afrontar el reto de la financiación?

03/11/2022
Rodolfo Miranda
Día T Transferencia 2022, Universidad de Almería
Almería

07/11/2022
Rodolfo Miranda
Round table "Ciencia en todo, Ciencia para todos"
Madrid
https://www.youtube.com/watch?v=sFHLIp6miNM

08/11/2022
Daniel Granados
Oportunidades del PERTE de Microelectrónica y Semiconductores en los sectores de Defensa y Seguridad
Madrid
https://www.fundacioncirculo.es/oportunidades-del-perte-de-microelectronica-y-semiconductores-en-los-sectores-de-defensa-y-seguridad/

10/11/2022
Valle Palomo
Jornada 'Mujeres en la ciencia'. Actividad de divulgación organizada por el Instituto Aragonés de la Juventud

11-17/11/2022
Emilio M. Pérez, Valle Palomo, Mª Teresa González Pérez
Semana de la Ciencia y la Innovación
https://www.semanacienciamadrid.org/actividades/listado?palabras=imdea+nanociencia&areatematica=&tipoactividad=&disciplina=&fecha=&horaDesde=&horaHasta=&fechadesde=&fechahasta=&municipio=&organizador=&publicoindividual=&publicogrupos=&tematica=&submit=Buscar

15-17/11/2022
Alberto Bollero
PUZZLE X 2022, Barcelona, Spain
Panel: Sustainable future through advanced materials
https://www.puzzlex.io/2022/puzzle-x-program

28/11/2022
Mercedes Hernández
Train the trainer on MSCA COFUND - MSCA NCP NETWORK
Online
https://horizoneuropencpportal.eu/academy/train-trainer-msca-cofund

02/12/2022
Valle Palomo
Nanociencia para todos: visita de los estudiantes del Máster de Biotecnología Industrial y Ambiental de la Universidad Complutense de Madrid

21/12/2022
Ester M. Palmero (Group Leader: Alberto Bollero)
Talk about 3D-printing of permanent magnets to the students of Sciences IES Murgi

3. TV and radio appearances

05/04/2022
Daniel Granados
Entrevista para RTVE, canal 24h, programa "La tarde", sobre el PERTE que lanzará el Gobierno de 11.000 millones en microchips
https://www.rtve.es/play/videos/la-tarde-en-24-horas/04-04-2022-2/6478362/

15/04/2022
Alberto Bollero
Entrevista para Telemadrid Noticias sobre el proyecto PASSENGER
https://www.telemadrid.es/programas/telenoticias-1/Telenoticias-1-15042022-2-2441775817--20220415043322.html

31/05/2022
Alberto Bollero
Las materias primas en Europa, en Radio Club SER Tenerife
https://www.youtube.com/watch?v=FsBmYgFA2wY
https://www.youtube.com/watch?v=qubiyU2e490

06/07/2022

Rodolfo Miranda

En Radio Libertad, programa Patenta Tu Éxito: "Premio Nacional de Nanotecnología, la ciencia que transformará el mundo"

https://www.ivoox.com/nanotecnologia-ciencia-transformara-mundo-audios-mp3_rf_89536971_1.html

03/08/2022

Alberto Bollero

Programa de radio nacional "Por tres razones" de RTVE: ¿Por qué no explotamos en España "minerales estratégicos"?

https://www.rtve.es/play/audios/por-tres-razones/minerales-estrategicos-tierras-raras-csic-ciencia/6663334/

13/09/2022

Alberto Bollero

Pura Ciencia Ser Las Palmas

https://play.cadenaser.com/audio/081RD010000000091133/

4. Press releases

10/01/2022

A boost to the optical properties of gold nanoclusters by designed proteins

Juan Cabanillas, Aitziber L Cortajarena

https://nanociencia.imdea.org/home-en/news/item/a-boost-to-the-optical-properties-of-gold-nanoclusters-by-designed-proteins

19/01/2022

IMDEA Nanociencia receives the 'HR Excellence in Research' award from the European Commission

https://nanociencia.imdea.org/home-en/news/item/imdea-nanociencia-receives-the-hr-excellence-in-research-award-from-the-european-commission

02/02/2022

Interview to Director Rodolfo Miranda, 'Miguel Catalán' 2021 Research Award

https://nanociencia.imdea.org/home-en/news/item/interview-to-director-rodolfo-miranda-miguel-catalan-2021-research-award

10/02/2022

Observación directa del movimiento de los electrones en moléculas complejas

Fernando Martín

https://www.nanociencia.imdea.org/home-en/news/item/observacion-directa-del-movimiento-de-los-electrones-en-moleculas-complejas

21/02/2022

Pure boric acid does not show room-temperature phosphorescence

Johannes Gierschner

https://nanociencia.imdea.org/home-en/news/item/pure-boric-acid-does-not-show-room-temperature-phosphorescence

25/02/2022

Prof. Rodolfo Miranda is awarded with the National Nanotechnology Award

https://nanociencia.imdea.org/home-en/news/item/prof-rodolfo-miranda-is-awarded-with-the-national

15 aniversario de los Institutos Madrileños de Estudios Avanzados

https://nanociencia.imdea.org/home-en/news/item/15th-anniversary

09/03/2022

Efficient Photogeneration: A Means of Synthesising Highly Reactive Molecules

Fabián Calleja

https://nanociencia.imdea.org/home-en/news/item/efficient-photogeneration-a-means-of-synthesising-highly-reactive-molecules

IMDEA Nanociencia participates in the outreach fair 'Madrid Es Ciencia'

https://nanociencia.imdea.org/home-en/news/item/imdea-nanociencia-participates-in-the-outreach-fair-madrid-es-ciencia

17/03/2022

IMDEA Nanociencia prepares for the F1 of the nanoworld

David Écija, Emilio M. Pérez

https://nanociencia.imdea.org/home-en/news/item/imdea-nanociencia-prepares-for-the-nanocar-race-ii?category_id=48

18/03/2022

First patient is enrolled in the NoCanTher's clinical study

http://www.nocanther-project.eu/index.php/news/70-first-patient-is-enrolled-in-the-nocanther-s-clinical-study

IMDEA Nanociencia coordinated NOCANTHER project enrolls the first patient in a clinical trial

https://nanociencia.imdea.org/home-en/news/item/imdea-nanociencia-coordinated-nocanther-project-enrolls-the-first-patient-in-a-clinical-trial

Vall d'Hebron enrolls the first patient in a clinical trial designed to treat locally advanced pancreatic cancer with nanoparticles

https://www.vhio.net/vall-dhebron-enrolls-the-first-patient-in-a-clinical-trial-designed-to-treat-locally-advanced-pancreatic-cancer-with-nanoparticles/

30/03/2022

The IMDEA Nanociencia team takes the podium in the international Nanocar Race

https://nanociencia.imdea.org/home-en/news/item/the-imdea-nanociencia-team-takes-the-podium-in-the-international-nanocar-race

07/04/2022

The IMDEA Nanoscience Open Science Project receives funding from FECYT's María de Guzmán call

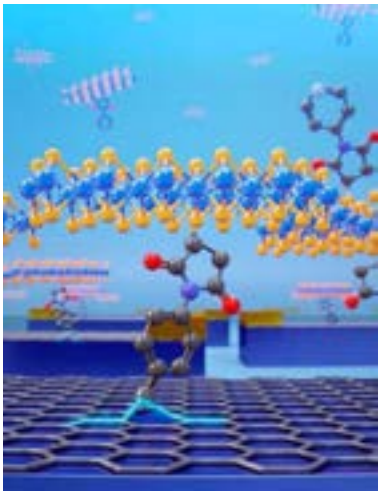
https://nanociencia.imdea.org/home-en/news/item/the-imdea-nanoscience-open-science-project-receives-funding-from-fecyt-s-maria-de-guzman-call

25/04/2022

Emilio M. Pérez, Enrique Burzurí

Beyond van der Waals: next generation of covalent 2D-2D heterostructures

https://nanociencia.imdea.org/home-en/news/item/beyond-van-der-waals-next-generation-of-covalent-2d-2d-heterostructures



19/05/2022

IMDEA Nanociencia hosts the final workshop of the project NoCanTher: magnetic nanoparticle-based approaches towards the clinic

Alvaro Somoza

https://nanociencia.imdea.org/home-en/news/item/imdea-nanociencia-hosts-the-final-workshop-of-the-project-nocanther-magnetic-nanoparticle-based-approaches-towards-the-clinic

23/05/2022

Prof. Rodolfo Miranda, director of IMDEA Nanociencia, receives the Golden Shield of the City of Almería

https://nanociencia.imdea.org/home-en/news/item/prof-rodolfo-miranda-director-of-imdea-nanociencia-receives-the

27/05/2022

Rodolfo Miranda

Prof. Rodolfo Miranda receives the National Nanotechnology Award

https://nanociencia.imdea.org/home-en/news/item/prof-rodolfo-miranda-receives-the-national-nanotechnology-award

30/05/2022

Prof. Alberto Bollero presents the PASSENGER project during the Raw Materials Summit in Berlin

https://nanociencia.imdea.org/home-en/news/item/prof-alberto-bollero-presents-the-passenger-project-during-the-raw-materials-summit-in-berlin

14/06/2022

Engineering periodic lanthanide networks by metal exchange

David Écija

https://nanociencia.imdea.org/home-en/news/item/engineering-periodic-lanthanide-networks-by-metal-exchange

01/07/2022

Emilio M. Pérez

Best Poster Award to Sara Moreno at the Biennial Meeting of RSEQ 2022

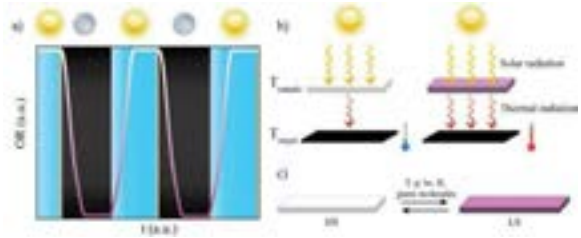
https://nanociencia.imdea.org/home-en/news/item/best-poster-award-to-sara

05/07/2022

José Sánchez Costa, Ana Espinosa

Temperature fluctuation control with a switchable spin-crossover material

https://nanociencia.imdea.org/home-en/news/item/temperature-fluctuation-control-with-a-switchable-spin-crossover-material



11/07/2022

Alberto Bollero

Best Poster Award to Zaida Curbelo at the Biennial Meeting of RSEF 2022

PASSENGER project

https://nanociencia.imdea.org/home-en/news/item/best-poster-award-to-zaida-curbelo-at-the-biennial-meeting-of-rsef-2022

15/07/2022

Isabel Rodríguez

Doctoral Thesis Award Nanolito 2022 to Alejandra Jacobo

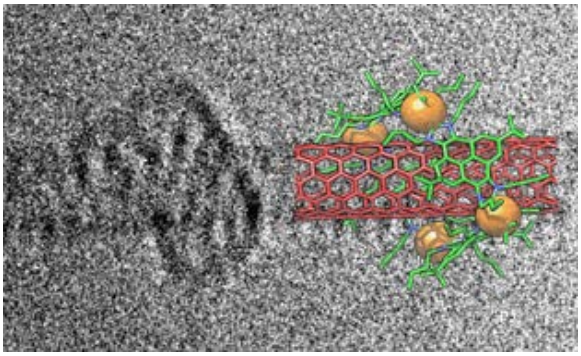
https://nanociencia.imdea.org/home-en/news/item/doctoral-thesis-award-nanolito-2022-to-alejandra-jacobo

20/07/2022

Emilio M. Pérez

Metallacycles embrace carbon nanotubes

https://nanociencia.imdea.org/home-en/news/item/metallacycles-embrace-carbon-nanotubes

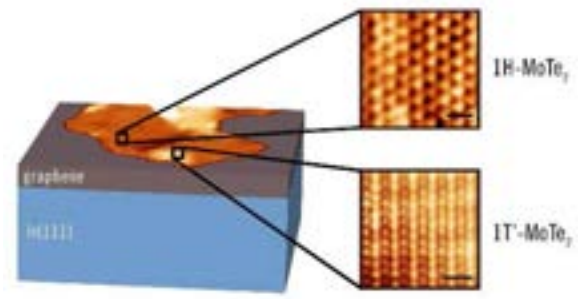


27/07/2022

Manuela Garnica

Engineering the phase and properties of 2-dimensional MoTe2

https://nanociencia.imdea.org/home-en/news/item/engineering-the-phase-and-properties-of-2-dimensional-mote2



28/07/2022
Optica Student Paper Award to Saül García at the 2022 Optica Advanced Photonics Congress

16/09/2022
Best Poster Presentation Award to Marco Ballabio at the nanoGeConference O2DMAT

21/09/2022
IMDEA Nanociencia: at the forefront of European research on rare earths and strategic raw materials for the Green Transition

23/09/2022
"Nanociencia entretenida", an outreach project for the elderly

30/09/2022
Unquenching the orbital moment of Co atoms by metal-organic coordination

21/10/2022
IMDEA Nanociencia strengthens its strategy to attract talent with the new project IDEAL PhD

30/10/2022
Prof. Fernando Martín is conferred his Honorary Doctor by Stockholm University

22/12/2022
The Early Stage Researchers Workshop returns in-person

23/12/2022
"The first fellows begin their IMDEA Nanociencia postdoctoral fellowships"

5. Social Media

https://twitter.com/IMDEA_Nano

instagram.com/imdeananociencia/

facebook.com/imdeananociencia/

youtube.com/c/IMDEANano

linkedin.com/company/imdea-nanociencia

26/04/2022

Hilo Tesis Twitter: Arturo Villechenous

https://twitter.com/AVillechenous/status/1518959989716574210?s=20&t=17eMV9ynpYcxOmRr6vJPaQ

6. Newsletters and brochures

Alumni Programme's newsletter

04/03/2022

Training course: Competitive Proposal Writing for Horizon Europe

18/03/2022

#4 Nanocar Race II, CM Research Award to Rodolfo Miranda, 15 anniversary of IMDEAs

19/05/2022

Career prospects with Dr. Christin David

16/06/2022

Training course: Writing a successful MSCA Postdoctoral Fellowship

05/09/2022

Training Course: How to prepare a competitive StG/CoG ERC proposal 2022

Research Projects Office Newsletter

31/01/2022
Issue 21

01/03/2022
Issue 22

01/04/2022
Issue 23

29/04/2022
Issue 24

01/06/2022
Issue 25

30/06/2022
Issue 26

22/07/2022
Issue 27

30/09/2022
Issue 28

28/10/2022
Issue 29

30/11/2022
Issue 30

23/12/2022
Issue 31

7. Videos and podcasts

20/01/2022

Nazario Martín

Charla "Nanociencia: la importancia de lo pequeño", dentro del XVII Ciclo de Conferencias de Divulgación Científica de la Real Academia de Ciencias Exactas Fisicas Naturales

Madrid

https://www.youtube.com/watch?v=Q9u2wZm4rpw

02/02/2022

Rodolfo Miranda

Entrevista al Prof. Rodolfo Miranda con motivo de su Premio de Investigación Miguel Catalán 2021

https://www.youtube.com/watch?v=fq9jsqoRU-M

02/03/2022

Video promocional IMDEA Nanociencia con animaciones

https://www.youtube.com/watch?v=GQUdzBuBiXc

03/03/2022

Pasado y presente de la ciencia del futuro: Nanotecnología, con Sebastián Thompson (IMDEA-Nano)

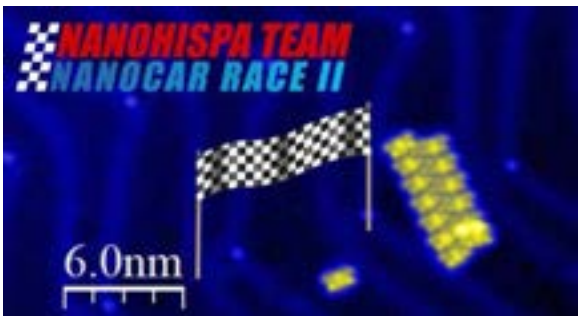
https://www.youtube.com/watch?v=v47n_HoSFtg&t=9s

24/03/2022

David Écija

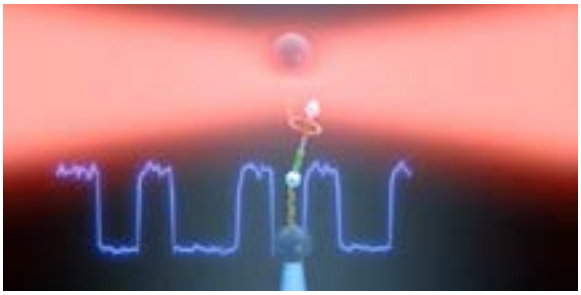
24h of Nanocar Race II

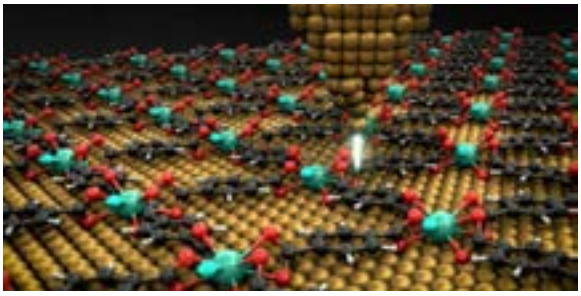
https://www.youtube.com/watch?v=JRmA7jl_usg

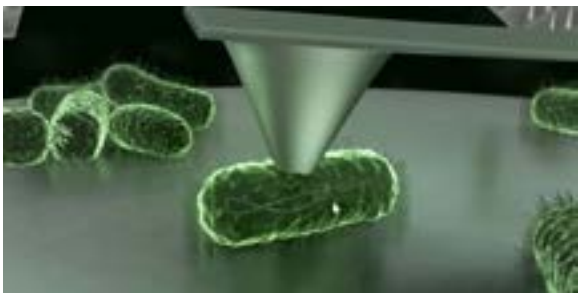


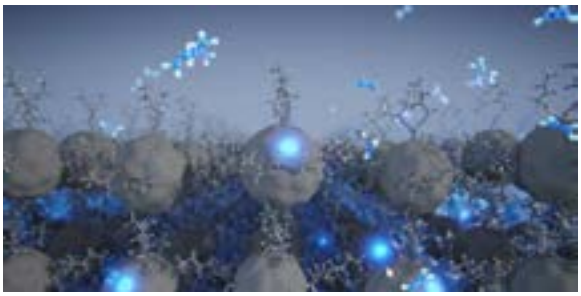
28/03/2022

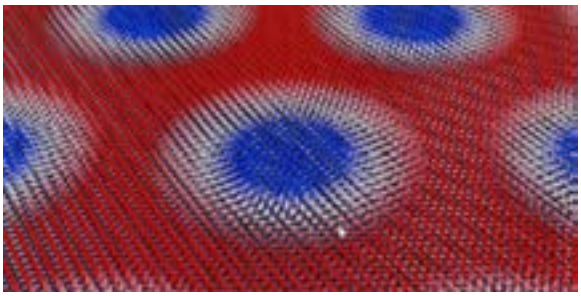
Animated version of the covers featuring several research works.

