Universidade do Minho
Escola de Ciências

Physics Centre of Minho and Porto Universities
Minho pole

Gualtar, Braga

Azurém, Guimarães

CF-UM-UP

Annual Report 2023

FCT Fundação para a Ciência e a Tecnologia
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

Cofinanciado por:
COMPETE 2020
PORTUGAL 2020
UNIÃO EUROPEIA
Fundo Europeu de Desenvolvimento Regional

Contents

Executive Summary

The Centre of Physics at the University of Minho (CFUM) research has been based on three fundamental core scientific activities: (i) theoretical research in the Physics of 2D materials, (graphene, plasmonics, nonlinear phenomena, materials electronic and optical properties, orbitronics, quantum algorithms, etc.); (ii) research in new materials targeting new technologies and applications (chiral plasmonic thin films, nanofibers, ferroelectric devices for low-power nanoelectronics, sensing, thin-filmed-based multiferroic systems with magnetic-electric-optical responses, etc.); (iii) and research in Optometry and Vision Science, with cutting edge optical equipment and modelling techniques, a natural development of the research pioneered at UM some 25 years ago in Applied Optics. The CFUM 2023 scientific output diversity and international visibility can be better appreciated when looking into the 221 publications in journals with peer review (available through Clarivate Web of Science/Scopus), 11 international patents and 97 oral presentations in international meetings, Conferences and Workshops. It is worth mentioning high impact factor (IF) publications in Q1 journals like PRX Quantum (IF=9.7), Nature (IF=64.8), Chemical Reviews (IF=62.1), Progress in Materials Science (IF=37.4), Advanced Materials (IF=29.4), Advanced Energy Materials (IF=27.8), Carbon Energy (IF=20.5) and Energy Storage Materials (IF=20.4).

In 2023, there were slightly fewer projects (43) compared to 2022 (59), yet the contracted funding increased to 2.6 million euros, when compared to the 2.1 million euros in 2022, almost matching the funding level of 2.7 million euros in 2021. This could signify a trajectory of recovery, suggesting the need for further efforts to sustain this upward trend in the future. This entails implementing suitable measures to bolster applications from CFUM members, especially for European funding opportunities as the ADAPTATION project, lead by the University of Minho, is a good example.

Still a significant fraction (76.6%) of the CFUM contracted funding in 2023 came mainly from Portuguese funding agencies like the National Innovation Agency (ANI) with 51.5% and the Foundation for Science and Technology (FCT) with 25.1%. International and H2020 contracted funding was at the level of 10%, similar to the level of funding from the Strategic Project (FCT). From the 43 ongoing projects during 2023, 21 were funding by FCT, 12 by ANI, 2 from bilateral programs, 4 by the European Commission and H2020, and 2 by companies.

Throughout 2023, the delays in the allocation of funds for numerous projects persisted, resulting in challenges acquiring necessary goods, services, and personnel. These delays affected the scientific progress of several projects. The Human Resources hiring processes remained quite long, entangled in slow administrative procedures. As a consequence, the resilience, the determination, and adaptability of researchers have become increasingly of utmost importance, over time. As of December 31st, 2023, the CFUM comprised 63 fully integrated members holding a PhD, along with 23 Post-Docs and PhD-holding collaborators, in addition to the current 94 PhD students affiliated with CFUM (who were 77 in 2022, 83 in 2021 and 76 in 2020).

The global results show a growth in scientific production, which, reveals a high degree of resilience, associated with a high determination, dedication and effort of the Centre's researchers. Finally, I would like to thank the executive team Mikhail Vasilevsky, Madalena Lira, Paulo Coutinho and Carlos Tavares for their support and collaboration, the administrative support Vitor Pacheco, Isabel Silva, and Fernanda Costa, and the help of the technical staff who collaborated in various ways in the operation of the Centre.

António Onofre
Director, CF-UM-UP

Mission and Objectives

Our Mission

The main goal of the CF-UM-UP as a whole is to perform internationally competitive research in several areas of Physics, fundamental and applied, linked to other disciplines of natural sciences and engineering, with strong international links and relevant, as far as possible, at the local level. CF-UM-UP has a critical mass of highly qualified researchers and aims at keeping equilibrium between applied and fundamental research and being the base for advanced training in Physics and adjacent areas, in the North of Portugal.

Organization structure

Management Entities

Director:
António Joaquim Onofre Abreu Ribeiro Gonçalves

Deputy Director:
Mikhail Igorevich Vasilevskiy

Executive Committee Members:

1. **Maria Madalena Cunha Faria Lira**
2. **Paulo José Gomes Coutinho**
3. **Carlos José de Macedo Tavares**

Strategic Research Lines

The research at the CF-UM-UP is conducted along the following Strategic Reaseach Lines:

(i) Assessment and Enhancing Visual Performance
Coordinator: Madalena Lira

(ii) Physics of Quantum Materials and Bionanostructures
Coordinator: Paulo Coutinho

(iii) Functional and Smart Materials and Surfaces for Advanced Applications
Coordinator: Carlos Tavares

(iv) Quantum Physics and Fields in High Energy and Condensed Matter Theory
Coordinator: Eduardo Castro

Advisory Board

- Prof. Sir Konstantin Novoselov, School of Physics & Astronomy, University of Manchester, Manchester, United Kingdom.

- Prof. Antti-Pekka Jauho, Department of Micro- and Nanotechnology, Technical University of Denmark, Denmark.

- Prof. Emeritus Denis Weaire, School of Physics, Trinity College, Dublin.

- Prof. Norberto López-Gil, Department of Physics, University of Murcia, Spain.

Scientific Activity

Description of the Main Activities by Research Line

Assessment and enhancing visual performance

Research Line Coordinator
Madalena Lira

The overall emphasis of the Research Line on Assessment and Enhancement of Visual Performance focuses on a number of different areas, highlighting this year the examination of visual evoked potentials, electroretinogram patterns, and human retinal neuronal selectivity under different conditions.

The research on controlling the progression of myopia and studying the relationship of the eye aberrations with the ocular accommodation and refractive errors is particularly relevant given the increasing prevalence of visual issues in today's society. The Research Line is a productive group with significant contributions to public visual health accessibility and vision rehabilitation. The group has made significant progress in comprehending how anomalous trichromacy affects the chromatic discrimination of natural hues, and adds valuable insights to the complexities of visual perception.

Furthermore, the team has actively engaged in the improvement of teaching, learning, and assessment methods in contact lens clinical skills education.

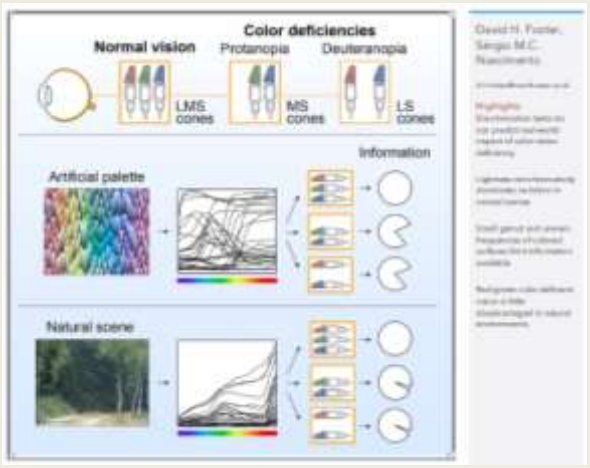
The international recognition is underscored by publications in journals with peer review, showcasing the group's commitment to disseminating knowledge and advancing the understanding of visual performance.

The Research Line has also ventured into innovation, with several patents in the area of diffractive lenses. These patents highlight the group's dedication to pushing the boundaries of technological advancements, potentially revolutionizing the field of visual aids and corrective lenses. Overall, the Research Line has a rich portfolio of publications and patents that collectively contribute to the advancement of visual health in general and visual performance in particular.