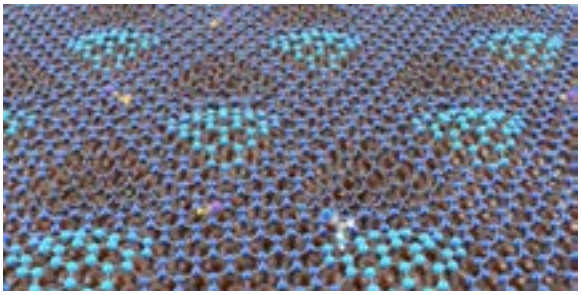


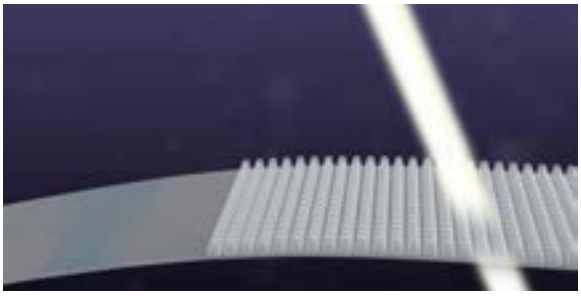


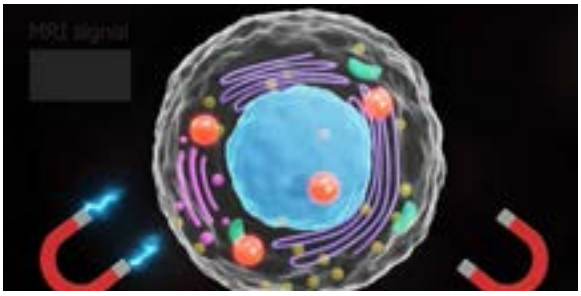


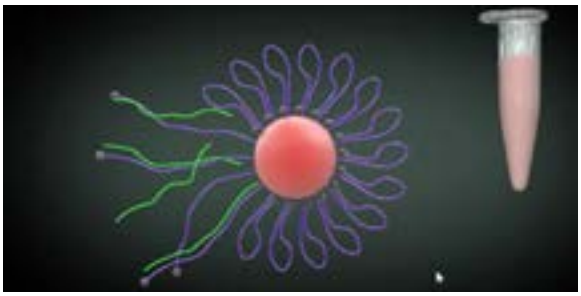












29/03/2022
Rodolfo Miranda
Entrevista a Rodolfo Miranda, Director de IMDEA Nanociencia // 15 Aniversario IMDEA Institutes
https://www.youtube.com/watch?v=ZUsipA3ihmg

26/04/2022
Daniel Granados, Ana Pizarro
Entrevista a Daniel Granados y Ana Pizarro // IMDEA Nanociencia // 15 Aniversario IMDEA Institutes
https://www.youtube.com/watch?v=JpTU3jokgbw

18/05/2022
Laurence Mechin
Joli mois de l'Europe · ByAxon
BYAXON project
https://www.youtube.com/watch?v=KinI1R9SDew

Entrevista Madri+d a Fernando Martin
TOMATTO project
https://www.youtube.com/watch?v=glKRCcaIAmM

26/05/2022

Daniel Granados

Daniel Granados en La Ser: La fiebre por producir microchips se dispara ante la alta demanda: "Si no existiesen volveríamos otra vez a la edad de piedra"

https://cadenaser.com/nacional/2022/05/26/la-fiebre-por-producir-microchips-se-dispara-ante-la-alta-demanda-si-no-exisitesen-volveriamos-otra-vez-a-la-edad-de-piedra-cadena-ser/

24/06/2022

PASSENGER introduction video

https://www.youtube.com/watch?v=5xhHrO8VFp4

25/07/2022

Sara Mejías

"Harnessing Light at the Nanoscale" with Sara H. Mejías in the podcast "Under the microscope"

https://open.spotify.com/episode/0kR0BrcMeWBBecUoLtPCqS?si=AEOLfZbYTnCqkyzBXJN7-w&nd=1

30/09/2022

IMDEAs y la Noche de los Investigadores 2022

https://www.youtube.com/watch?v=12ZiVJo_45c&t=6s

8. Press clippings

For further details see Annex **page 194**

9. Research Management Offices

Competitive Projects Office (CPO)

CPO works to promote the participation of the researchers in funding programmes to develop ambitious, innovative and high-quality research.

FOCUS 1: VISIBILITY

- Monthly Internal Newsletter
- Factsheets & Tools
- Training *(Skills development support programme)*
- Updated Research Projects Office Web page
- IMDEA Nano Coffee Breaks

imdea nano coffee breaks

FOCUS 2: TALENT ATTRACTION

The CPO engages in talent attraction campaigns to recruit outstanding researchers:

- CPO-led initiatives (CO-FUND, ITN, large consortium)
- Open-Training
- *Expressions of interest* for Competitive International Calls

ideal programme
IMDEA Nanociencia postdoctoral programme in nanoscience

ideal PhD programme
IMDEA Nanociencia doctoral training programme in nanoscience

FOCUS 3: ASSISTANCE

- Active Funding identification
- Proposal Revision Service
- Support service to find partners
- Projects Report Service
- Innovation-based proposal (EIC)

FOCUS 4: SUSTAINABILITY

PROYECTO
IM-PULSA

PROYECTO
NANOCIENCIA ABIERTA

nano ciencia to GO
listo para experimentar

nano ciencia entretenida

nano ciencia para contar

Researcher Support

FOCUS 1: HR SUPPORT

- Implementation phase of the Human Resources Strategies for Researchers (HRS4R)
- Research and management support funding
- Internationalization and diversity

igualdad de género
instituto imdea nanociencia

FOCUS 2: NETWORKING

IMDEA Nanociencia is an institutional member of the European Association of Research Managers and Admnistrators (EARMA) that represents the community of Research Managers and Administrators (RMAs) in Europe.

EARMA
EUROPEAN ASSOCIATION OF RESEARCH MANAGERS AND ADMINISTRATORS

Dissemination and Communication

FOCUS 1: OPEN SCIENCE

- Repository
- Training Open Science and Open Access in HE
- *Nanociencia Abierta* Project

FOCUS 2: COMMUNICATION AND OUTREACH

- *Nanociencia para todos* Projects

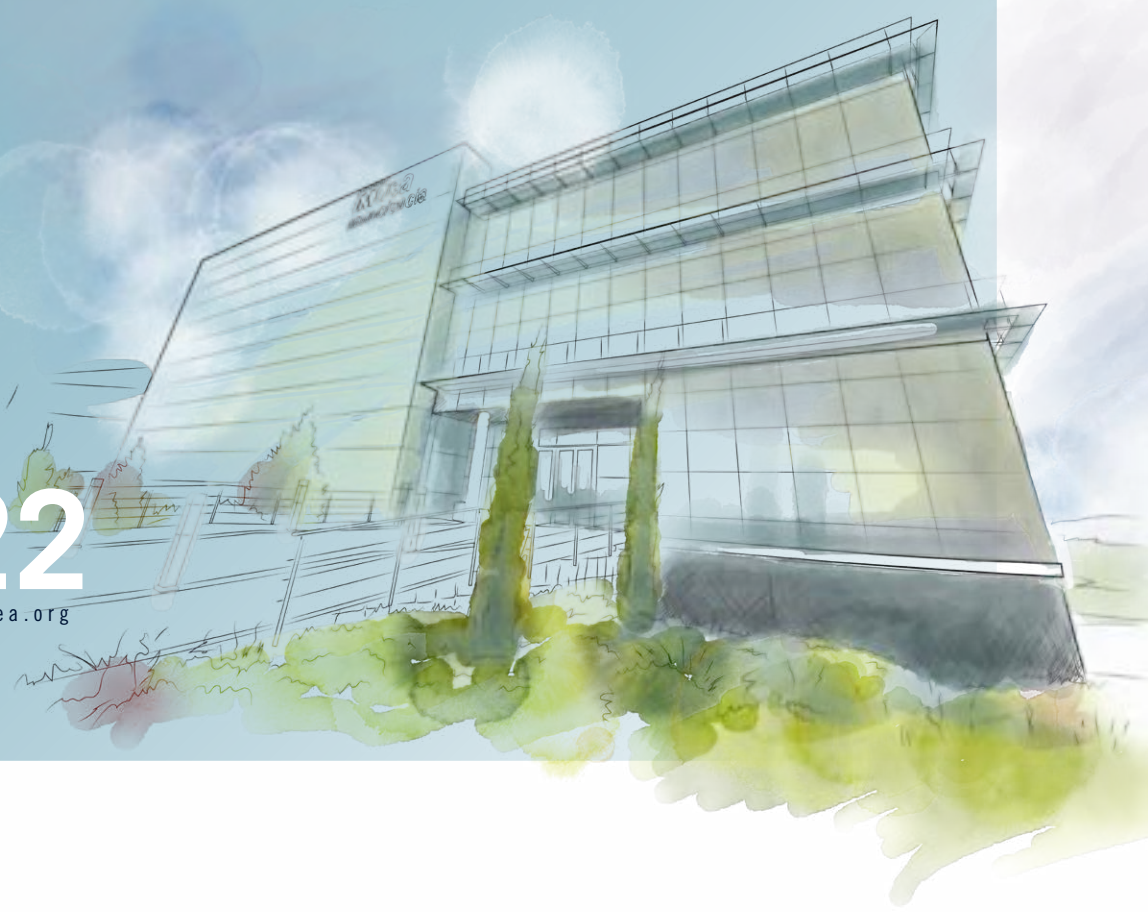
imdea nanociencia
nanociencia para todos

- Participation in Fairs and Exhibitions
- Social Media


imdea
nanociencia

4

research focus



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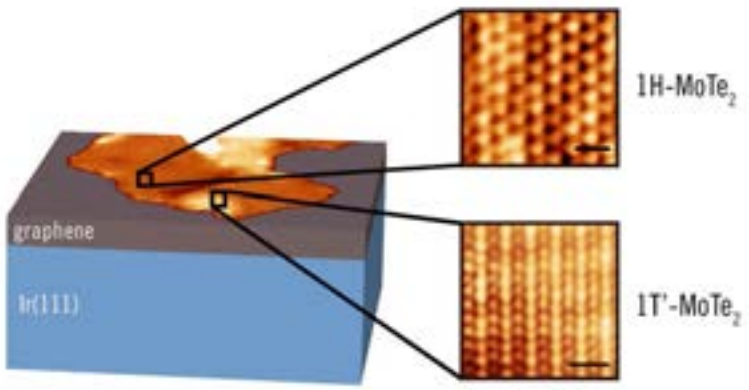
1. Research Highlights

Engineering the phase and properties of 2-dimensional $MoTe_2$



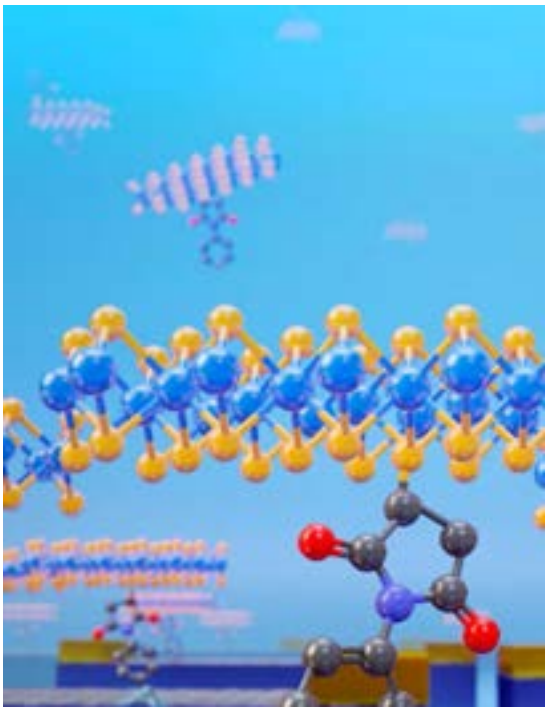
The application of 2-dimensional materials in optoelectronic devices is sometimes hampered by the electrical barrier between the electrodes and the materials itself. This is called a Schottky contact: a potential energy barrier for electrons formed at a metal–semiconductor junction, which represents an important throwback when building efficient devices. A possible solution to reduce the contact resistance is to build a continuous a lateral structure with different properties: semiconducting and metallic phases of the same material.

The work by the IMDEA Nanociencia group of Dr. Manuela Garnica, published in Nanoscale, reports on the synthesis and in situ characterization of different phases in single-layer MoTe2 on graphene. Tuning the growth parameters, such as Telluride/Molybdenum ratio and sample temperature, the team was able to achieve phase engineering in this material to produce large areas of pure semimetallic phase. In their scanning tunnelling microscope images, they could clearly identify two phases: the semiconducting hexagonal phase (1H), and the semimetallic distorted octahedral phase (1T′) in large islands of tens of nanometers in size.

The idea is simple: the same material exhibits different electronic properties depending on the location. This consists a great opportunity for fabricating electronic devices. The junction of a semiconducting phase as channels and a metallic phase of the same material as electrodes produces an ohmic contact with low resistance and eases current conduction from metal to semiconductor and vice versa.

This research result is a collaboration between researchers at IMDEA Nanociencia and Universidad Autónoma de Madrid, and is cofunded through the Postdoctoral Junior Leader Fellowship Programme from “la Caixa” to Manuela Garnica; and through the Severo Ochoa Centre of Excellence award to IMDEA Nanociencia.

Beyond van der Waals: next generation of covalent 2D-2D heterostructures



The most widespread method for the synthesis of 2D-2D heterostructures is the direct growth of materials on top of each other. 2D structures are atomically thin layered materials that can be stacked to build functional heterostructures. In such structures built by atomic deposition, 2D layers are weakly bonded by van der Waals interactions and can be taken apart in some solvents or thermal processes. The lack of control over the interface of the two materials in terms of electronic communication, chemical nature or interlayer distance thus impedes the construction of robust multi-purpose devices.

A team of researchers led by Enrique Burzurí and Emilio M. Pérez at IMDEA Nanociencia have connected covalently for the first time layers of 2D materials: MoS_2 and graphene. The team has used the tools of synthetic chemistry to sew several flakes of MoS_2 to single-layer graphene devices, using a bifunctional molecule with two anchor points. The results, published in **Nature Chemistry**, show that the final electronic properties of the heterostructure are dominated by the molecular interface.

For the first time, researchers have used the tools of chemistry to covalently bond 2D materials. The results show the power of the chemical approach to build MoS_2-graphene heterostructures beyond van der Waals preserving the carrier mobility of graphene for high performance FET devices. The vertical covalent connection brings an additional lever to the final properties of nanodevices beyond the intrinsic properties of the materials, and has the potential for facile high-throughput homologation.