Research Highlight

Visual information loss with red-green color deficient vision in natural environments

Inherited color vision deficiency affects red-green discrimination in about one in twelve men from European populations. The aim of this study was to quantify the impact of color vision deficiency by estimating computationally the information available to observers about colored surfaces in natural scenes. With representative independent sets of 50 and 100 hyperspectral images, estimated information was found to be only a little less in red-green color vision deficiency than in normal trichromacy. Colorimetric analyses revealed the importance of large lightness variations within scenes, small redness-greenness variations, and uneven frequencies of different colored surfaces. While red-green color vision deficiency poses challenges in some tasks, it has much less effect on gaining information from natural environments.



Research Highlight

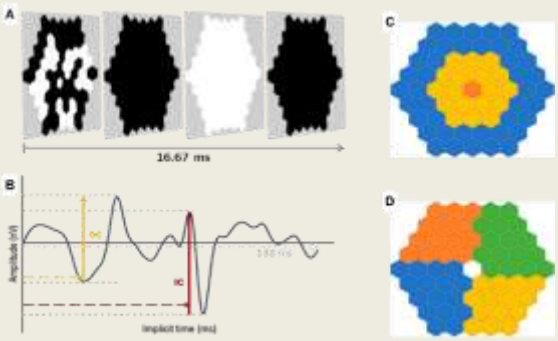
Contribution for Addressing Public Visual Health Accessibility with Refractive Services

Researchers from the Physics Center contributed during 2023 with a proposal to overcome the barriers of millions of Portuguese citizens to access primary vision health coverage in the public system. Through a comprehensive analysis of the current status, and in the framework of the international consensus, the researchers concluded that Portuguese NHS has all the requirements to reorientate refractive care from the current hospital-based model to primary care. The country also has a trained and qualified workforce to address this condition. Evidence demonstrates that the provision of refractive services at primary care is efficient and effective and translates into an opportunity to identify other visual conditions.

Research Highlight

Shedding light in the connection between retinal image degradation and neural activity of the visual system

Neural binocular summation and the effect of defocus on the pattern electroretinogram and visual evoked potentials for different pupil sizes. Center of Physcs researchers at the Clinical and Experimental Optometry Research Lab (CEORLab) demonstrated binocular summation effects in the retinal (electroretinogram -ERG) and cortical (visual evoked potentials VEP) visual processing through controlled trials with different levels of spherical and astigmatic defocus. The mechanism could be initiated as early as the retinal processing stage, then being modulated and enhanced along the visual pathway and within the visual cortex.

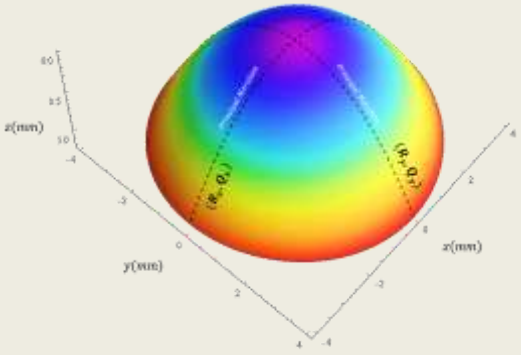


Research Highlight

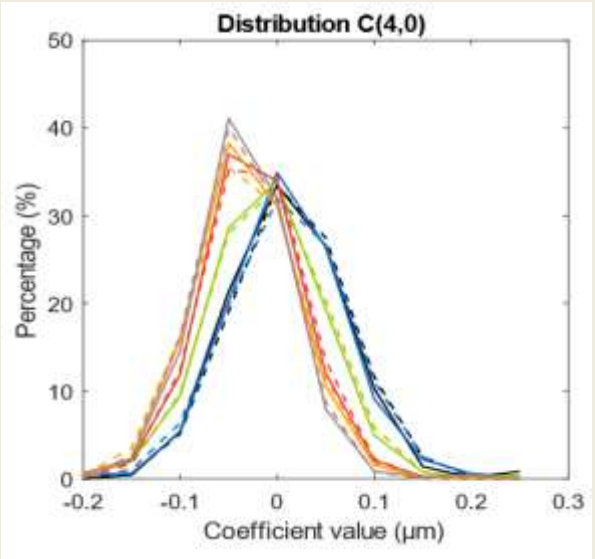
Opto-biomechanical Eye Research Network OBERON Marie Skłodowska-Curie grant

Researchers from the Physics Center integrated in the European Resarch Network OBERON coordinated by Center of Physics – Optometry and Vision Science, advanced further in their work with research highliths presented at international conferences and published in highly-ranked peer-review journals.

Linear fitting of biconic surfaces for corneal modelling. *Journal of the Optical Society of America JOSA-A.*



Accommodating statistical eye model. *Project Deliverable.*



Physics of quantum materials and bionanostructures

Research Line Coordinato
Paulo J. G. Coutinho

The focus of the overall research performed in the strategic line Physics of Quantum Materials and Bionanostructures is the development, both at theoretical and fabrication levels, of quantum materials and (bio)nanosystems and their applications in nowadays society, ranging from biomedical to environmental.

The research included theoretical studies on Moiré materials – which display interference patterns due presence of different crystalline structures – in general quasiperiodic, which can induce localization of the electronic degrees of freedom. The interplay between electron-electron interactions and quasiperiodicity, demonstrated that quasiperiodicity can give origin to new ordered phases in 1D systems, and that if can enhance superconductivity. The mathematical physics team have addressed, in the context of the Generalised Finite Difference Method, the optimal choice of the stencil together with the other parameters that could reduce the global conditioning of the system and bring more stability and better accuracy. A detailed construction of the very high-order polynomial representation was proposed, considering a functional that assesses the quality of the polynomial reconstruction. In this way, a new stencil and kernel optimisation for mesh-free very high-order generalised finite difference method has been proposed and validated. Development of Reconstruction for Off-site Data (ROD) method up to eigth-order finite volume schemes with curved boundary and slip boundary conditions for 3D incompressible flows, as well as new compact discretizations in time for ODE and PDE problems to achieve very high-order still preserving the stability, were focused.

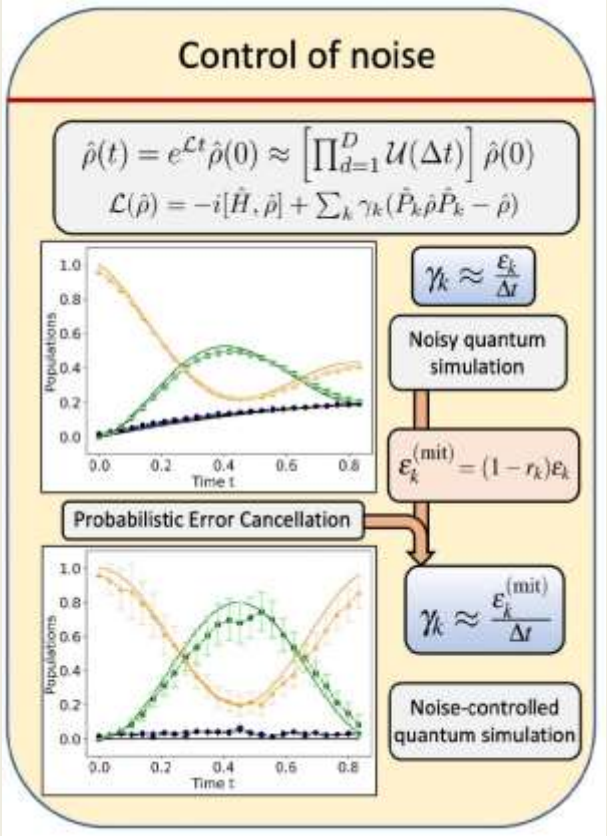
In biomedical applications, research included multifunctional nanosystems for delivery of chemotherapeutic drugs, bioactives and/or graphene based nanomaterials produced from marine biowaste by green synthetic approaches that can be combined with other therapeutic modalities (gene therapy or imaging) for therapeutic screening and diagnosis. 2D and 3D self-assembled mesophases were also developed for pH triggering of drugs release and targeting strategies to overcome cancer challenges.

In environmental applications, research continued on the use of graphitic carbon nitride nanostructures (2D and 3D) for hydrogen production from photoreduction of water.