This work is a collaboration among researchers at IMDEA Nanociencia, Universidad Autónoma de Madrid, CEITEC Masaryk University Kamenice, Universidad de Zaragoza, INMA and CIBER-BNN, and has been cofunded by the European Research Council (ERC) trough StG MINT and PoC PINT grants and MSCA PD grant no. 892667 TweeTERS.

Engineering periodic lanthanide networks by metal exchange

The stabilization of single atom magnets represents the ultimate limit on the reduction of storage devices. However, single standing atoms adsorbed on surfaces are not suitable for practical applications due to their high diffusion. The next step towards more realistic systems is the coordination of these atoms in metal-organic networks. Lanthanides (4*f* elements) possess properties that make them interesting for stabilizing magnetism. Their spin-orbit coupling is translated as a high magnetic anisotropy and a very stable magnetic state that could be protected from external perturbations.

In a recent study, published in Small, researchers led by Prof. David Écija have realized the tuning of the electronic and magnetic properties of dinuclear lanthanide metal–organic networks by metal exchange. While **preserving the same structural architecture**, the exchange between erbium (Er) and dysprosium (Dy) metallic centers leads to a shift in the energy level alignment and change in the intensity and orientation of the magnetic anisotropy. The networks are the same, but the properties change. The results open perspectives for the design of periodic 2D materials with tailored optoelectronic and magnetic functionalities.

The magnetism of the system was measured using the magnetic dichroism technique by Dr. Sofia Parreiras (MSCA fellow at IMDEA Nanociencia) in collaboration with the scientists of the BOREAS line at the ALBA Synchrotron. The work is a collaboration between researchers at IMDEA Nanociencia, ICMM-CSIC, ALBA Synchrotron, and the Condensed Matter Physics Center (IFIMAC, UAM), and has been cofunded by the ERC-AdG ELECNANO project to Prof. Écija, the "4f-Mag" project (MSCA-IF) to Dr. Parreiras and the Severo Ochoa Center of Excellence award to IMDEA Nanociencia in 2017.

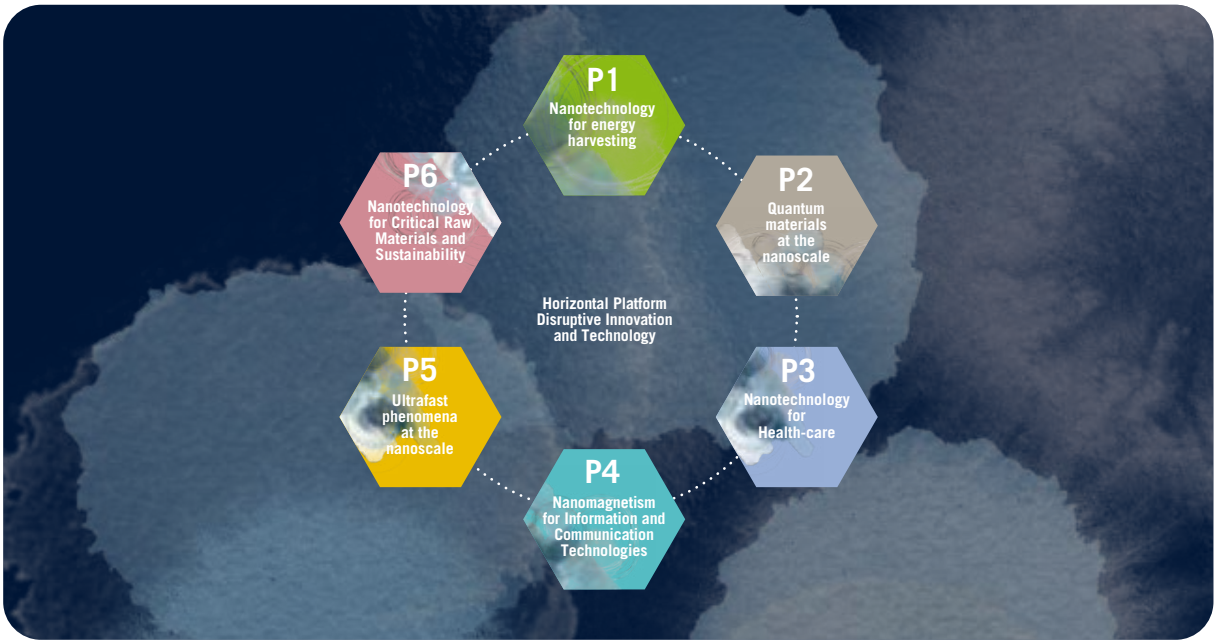
2. Projects

GLOBAL RECOGNITION

Severo Ochoa (SO) Centre of Excellence 2017-2021 and 2022-2025

In July 2021 IMDEA Nanociencia was once again awarded the Severo Ochoa (SO) Centre of Excellence accreditation by the Spanish State Agency of Research (Agencia Estatal de Investigación; AEI). The Institute will receive € 1M/year for the period 2022-2025 **to consolidate its position as a reference centre for research, both nationally and internationally**. The strategic vision of the SO programme is to continue strengthening the interdisciplinary character of the Institute, boosting the synergies of the research programmes. Additionally, we will continue the successful strategy of interaction with industry, based on a model that identifies the strategic needs of companies and selects problems that contain both enough basic science to inspire our researchers and tactical interest for the company.

Through this we aim to tackle, using nanoscience and nanotechnology, specific societal challenges addressed by the EU in the Horizon Europe programme. We will reshape and further strengthen four well-established and successful Programmes (P1-P4), implement a new one (P5) to explore phenomena at the nanoscale in the ultrashort time regime (going down to attoseconds), and give a new emphasis to another (P6) on critical raw materials and sustainability, which is of utmost practical importance in the framework of Horizon Europe, to support the programmes we will evolve to a new Platform for Disruptive Innovation.



IDEAL FELLOWSHIP PROGRAMME

As part of IMDEA Nanoscience's strategy to attract and train exceptional researchers in the field of Nanoscience and Nanotechnology, the IDEAL Fellowship Programme aims to boost the careers of 24 talented fellows. The programme is supported by the European Commission Marie Skłodowska-Curie Actions, and IMDEA Nanociencia has received > € 2.5 M from the COFUND calls to help co-finance the programme across two separate actions **IDEAL Postdoctoral** and **IDEAL PhD**.

In 2002, IDEAL PhD was awarded to the Institute via a competitive EU-wide call, it is the second project in consecutive years for which IMDEA Nano has obtained funding following on from the success of the IDEAL Postdoctoral awarded in 2021, echoing the excellence of the institutional strategy for attracting talent.

The key objectives of the programme are:

- Offer Researchers an interdisciplinary research training programme of excellence in a thriving environment that realises the full potential of each candidate and maximises their career prospects.
- Consolidate institutional best practice in our recruitment, research support and management processes.
- Provide attractive working and employment conditions and a tailored career development plan with access to quality mentoring and a cross-sectoral network of collaborators and partner organisations.
- Nurture a mind-set towards open and collaborative research that promotes sustainable innovation and a positive impact in society.

Fellows receive a well-balanced training and quality mentoring from an experienced scientific and management team as well as access to an infrastructure of the highest level for the pursuit of their projects in nanoscience and nanotechnology. A unique set of training sessions and activities will be delivered on open science practices, research impact, transferable skills and entrepreneurship.

The first five postdoctoral fellows were welcomed to the Institute in December, with Prof Rodolfo Miranda giving them an overview of the work at the Institute and what they should expect from the new fellowship programme. Jesús Rojo, Head of Unit. European Programmes and Technology Transfer at the Madri+d Foundation for Knowledge, presented the support available for the fellows provided by the Madrid regional government. A round table discussion finished the session -the 'Impact of MSCA on the scientific career and professional development.' -the panel was made up from current and former IMDEA Nano MSCA fellows, many who are now leading their own independent research groups.

Dr. Indranil Bhattacharjee

Dr. Marc G. Cuxart

Dr. Andrés Burgos

Dr. Zhen Zhan

Dr. Felipe Viela

FUTURE RARE-EARTH-FREE PERMANENT MAGNET MATERIALS

In 2022, the Permanent Magnets Group, led by Alberto Bollero, has launched a new 3-year project funded by Bosch Research (Germany - Robert Bosch GmbH), focused on the sustainable development of new permanent magnets produced in Europe, to meet the future needs of the electric vehicle sector.

The transition to electrification is already well underway and Bosch are leaders in the field, electric drives are at the heart of many of their product categories, ranging from eMachines for electric vehicles and eBike drive systems to power tools. This project is helping them address one of the important challenges in optimizing electric drives -to make them more efficient and more sustainable.

This initiative stem from the one of the new research programmes of the 'Severo Ochoa Excellence' project "Nanotechnology for Critical Raw Materials and Sustainability", led by Prof Bollero.

This initiative joins many others in which IMDEA Nanociencia, through its Nanotechnology Programme for Critical Raw Materials and Sustainability, works together with more than twenty European companies in the frame-work of national and international projects. These actions cover, from the processing of rare earth oxides from mining deposits, to the manufacture of permanent magnets from these processed materials and from recycled permanent magnets.

The Bosch Research team visited IMDEA Nanociencia in November to get to know the research team and the facilities at the Institute.

PLAN COMPLEMENTARIO DE MATERIALES DISRUPTIVOS BIDIMENSIONALES (2D)

The Complementary Plan for Advanced Materials (Plan Complementario de Materiales Avanzados) is an R + D + I programme that will mobilize 53 million euros, of which the Ministry of Science and Innovation will contribute 31 million with the impulse of the European funds of the Recovery, Transformation and Resilience Plan (Plan de Recuperación, Transformación y Resiliencia). The programme aims to promote the creation of research networks to discover and develop new, more sustainable materials, which will be used in batteries, electric vehicles and solar panels, among other technologies, and that will allow progress in the decarbonization of our country. **Prof. Nazario Martín, chair at Chemistry Faculty (UCM) and vicedirector of IMDEA Nanociencia, is scientific responsible of the programme for the Madrid region**.

Materiales Avanzados

The three-year programme sets out four strategic points. The first is the promotion of multidisciplinary research on graphene and other two-dimensional materials with a view to their possible applications. The second is the development and integration of key innovative materials and processes for renewable energy generation, energy storage and carbon dioxide capture and recovery. The program includes as a third objective the design of materials with advanced functionalities, particularly materials, that respond to external stimuli and are useful for information and communication technologies, health, mobility, habitat or the environment. Finally, and in general, the goal is about promoting and enhancing collaboration and synergies between the different actors involved in R + D + i in Advanced Materials. And to do so through joint actions that give visibility to the national scientific-technological community and training actions on dissemination and transfer of knowledge aimed at new generations of scientists.

IMDEA Nanociencia will contribute through the research of the groups of Prof. Francisco Guinea (Theoretical Modelling), Prof. Emilio M. Perez (Chemistry of Low Dimensional Materials), Prof. David Écija (Nanoarchitectures at Surfaces), Dr. Manuela Garnica (Topological Surfaces States in Quantum Materials) and Dr. José Sánchez Costa (Switchable Nanomaterials).

The materials are in every aspect of our lives. They have an impact on the environment, society and the economy and can drive the transition towards greener technologies and better healthcare, with better features and better performance, as recognised by the European Commission in its strategy.

OPEN SCIENCE

Open Science is priority for the European Commission aiming to improve the quality, efficiency and responsiveness of research. Open Science is a systemic concept that encompasses:

1. Open Access to scientific publications and data
2. Open Science Evaluation
3. Next generation metrics
4. Reproducible Research
5. Open Source Software
6. Open educational resources and citizen science

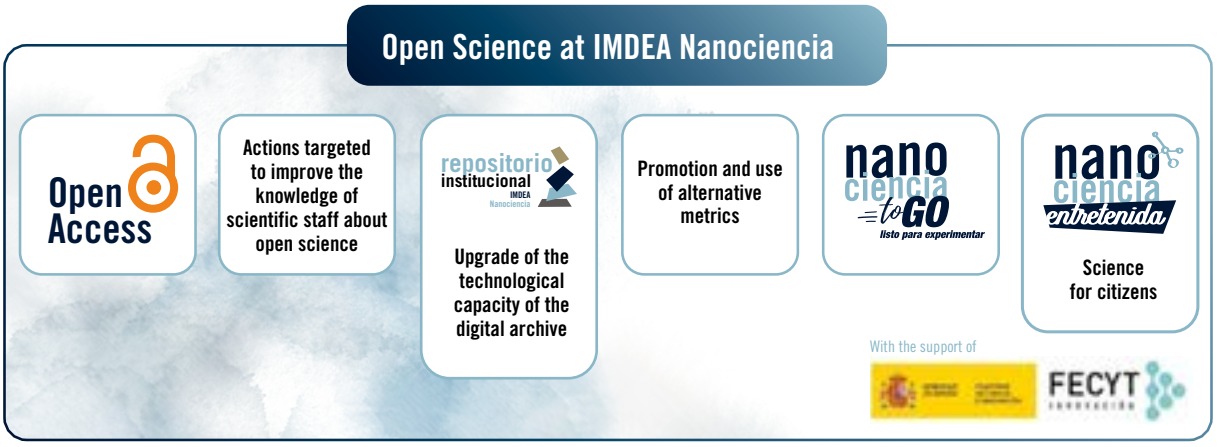
This has also been prioritized at a national and regional level, with policies requiring Open Access to scientific results (publications and data) widely available without restrictions to all. IMDEA Nanociencia is fully committed to this with two main lines of action: **the institutional repository** and **the science for citizens activities**.

The continued development of the **institutional repository**, has been further supported by the funding provided by the Spanish Foundation for Science and Technology (FECYT) in the framework of *Nanociencia Abierta* a project awarded under the María de Guzmán Call for the Promotion of Scientific Research of Excellence. The aim of this funding programme is to contribute to improving the technological capacity, quality and interoperability of institutional digital infrastructures of scientific information in the field of open science.

This project not only allows the institute to support the technical improvement of the database but allows both the training of the personnel of the institute and the promotion of open access to scientific results. The first information session was held in May 2022 were national and European representatives gave a workshop covering topics "What is Open Access and why, National and European mandates, how to make Open Access, Open Access in Horizon Europe, research data, data management plans" –the project runs until 2024.

https://repositorio.imdeananociencia.org/

Project reference: MDG-20-11189
Title: Nanociencia abierta
Modalidad: 1. Repositorios institucionales



Opening the doors of IMDEA Nanociencia to the citizens is in the foundations of our institute. The "Nanociencia para todos" outreach programme is an action of **science for citizens** that comprises of a very special project, aimed to students from Universities of Experience: "Nanociencia to-go". The project aims to turn those over 55 into agents to transmit the information to their grandchildren, and beyond to other relatives, offering to share a moment together around science with the aid of scientific kits to take-away.

Given the success of this project, IMDEA Nanociencia raised a new challenge: to reach those elderly institutionalized in residences. With this objective in mind, the Dissemination Office teamed up with Dr Josefa Ros, MSCA postdoctoral researcher at the UCM, specialist in Boredom Studies and 2022 National Research Prize Awardee, in order to bring science to a wider audience and at the same time help address boredom in nursing homes, factor that is believed behind the deterioration in aging. The activity included storytelling to engage and introduce scientific highlights along with some simple demonstrations and experiments. With this project, IMDEA Nanociencia facilitates the participation of society, reaching out one of the least common sectors in this type of dissemination activities, and to promote scientific education, both formally and informally. These project have supported by funding from the Spanish Foundation for Science and Technology (FECYT) through its Grants for the Promotion of Scientific Culture.

Project reference: FCT-20-16224
Title: Nanociencia para contar: aprende y combate el aburrimiento

With the support of

5

annexes

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nanoscience.imdea.org

1. National and international Congresses: invited lectures and regular contributions

121 events
11 on line

302 contributions

60 invited lectures
and 242 regular contributions,
128 oral and 114 as posters

10/01/2022

15th Joint 'Magnetism and Magnetic Materials' and 'International Magnetic' Conference (MMM-INTERMAG)
New Orleans, USA

Oral contributions

A Sustainable Route for Permanent Magnets Fabrication: Additive Manufacturing Applied to Recycled Ferrite Residues
D. Casaleiz*, E.M. Palmero, J. de Vicente, A. Seoane, R. Altimira, A. Bollero

Antibacterial activity of γ-Fe2O3/Ag nanocomposites under alternating magnetic fields
Yurena Luengo, Begoña Sot, Gorka Salas

Charge-spin current interconversion in high-quality epitaxial Co/Pt systems
Gudín Holgado, Adrián; Anadon, Alberto; Arnay, Iciar; Guerrero, Ruben; Petit-Watelot, Sebastien; Camarero, Julio; Miranda, Rodolfo; Rojas-Sanchez, Juan-Carlos; Perna, Paolo

Direct X-ray detection of the spin Hall effect in CuBi
S. Ruiz Gómez; R. Guerrero; W. Khaliq; C. Fdez-Gonzalez; S. Finizio; P. Perna; J. Camarero; L. Perez; L. Aballe; M. Foerster

Effect of Dopants (Mo, Cr, V) on the Magnetic Properties of Mn-Al-C nanostructured by Flash-Milling
C. Muñoz-Rodríguez*, J. Soler-Morala, E.M. Palmero, B. Skårman, H. Vidarsson, P.-O. Larsson, A. Bollero

Engineering functional graphene-based systems by thermally assisted metal intercalation
I. Arnay; A. Gudín; A. Guedeja-Marron; J.M. Diez; A. Anadón; R. Guerrero; M. Varela; J. Camarero; R. Miranda; P. Perna

Homogenization of heating in magnetic hyperthermia through exploitation of magnetization dynamics of interacting particles
J. Leliaert, J. Ortega-Julia, D. Ortega

In silico safety analysis of magnetic hyperthermia treatments of implant-bearing patients
I. Rubia-Rodríguez, L. Zilberti, A. Arduino, O. Bottauscio, M. Chiampi, D. Ortega

Optimizing the Particle Size Distribution in Permanent Magnet Composites to Extrude Flexible Filaments for Additive Manufacturing
E.M. Palmero*, D. Casaleiz, J. de Vicente, A. Bollero

Scalable Synthesis of CoFe and NiFe Nanoparticles from Ferrite Precursors with Tailored Magneto-Thermal Properties by a Combined Co-Precipitation, Milling and Reduction Process
D. Casaleiz*, M. Villanueva, A.J. Campos, J. Castillo, J. Camarero, E.M. Palmero, A. Espinosa, G. Salas, A. Bollero

Spin-charge interconversion in 111 oriented epitaxial Pt thin films
Anadón, Alberto; Gudín, Adrián; Arnay, Iciar; Guerrero, Ruben; Petit-Watelot, Sebastien; Camarero, Julio; Miranda, Rodolfo; Perna, Paolo; Rojas-Sanchez, Juan-Carlos

Unravelling exchange bias phenomena in V2O3/Co bilayers
J. M. Diez; J.L.F. Cuñado; P. Perna; P.N. Lapa; A. Bollero; R. Miranda; I. K. Schuller; J. Camarero

25/01/2022

2nd Workshop on Recent Developments in High-Power Impulse Magnetron Sputtering (HiPIMS Today)
Online

Poster contributions

Thin film coated moth-eye nanostructured arrays with improved mechanical and thermal stability
Daniel F. Fernandes, Tomas Kubart, Alejandra Jacobo-Martín, Jaime J. Hernández, Isabel Rodríguez

27/02/2022

Single Molecule Biophysics 2022
Les Houches, France

Poster contributions

Single-stranded dna-binding protein kinetics: theory and experiments
JP G-Villaluenga, B. Ibarra, FJ Cao-García*

01/03/2022

FLAGERA Workshop 2022
Online

Invited talks

SOgraphMEM
Paolo Perna

International School on Quantum Electronics: "The Frontiers of Attosecond and Ultrafast X-ray Science"
Online

Oral contributions

Molecular physics with attosecond pulses
Fernando Martín

School on New Computational Methods for Attosecond Molecular Processes
Zaragoza, Spain

Oral contributions

Theoretical modeling of attosecond electron dynamics in molecules
Fernando Martín

10/03/2022
8th Latin American Symposium on Coordination and Organometallic Chemistry
Online

Poster contributions

Cytotoxic rhodium(III) and iridium(III) metallodrugs based on tether structure
A. Villechenous Rojo, Ana M. Pizarro

Ruthenium- and osmium-arene tethered complexes as anticancer agents
Claudia Cardozo Yusti, Ana M. Pizarro

Workshop of the project TRIATLAS: Tropical and South Atlantic climate-based marine ecosystem predictions for sustainable management
Recife, Brazil

Oral contributions

ENSO coupling to Tropical Atlantic: improved recharge oscillator mode
Francisco Javier Cao-García

14/03/2022
Workshop of the project FOTOART
Madrid, Spain

Invited talks

Atomic scale characterization of surfaces
Koen Lauwaet

Oral contributions

Growth of thin films by MBE and magnetron sputtering
C. Navío

15/03/2022
Workshop of the project HOTZYMES: Designing MNPs for nanoactuation based on magnetic heating
Online

Invited talks

Aggregation effects on the properties of magnetic nanoparticles in colloidal suspension
Gorka Salas

20/03/2022
XVIII Escuela Nacional de Materiales Moleculares
Santiago de Compostela, Spain

Invited talks

Synthesis, structure, and physicochemical properties of porphyrinoid-based electron donor-acceptor conjugates containing tetracyanobuta-1,3-diene
G. Bottari

Oral contributions

Lanthanide-based metal-organic frameworks as luminescent sensors of atmospheric pollutants
Jorge Sangrador Pérez, Arturo Gamonal Crespo, Roberta Poloni, Juan Cabanillas-González, and José Sánchez Costa

Single crystal switchable Fe(II)-Bis(tetrazolate) framework: synergy between magnetic activity and electrical conductivity
A. Martinez-Martinez, E. Resines-Urien, L. Piñeiro-López, A. Fernández-Blanco, J. A. Rodríguez-Velamazán,E. C. Sañudo, E. Burzurí, and J. Sánchez Costa

21/03/2022
International School On Quantum Electronics: The Frontiers of Attosecond and Ultrafast X-ray Science
Online

Invited talks

Molecular physics with attosecond pulses
Fernando Martín

28/03/2022
Magnetism 2022
York, UK

Oral contributions

Magnetic Nanoparticles as a Theranostic Platform for Cardiovascular Diseases
A. Harper, A. Santana-Otero, M. E. Sharifabad, D. Ortega, N. D. Telling, D. Cabrera

School on New Computational Methods for Attosecond Molecular Processes
Zaragoza, Spain

Invited talks

Theoretical modeling of attosecond electron dynamics in molecules
Fernando Martín

04/04/2022
Journées Nationales GDR Oxyfun
Guethary, France

Oral contributions

Anisotropic magnetoresistance based on La2/3Sr1/3MnO3 thin films: ways of improvement
L. G. Enger , S. Flament, O. Rousseau, I. Noor, B. Guillet, M.L. Chok Sing, V. Pierron, S. Lebargy, J.M. Diez, A. Vera, I. Martinez, R. Guererro, L. Perez, P. Perna, J. Camarero, R. Miranda, M. T. Gonzalez, L. Méchin

Substrate induced magnetic anisotropy in La2/3Sr1/3MnO3 thin films
S.-K. Chaluvadi, P. Rajak, D. Knez, P. Orgiani, G. Rossi, R. Ciancio, J. Camarero, P. Perna, V. Pierron, L. Mechin

Light-matter interaction in two-dimensional nonlinear materials
Stockholm, Sweden

Invited talk

Electrons and phonons in twisted bilayer graphene
F. Guinea

19/04/2022

VII Encuentro de la Red de Infraestructuras de Astronomía (RIA-Tec2Space)

Madrid, Spain

Poster contributions

Hybrid superconducting nanowire single photon detectors

Cristina García-Pérez, Julia García-Pérez, Marina C. De Ory, María Acebrón, María Teresa Magaz, Ramón Bernardo-Gavito, Alicia Gómez, Daniel Granados

27/04/2022

3rd International Conference on Nanomaterials Applied to Life Sciences (NALS 2022)

Santander, Spain

Oral contributions

Intracellular temperature measurements

Sebastian Thompson

Reprogramming cancer cells with non-coding RNAs

Paula Milán-Rois1*, David García Soriano2, Irene Pardo3, Luis A. Campos4, Nuria Lafuente-Gómez5, Gorka Salas6, Álvaro Somoza7

Poster contributions

Determination of pathological protein aggregation and secretion in vesicles in cells of ALS patients

Carmen Pérez de la Lastra, J. Alejandro Bueso, Angeles Martín-Requero and Valle Palomo

Enhanced electrochemiluminiscent platform based on bifunctional carbon nanodots for HER2 sensing

Tamara Guerrero-Esteban, Cristina Gutiérrez-Sánchez, Tania García-Mendiola, Mónica Revenga-Parra, Félix Pariente, Encarnación Lorenzo Revenga-Parra, Félix Pariente Encarnación Lorenzo"

Flow cytometry and quantum dots to improve patgological proteins analysis in lymphoblasts from ALS patiens

Paula Fernández, Carlota Tosat-Bitrián, Ángeles Martín Requero, Valle Palomo.

Glycine as phase driver in fast microwave-assisted synthesis of iron oxide nanoparticles

A. Santana-Otero, C. Frade-González, D. Ortega

Homogenisation of Tumour Heating in Magnetic Hyperthermia Through Exploitation of Magnetisation Dynamics of Interacting Particle

J. Leliaert, J. Ortega-Julia, D. Ortega

In silico safety analysis of different metallic implants in magnetic hyperthermia treatments

I. Rubia-Rodríguez, L. Zilberti, A. Arduino, O. Bottauscio, M. Chiampi, D. Ortega

Quantum dots for monitoring the modulation of molecular motors in disease and drug therapy

Rebeca París-Ogáyar, Carlota Tosat-Bitrián, Ahmed Soliman, Oliva M.A, J. Fernando Díaz, Valle Palomo.

Tumour-on-chip device for in vitro nanomedicine transvascular studies

Sergio Dávila, Alberto Martin, Jean Cacheux, Isabel Rodriguez

Visual and multiplexed detection of microRNAs using functionalized gold nanoparticles

Coutinho, Catarina; Lafuente Gómez, Nuria; Pardo, Demian; Duarte, Christian; Latorre, Alfonso; Castellanos, Milagros; Somoza, Álvaro

28/04/2022

4th AbNeuralNets Meeting: Focus on emerging technologies (Instituto Cajal-CSIC)

Madrid, Spain

Invited talks

Nanotechnology-based solutions for neuroscience

M.Teresa González, Lucas Pérez, Isabel Rodríguez, Rodolfo Miranda, Julio Camarero

03/05/2022

LVIII Congreso Nacional de la Sociedad Española de Cerámica y Vidrio

Madrid, Spain

Oral contributions

The role of silicon oxide in the stabilization and magnetoresistance switching of Fe3O4/SiO2/Si heterostructures

I. Arnay

04/05/2022

23rd European Conference on the Dynamics of Molecular Systems (MOLEC 2022)

Hamburg, Germany

Poster contributions

Recent advances in the first principle simulation of attosecond XUV pump - XUV probe ionization spectra

Fernando Martín

08/05/2022

Spring Meeting of the Materials Research Society (MRS)

Honolulu, USA

Invited talk

Collective charge fluctuations and superconductivity in twisted bilayer graphene and related materials

F. Guinea

12/05/2022

XXIII Congreso de Física Estadística (FisEs'22)

Zaragoza, Spain

Poster contributions

Spatial scales of population synchrony increase as fluctuations propagate through the food web

Miguel Angel Fernandez-Grande, Francisco Javier Cao-Garcia*

15/05/2022

Gordon Research Conference: Hybrid Electronic and Photonic Materials and Phenomena

Castelldefels, Spain

Invited talks

The search for hole transporting materials in long-term perovskite solar cells
Nazario Martín León

17/05/2022

NanoSpain Conference
Madrid, Spain

Oral contributions

Electronic properties of a 1H/1T/2H-TaS2 polymorphic vdW heterostructure
F.Calleja, C.G. Ayani, M. Garnica, R. Miranda, A.L. Vázquez de Parga

Engineering bandgap opening in Dirac cone on graphene/Te heterostructure
B. Muñiz Cano, J. Ripoll, F. Calleja, I. Martínez, D. Pacilé, P. Moras, P. M. Sheverdyaeva, M. Pisarra, K. Lauwaet, A. L. Vázquez de Parga, J. Camarero, R. Miranda, M. Á. Valbuena and M. Garnica

FeNi nanowires magnetic interactions study through coercivity angular analysis and FORC measurements
A.J. Campos-Hernandez*, E.M. Palmero, A. Bollero

Hexagonal MnBi islands with tunable magnetic anisotropy
C. Navío*, M. Villanueva, E. H. Sánchez, P. Pedraz, P. Olleros-Rodríguez, L. Zha, P. Perna, O. Chubykalo-Fesenko, J. Camarero, J. B. Yang, P. S. Normile, J. A. De Toro and A. Bollero

Novel and Sustainable Manufacturing of Nanocrystalline Ferrite Permanent Magnets through Recycling and Additive Manufacturing
D. Casaleiz, E.M. Palmero*, J. de Vicente, A. Seoane, R. Altimira, A. Bollero

Quantification of TDP-43 in lymphoblasts from ALS patients and their exovesicles with QD-based multiplexing approach
Valle Palomo, Carlota Tosat-Bitrián, Paula Fernández, Camen Pérez de La Lastra, J. Alejandro Bueso, Manuel Izquierdo, Ángeles Martín Requero

Tuning the nanoscale architecture in NdFeB ultrathin films with varying buffer layer
J. Soler-Morala*, C. Navío, L. Zha, J. Yang and A. Bollero

Tuning the nanoscale architecture in NdFeB ultrathin films with varying buffer layer.
J. Soler-Morala*, C. Navío, L. Zha, J. Yang and A. Bollero

Poster contributions

Deposition of maleimide molecules on MoS2 under UHV conditions
Iván M. Ibarburu, F. Calleja, M.V. Sulleiro, M. Pisarra, E. M. Pérez, A. L. Vázquez de Parga

Phase controlled synthesis of 2D-MTe2 (M=Mo, Ir) on epitaxial graphene
J. Ripoll-Sau, F. Calleja, P. Casado Aguilar, I.M. Ibarburu, I. Di Bernardo, R. Miranda, A. L. Vázquez de Parga, M. Garnica

19/05/2022

2nd Young Researchers in Chemistry Symposium (YRChem-2022)
Valencia, Spain

Invited talks

Scientific misconduct in current chemistry research: aspects and conditions
J. Gierschner

22/05/2022

5th European Workshop on Epitaxial Graphene and 2D Materials
St. Moritz
Switzerland

Poster contributions

Epitaxial growth and characterization of a single-layer 1T'-MoTe2 phase on graphene on Ir(111)
B. Muñiz Cano, J. Ripoll Sau, F. Calleja, I. M. Ibarburu, M. Pisarra, D. Pacile, A.L. Vázquez de Parga, R. Miranda, M.A. Valbuena, M. Garnica

15th European School on Molecular Nanoscience (ESMolNa2022)
Tordesillas, Spain

Invited talks

The search for hole transporting materials in long-term perovskite solar cells
Nazario Martín León

Ultrafast Surface Dynamics 2022 (USD12)
Benasque, Spain

Oral contributions

Density dependent mobility in photo-doped silicon
S. Revuelta and E. Cánovas

Excited state dynamics in panchromatic porphyrin-nanographene conjugates
S. Garcia et al.