Research Highlight

Noise-assisted digital quantum simulation of open systems

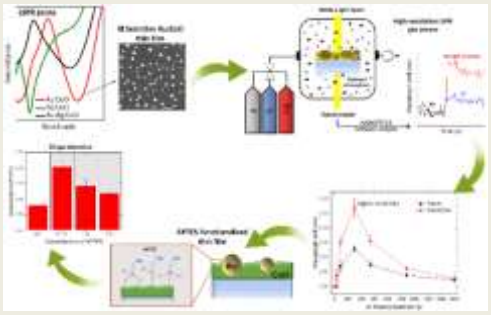
In the current developmental phase of quantum computing, noise is generally considered as a limiting factor. However, our recent research demonstrates that the intrinsic noise can be strategically utilized to efficiently simulate open quantum systems within the Markovian approximation, with application, e.g. to energy harvesting complexes in photosynthesis. It opens the door for a potential exponential speedup in the simulation of open quantum systems when compared to the equivalent closed-system quantum simulations in current noisy quantum devices. We further presented a new methodology for simulating generalized amplitude damping in quantum computers. This approach eliminates the dependence on resource-intensive ancillary qubits or mid-circuit measurements.



Research Highlight

Using the localized surface plasmon resonance phenomenon to develop thin film gas sensors

New nanocomposite thin films composed of noble metal nanoparticles dispersed in a CuO matrix are proposed for LSPR gas sensing. Different systems of thin films, namely Au:CuO, Ag:CuO and Au-Ag:CuO, were deposited by reactive magnetron sputtering, after a previous optimization of the deposition parameters. The sputtering process was followed by thermal annealing to induce the formation of the nanoparticles, inside the CuO matrix, which are responsible for the LSPR behaviour. The chemical, micro- and nanostructure, and optical responses of the thin films were thoroughly investigated. Their sensing response was methodically improved by surface plasma treatments and surface functionalization with a self-assembled monolayer (APTES molecule). Gas sensing tests were performed using a home-made gas sensing apparatus that combines a custom-made high-resolution LSPR spectroscopy and a vacuum system, developed within the scope of this work. The developed LSPR-based Au:CuO thin film sensor is able to detect extremely small changes in bulk refractive index, as low as 6×10^{-5} RIU, highlighting the fact that it performs at room temperature.



Research Highlight

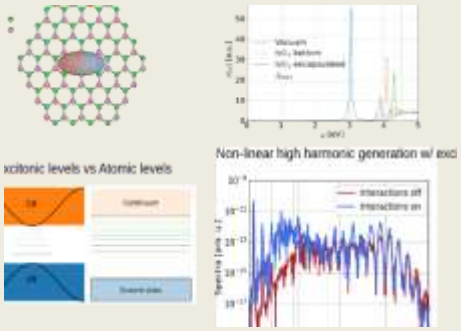
Quantum Plexcitonic Nanoparticles for Ultrasensitive Single Particle Detection

Plexcitonic nanoparticles exhibit strong light-matter interactions between molecular transitions and surface plasmon resonances, holding promise for potential applications in photonics, solar cells, and sensing. In this work, a new type of plexcitonic nanoparticle, optimized for surface-enhanced Raman scattering (SERS) spectroscopies, demonstrated its potential by showing a detection sensitivity down to the single-nanoparticle level. These findings may open new opportunities for ultrasensitive biosensing and bioimaging, providing superbright and highly stable optical labels based on the strong coupling effect.

Research Highlight

Excitonic effects in strong field response

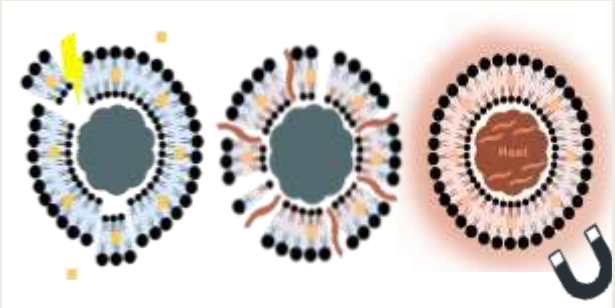
We developed a time-dependent mean-field method to theoretically model the role of excitons (electron-hole excited bound states) in the optoelectronic response of insulators driven by a strong laser field. With this method we have shown that excitonic effects lead to an enhancement of the high-harmonic generation at frequencies compatible with the energy of the excitons.



Research Highlight

Multi-stimuli-responsive magnetoliposomes and lipogels for advanced therapies

Multi-stimuli-responsive magnetoliposomes were developed for advanced therapies. Particularly, pH-sensitive solid magnetoliposomes containing shape-anisotropic nanoparticles and loaded with the anticancer drug doxorubicin have shown enhanced growth inhibition of human hepatocellular carcinoma cells. A new magnetoliposomes' architecture, with the magnetic nanoparticles anchored on the lipid surface, have exhibited suitable capabilities for synergistic magnetic and photothermal hyperthermia in cancer therapy. Bovine lactoferrin-loaded plasmonic magnetoliposomes, containing functionalized gold nanoparticles, were developed as innovative platforms for antifungal therapeutic applications. Controlled and sustained drug release was achieved by using lipogels containing multicore magnetic nanoparticles or silica-coated gold nanorods, allowing multimodal therapeutic modalities.



Functional and smart materials and surfaces for advanced applications

Research Line Coordinator
Carlos José Tavares

The focus of the overall research done in the strategic line **Functional and smart materials and surfaces for advanced applications** resides in the development of novel materials based on polymer composites, nano structures, alloy oxides and nitride films. The inherent studies involve the understanding of the electrical, magnetic, optical, mechanical, and other physical-chemical properties of these materials, having in mind applications in several types of devices, such as sensors, actuators, battery elements including novel separation membranes, transparent thermoelectric films, solar absorbers, information and energy storage, amongst other functional and smart materials. Energy considerations are essential in nowadays society and increasingly dependent on mobility and interconnectivity with the need to reduce the environmental impacts related to fossil fuels. The Centre of Physics of the University of Minho is undergoing competitive research in advanced materials for energy. The principal techniques for material development in the form of thin film deposition are magnetron sputtering and laser ablation. A low-cost technique by direct inkjet printing of material is also recurred, as other nano and micro structuring techniques to functionalize materials.

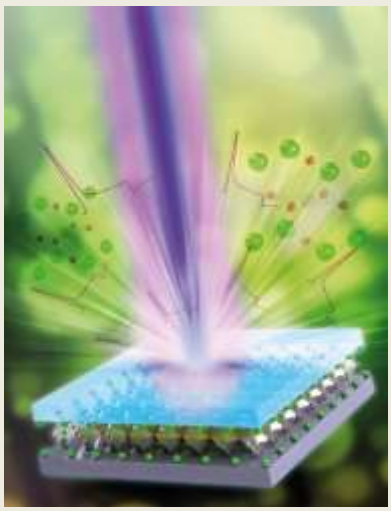
Research Highlight

Electroactive smart strategies for tissue regeneration

The challenge of organ and tissue loss within the healthcare system is not only prevalent but also immensely devastating and costly. Recognizing the profound impact on patients' well-being, there is a heightened focus on innovative strategies for tissue repair and regeneration. Tissue engineering research is at the forefront of this quest, tirelessly seeking alternatives to current treatments.

In this pursuit, the utilization of biomaterials capable of providing cell support and active stimuli is paramount. These materials aim to create permissive environments conducive to tissue regeneration, addressing the critical need for effective solutions in healthcare.

A noteworthy avenue within tissue engineering involves the exploration of electroactive polymers and their influence on various cell types such as cardiac and skeletal muscle, bone, and neural cells. Excitingly, research has already shown that electroactivity can significantly enhance cell adhesion, proliferation, and differentiation across these diverse cell types.



Research Highlight

Thin films for multi-sensing response

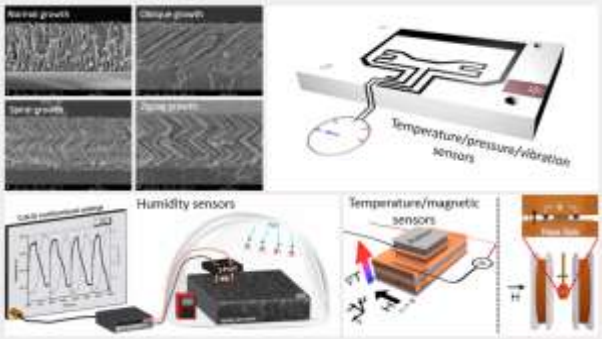
New sensors and electrodes, based on nano-designed thin film structures, are developed for providing transduction of physical properties into electronic signals. To reach this target, nanostructured thin film systems are deposited by magnetron

Research Highlight

Magnetoactive materials for sustainable energy, sensing, actuation and biomedicine

Printing techniques are used for the production of self-powered multifunctional devices (capable of being simultaneously used

sputtering, in oblique and glancing angle deposition geometries. The main idea is to obtain punctual or matrix-like tactile sensing through the targeted applications. The optimized thin film systems can scan shape, texture, friction, force, pain, temperature, and several other physical quantities. To provide some next-generation solutions to control production variables such as temperature, pressure, humidity, or vibration, to improve on-site and real-time products quality, constant monitoring of materials behavior, processes development, and devices/materials sustainability are analyzed. Working in a close loop with industrial partners, the group acts also in the development of key hardware and software features that are important in the design of sensors and sensor systems for different environments.

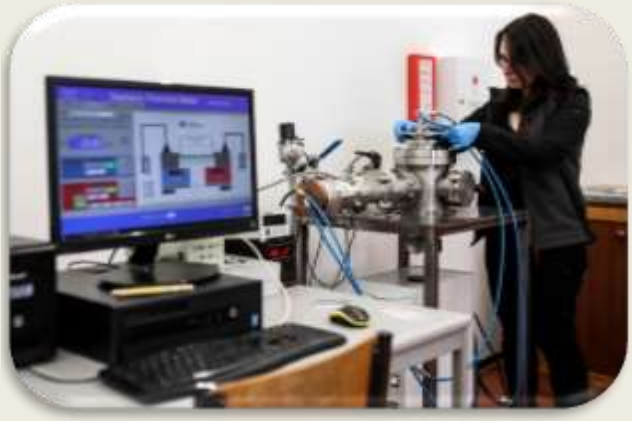


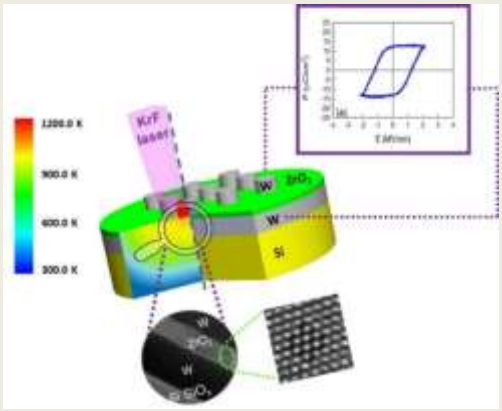
as a permanent magnet, sensor, actuator, and energy harvester) whose main components derive from magnetic hazardous waste. The environmentally friendly technological platforms are based on piezoelectric P(VDF-TrFE), magnetic waste, and paper; and are processed by screen-printing, presenting a record maximum magnetic energy product. Such approach allows to recover/reuse all major components of the system, saving raw materials, energy, and production time in the fabrication of recycled smart materials with suitable functional response. The same platform, due to its magnetoelectric coupling, can also be used for switching the magnetization of spintronic devices. This is highly attractive due to their non-volatility, high-speed operation, reduced heat dissipation, miniaturization, and scalability.

Research Highlight

Ferroelectric oxide thin films for information and energy storage

Ferroelectric binary oxide thin films are attracting tremendous attention for neuromorphic and energy-related applications. However, their ferroelectric properties are only achieved if the films crystallize in the orthorombic or rhombohedral phases. To achieve that, the control of the growth and post-deposition annealing are crucial. Researchers at CF-UM-UP revealed that it is possible to achieve ferroelectric orthorombic ZrO_2 films by sputtering followed by a nanosecond laser annealing (NLA) step, which is extremely relevant for CMOS-compatible memories. The potential of the NLA process for the fabrication of ferroelectric memory devices with high polarization, low coercive field, and high cycling stability are unraveled

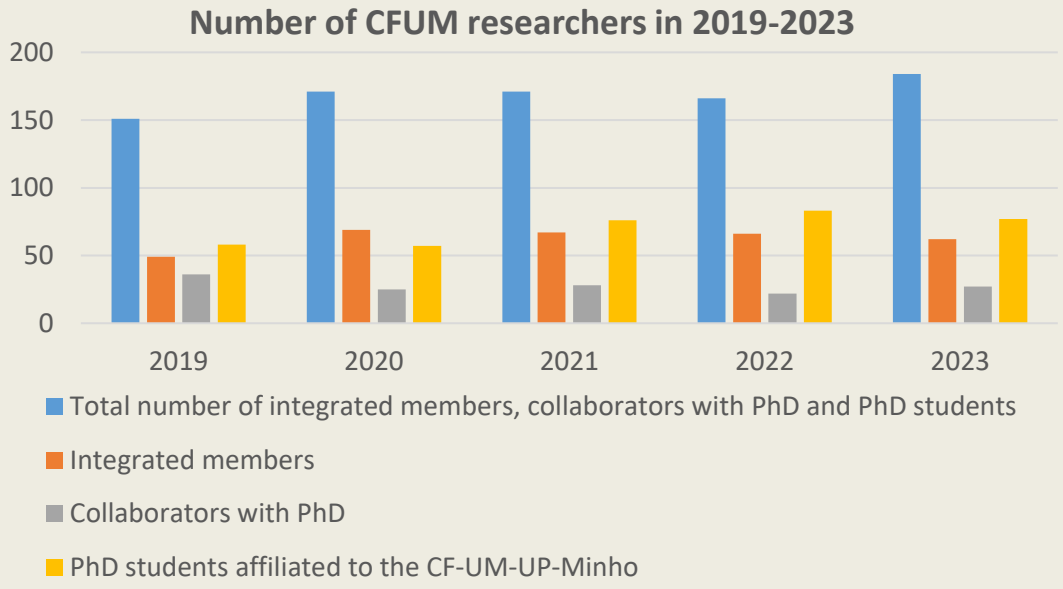




CFUM in numbers

Members (as of December 31, 2023)

Integrated Members with PhD	63
Post-Docs and Collaborators with PhD	23
PhD Students with CFUM affiliation	94



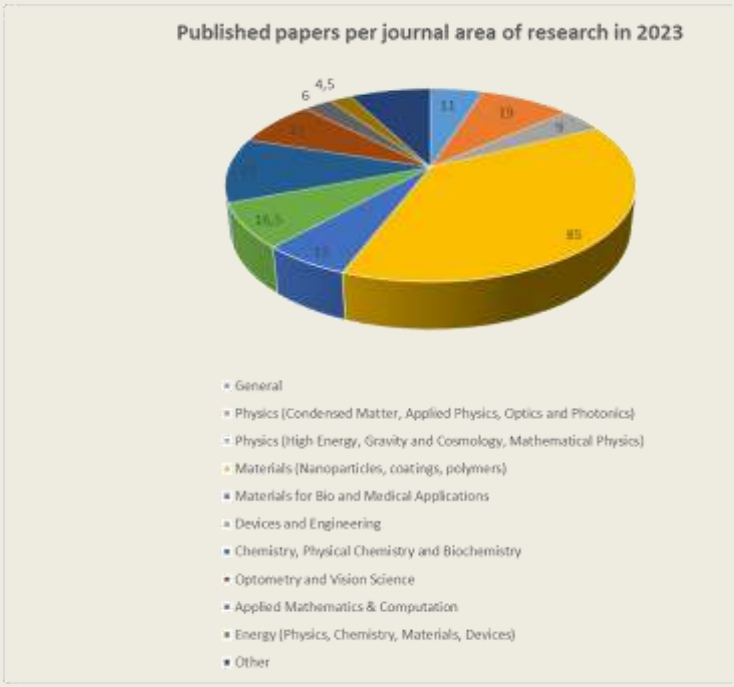
Number and type of Publications

Publications in 2023

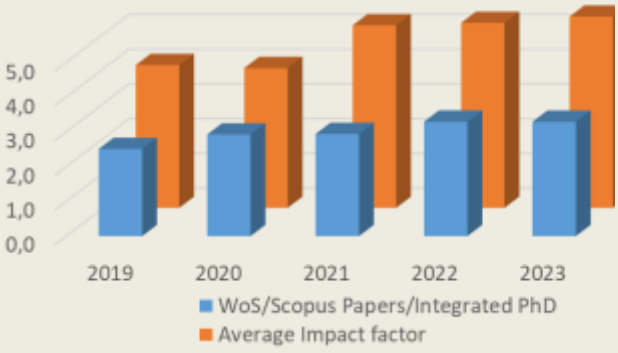
WoS/Scopus papers regular journal articles	221
Books (written/edited)	4/1
Book chapters	16
Patents (national /international)	0/11
Oral Presentations in International Conferences (total/by invitation)	97/49