Poster contributions

Excited state dynamics in panchromatic porphyrin-nanographene conjugates
Saul Garcia Orrit, Victor Vega Mayoral, Juan Cabanillas Gonzalez

23/05/2022

Computational methods and tools for complex suspensions
Bilbao, Spain

Oral contributions

Simulating the magnetization dynamics of magnetic nanoparticles for biomedical applications
J. Leliaert, J. Ortega-Julia, A. Coene, D. Ortega

24/05/2022

5th European Workshop on Epitaxial Graphene and 2D Materials (EWEG2D'22)
Saint Moritz, Switzerland

Oral contributions

Engineering a band gap opening in Dirac cones on graphene/Tellurium heterostructures
Beatriz Muñiz Cano, J. Ripoll Sau, D. Pacile, P. M. Sheverdyaeva, P. Moras, R. Miranda, J. Camarero, M. Garnica and M. A. Valbuena

Poster contributions

Experimental Evidence of Extrinsic Spin-Orbit Coupling Nature for the Dzyaloshinskii-Moriya Interaction in Gr/Ferromagnetic/Heavy Metal Heterostructures
B. Muñiz Cano , A. Gudín , A. Anadón , J. M. Díaz, P. Olleros-Rodríguez, F. Ajejas, I. Arnay, M. Jugovac, J. Raoult, P. Lefevre , N. Joauen , F. Bertrand , G. Bilmayer, S. Blügel, J. Camarero, R. Miranda, M. A. Valbuena and P. Perna

EurJOC-GEQOR-RSEQ Virtual Symposium
Online

Invited talks

Unveiling the Properties of Chiral Synthetic Nanographenes
Nazario Martín León

25/05/2022

Annual Meeting of the International Society for Extracellular Vesicles (ISEV)
Lyon, France

Poster contributions

título
Carmen Pérez de la Lastra, Carlota Tosat-Bitrián, J. Alejandro Bueso, Ana Martínez , Angeles Martín-Requero, Manuel Izquierdo and Valle Palomo

30/05/2022

Encuentro de Dendrímeros (DEN-8)
Alcalá de Henares, Spain

Invited talks

Glicofullerenos multivalentes para virus emergentes
Nazario Martín León

01/06/2022

Encuentro de la Red Temática OsMolSys: Ciencia Molecular sobre Superficies, Síntesis y Funcionalidad
Granada, Spain

Invited talks

Tetrabromo- p-Quinodimethanes (TBQs): Highly Versatile Building Blocks for On-surface Synthesis
Nazario Martín León

Towards high magnetic exchange coupling in PAHs
David Écija

European Network to Cure ALS meeting 2022 (ENCALS)
Edinburgh, UK

Poster contributions

Pathological aggregation and exovesicles concentration in ALS patient derived models are reduced upon treatment with TDP-43 modulators.
Carlota Tosat-Bitrián, Carmen Pérez de la Lastra, J. Alejandro Bueso, Ana Martínez, Angeles Martín-Requero and Valle Palomo

Poster contributions

Modulation of TDP-43 by TTBK1 inhibitors: A new therapeutic approach for amyotrophic lateral sclerosis and other TDP-43-pathies
Loreto Martinez-Gonzalez, Vanesa Nozal , Claudia Gonzalo Consuegra, Angeles Martín-Requero, Carmen Gil, Valle Palomo, Eva de Lago, Ana Martinez

02/06/2022

Meeting CIEMAT - IMDEA Nanociencia: Towards the Gene Therapy with Nanoparticles and Non-viral Vectors
Madrid, Spain

Oral contributions

Magnetic nanoparticles for biomedical applications
Gorka Salas

Nanotechnology-based strategies for non-viral CRISPR RNP delivery
Begoña Sot

Potential applications for multifunctional porous metal-organic frameworks (MOF)
Jose Sanchez Costa

03/06/2022

Workshop of the Institute for Advanced Research in Chemistry (IAdChem): New Horizons in Research
Madrid, Spain

Oral contributions

Carbon nanodots: versatile nanomaterials for surfaces design
Cristina Gutiérrez-Sánchez

05/06/2022

18th International Conference on Electroanalysis (ESEAC 2020)
Vilnius, Lituania

Oral contributions

Direct covalent immobilization of new nitrogen-doped carbon nanodots by electrografting for sensing applications
Cristina Gutiérrez-Sánchez, Mónica Mediavilla, Tamara Guerrero-Esteban, Mónica Revenga-Parra, Félix Pariente and Encarnación Lorenzo

06/06/2022

16th International Conference on Nanostructured Materials (NANO 2022)
Sevilla, Spain

Invited talks

Development of nanostructured rare earth-free permanent magnets for a sustainable technological horizon
A. Bollero*, E.M. Palmero, C. Muñoz-Rodríguez, D. Casaleiz

Oral contributions

Customized rare earth-free permanent magnet composites for additive manufacturing of magnets
E.M. Palmero*, D. Casaleiz, J. de Vicente, A. Bollero

Stripe magnetic domains and anisotropy control on hexagonal MnBi micro-islands
M. Villanueva, C. Navío,*, E. H. Sánchez, P. Pedraz, P. Olleros-Rodríguez, L. Zha, P. Perna, O. Chubykalo-Fesenko, J. Camarero, J. B. Yang, P. S. Normile, J. A. De Toro and A. Bollero

Tunable hard magnetic properties in FeNi nanowire arrays: A model system to unveil the artificial synthesis of the cosmic L10-FeNi phase
A.J. Campos-Hernandez*, E.M. Palmero, A. Bollero

Underlayer dependence of ultrathin films of NdFeB grown by Molecular Beam Epitaxy
J. Soler-Morala*, C. Navío, L. Zha, J. Yang and A. Bollero

Stripe magnetic domains and anisotropy control on hexagonal MnBi micro-islands
M. Villanueva, C. Navío,*, E. H. Sánchez, P. Pedraz, P. Olleros-Rodríguez, L. Zha, P. Perna, O. Chubykalo-Fesenko, J. Camarero, J. B. Yang, P. S. Normile, J. A. De Toro and A. Bollero

Underlayer dependence of ultrathin films of NdFeB grown by Molecular Beam Epitaxy
J. Soler-Morala*, C. Navío, L. Zha, J. Yang and A. Bollero

08/06/2022

Workshop on Magnetism 2022: From Fundamentals to Applications (Summer School organized by the Spanish Club of Magnetism, CEMAG)
Llanes, Spain

Oral contributions

Additive fabrication of permanent magnets
Ester M. Palmero

11/06/2022

Novel Electronic Properties of Two-Dimensional Materials (NEP2DM)
San Sebastián, Spain

Poster contributions

An atomistic study of the effect of substrates on the structural and electronic properties of Twisted Bilayer Graphene
J. A. Silva Guillén

14/06/2022

13th International Conference on the Scientific and Clinical Applications of Magnetic Carriers
London, UK

Oral contributions

In silico safety analysis of different metallic implants in magnetic hyperthermia treatments
Irene Rubia-Rodríguez, Luca Zilberti, Alessandro Arduino, Oriano Bottauscio, Mario Chiampi, Daniel Ortega

19/06/2022

XX National Meeting of the Spanish Society of Medicinal Chemistry (SEQT2022)
Santiago de Compostela, Spain

Poster contributions

Studying the effect of microtubule targeting agents on microtubule transport: short-term clinical applications as wide spectrum antivirals
Carlota Tosat-Bitrián, Marián Oliva, Lucía Barrado-Gil, Francesca Bonato, Inmaculada Galindo, Urtzi Garaigorta, Beatriz Álvarez-Bernad, Rebeca París-Ogayar, Daniel Lucena-Agell, Juan Francisco Giménez-Abián, Pablo Gastaminza, J. Fernando Díaz, Covadonga Alonso and Valle Palomo

20/06/2022

8th International Biophysics Conference
Bilbao, Spain

Poster contributions

Pulling on individual Influenza A genomes: Elastic properties of structured single-stranded RNA molecules
C.R. Pulido, R. Bocanegra, F. Ritort, B. Ibarra

Single-molecule characterization of the DNA unwinding mechanism of the human mitochondrial DNA helicase
I. Plaza-G.A., G. Ciesielski, K.Lemishko, B. Ibarra

Towards the mechano-chemical characterization of Pfh1 helicase activity
M. Ortiz, R. Galleto, B. Ibarra

II International Conference on Novel 2D Materials Explored via Scanning Probe Microscopy & Spectroscopy
San Sebastian, Spain

Invited talks

Two-dimensional Kondo lattice in a TaS2 van der Waals heterostructure
Al. Vázquez de Parga

Oral contributions

Epitaxial growth and characterization of a single-layer 1T'-MoTe2 phase on graphene on Ir(111)
M. Garnica, B. Muñiz Cano, J. Ripoll Sau, F. Calleja, I. M. Ibarburu, M. Pisarra, D. Pacile, A.L. Vázquez de Parga, M.A. Valbuena, R. Miranda

Frontiers in Quantum Materials and Devices
Valencia, Spain

Poster contributions

An atomistic study of the effect of substrates on the structural and electronic properties of Twisted Bilayer Graphene
J. A. Silva Guillén

Invited talk

F. Guinea

Poster contributions

Superconductivity from repulsive interactions in bernal bilayer graphene
A. Jimeno Pozo

Interaction enhanced topological Hall effects in twisted bilayer graphene
P. A. Pantaleon

21/06/2022

Modern Directions in Epitaxy
Copenhagen, Denmark

Poster contributions

Phase controlled synthesis of 2D-MTe2 (M=Mo, Ir) on epitaxial graphene
J. Ripoll-Sau, F. Calleja, P. Casado Aguilar, I.M. Ibarburu, I. Di Bernardo, R. Miranda, A. L. Vázquez de Parga, M. Garnica

22/06/2022

3rd Workshop "Electrochemical Sensors And Biosensors" (ELECTROBIONET) and TRANSNANOAVANSENS
Madrid, Spain

Oral contributions

Electrochemiluminescent dna platforms based on carbon nanodots and gold nanomaterials for sars-cov-2 detection
Tania García-Mendiola, Laura Gutiérrez Gálvez, Rafael del Caño, M. Luna,Teresa Pineda and Encarnación Lorenzo

3rd Workshop "Electrochemical Sensors And Biosensors" (ELECTROBIONET) and TRANSNANOAVANSENS
Madrid
Spain

Oral contributions

Synthesis of new carbon nanodots made of phenazine and phenothiazines for bioanalytical tool developments
Emiliano Martínez-Periñán, Tania García-Mendiola, Cristina Gutiérrez-Sánchez, Mónica Revenga-Parra, Eva Mateo-Martí, Félix Pariente, Encarnación Lorenzo

Electrochemiluminescence immunosensor for sars-cov-2 detection based on bifunctional au@pt/au core@shell nanoparticles
Ana M. Villa-Manso, Cristina Gutiérrez-Sánchez, Mónica Revenga Parra, Tamara Guerrero-Esteban

Poster contributions

Electrochemiluminescent immunosensor based on bifunctional carbon nanodots for HER2 detection
Tamara Guerrero-Esteban, Cristina Gutiérrez-Sánchez, Tania García-Mendiola, Mónica Revenga-Parra, Félix Pariente, Encarnación Lorenzo

23/06/2022

3rd International Conference on Interface Properties In Organic and Hybrid Electronic: Perspectives & Key Challenges (IPOE)
Malaga, Spain

Oral contributions

Highly fluorescent organic charge-transfer co-crystals: detailed insight to the photo-kinetics
J. Gierschner

24/06/2022

Joint European Magnetic Symposia (JEMS2022)
Warsaw, Poland

Oral contributions

Influence of the buffer layer on the nanoscale architecture in NdFeB ultra-thin films
J. Soler-Morala*, C. Navío, L. Zha, J. Yang and A. Bollero

27/06/2022

XXXVIII Reunión Bienal de la Sociedad Española de Química (RSEQ)
Granada, Spain

Oral contributions

Activatable fluorophores for selective imaging and photodamage of amyloid structures in bacterial biofilms
J. Torra, T. Sawazaki, S. Nonell, M. Kanai, Y. Sohma, C. Flors*

Bottom-up fabrication and atomic-scale characterization of porphyrin-based nanostructures
G. Bottari

Carbon nanodots and gold nanomaterials as new electrochemiluminescent dna platforms for sars-cov-2 detection
T. Garcia-Mendiola, L. Gutiérrez-Gálvez, R. Del Caño, M. Luna, E. Lorenzo Abad.

Implementing QD-based multiplexing for pathological quantification of TDP-43 in lymphoblasts from ALS patients
C. Tosat Bitrián, P. Fernández, Á. Martín Requero, V. Palomo

Long-lived charged states in single porphyrin nanoribbon molecular junctions
Edmund Leary*, Georg Kastlunger, Bart Limburg, M. Teresa González, Nicolás Agrait, Harry L. Anderson, Robert Stadler and Richard J. Nichols.

Playing with the weakest supramolecular interactions in a 3D crystalline hexakis[60] fullerene induces control over hydrogenation selectivity
E. Fernandez-Bartolome, A. Gamonal, J. Santos, S. Khodabakhshi, E. Rodríguez-Sánchez, E.C. Sañudo, N. Martín, J. Sanchez Costa

Potent Osmium(ii) half-sandwich anticancer agents bearing phenylpyridine ligands and functionalized hemilabile arenes
Sonia Infante-Tadeo*, Vanessa Rodríguez-Fanjul and Ana M. Pizarro

Smart magnetic nanoparticles to boost chemotherapy and immunotherapy treatments
Nuria Lafuente-Gómez, Paula Milán-Rois, David García-Soriano, Shiqi Wang, Flavia Fontana, Alexandra Correia, Yurena Luengo, Mónica Dhanjani, Marco Cordani, Milagros Castellanos, Hélder A. Santos, Gorka Salas, Álvaro Somoza

Tunable proton conductivity and color in a nonporous coordination polymer via lattice accommodation of small molecules
Esther Resines-Urien,1 Aysegul Develioglu,1 Estefania Fernandez-Bartolome,1 Roberta Poloni,2 Lucía Martín-Pérez,1 Simon J. Teat,3 José Sanchez Costa*a and Enrique Burzurí*1

Poster contributions

Cytotoxic rhodium(III) and iridium(III) pianostool complexes fluorophore
Arturo Villechenous Rojo*, Sonia Infante-Tadeo, Vanessa Rodríguez-Fanjul and Ana M.Pizarro

Electrochemiluminescence aptasensor for early

diagnosis of breast cancer
L. Gutiérrez Gálvez, T. García Mendiola, M. Vázquez Sulleiro, E.M. Pérez Álvarez, F. Pariente, M.E. Lorenzo Abad

Lanthanide-based metal-organic frameworks as luminescent sensors of atmospheric pollutants
Jorge Sangrador Pérez, Arturo Gamonal Crespo, Roberta Poloni, Juan Cabanillas-González, and José Sánchez Costa

Ruthenium- and osmium-arene tethered complexes as anticancer agents
Claudia Cardozo Yusti*, Ana M. Pizarro

Sequential single-crystal-to-single-crystal vapochromic inclusion in a nonporous coordination polymer: unravelling dynamic rearrangement for selective pyridine sensing
E. Fernández Bartolomé, E. Resines Urien, M. Murillo Vidal, L. Piñeiro López, J. Sánchez Costa

Single crystal switchable Fe(II)-Bis(tetrazolate) framework: synergy between magnetic activity and electrical conductivity
A. Martinez-Martinez, E. Resines-Urien, L. Piñeiro-López, A. Fernández-Blanco, J. A. Rodríguez-Velamazán,E. C. Sañudo, E. Burzurí, and J. Sánchez Costa

ICFO International School On The Frontiers Of Light: New horizons in Quantum Materials
Barcelona, Spain

Invited talk

Electron-electron interactions and superconductivity in twisted bylayer graphene and related materials
F. Guinea

Poster contributions

Superconductivity from repulsive interactions in bernal bilayer graphene
A. Jimeno Pozo

Joint 'International Symposium on Applications of Ferroelectrics', 'European Conference on Applications of Polar Dielectrics' and 'Piezoresponse Force Microscopy International Workshop' (IEEE ISAF 2022)
Tours, France

Oral contributions

Optimizing nucleation layers for the integration of ferroelectric HZO on CVD-grown graphene
S. Lancaster, I. Arnay, R. Guerrero, A. Gudin, T Mikolajick, P. Perna, S. Slesazeck

Reunión Científica del Grupo Especializado en Ciencia y Tecnologías (Bio)Analíticas (GCTbA 2022)
Granada, Spain

Oral contributions

Enhanced performance of reagent-less carbon nanodots based enzyme electrochemical biosensors
M. Revenga-Parra, I. Bravo, C. Gutiérrez-Sánchez, T. García-Mendiola, F. Pariente, E. Lorenzo

03/07/2022

19th International Symposium on Novel Aromatic Compounds (ISNA-19)
Warsaw, Poland

Invited talks

Unveiling Some Properties of Chiral Synthetic Molecular Nanographenes
Nazario Martín León

05/07/2022

International Conference on Analytical and Bioanalytical Techniques
Paris, Francia

Oral contributions

Bifunctional cnds to enhance electrochemiluminescence for the sensitive detection of analytes of clinical and environmental interest
Cristina Gutiérrez-Sánchez, Tamara Guerrero-Esteban, Mónica Revenga-Parra, Felix Pariente, Encarnación Lorenzo

08/07/2022

International Symposium on Bioorganometallic Chemistry
Paris, France

Poster contribution

Potent tethered Osmium(ii) half-sandwich anticancer agents bearing phenylpyridine
Sonia Infante-Tadeo, Vanessa Rodríguez-Fanjul, Abraha Habtemariam and Ana M. Pizarro*

09/07/2022

46th Federation of European Biochemical Societies Congress - The Biochemistry Global Summit
Lisbon, Portugal

Invited talks

Advanced fluorescence microscopy to study bacterial response to environmental challenges at the single-cell level
Cristina Flors

Meeting of the International Society on Thrombosis and Haemostasis
London, UK

Poster contributions

In vitro monitoring of anti-coagulation therapy in whole blood using magnetic nanoparticles and susceptometry
A. Harper, A. Santana-Otero, N. Telling, D. Ortega, D. Cabrera

10/07/2022

12th International Conference on Porphyrins and Phthalocyanines (ICPP-12)
Madrid, Spain

Invited talks

Bottom-up fabrication and atomic-scale characterization of porphyrin-based nanostructures
G. Bottari

Inducing magnetism in one-dimensional porphyrinoid polymers synthesized via oxidative coupling of isopropyl substituents on a metal surface
José Ignacio Urgel

Metallation of porphyrins with lanthanides
David Écija

Porphyrins as Scaffolds for Multivalent Presentation of Glycofullerenes
Nazario Martín León

24th International Colloquium on Magnetic Films and Surfaces (ICMFS-2022)
Online

Poster contributions

Hexagonal LTP-MnBi micro-islands with tunable anisotropy
C. Navío*, M. Villanueva, E. H. Sánchez, P. Pedraz, P. Olleros-Rodríguez, L. Zha, P. Perna, O. Chubykalo-Fesenko, J. Camarero, J. B. Yang, P. S. Normile, J. A. De Toro and A. Bollero

11/07/2022

8th International Conference on Attosecond Science and Technology (ATTO VIII)
Orlando, USA

Oral contributions

Attosecond Chemistry. European COST Action CA18222
Fernando Martín

Computational tools for the description of attosecond electron and nuclear dynamics
Fernando Martín

Real space-time imaging of electron dynamics in molecules
Fernando Martín

Ultrafast dynamics in nitroaniline molecules initiated by isolated attosecond pulses
Fernando Martín

Novel Electronic Properties of Two-Dimensional Materials (NEP2DM)
San Sebastian, Spain

Invited talk

Band structure and topological properties of graphene multilayers
P. A. Pantaleón

Poster contributions

Pairing transition in a heterogeneous double layer with interlayer Coulomb repulsion
A. Sinner

Superconductivity from repulsive interactions in bernal bilayer graphene
A. Jimeno Pozo

Current-phase relation in twisted bilayer graphene Josephson junctions
H. Sainz Cruz

XII Reunión Científica de la Asociación Española de Bioinorgánica (BioMadrid AEBIN)
Madrid, Spain

Invited talk

Osmium(II) tethered half-sandwich complexes: pH-dependent aqueous speciation and chemical reactivity inside cells
Sonia Infante-Tadeo, Vanessa Rodríguez-Fanjul, Abraha Habtemariam and Ana M. Pizarro*

XXXVIII Reunión Bienal de la Real Sociedad Española de Física (RSEF)
Murcia
Spain

Oral contributions

Electro-optical study of MoS2 micro-drum resonator
Julia García-Pérez, Víctor Marzoa, María Acebrón, Ramón Bernardo-Gavito and Daniel Granados

FORC and coercivity angular measurements analysis of the magnetic interactions in FeNi nanowires
A.J. Campos-Hernandez*, E.M. Palmero, A. Bollero

Poster contributions

Hybrid superconducting nanowire Single-Photon detectors
Cristina García-Pérez, Víctor Marzoa, María Acebrón, Marina C. De Ory, María Teresa Magaz, Julia García-Pérez, Ramón Bernardo-Gavito, Alicia Gómez, Daniel Granados

Role of the particle size in the development of customized permanent magnet composites and flexible filaments for additive manufacturing
E.M. Palmero*, D. Casaleiz, J. de Vicente, A. Bollero

Synthesizing MnAlC / hydrogel composites for 3D-printing of alternative permanent magnets
Z. Curbelo*, E.M. Palmero, C.M. Montero, A. Bollero

17/07/2022

16th European Biologic Inorganic Chemistry Conference (EuroBIC-16)
Grenoble, France

Oral contribution

Potent tethered osmium(ii) half-sandwich anticancer agents bearing phenylpyridine
Sonia Infante-Tadeo, Vanessa Rodríguez-Fanjul and Ana M. Pizarro*

28th Symposium of the International Union of Pure and Applied Chemistry (IUPAC) on Photochemistry
Amsterdam, Netherlands

Invited talks

Protein promoted excited state modulation
Sara Hernandez

International Conference on the Science and Technology of Synthetic Metals (ICSM)
Glasgow, United Kingdom

Invited talks

Photophysical pathways through charge-transfer states in all-organic materials
J. Gierschner

18/07/2022

International Conference on Ultrafast Phenomena

Montreal, Canada

Oral contributions

Ultrafast dynamics in nitroaniline molecules initiated by isolated attosecond pulses

Fernando Martín

24/07/2022

Joint European Magnetic Symposia (JEMS2022)

Warsaw, Poland

Oral contributions

Chemically modulated Fe-Ni cylindrical nanowires with asymmetric magnetic response

C. Fernández-González, A. Berja, L. Aballe, L. Álvaro-Gómez, C. Martín-Rubio, M. Foerster, M. A. Niño, R. Sanz, A. Mascaraque, L. Pérez, S. Ruiz-Gómez.

Crystal quality assessment of highly Bi-doped electrodeposited Cu nanowires for spintronics applications.

A. Guedeja-Marrón, I. García-Manuz, S. Ruiz-Gómez, C. Fernandez-González, L. Pérez, and M. Varela

Direct X-ray detection of the spin Hall effect in CuBi

Sandra Ruiz-Gómez, Rubén Guerrero, Muhammad W. Khaliq, Claudia Fernández-González, Jordi Prat, Andrés Valera, Simone Finizio, Paolo Perna, Julio Camarero, Lucas Pérez, Lucía Aballe, Michael Foerster

Effect of Particle Size in Extruding Flexible Permanent Magnet Filaments from Tuned Composites for Additive Manufacturing

E.M. Palmero*, D. Casaleiz, J. de Vicente, A. Bollero

Spin Reorientation Transition In Epitaxial Nd-Fe-B Thin Films With High Perpendicular Magnetic Anisotropy

J. Soler-Morala*, I. Arnay, G. Gzoukia, P. Pedraz, P. Perna, L. Alff, C. Navío and A. Bollero

Sustainability through industrial recycling and advanced manufacturing of nanocrystalline ferrite permanent magnet material

A. Bollero*, D. Casaleiz, E.M. Palmero, J. de Vicente, A. Seoane, R. Altimira

Poster contributions

Study of the magnetic interactions in FeNi nanowires through coercivity angular measurements and FORC analysis

A.J. Campos-Hernandez*, E.M. Palmero, A. Bollero

The Optical Society of America (OSA) Advanced Photonics Congress

Maastricht, Netherlands

Oral contributions

Cove-edge nanographenes as potential optical gain media for lasing

Saul Garcia Orrit, Victor Vega Mayoral, Juan Cabanillas Gonzalez

Poster contributions

Boost in THz mobility in UMG silicon treated by phosphorous diffusion gettering

S. Revuelta, N. Dasilva, D. Fuertes-Marron, C. del-Cañizo and E. Canovas

25/07/2022

Birth and Fission of Cellular Compartments

Bilbao, Spain

Oral contributions

Measuring force generation by dynamin isoforms

B. Ibarra, R. Bocanegra, V. Frolov

Poster contributions

Axial force measurements during membrane nanotube constriction and fission by Dynamin1

R. Bocanegra, A. Shnirova, V. Frolov, B Ibarra

Mechanisms for Superconductivity

New York, USA

Invited talk

Collective charge fluctuations and superconductivity in twisted bilayer graphene and related materials

F. Guinea

21/08/2022

29th General Conference of the Condensed Matter Division of the European Physical Society (CMD29)

Manchester, England

Oral contributions

Tailoring the magnetic anisotropy of mono and dinuclear lanthanide metal-organic networks by metal exchange

S . O. Parreiras, D. Moreno, B. Cirera, M. A. Valbuena, J. I. Urgel, J. I. B. Muñiz-Cano, C. Martín-Fuentes, K. Lauwaet, M. Paradinas, M. Panighel, F. Ajejas, M. A. Niño, J. M. Gallego, M. Valvidares, W. Kuch, J. I. Martinez, A.; Mugarza, P. Gargiani, J. Camarero, R. Miranda, P. Perna, D. Ecija

6th Photobiology School

Brixen/Bressanone Italy

Poster contributions

Min Oscillations as Reporter of Bacterial Photodynamic Inactivation at the Single-Cell Level

I. V. Ortega,* J. Torra, C. Flors

22/08/2022

Strongly Correlated Matter: from Quantum Criticality to Flat Bands

Trieste, Italy

Invited talk

Charge fluctuations, phonons, and superconductivity in twisted an un-twisted graphene stacks

F. Guinea 23/08/2022

Curso de Verano de la Universidad Internacional Menéndez Pelayo
Madrid
Spain

Invited talks

Emergent topics in Chemical Science
Nazario Martín

28/08/2022

8th Congress of the European Chemical Society (8th EuChemS)
Lisboa, Portugal

Oral contributions

Attochemistry: imaging and controlling electron dynamics in molecules with attosecond light pulses
Fernando Martín
Lisbon
Portugal

Invited talks

Engineering pi-conjugation on surfaces
David Écija

Synthetic Chiral Molecular Nanographenes
Nazario Martín León

36th European and 12th International Peptide Symposium
Sitges, Spain

Poster contributions

Peptide biosensor for tracking axonal transport through motor proteins
Rebeca París-Ogáyar, Carlota Tosat-Bitrián, Oliva M.A, J. Fernando Díaz, Valle Palomo

44th International Conference on Coordination Chemistry
Rimini, Italy

Oral contribution

Bodipy-bound Rhodium(iii) and Iridium(iii) potent half- sandwich compounds for anticancer applications
Arturo Villechenous Rojo*, Sonia Infante-Tadeo, Vanessa Rodríguez-Fanjul and Ana M.Pizarro

The International Society of Neurochemistry and the Asian Pacific Society of Neurochemistry (ISN-APSN) Meeting
Kyoto, Japan

Poster contributions

Quantum dot conjugates in cellular model derived from patients: towards molecular characterization and personalised medicine
Carlota Tosat-Bitrián, Paula Fernández, Ana Martínez, Ángeles Martín-Requero, Valle Palomo

XXIV International Round Table on Nucleosides, Nucleotides and Nucleic Acids
Stokholm, Suecia

Poster contributions

Non-coding RNAs and chemotherapeutics for synergistic cancer treatment
Paula Milán-Rois*, David García Soriano,Eva López, Luis A. Campos, Irene Pardo, Miguel Gisbert-Garzarán, Mario Martínez Mingo, Nuria Lafuente-Gómez, Gorka Salas, Álvaro Somoza

29/08/2022

European Conference on Surface Science (ECOSS35)
Belval, Luxembourg

Oral contributions

Electronic Temperature and Two-Electron Processes in Overbias Plasmonic Emission from Tunnel Junctions
Koen Lauwaet

Interplay between ϖ–conjugation and exchange magnetism in one-dimensional porphyrinoid polymers
Kalyan Biswas

Mono- and bi-elemental 2D materials on metal supports: growth, interface characterization, and templating functionality
Marc G. Cuxart

Selectively addressing plasmonic or excitonic modes for a quantum emitter inside a plasmonic nanocavity
A. Martín-Jiménez, O. Jover, K. Lauwaet*, D. Granados, R. Miranda, and R. Otero

Synthesis and characterization of open-shell nanographenes on a metallic surface
Koen Lauwaet

Tailoring the magnetic anisotropy of mono and dinuclear lanthanide metal-organic networks by metal exchange
S . O. Parreiras, D. Moreno, B. Cirera, M. A. Valbuena, J. I. Urgel, J. I. B. Muñiz-Cano, C. Martín-Fuentes, K. Lauwaet, M. Paradinas, M. Panighel, F. Ajejas, M. A. Niño, J. M. Gallego, M. Valvidares, W. Kuch, J. I. Martinez, A.; Mugarza, P. Gargiani, J. Camarero, R. Miranda, P. Perna, D. Ecija

31/08/2022

7th International Workshop of Materials Physics
Magurele, Romania

Invited talks

Developing Rare Earth-free and Hybrid Permanent Magnets: from the Synthesis of Customized Composites to Additive Manufacturing
E.M. Palmero*, D. Casaleiz, J. de Vicente, A. Bollero

Nanomagnetism applied to the development of sustainable permanent magnets for energy and transport applications
A. Bollero*

Around-the-Clock Around-the-Globe Magnetics Conference 2022 (IEEE AtG-AtC 2022)
Online

Oral contributions

FeNi nanowires magnetic interactions study: FORC and magnetization reversal analysis
A.J. Campos-Hernandez*, E.M. Palmero, A. Bollero

01/09/2022

Spin Argentina
Bariloche, Argentina

Oral contributions

Spin conversion in epitaxial monolayer graphene structures
Alberto Anadón, Adrián Gudín, Iciar Arnay, Heloise Damas, Rubén Guerrero, Alejandra Guedeja-Marron, Jose Manuel Díez Toledano, Rodolfo Miranda, Julio Camarero, Junior Alegre, Sébastien Petit-Watelot, Paolo Perna, Juan-Carlos Rojas-Sánchez

04/09/2022

Bacterial Networks (BacNet22)
St Feliu de Guíxols, Spain

Oral contributions

How bacteria use the force to control adhesion
F. Viela,* M. Mathelié-Guinlet, D. Alsteens, Y. F Dufrêne

Deutsche Physikalische Gesellschaft (DPG) Conferences
Regensburg, Germany

Oral contributions

Interplay between ϖ–conjugation and exchange magnetism in one-dimensional porphyrinoid polymers
Kalyan Biswas

Trends in Magnetism
Venice, Italy

Invited talks

Direct X-ray detection of the spin Hall effect in CuBi
S. Ruiz-Gómeza,b*, R. Guerreroc+, M. W. Khaliqb, C. Fernández-Gonzáleza,c, J. Pratb, S. Finiziod, P. Pernac, J. Camareroc,e, L. Péreza,c, L. Aballeb, M. Foersterb

Poster contributions

In-vitro real-time magnetic recording of neuronal activity on spinal cord slices
Lucas Perez, Arturo Vera, Ivo Calaresu, Isidoro Martínez, Denis Scaini, Jaime Hernandez, Rubén Guerrero, Paolo Perna, Isabel Martínez, Rodolfo Miranda, Julio Camarero, Laura Balleriniand M. Teresa González

Magnetization in cylindrical nanowires: the role of chirality
S. Ruiz-Gómez, C. Fernández-González, E. Martínez, V, Raposo, A. Sorrentino, M. Foerster, L. Aballe, A.Mascaraque, S. Ferrer, Lucas Pérez

05/09/2022

2nd BrainTwin Summer School
Online

Invited talks

Ultimate sensing, smart exciting and controlled repairing
M.T González, L.Pérez, P. Perna ,R. Miranda, J. Camarero

X AUSE Conference & V ALBA User's Meeting
Cerdanyola del Vallès
Spain

Invited talks

Bandgap opening in graphene on Ir (111) mediated by Tellurium intercalation
B. Muñiz Cano; D. Pacilé; E. Salagre; E. García-Michel; J. Camarero; M. Garnica; M. Á. Valbuena; P. Moras; P. Segovia; P. M. Sheverdyaeva; R. Miranda

Magnetic and electronic properties of 2D metal-organic networks
S. O. Parreiras

Poster contributions

Tuning the hexagonal warping of topological surface states in rare-earth surface doped magnetic topological insulators
B. Muñiz Cano; A. I. Figueroa, K. Garcia, J. Dai, M. Tallarida, M. G. Cuxart, P. Gargiani, M. Valvidares, A. Barla, J. Camarero, R. Miranda, S. O. Valenzuela, A. Mugarza and M. A. Valbuena

X International Congress on Analytical Nanoscience and Nanotechnology–X (NyNA 2022)
Ciudad Real, Spain

Invited talks

High performance clinical biosensors based on new 2d layered materials.
Encarnación Lorenzo

Oral contributions

Synthesis of new carbon nanodots made of phenazine and phenothiazines for bioanalytical tool developments "
Emiliano Martínez-Periñán, Tania García-Mendiola, Cristina Gutiérrez-Sánchez, Mónica Revenga-Parra, Eva Mateo-Martí, Félix Pariente, Encarnación Lorenzo

06/09/2022

44º Congreso Nacional de la Sociedad Española de Bioquímica y Biología Molecular
Málaga, Spain

Oral contributions

Visual and multiplexed detection of clinically relevant nucleic acids using functionalized gold nanoparticles
Catarina Coutinho, Ciro Rodríguez-Díaz, Nuria Lafuente-Gómez, Demián Pardo, Hernán Alarcón-Iniesta, María López-Valls, Rocío Coloma, Paula Milán-Rois, Mirian Domenech, Melanie Abreu, Rafael Cantón, Juan Carlos Galán, Rebeca Bocanegra, Luis A. Campos, Christian Duarte, Alfonso Latorre, Rodolfo Miranda, Álvaro Somoza, Milagros Castellanos

08/09/2022

3rd International Conference on Nanomaterials Applied to Life Sciences (NALS 2022)
Madrid, Spain

Oral contributions

Core@shell nanostructured electrodes for neural interfacing
Beatriz L. Rodilla*, Ana Arché-Nuñez, Sandra Ruiz-Gómez, Claudia Fernández-González, Cla-

ra Guillén-Colomer, Ana Domínguez-Bajo, Ankor González-Mayorga, Julio Camarero, Rodolfo Miranda, Elisa López-Dolado, Pilar Ocón, María C. Serrano, Lucas Pérez and M. Teresa González

5th Spanish Conference on Biomedical Applications of Nanomaterials (SBAN 2022)
Madrid, Spain

Oral contributions

A magnetic nanoparticle-based vaccine generates anti-tumour immunity in vitro and in vivo
Nuria Lafuente-Gómez, Irene de Lázaro, Mónica Dhanjani, David García-Soriano, Miguel C. Sobral, Gorka Salas, David J. Mooney, Álvaro Somoza

Poster contributions

Benign and versatile synthesis of iron oxide nanoparticles and their study in biomedical applications
Mónica Dhanjani, César del Valle Pérez, Gorka Salas

Development of Quantum Dot platform to measure pathological proteins and pharmacological action in lymphoblasts from ALS patients
Paula Fernández, Carlota Tosat-Bitrián, Ángeles Martín Requero, Valle Palomo

Fe/Au/Cu nanostructures for biomedical applications
Nadia Pastor, David García Soriano, Gorka Salas

Neural stem cells differentiation on densely packed high aspect ratio nanopillars
Miguel Esteban-Lucia, Silvia García-López, Jaime J Hernández, Alberto Martínez-Serrano , Marta P. Pereira and Isabel Rodríguez

Preparation of Fe3O4/Au nanostructures for biomedical applications
César del Valle Pérez, David García Soriano, Gorka Salas

Tumor solid stress reduces nanomedicine penetration in tumors
Alberto Martín-Asensio, Sergio Dávila, Jean Cacheux, Isabel Rodríguez

11/09/2022

22nd International Vacuum Congress (IVC-22)
Sapporo, Japan

Oral contributions

Designing of a 2D metal-organic network featuring a large orbital magnetic moment
S. O. Parreiras, C. Martín-Fuentes, J. I. Urgel, V. Rubio-Giménez, B. Muñiz-Cano, D. Moreno, K. Lauwaet, M. Valvidares, Miguel A. Valbuena, P. Gargiani, J. Camarero, J. M. Gallego, R. Miranda, J. I. Martínez, C. Martí-Gastaldo, David Écija

Poster contributions

Nanocar Race II: Keys to victory
A. Barragán, K. Lauwaet, A. Sánchez-Grande, J.I. Urgel, T. Nicolás, J. Björk, E. Pérez, D. Écija

14/09/2022

16th Conferencia Anual de Usuarios de la Red Española de Supercomputación
Cáceres, Spain

Invited talks

Precise characterization of low temperature structures of vanadium oxides
J. A. Silva Guillén

15/09/2022

Organic 2D Crystalline Materials: Chemistry, Physics and Devices (O2DMAT)
Madrid, Spain

Invited talks

Metal-organics on surfaces
David Écija

Oral contributions

Non-contact optical method for characterization of organic 2D materials via THz spectroscopy
Vasileios Balos,*et al.