Publications in the period 2019-2023

Published papers per journal area of research in 2023



Number of ISI publications per integrated member and average impact factor of journals where the papers were published



Scientific Supervision Numbers

			total
Master Theses	COMPLETED	-	35
PhD Theses affiliated to CFUM (supervised /co-supervised by a centre member)	ONGOING	71/23	94
	COMPLETED	6/2	8

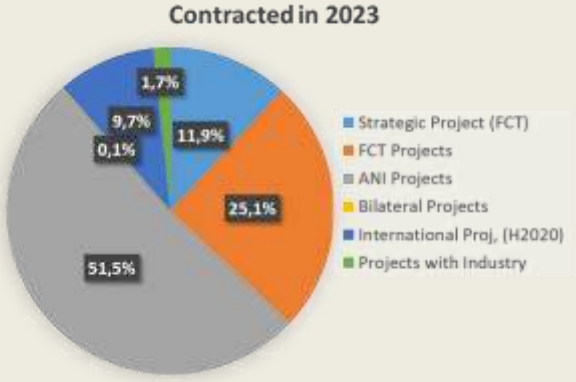
Funding Summary

Funding in 2023

	Contracted in 2023	%	Received in 2023	%	Executed in 2023	%	Number of projects in 2023
Strategic Project (FCT)	309 846,65 €	11,9%	315 157,01 €	18,1%	195 807,97 €	31,6%	2
FCT Projects	651 739,87 €	25,1%	647 068,71 €	37,2%	137 517,62 €	22,2%	21
ANI Projects	1 337 474,43 €	51,5%	709 533,11 €	40,8%	123 175,40 €	19,9%	12
Bilateral Projects	2571,43	0,1%	4 000,00 €	0,2%	0,00 €	0,0%	2
International Proj, (H2020)	252 498,45 €	9,7%	57 432,49 €	3,3%	160 919,95 €	26,0%	4
Projects with Industry	44 262,92 €	1,7%	5 481,59 €	0,3%	1 436,03 €	0,2%	2
Total	2 598 393,75 €	100%	1 738 672,91 €	100%	618 856,97 €	100%	43

The contracted value includes overheads and the university's contribution to ANI's and European projects with allocation of teacher´s salaries. The amount received and the amount executed do not include overheads or the university's contribution to ANI's projects. Thus, both the amount received and executed must be significantly smaller than the amount contracted.
The values of the contracted projects were obtained by dividing, in each project, its global financing equally throughout its duration.

Funding contracted in 2023 according to projects' contracts

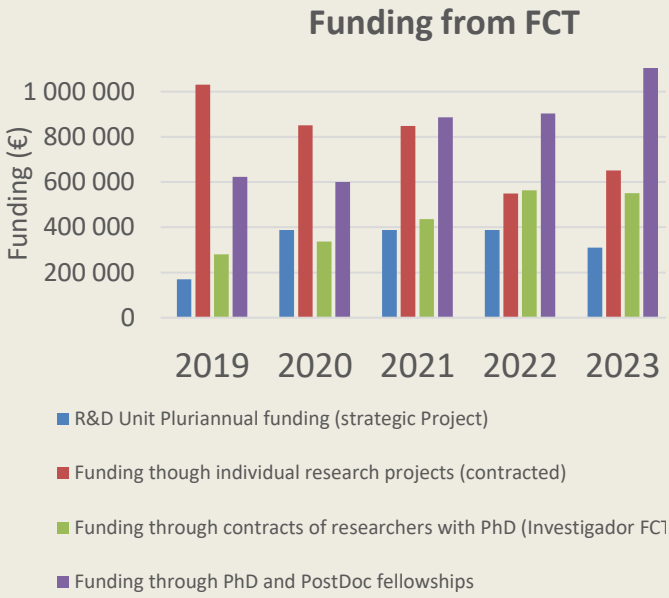


Funding executed in 2023

Funding from FCT is divided into four different items. The first two correspond to unit strategic project funding and individual research projects funded by FCT. The third item includes researchers with a contract paid by the FCT (FCT researchers, both from individual and institutional programs) in which their host research unit is the UMinho pole of the CF-UM-UP. The fourth item in the figure corresponds to the funding of PhD schorlarships and PostDocs directly paid by FCT to grant holders, whose host unit is the UMinho pole of the CF-UM-UP. The funding of research grants and contracts associated with individual projects and with the strategic project are already included in the funding of the respective projects, so they were not taken into account.

Funding history 2019-2023 (Contracted values by funding agency). Values in k€.

Funding from FCT in the period 2019-2023



Active Projects (started and finished) in the period 2019-2023

Members (as of December 31, 2023)

Integrated members

António Filipe Teixeira Macedo
António Joaquim Onofre Abreu Ribeiro Gonçalves
António Manuel Gonçalves Baptista
António Manuel Marques Queirós Pereira
Armando José Barros Ferreira
Bernardo Gonçalves Almeida
Bruno António Campos Amorim
Cacilda Maria Lima de Moura
Carlos José de Macedo Tavares
Carlos Miguel da Silva Costa
Clarisse Marta Oliveira Ribeiro
Claudia Jesus Ribeiro Lopes
Daniela Patricia Lopes Ferreira
Elisabete Maria dos Santos Castanheira Coutinho
Francisco José Machado de Macedo
Gaspar José Brandão Queirós Azevedo Machado
Gueorgui Vitalievitch Smirnov
Iran Gomes Rocha Segundo
João Manuel Maciel Linhares
João Pedro Santos Hall Agorreta Alpuim
Joaquim Alexandre dos Santos A. de Oliveira Carneiro
Joel Nuno Pinto Borges
Jorge Manuel da Silva Figueiredo
Jorge Manuel Martins Jorge
José Carlos Viana Gomes
José Filipe Vilela Vaz
José Manuel González Méijome
José Pedro Basto da Silva
Luís António Carvalho Gachineiro da Cunha
Luís Manuel Fernandes Rebouta
Luís Manuel Gomes Vieira
Luís Silvino Alves Marques
Manuel Filipe Pereira da Cunha Martins Costa
Maria de Fátima Guimarães Cerqueira
Maria de Jesus Matos Gomes
Maria José Bastos Pires Lima
Maria Madalena da Cunha Faria de Lira
Mário António Caixeiro de Castro Pereira
Mário Rui da Cunha Pereira
Marlene Susana Dionísio Lúcio
Marta Maria Duarte Ramos
Michael Scott Belsley
Miguel Faria Ribeiro
Mikhail Igorevich Vasilevskiy
Nuno Miguel Machado Reis Peres
Paulo José Gomes Coutinho
Paulo Rodrigues Botelho Fernandes
Pedro Libânio Abreu Martins
Ricardo Pedro Lopes Martins de Mendes Ribeiro
Rosa Maria Ferreira Batista
Rui Miguel Soares Pereira
Rute Juliana Ferreira Macedo de Araujo
Sandra Maria de Braga Franco
Sara Núñez Sánchez
Senen Lanceros-Mendez
Sérgio M. Cardoso Nascimento
Sylvie Oliveira Ribeiro
Sofia Oliveira Lopes
Stanislav Lazarov Ferdov
Tatiana Gabriela Rappoport
Teresa Maria Santos Ribeiro Viseu
Vasco Manuel Pinto Teixeira
Yuliy Bludov