Poster contributions

High-mobility band-like charge transport in a semiconducting two-dimensional Fe3THT2 MOF
Marco Ballabio*, et al.

Two dimensional lattices of covalent- and metal-organic frameworks for the quantum hall resistance standard
S. Estévez, I. Figueruelo, J. García, M. Acebrón , F. Raso, G. Luka, L. Callegaro, F. Couedö, H. Scherer, A. E. Sadak, T. Heine, M.Ortolano, R. Dong, X. Feng, M. Menghini, D. Granados and E. Cánovas

19/09/2022

XVI School on Synchrotron Radiation: Fundamentals, Methods and Applications
Trieste, Italy

Poster contributions

Tuning the hexagonal warping of topological surface states in rare-earth surface doped magnetic topological insulators
B. Muñiz Cano, A. I. Figueroa, K. Garcia, J. Dai, M. Tallarida, M. G. Cuxart, P. Gargiani, M. Valvidares, A. Barla, J. Camarero, R. Miranda, S. O. Valenzuela, A. Mugarza and M. A. Valbuena

European Materials Research Society Fall Meeting (EMRS)
Warsaw, Poland

Oral contributions

Epitaxial La2/3Sr1/3MnO3 thin films on vicinal SrTiO3 substrates for sensitive anisotropic magnetoresistive sensors operated at room temperature
L. G. Enger , S. Flament, O. Rousseau, I. N. Bhatti, B. Guillet, M. Lam Chok Sing, V. Pierron, S. Lebargy, J.M. Diez, A. Vera, I. Martinez, R. Guerrero, L. Perez, P. Perna, J. Camarero, R. Miranda, M. T. Gonzalez, L. Méchin

22/09/2022

International Conference 2022: Exploring the Nonequilibrium Properties of Condensed Matter (CRC1242): Non-Equilibrium Dynamics of Condensed Matter in the Time Domain
San Sebastian, Spain

Invited talks

Transient dynamics in silicon monitored by time resolved THz spectroscopy
Enrique Canovas

25/09/2022

On-Surface Synthesis International Workshop (OSS2022)
Sant Feliu de Guixols, Spain

Invited talks

Atomically sharp lateral superlattice heterojunctions built-in nitrogen-doped nanoporous graphene
David Ecija

Engineering pi-conjugation on surfaces
David Écija

Oral contributions

Synthesis and characterization of open-shell nanographenes on a metallic surface
Kalyan Biswas

Poster contributions

Integration of Antiaromatic Units in Polycyclic Hydrocarbons by Intra- and Intermolecular Ring-Rearrangement Reactions
E.Pérez-Elvira

27/09/2022

International Symposium on the Synthesis and Application of Curved Organic p-molecules and Materials (CURO-p)
Beijing, China

Invited talks

Electronic Control of the Scholl Reaction: Selective Synthesis of Spiro vs Helical Nanographenes
Nazario Martín León

28/09/2022

Joint Annual Conference of the Austrian, German and Swiss Societies for Biomedical Engineering
Innsbruck, Austria

Oral contributions

Simulating the magnetization dynamics of magnetic nanoparticles for biomedical applications
J. Leliaert, J. Ortega-Julia, A. Coene, D. Ortega

Poster contributions

Estimating the heating of complex aggregates of magnetic nanoparticles for hyperthermia
J. Ortega, D. Ortega, J. Leliaert

10/10/2022

Carbon Chemistry and Materials 2022
Rome, Italy

Invited talks

Fabrication of 2D materials-based nanoarchitectures via innovative CVD processes
Marc G. Cuxart

International Conference on Spectral Shaping for Biomedical and Energy Applications (SHIFT2022)
Tenerife, Spain

Invited talks

Real-time imaging and control of electron currents: towards attochemistry
Fernando Martín

Oral contributions

From the cosmos to the nanoscale: nanostructured permanent magnets for a green energy transition
A. Bollero*, E.M. Palmero, C. Muñoz-Rodríguez, A.J. Campos-Hernández

Synthesis of MnAlC / Hydrogel Inks for Fabricating Alternative Permanent Magnets by Bonding and 3D-printing
Z. Curbelo*, E.M. Palmero, C.M. Montero, A. Bollero

Understanding the role of particle size in the development of flexible permanent magnet-polymer filaments for additive manufacturing
E.M. Palmero*, D. Casaleiz, J. de Vicente, A. Bollero

16/10/2022

11th International Conference on Fine Particle Magnetism
Yokohama, Japan

Oral contributions

Homogenization of Heating in Magnetic Hyperthermia Through Exploitation of Magnetisation Dynamics of Interacting Particles
J. Leliaert, J. Ortega-Julia, D. Ortega

26/10/2022

8th Workshop of the Spanish Network of Nanolithography (NANOLITO 2022)
Valencia, Spain

Oral contributions

Fabrication and opto-electro-mechanical study of MoS2 micro-drum resonators
Julia García-Pérez, Víctor Marzoa, María Acebrón, Ramón Bernardo-Gavito and Daniel Granados

Fabrication of micrometer ferromagnetic parts through an optimized combination of lithography and electrodeposition
E.M. Palmero*, M.R. Osorio, A. Valera, M. Acebrón, A. Bollero, D. Granados

Nanoimprinted polymers as cell instructive & bactericidal surfaces
M. Teresa Alameda, Miguel Esteban-Lucia, Manuel R. Osorio, Jaime J. Hernández & Isabel Rodríguez

Poster contributions

Nanotithography applied to the development of the quantum Hall resistance standard based on organic two-dimensional crystalline lattices
S. Estévez, I. Figueruelo, J. García, M. Acebrón , F. Raso, G. Luka, L. Callegaro, F. Couedö, H. Scherer, A. E. Sadak, T. Heine, M. Ortolano, R. Dong, X. Feng, E. Cánovas, M. Menghini and D. Granados

Quantum technologies at the Centre for Nanofabrication of IMDEA Nanociencia
Manuel R. Osorio, María Acebrón, Julia García, Matía Teresa Magaz, Patricia Cancho, Andrés

Valera, Iván Redondo, Fernando J. Urbanos, Alicia Gómez, Daniel Granados

NanoMedicine International Conference (NanoMed 2022)
Athens, Greece

Oral contributions

Nanowire-based electrodes for electrophysiological studies: Fabrication, on-bench characterization and in-vitro biocompatibility
Ana Arché-Núñez*, Beatriz L. Rodilla, Claudia Fernández-González, Clara Guillén-Colomer, Sandra Ruiz-Gómez, Julio Camarero, Rodolfo Miranda, Pilar Ocón, Lucas Pérez, M. Concepción Serrano and M. Teresa González

New Trends in 2D Materials
Madrid, Spain

Invited talks

Geometry, anomalies, and transport
Y. Ferreirós

Superconductivity from electronic interactions and spin-orbit enhancement in bilayer and trilayer graphene
A. Jimeno Pozo

Effects of f-wave pairing in graphitic superconductors
H. Sainz Cruz

Strain induced quasi-unidimensional channels in twisted moiré lattices
P. A. Pantaleón

30/10/2022

Molecular Functionality at Surfaces
Bad Honnef, Germany

Invited talks

Engineering pi-conjugation on surfaces
David Écija

31/10/2022

67th Annual Conference on Magnetism and Magnetic Materials
Minneapolis, USA

Oral contributions

Analysis of the Magnetic Interactions in FeNi Nanowire Arrays through FORC and Angular Coercivity Measurements
A.J. Campos-Hernandez*, E.M. Palmero, A. Bollero

Highly coercive PrFeB Films with Strong Perpendicular Magnetic Anisotropy.
J. Soler-Morala*, G. Gkouzia, P. Pedraz, L. Zha, J. Yang, L. Alff, C. Navío and A. Bollero

07/11/2022

8th International Fall School on Organic Electronics (IFSOE-2022)
Online

Invited talks

Intrinsic visible light emission of aggregated non-conjugated organic molecules - a critical analysis
J. Gierschner

Scientific misconduct in current chemistry research: aspects and conditions
J. Gierschner

Workshop on Advanced Materials in Spain (MAD2D-CM)
Gandía, Spain

Invited talks

Presentación del proyecto Materiales Disruptivos Bidimensionales (2D) para la nueva transformación tecnológica
Nazario Martín León

16/11/2022

Ultrafast Science and Technology Spain 2022 (USTS 2022)
Málaga, Spain

Invited talks

Protein promoted excited state modulation
Sara Hernandez

Oral contributions

Band-like charge transport in phytic acid-doped polyaniline thin films
Marco Ballabio,* Tao Zhang, Chen Chen, Peng Zhang, Zhongquan Liao, Mike Hambsch, Stefan C. B. Mannsfeld, Ehrenfried Zschech, Henning Sirringhaus, Xinliang Feng, Mischa Bonn, Renhao Dong, and Enrique Cánovas

The role of symmetry in the photophysics of fused nanographene-metalloporphyrin conjugates
S. Garcia et al.

Poster contributions

Photophysics of porphyrin-nanographene dyads
Victor Vega Mayotal, Saul Garcia Orrit, Juan Cabanillas Gonzalez

The role of symmetry in the photophysics of fused nanographene-metalloporphyrin conjugates
Saul Garcia Orrit, Victor Vega Mayoral, Juan Cabanillas Gonzalez

17/11/2022

6th Young Researchers in Magnetism Conference
Cádiz, Spain

Oral contributions

3D-printing of Alternative Permanent Magnets using tuned MnAlC / hydrogel composite inks
Z. Curbelo-Cano*, E.M. Palmero, C.M. Montero, A. Bollero

Poster contributions

Coercivity development in FeNiPC ribbons as possible precursor for novel sustainable permanent magnets
C.I. Fernández-Cuevas*, A.J. Campos-Hernandez, E.M. Palmero, J.J. Suñol, P. Svec, P. Svec Sr., A. Bollero

23/11/2022

Spanish & Portuguese Advanced Optical Microscopy Meeting

Salamanca, Spain

Oral contributions

Real-time imaging of the mechanobactericidal action of nanoMaterials

F. Viela,* I. V. Ortega, C. Flors

Unconventional fluorophores for super-resolution microscopy

C. Flors

Poster contributions

Min oscillations as real-time reporter of sublethal effects in photodynamic treatment of bacteria

I. V. Ortega,* J. Torra, C. Flors

Unveiling the dynamics of genome release from individual adenovirus particles induced by chemical stress

M. Alcaraz-Hurtado* , K. Strobl, M. Pérez-Illana, C. San Martín , M. Hernando-Pérez , P.J. de Pablo

25/11/2022

Jornada Científica Sobre Nuevas Plataformas Sensoras Miniaturizadas

Burgos, Spain

Oral contributions

Biosensor electroquimioluminiscente para la detección del SARS-COV-2 basado en nanopuntos de carbono y nanomateriales de oro

Laura Gutiérrez Gálvez

01/12/2022

Materials Reseach Society Fall Meeting (MRS)

Boston, USA

Invited talks

Harnessing functional defects for energy and electronic frontiers

Alejandra Guedeja-Marron , Francisco Fernandez-Canizares , Gabriel Sanchez-Santolino , Juan I. Beltran , Paolo Perna , Lucas Perez , Maria Varela

15/12/2022

12th Early Stage Researchers Workshop in Nanoscience

Madrid, Spain

Oral contributions

2D MoS2/graphene heterostructure for SARS-CoV-2 aptasensor development

Estefanía Enebral Romero, Laura Gutiérrez-Gávez, Rafael del Caño, Manuel Vázquez Sulleiro, Alicia Naranjo, I. Jénnifer Gómez, Félix Pariente, Emilio M. Pérez, Tania García-Mendiola and Encarnación Lorenzo

Band-like charge transport in phytic acid-doped polyaniline thin films

Marco Ballabio*, et al.

Coercivity dependence on PrFeB Films with Strong Perpendicular Magnetic Anisotropy

J. Soler-Morala*, C. Navío, G. Gkouzia, P. Pedraz, L. Zha, J. Yang, L. Alff and A. Bollero

Fluorescent metallodrugs for anticancer applications

Arturo Villechenous Rojo*, Vanessa Rodríguez-Fanjul and Ana M.Pizarro

Phase engineering of two-dimensional Transition Metal Ditellurides.

Joan Ripoll-Sau, I. Di Bernardo, F. Calleja, P. Casado Aguilar, I.M. Ibarburu, R. Miranda, A.L. Vázquez de Parga, M. Garnica

Spin state switching-assisted modulation of electron transport in a single crystal 3D metal-organic framework

A. Martinez-Martinez, E. Resines-Urien, L. Piñeiro-López, A. Fernández-Blanco, J. A. Rodríguez-Velamazán,E. C. Sañudo, E. Burzurí, and J. Sánchez Costa

Transport, symmetry and disorder in twisted bilayer graphene

H. Sainz Cruz

Poster contributions

Additive manufacturing of rare earth-free permanent magnets using tunable MnAlC and hydrogel composite inks

Z. Curbelo-Cano*, E.M. Palmero, C.M. Montero, J. de Vicente, A. Bollero

Amperometric NADH sensor based on high-quality few-layers bismuthene hexagons modified screen printed electrodes

Ana María Villa-Manso, Iñigo Torres, Mónica Revenga-Parra,Cristina Gutiérrez-Sánchez, Diego A. Aldave, Elena Salagre, Enrique García Michel, María Varela, Julio Gómez-Herrero, Encarnación Lorenzo, Félix Parientea, Félix Zamora

Benign and versatile synthesis of iron oxide nanoparticles and their study in biomedical applications

Mónica Dhanjani, César del Valle and Gorka Salas

Biocatalyzed electrochemiluminescence biosensor based on Bismuthene and DNA Nanostructures for COVID-19 diagnosis

Laura Gutiérrez-Gálvez, Daniel García-Fernández, Melisa del Barrio, M. Luna, Íñigo Torres, Félix Zamora, Milagros Castellanos, Álvaro Somoza, Tania García-Mendiola and Encarnación Lorenzo

Biocatalyzed electrochemiluminescence biosensor based on bismuthene and dna nanostructures for covid-19 diagnosis.

Laura Gutiérrez-Gálvez, Daniel García-Fernández, Melisa del Barrio, M. Luna, Íñigo Torres, Félix Zamora, Milagros Castellanos, Álvaro Somoza, Tania García-Mendiola and Encarnación Lorenzo.

Concomitant Thermochromic and Phase-Change Effect in a Switchable Spin Crossover Material for Efficient Passive Control of Day and Night Temperature Fluctuations

Esther Resines-Urien, Miguel Ángel García García-Tuñón, Mar García-Hernández, Jose Alberto Rodríguez-Velamazán, Ana Espinosa and José Sánchez Costa*

Design and implementation of fluorescent probes to assess cytosolic intracelullar transport in presence of microtubule targeting agents

Rebeca París-Ogáyar, Carlota Tosat-Bitrián, Oliva M.A, J. Fernando Díaz, Valle Palomo.

Design and synthesis of PLGA nanoparticles and their potential for the treatment of neurodegenerative diseases
Paula Fernández, Vanesa Nozal, Ana Martínez and Valle Palomo

Development of nanostructured neural implants based on nanotechnology
Noelia Rodríguez-Díez*, Ana Arché-Núñez, Beatriz L. Rodilla, Julio Camarero, Rodolfo Miranda, Lucas Pérez, Isabel Rodríguez, M. Teresa González

Development of Superconducting Single-Photon Detectors based on NbTiN and Graphene
Cristina García-Pérez, Víctor Marzoa, María Acebrón, Marina C. De Ory, María Teresa Magaz, Julia García-Pérez, Ramón Bernardo-Gavito, Alicia Gómez, Daniel Granados

Electrical characterization of organic 2D materials using THz time-domain spectroscopy
Vasileios Balos,*et al.

Electrochemiluminescent DNA biosensor for mutation detection
Daniel García-Fernández, Laura Gutiérrez-Gálvez, Íñigo Torres, Félix Zamora, Tania García-Mendiola, Encarnación Lorenzo

Fe/Au/Cu nanostructures for biomedical applications
Nadia Pastor, David Garcia-Soriano, César del Valle, Mónica Dhanjani and Gorka Salas

Fe-Ni-P-C amorphous ribbons as potential precursor to obtain alternative rare earth-free permanent magnets
C.I. Fernández-Cuevas*, A.J. Campos-Hernandez, E.M. Palmero, J.J. Suñol, P. Svec, P. Svec Sr., A. Bollero

Lanthanide-based metal-organic frameworks as luminescent sensors of atmospheric pollutants
Jorge Sangrador Pérez, Arturo Gamonal Crespo, Esther Resines Urien, Roberta Poloni, Juan Cabanillas-González, and José Sánchez Costa

Long non-coding RNA FOXD3-AS1 as a therapeutic target for breast and colon cáncer
Irene Pardo*, Luis A. Campos, Álvaro Somoza

Magnetic nanoparticles as vaccine platforms to foster anti-tumor immunity
Nuria Lafuente-Gómez, Irene de Lázaro, Mónica Dhanjani, David García-Soriano, Miguel C. Sobral, Gorka Salas, David J. Mooney, Álvaro Somoza

Novel highly citotoxic ruthenium- and osmium-arene tethered complexes as anticancer agents
Claudia Cardozo Yusti*, Ana M. Pizarro

PASSENGER: Substitution as a key for the production of sustainable permanent magnets
A. Fernández-Calzado*, J. Vergara-Ortega, J.L. Fernández-Cuñado, A. Martín-Cid, E.M. Palmero, A. Bollero

Performing a tone cluster of MoS2 micro-drum resonators
Julia García Pérez, Ramón Bernardo Gavito, Daniel Granados

Playing with the weakest supramolecular interactions in a 3D crystalline hexakis[60]fullerene induces control over hydrogenation selectivity
Estefania Fernandez-Bartolome, Arturo Gamonal, Jose Santos, Saeed Khodabakhshi, Eider Rodrıguez-Sanchez, E. Carolina Sanudo, Nazario Martın and Jose Sanchez Costa

Preparation of Fe3O4/Au nanostructures for biomedical applications
César del Valle Pérez, David García Soriano, Gorka Salas

Quantification of protein aggregates and drug evaluation in a model of ALS and cells derived from patients
Carmen Pérez de la Lastra, Gracia Porras Franco, Angeles Martín-Requero, Ana Martínez Gil and Valle Palomo

Temperature and angular features of magnetic and transport properties in LSMO films towards biosensor applications
I. García-Manuz, R. Solís, J.M. Diez, R. Singh, G. De Arana, J. L. F. Cuñado, A. Gudín, L.G. Enger, B. Guillet, L. Méchin, S. Flament, P. Perna and J. Camarero

Temperature dependence od carrier density and mobility in n-type silicon
S. Estévez, Gabriel Caballero, Ignacio Figueruelo, Manuel R. Osorio, Daniel Granados, Mariela Menghini and Enrique Cánovas

Towards tethered rhenium organometallic half-sandwich complexes as anticancer agents
Alejandro Martín Hoyas*, Ana M. Pizarro

Tuning the hexagonal warping of Bi2Se2Te topological insulator's surface state by magnetic Rare Earth surface dopant
B. Muñiz Cano, A. I. Figueroa, K. García, S. O. Valenzuela, A. Mugarza, J. Daic, M. Tallarida, Y. Ferreirosa, P.A. Pantaleón, J.A. Silva-Guillén, F. Guinea, V. Marinova, R. Miranda, J. Camarero, and M. Á. Valbuena

Upgraded metallurgical grade silicon: a terahertz spectroscopy study
Pulido-Lendínez, M. A., Ballabio, M., Dasilva-Villanueva, N., Sánchez, J., Crespillo, M. L., García, G., Fuertes, D., del Cañizo, C., and Cánovas, E.

Tumor-on-a-chip to study nanoparticles penetration in tumors
Alberto Martín-Asensio, Sergio Dávila, Jean Cacheux, Isabel Rodríguez

16/12/2022

Instituto Nicolás Cabrera Young Researchers Meeting 2022
Madrid, Spain

Poster contributions

Phase engineering of two-dimensional transition metal ditellurides
Joan Ripoll-Sau, I. Di Bernardo, F. Calleja, P. Casado Aguilar, I.M. Ibarburu, R. Miranda, A.L. Vázquez de Parga, M. Garnica

2. Press clippings

10/01/2022
Juan Cabanillas, Aitziber L Cortajarena
A boost to the optical properties of gold nanoclusters by designed proteins
https://www.cicbiomagune.es/news/boost-optical-properties-gold-nanoclusters-designed-proteins
https://www.nanowerk.com/nanotechnology-news2/newsid=59503.php

11/01/2022
Juan Cabanillas, Aitziber L Cortajarena
A boost to the optical properties of gold nanoclusters by designed proteins
https://www.azooptics.com/News.aspx?newsID=27320

Impulso a las propiedades ópticas de los nanoclusters de oro diseñados por proteínas
http://www.madrimasd.org/notiweb/noticias/impulso-las-propiedades-opticas-los-nanoclusters-oro-disenados-por-proteinas

12/01/2022
Ana Pizarro
Luz de sincrotrón para promover la salud
https://www.lavanguardia.com/vida/junior-report/20220112/7954360/luz-sincrotron-promover-salud.html

16/01/2022
Daniel Granados
Entrevista para El Confidencial: "Las ideas de 'tecnología profunda' que no ves pero se están llevando todo el dinero"
https://www.elconfidencial.com/tecnologia/2022-01-16/deep-tech-tecnologia-profunda-ingenieria-inversiones_3358581/

17/01/2022
Fernando Martín
Quantensprung im Film
https://www.mpg.de/18148334/quantensprung-elektron-film?c=2191

Direct visualization of electron motion in atoms and molecules
https://www.techexplorist.com/direct-visualization-of-electron-motion-atoms-molecules/44174/?utm_source=rss&utm_medium=rss&utm_campaign=direct-visualization-of-electron-motion-atoms-molecules

Breakthrough in visualising motion of electrons
https://www.deccanherald.com/science-and-environment/breakthrough-in-visualising-motion-of-electrons-1072831.html

Spezialmikroskop filmt Elektronenbewegung im Molekül
https://www.laborpraxis.vogel.de/spezialmikroskop-filmt-elektronenbewegung-im-molekuel-a-1089080/

Ungeahnte Einblicke in die Dynamik von Elektronen in Molekülen
https://analytik.news/presse/2022/38.html

Subfemtosecond imaging of quantum electronic coherences in molecules
https://phys.org/news/2022-01-subfemtosecond-imaging-quantum-electronic-coherences.html

26/01/2022
Héctor Guerrero
Entrevista sobre la nanotecnología al Dr. Héctor Guerrero Padrón - Empresa NOB166
https://nob166.com/entrevista/nanotecnologia-hector-guerrero/

02/02/2022
Rodolfo Miranda
Madrid homenajea a la ciencia con los Premios I+D: medicina contra el cáncer, antibióticos, nanofotónica cuántica…
https://www.20minutos.es/noticia/4950756/0/madrid-homenajea-a-la-ciencia-con-los-premios-de-investigacion-2021-maria-vallet-alvaro-san-millan-idoia-murga/?autoref=true

Díaz Ayuso entrega los Premios de Investigación subrayando el incremento del 49% en inversión en I+D para 2022: "Queremos más especialización"
https://www.comunidad.madrid/noticias/2022/02/02/diaz-ayuso-entrega-premios-investigacion-subrayando-incremento-49-inversion-id-2022-queremos-especializacion

03/02/2022
Alberto Bollero
Spanish researchers develop 3d printed magnets made of recycled materials
https://3dprintingindustry.com/news/spanish-researchers-develop-3d-printed-magnets-made-of-recycled-materials-203579/

Fernando Martín
Quantum leap on film
https://www.nanowerk.com/nanotechnology-news2/newsid=59700.php

06/02/2022
Rodolfo Miranda
El almeriense Rodolfo Miranda, premio a la carrera científica de la Comunidad de Madrid
https://www.diariodealmeria.es/almeria/cientifico-Rodolfo-Miranda-Comunidad-Madrid_0_1653435210.html

07/02/2022
Rodolfo Miranda
El científico Rodolfo Miranda quiere traer un centro de investigación a Almería
https://www.lavozdealmeria.com/noticia/12/almeria/230947/el-cientifico-rodolfo-miranda-quiere-traer-un-centro-de-investigacion-a-almeria

09/02/2022
Fernando Martín
Primera observación directa del movimiento de los electrones en acción
http://www.madrimasd.org/notiweb/noticias/primera-observacion-directa-movimiento-los-electrones-en-accion

Logran la primera observación directa del movimiento de electrones en acción
https://www.infobae.com/america/agencias/2022/02/10/logran-la-primera-observacion-directa-del-movimiento-de-electrones-en-accion/

Neuer Blick auf den Quantensprung
https://www.scinexx.de/news/technik/neuer-blick-auf-den-elektronensprung/

Scientists manage to observe for the first time the movement of electrons in action
https://then24.com/2022/02/11/scientists-manage-to-observe-for-the-first-time-the-movement-of-electrons-in-action/

Primera observación directa del movimiento de los electrones en acción
https://www.agenciasinc.es/Noticias/Primera-observacion-directa-del-movimiento-de-los-electrones-en-accion
https://www.lasexta.com/tecnologia-tecnoxplora/sinc/primera-observacion-directa-movimiento-electrones-accion_2022021162065d452b4485000158e732.html

Primera observación directa del movimiento de los electrones en acción
https://noticiasncc.com/cartelera/articulos-o-noticias/02/11/primera-observacion-directa-del-movimiento-de-los-electrones-en-accion/

16/02/2022
Fernando Martín
Hacia la electrónica molecular
https://www.madrimasd.org/notiweb/noticias/hacia-electronica-molecular
https://www.uam.es/uam/investigacion/cultura-cientifica/noticias/hacia-electronica-molecular

José Ángel Silva-Guillén
José Ángel Silva Guillén, especialista en Nanociencia, abre un nuevo ciclo de conferencias de la Sede Universitaria de Villena
https://elperiodicodevillena.com/villena-en-la-frontera-del-conocimiento/

17/02/2022
Alberto Bollero
Spanische Forscher entwickeln 3D-gedruckte Magnete aus recycelten Materialien
https://3druck.com/forschung/spanische-forscher-entwickeln-3d-gedruckte-magnete-aus-recycelten-materialien-54106212/

19/02/2022
Fernando Martín
Primera observación directa del movimiento de los electrones en acción
https://www.heraldo.es/noticias/sociedad/2022/02/19/primera-observacion-directa-del-movimiento-de-los-electrones-en-accion-1554123.html

22/02/2022
Alberto Bollero
SOMMa Centers technology exhibition in Transfiere 2022
SO PASSSENGER project
https://www.somma.es/articles/somma-centers-technology-exhibition-transfiere-2022

25/02/2022
15 aniversario de la constitución de los Institutos Madrileños de Estudios Avanzados (IMDEAs)
https://www.csic.es/es/agenda/agenda-institucional/15-aniversario-de-la-constitucion-de-los-institutos-madrilenos-de
https://www.tecnogetafe.es/15-aniversario-los-imdea/

Carta del viceconsejero de Universidades, Ciencia e Innovación con motivo del 15 aniversario de los IMDEA
https://www.madrimasd.org/notiweb/analisis/carta-viceconsejero-universidades-ciencia-e-innovacion-motivo-15-aniversario-los-imdea

Directores de IMDEA agradecen el apoyo recibido por la Comunidad de Madrid
https://www.20minutos.es/videos/economia/4962763-directores-de-imdea-agradecen-el-apoyo-recibido-por-la-comunidad-de-madrid/

La Comunidad de Madrid celebra el 15º aniversario de los IMDEA que atraen más de 60 millones de euros en proyectos I+D
https://diariolalupa.es/art/65425/madrid-celebra-el-15o-aniversario-de-los-imdea-que-atraen-mas-de-60-millones-de-euros-en-proyectos-id/
https://gacetinmadrid.com/2022/02/25/madrid-celebra-el-15o-aniversario-de-los-imdea-que-atraen-mas-de-60-millones-de-euros-en-proyectos-id/
https://www.comunidad.madrid/noticias/2022/02/25/comunidad-madrid-celebra-15o-aniversario-imdea-atraen-60-millones-euros-proyectos-id
https://www.cope.es/emisoras/comunidad-de-madrid/noticias/comunidad-madrid-celebra-aniversario-los-imdea-que-atraen-mas-millones-euros-proyectos-20220225_1913778

26/02/2022
Rodolfo Miranda
El almeriense Rodolfo Miranda, Premio Nacional de Nanotecnología
https://www.lavozdealmeria.com/noticia/12/almeria/232426/el-almeriense-rodolfo-miranda-premio-nacional-de-nanotecnologia

01/03/2022
Fernando Martín
Primera observación directa del movimiento de los electrones en acción
https://noticiasdelaciencia.com/art/43771/primera-observacion-directa-del-movimiento-de-los-electrones-en-accion

02/03/2022
Nanomedycyna w leczeniu raka trzustki (Nanomedicina en el tratamiento del cáncer de páncreas)
NOCANTHER project
https://www.termedia.pl/onkologia/Nanomedycyna-w-leczeniu-raka-trzustki,45935.html

Nowa metoda terapii z zakresu nanomedycyny włacza sie do walki z rakiem trzustki (Un nuevo método de terapia en el campo de la nanomedicina se suma a la lucha contra el cáncer de páncreas)
NOCANTHER project
https://www.mp.pl/onkologia/aktualnosci/292594,nowa-metoda-terapii-z-zakresu-nanomedycyny-wlacza-sie-do-walki-z-rakiem-trzustki

03/03/2022
Rodolfo Miranda
Entrevista al Prof. Rodolfo Miranda con motivo de su Premio de Investigación Miguel Catalán 2021 "Este premio ha supuesto una satisfacción inesperada dada la cantidad de científicos excelentes que hay en Madrid"
https://www.madrimasd.org/https://www.madrimasd.org/notiweb/entrevistas/este-premio-ha-supuesto-una-satisfaccion-inesperada-dada-cantidad-cientificos-excelentes-existentes-en-madrid

09/03/2022

Isabel Rodríguez

Research Spotlight: Microvessel-on-Chip Fabrication for the In Vitro Modelling of Nanomedicine Transport

https://evonano.eu/2022/03/09/research-spotlight-microvessel-on-chip-fabrication-for-the-in-vitro-modelling-of-nanomedicine-transport/

11/03/2022

David Écija, Emilio M. Pérez

The second NanoCar Race is off to a good start

https://www.nanowerk.com/nanotechnology-news2/newsid=60013.php

14/03/2022

Rodolfo Miranda

La Fundación Cellbitec y el PITA visitan el instituto IMDEA-Nanociencia de Madrid

https://pitalmeria.es/prensa/2022-la-fundacion-cellbitec-y-el-pita-visitan-el-instituto-imdea-nanociencia-de-madrid/

Diario de Almería "La Fundación Cellbitec y el PITA visitan el instituto IMDEA-Nanociencia de Madrid"

https://www.diariodealmeria.es/finanzasyagricultura/Fundacion-Cellbitec-PITA-IMDEA-Nanociencia-Madrid_0_1665134459.html

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David Écija, Emilio M. Pérez

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