Other affiliated members with PhD

Ana Rita Oliveira Rodrigues
Anabela Gomes Rolo
Anna Paula Safenraider Crema
António Mário Lourenço da Fonseca Almeida
Cristiana Filipa Almeida Alves
Diego Martinez Martinez
Eya Hergli
Filipe André Peixoto Oliveira
Flávia Vieira Barbosa
João Pedro Nunes Pereira
Colaborator
Jorge António Silva Mendes
Júlia Maria Simões Dias Barata de T. Ayres de Campos
Marcio Correa
Margarida Maria Macedo Francesko Fernandes
Maria Elisabete da Cunha Dias Real Oliveira
Maria Teresa Pitta de Lacerda-Arôso
Mário Jorge Dias Zamith Silva
Martin Andritschky
Nelson Miguel Macedo Silva Pereira
Pedro Filipe Ribeiro Costa
Peter Michael Schellenberg
Sandra Maria Fernandes Carvalho
Vasco Miguel Nina de Almeida
Kishor Sapkota

Member Engagements and Achievements

Conferences, Workshops and seminars organization

CIOCV23 - 20th International Congress of Optometry and Vision Sciences 2023- Universidade do Minho; Espaço Vita, 30th September-1st October 2023

Quantum Matter Colloquia - A monthly series of online Colloquia on Quantum Matter by experts. Event organized by the Quantum.Matter@PT network (co-organizer: Bruno Amorim), with a series of 6 colloquia in 2023. (https://quantummatterpt.weebly.com/qmcolloquium.html)

Quantum Agora - A series of online talks, discussions, short courses and everything Quantum Matter related. Event organized by the Quantum.Matter@PT network (co-organizer: Bruno Amorim), with a series of 12 talks in 2023. (https://quantummatterpt.weebly.com/qmagora.html)

Quantum Matter | Materials & Concepts - Summer School 2023. Universidade de Aveiro, Portugal, 3-7 July 2023 (co-organizer: Bruno Amorim). (https://sites.google.com/view/qm-ss-2023)

Criticality, Dynamics, and Nonequilibrium Behavior in Quantum Systems, Évora, Portugal, 2-6 October 2023. Organizing committee member: Yuliy Bludov.

P. Alpuim was a member of the Scientific Committee for the NanoSpain 2023 conference, Tarragona, April 25-28, 2023.
P. Alpuim was a member of the International Program Committee of the ICTF2023, Burgos, 26-29 September 2023.
P. Alpuim was Vice-chair of the IUVSTA Biointerfaces Division in 2023.
New physics concepts for energy and environmental nanomaterials, Mini-colloquium in CMD30: 30th Condensed Matter Division Conference of the European Physical Society, Milan, Italy, 2-6 Sept. 2023. Co organizers: Bernardo Almeida, José Basto Silva. https://eventi.cnism.it/cmd30-fismat

Joaquim Carneiro: 20th International Conference on Hands-on Science - Celebrating Science and Science Education, July

Awards and achievements

Tear-borne interleukin 1-beta and transforming growth factor-beta and its relationship with clinical parameters in neophytes contact lens wearers. E. Insua Pereira, M. Lira, A. Sampaio. 26th EVER Congress, Valencia (Spain), 26 to 28 October 2023. EVER award by the Scientific Committee os EVER 2023- Best poster in IM section

- Prémio UMinho de Iniciação à Investigação Científica 2023: Filipa Costa e Sá, "Desenvolvimento de lipogéis plasmónicos para aplicação em terapia multimodal do cancro" (supervision: Elisabete Castanheira Coutinho), University of Minho, 12 December 2023.

- Nanoscale Horizons Prize to Best Short Communication (distinction by The Royal Society of Chemistry): Valéria Gomes, "Versatile magneto-plasmonic composites based on dehydropeptide hydrogels for multimodal cancer therapy", Sorrento 2013 – Sorrento 2023 Workshop: A Decade of Peptide Materials, 26-28 October 2023, Sorrento, Italy.

- European Biophysical Society Poster Award: Eduarda Fernandes, "Biophysical insights of an innovative lipid-enginneered Stratum Corneum model for compound permeation studies", EBSA-2023 (European Biophysical Societies Association Congress 2023), 31 July-4 August 2023, Stockholm, Sweden.

Prémio de melhor apresentação realizada por jovem investigador doutorado no International Symposium - Pavement Functional Design and Management (PFDM), Guimarães, Portugal, Abril 2023. Iran Gomes da Rocha Segundo. "Application of anti-icing solutions on asphalt pavements". Iran Rocha Segundo; Luís Moreira; Orlando Lima Jr.; Paulo Pereira; Elisabete Freitas; Joaquim O. Carneiro.

Prémio de melhor apresentação realizada por jovem investigador no International Symposium - Pavement Functional Design and Management (PFDM), Guimarães, Portugal, Abril 2023. Orlando de Sousa Lima Jr.. "Thermochromic Asphalt Pavement Toward the Mitigation of

17-21, 2023, Barcelona, Spain. International Advisory Board.

Iran Rocha Segundo: 2nd PFDM 2023 - Pavement Functional Design and Management - International Symposium, 27-29 April 2023, University of Minho, Guimarães, Portugal. Technical Program Committee.

Joaquim Carneiro: A 11ª Feira de Ciências "Hands-on Science" / 7º Concurso "À Descoberta da Luz - Feira de ciências HSCI 2023'', 18 de Maio de 2023, Viana do Castelo, Portugal. Comité Científico:

Carlos José Tavares: 49th International Conference on Metallurgical Coatings and Thin Films (ICMCTF 2023), May 21-26 2023, organizer and member of the scientific committee of the symposium: C3. Thin Films and Novel Surfaces for Energy I & II, San Diego CA, United States https://icmctf2023.avs.org/

Carlos José Tavares: ICTF 2023, International Conference on Thin Films, Burgos, Spain. September 26-29th 2023, Local Organizer https://ictf2023.com/

Carlos Costa, S. Lanceros-Mendez: Symposium organizer, N: Sustainable advanced and multifunctional polymer based materials for sensor and actuators, energy and environmental applications. E-MRS fall meeting 2023, September 18 to 21, 2023

Silvie Ribeiro Termis: Tissue Engineering and Regenerative Medicine International Society (TERMIS) European Chapter Meeting 2023 – Manchester Central Conference Centre; Manchester, 28-31 of March 2023

Carlos Costa, P.A. Martins and S. Lanceros-Mendez: Organization of the Workshop "Materials Science for Environment and Beyond" Workshop organized under the frame of INDESMOF-RISE-MSCA project 19th December 2023.

Manuel Filipe Costa, Chairperson, Topical Meeting "Advances of Optics and Photonics", EOSAM2023, September 11-15, 2023, Dijon, France.

Urban Heat Island Effects". Orlando Lima Jr.; Pedro Cardoso; Élida Margalho; Nathalia Hammes; Iran Rocha Segundo; Vasco Teixeira; Elisabete Freitas; Joaquim Carneiro.

Prémio do melhor poster no 5th Doctoral Congress in Engineering, June 15th – 16th, 2023, Porto, Portugal. Nathalia Hammes. "Development of Coaxial Fibers Loaded with Polyethylene Glycol 2000 for Thermoregulation Applications". Nathalia Hammes; Claver Pinheiro; Iran Rocha Segundo; Natália Homem; Helena P Felgueiras; Graça M.B Soares, G; Elisabete Freitas; Manuel Filipe Costa; Joaquim Carneiro.

ICTF-AUSE Poster Award, Award supported by the Spanish Association of Synchrotron Radiation Users (AUSE) to the best posters presented at ICTF-2023, runner up, Transparent Niobium-doped Titanium Dioxide thin films by Reactive Magnetron Sputtering for thermoelectric modules, J. M. Ribeiro, A. Welle, T. Boll, C. J. Tavares, 19-th International Conference ob Thin Films – ICTF 2023, Burgos, Spain, September 26-29, 2023. https://ictf2023.com/

Estela Carvalho: Young Researcher Award: Best oral presentation – Awarded by the European Materials Research Society at the 2023 Fall Symposia in Warsaw, Poland.

The manuscript Applied Materials Today 30 (2023) 101708 was highlighted in the News section of Materials Today https://www.materialstoday.com/electronic-properties/news/zr-oxide-thin-films-promise-next-generation-memory/

The manuscript Applied Materials Today 30 (2023) 101708 was selected as the Front cover pager of Applied Materials Today, volume 30, February 2023. https://doi.org/10.1016/S2352-9407(23)00030-6

The manuscript Carbon Energy 5 (2023) e297 was selected as the Front cover pager of Carbon Energy, June 2023. https://onlinelibrary.wiley.com/doi/abs/10.1002/cey2.414

The manuscript Applied Physics Review 10, 041415 (2023) was selected as a Featured Article from Applied Physics Reviews. https://doi.org/10.1063/5.0172259

Manuel Filipe Costa, Chairperson, 20th International Conference on Hands-on Science - Celebrating Science and Science Education, July 17-21, 2023, Barcelona, Spain.

Manuel Filipe Costa, member of the Organizing Committee, 2nd Global Summit on Applied Science, Engineering and Technology, March 23-25, 2023, Rome, Italy.

Manuel Filipe Costa, member of the Steering Committee, RIAO-OPTILAS2023 - XI Iberoamerican Optics Meeting / XIV Latinamerican Meeting on Optics, Lasers and Applications, March 27 to 31, 2023, San Jose, Costa Rica.

Manuel Filipe Costa, member of the International Scientific Committee, 7th ICASE World Conference on Science and Technology Education, March 27-30, 2023, Dubai, UAE.

Manuel Filipe Costa, member of the Scientific Committee, I International Congress of STEAM educational experiences. Thinking outside the box in education, April 12-15, 2023, Burgos, Spain.

Manuel Filipe Costa, member of the Conference Review Committee, 3rd International Conference on Laser, Optics, and Optoelectronic Technology (LOPET 2023, May 26-28, 2023, Kunming, China.

Manuel Filipe Costa, Regional Chair of the 9th International Conference on Frontiers of Educational Technologies - ICFET2023, June 9-11, 2023, Bali, Indonesia.

Manuel Filipe Costa, member of the Scientific Committee, 8th International Conference on Higher Education Teaching (CINDU 2023), June 12 to 15, 2023, online.

Manuel Filipe Costa, member of the Technical Program Committee, 14th International Symposium on Photonics and Optoelectronics (SOPO 2023), August 14 to 16, 2023 in Xiamen, China.

Manuel Filipe Costa, member of the Scientific Committee, 3rd International Meet & Expo on 3D Printing and Additive Manufacturing, October 16-18, 2023 Dubai, UAE.

Editorial board members

17 researchers of the Centre are editors or members of editorial committees of Scopus journals

Outreach Activity

The Centre members participate in several science dissemination activities:

-Energia eólica e fotovoltaica em Angola: uma perspectiva futura
-Verão no campus
-UMinho de Portas Abertas 2023
-Noite Europeia os Investigadores (NEI) 2023
-Vamos Experimentar a Uminho
-11ª Feira de Ciências Hands-on Science
-VII Informal Digital Photography Contest
-Action to Promote Science at the Oficinas de Criatividade Himalaya - Centro Ciência Viva dos Arcos de Valdevez
-NEI 2023: European Researchers' Night
-V Journeys of Science 2023
- Researchers go back to School
- Physics Colloquia
- Pint of Science Festival
- Visitas ao laboratório da Ciência da Cor na Escola de Ciências da Universidade do Minho

Symposia H “Ferroelectric HfO2 and ZrO2-based thin films” at E-MRS 2023 Fall Meeting, Warsaw, September 2023, Poland - event co-organized by José P. B. Silva.

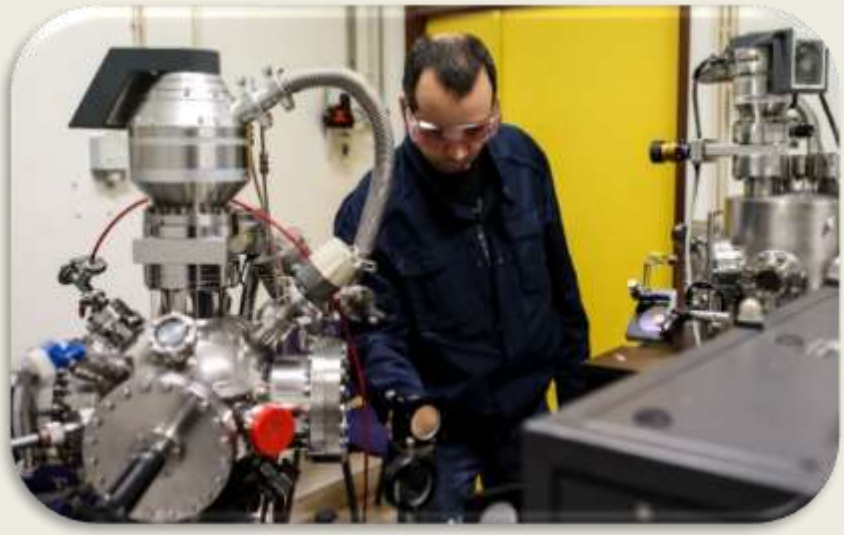
Minicolloquia “New Physics Concepts for Energy and Environmental Nanomaterials” at CMD30-FisMat 2023 (Milano, Italy) - event co-organized by José P. B. Silva and Bernardo Almeida.

Oraideia Workshop inserted in MATERIAIS 2023 conference, Guimarães 6th april 2023. Organizers: Maria José Lima and Sandra Marques

The Members of the Centre also gave Lectures and Workshops in high schools or to high schools’ students visiting University. Other research awareness activities included the presence in radio programs, such as “Communicating Science” of radio station Antena Minho, and “Mesa Redonda” of radio station “Rádio Rural”

Research Laboratories

Laboratory – location	Research Line	Responsable
Biophysics – Gualtar	2	Paulo José Coutinho
Ceramics Research – Azurém	3	Mário António de Castro Pereira
Computational Physics – Gualtar	3	Luís Silvino Alves Marques
Corrosion and electrochemical testings – Azurém	3	Joaquim Carneiro
Crystal Growth – Gualtar	2	Bernardo Gonçalves Almeida
Dielectric Properties – Gualtar	2	Bernardo Gonçalves Almeida
Electromechanical properties of materials – Azurém	3	Senen Lanceros-Mendez/Filipe Vaz/Armando Ferreira
Femtosecond Laser Spectroscopy –Gualtar	2	Michael Scott Belsley
Fluorescence Lifetimes - Gualtar	2	Mário Rui da Cunha Pereira
Functional Coatings I – Azurém	3	Martin Andritschky
Functional Coatings II – Azurém	3	Luís Rebouta
Functional Coatings III – Azurém	3	José Filipe Vilela Vaz
Infrared Spectroscopy – Gualtar	2	Luís Manuel Gomes Vieira (until June 2023) Disabled from July 2023
Magnetic and Electromechanical Properties – Gualtar	2	Bernardo Gonçalves Almeida
Materials Processing – Azurém	3	Stanislav Lazarov Ferdov
Microtopography – Gualtar	3	Manuel Filipe Costa
Visual Optics and Ophthalmic Instrumentation – Gualtar	1	Sandra Maria Braga Franco



Laboratory – location	Research Line	Responsable
Optoelectronics – Azurem	3	Carlos José Tavares
Photoconductivity – Gualtar	2	Maria de Fátima Cerqueira
Photophysics I – Gualtar	2	Elisabete Coutinho
Photophysics II – Gualtar	2	Elisabete Coutinho
Preparation – Azurém	3	Stanislav Ferdov
Preparation I – Gualtar	2	Elisabete Coutinho
Preparation II – Gualtar	3	Maria de Jesus Matos Gomes
Raman Spectroscopy and Photothermal Measurements – Gualtar	3	Francisco Macedo
Research in Clinical and Experimental Optometry – Gualtar	1	José González Meijome / António Queirós
Science of Vision and Colour – Gualtar	1	João Manuel Maciel Linhares
Surface analysis – Azurem	3	José Filipe Vilela Vaz
Thin Films I – Gualtar	3	Maria Jesus Matos Gomes
Thin Films II – Gualtar	3	Mário António Castro Pereira
Visual Rehabilitation – Gualtar	1	António Manuel Baptista
Electrophysiology Research Lab	1	Paulo Fernandes / José González Meijome
Clinical and Experimental Optometry Research Lab (CEORLab) - Gualtar	1	José González Meijome / António Queirós
Applied Optics Laboratory	2	Luis Rebouta
Raman Imaging and 2D Materials and Devices - INL	2	João Pedro Alpuim

Supervision of Research Students

PhD completions in 2023

Ana Isabel Carvalho Amorim de Sousa
Supervised by José González Meijome, António Queirós Pereira e Norberto López-Gil (U. Murcia)
Adaptive and Selective Optical Setup for Visual Stimulation: Proof of concept, Experimental Setup and Validation

Arthur Lanne Ricardo de Souza
Supervised by Marcio Assolin Correa (UFRN) and Armando Ferreira
Caracterização e manipulação do fator de amortecimento em nanoestruturas ferromagnéticas produzidas via GLAD Sputtering

Beatriz Dias Cardoso
Supervised by Elisabete M.S. Castanheira Coutinho, Vanessa Cardoso, S.Lanceros-Méndez
Microfluidic evaluation of drug-loaded magnetoliposomes as multifunctional platforms for advanced cell therapies

Gonçalo Catarina
Supervised by Nuno Peres
Correlated electronic phases in low-dimensional materials

João Barbosa
Supervised by Carlos M. Costa, Senentxu Lanceros-Mendez, Verónica de Zea Bermudez
Development of new solid-polymer electrolytes based on three composites for energy storage applications

Laura Hernández Moreno
Supervised by António Filipe Macedo e João M.M Linhares
Cost-effectiveness of basic vision rehabilitation in Portugal

Ricardo Jorge Brito Gonçalves Pereira
Supervised by Vanessa F. Cardoso and Senentxu Lanceros-Méndez
A new generation of microfluidic platforms based on smart and multifunctional materials

Teresa Marques-Almeida
Supervised by Clarisse Ribeiro, Senentxu Lanceros-Mendez, Hugo Fernandes
Biodegradable electroactive polymer materials as a novel approach for neural tissue engineering applications

PhD projects in progress at December 31, 2023

Name	Supervisor	Title	Doctoral Program
Alshaarawi M. A. Salem	Sandra Franco/ António Baptista	The effect of near vision tasks in the visual system: university students	Optometry and Vision Sciences
André Gustavo Silva de Macedo	Clarisse Ribeiro, S. Lanceros-Mendez, Vanessa Cardoso	Multiresponsive hydrogels as a novel approach for bone cancer therapies	Materials Engineering
André Rino Amorim	Miguel Faria Ribeiro, José Manuel González Méijome	Improving objective csf estimates using as oct densitometry data	Optometry and Vision Sciences
Andreia Esteves Gomes	Sérgio M.C. Nascimento e João M.M Linhares	Tuning illumination and colored optical filters for optimal viewing of human skin	Optometry and Vision Sciences
Anita Camillini	Ernesto Galvão (INL), Michael Belsley	Architectures for scalable quantum photonic computing	MAP-Fis
Alcinda Valéria Gomes Silva	Elisabete M.S. Castanheira Coutinho, Paulo Ferreira CQUM, David Pereira FEUP	Plasmonic dehydropeptide-based lipogels: functionalizing post-surgical patches against melanoma recurrence and	Materials Engineering
Alexandre Daniel Mendonça Faria da Silva	Luís Silvino Alves Marques, Veniero Lenzi	Emergence of novel properties at the interfaces in oxide heterostructures and superlattices	MAP-Fis
Barbara Daniela Duarte Cruz	S. Lanceros-Méndez; Daniela Correia	Nanoparticle free functional materials for printable sensors	Materials Engineering
Belgacem Tiss	Luís Cunha, Diego Martínez	Deposition of UV-protective oxide films on complex substrates: cork and rubber.	Materials Engineering
Bruna Machado da Silva	Bernardo Almeida, João Pedro Araújo, Armandina Lopes	Naturally Layered Perovskyte Heterostructures	MAP-Fis
Bruno Rodrigues Pacheco e Murta	Joaquín Fernandez Rossier, Nuno Miguel Machado Reis Peres	Quantum Many-Body Ground States via Digital Quantum Simulation	MAP-Fis
Catarina Oliveira	Jeff Th. M. De Hosson/Diego Martinez-Martinez/Luís Cunha	Deposition and characterization of sputtered Zr-O-N based films for fine tuning of their physical properties	Materials Engineering
Celso Joel Oliveira Ferreira	Bruno F. C. Silva, Cláudia Botelho (CEB), M. Elisabete R. Oliveira	Microfluidics for size-controlled cationic liposome-DNA complexes: going beyond the universal transfection curve	MAP-Fis
Diana Margarida Ferraz Bogas	Clarisse Marta Oliveira Ribeiro, Senentxu Lanceros-Mendez	Spatially and temporally modulated active patches for skin cancer treatment	MAP-Fis
Daniela Filipa Magalhães dos Santos	Bernardo Gonçalves Almeida, Rosa Maria Ferreira Batista, Leonard Francis	Biofunctional Cyclic Dipeptide Nanofibers for Energy Harvesting and Nonlinear Optical Conversion	MAP-Fis
Daniela Morais	Vítor Vilar e Francisca Moreira (FEUP), Carlos JTavares	A continuous - flow photoelectrocatalytic static mixer microreactor applied to the synthesis of high-value organic chemicals	Chemical and Biological Eng. (FEUP)
Diana Isabela Meira	Filipe Vaz, Joel Borges, Vitor Correlo (ICVS/3B's)	Development of nanoplasmonic thin film biosensors with enhanced sensitivity for detection of Ochratoxin-A.	MAP-Fis
Diogo Emanuel Carvalho Costa	Filipe Vaz, Paula Sampaio (CBMA), Graça Minas (DEI)	Development of optical (T-LSPR) biosensors, based in nanoplasmonic thin films, for fast Legionella pneumophila detection in patients or environmental samples	MAP-Fis
Diogo Filipe Pinto Cunha	Mikhail Vasilevskiy	Theory and modeling of two-dimensional materials and hybrid structures for nano-photonics	MAP-Fis
Dora Nazaré Marques	Sérgio M.C. Nascimento e João M.M Linhares	Environmental spectral statistics and brain plasticity – testing hypotheses about the mysterious vision of X-linked forms of colour vision deficiencies	Optometry and Vision Sciences
Eduarda Barbosa Fernandes	Marlene Lúcio, Vanessa Cardoso, S. Lanceros-Méndez	BIOMYSKIN – Biomimicry profiling supporting drug discovery for topical applications	Materials Engineering
Eduardo Ínsua Pereira	Madalena Lira e Paula Sampaio	Evaluation of cytotoxic potential and inflammatory response induced by contact lenses	Optometry and Vision Sciences
Eduardo José de Sousa Pimentel	Carlos Costa, Daniel Miranda, S. Lanceros Mendez	Printable piezoresistive materials based on natural polymers for medical device applications	Materials Engineering
Élida Melo Margalho	Elisabete Fraga de Freitas, Iran Gomes da Rocha Segundo, Joauim Carneiro	Demonstration of the impacts of photocatalytic asphalt pavements	Civil Engineering

Elmahdi Amar	Nicoleta Nicoara (INL), Pedro Alpuim	Characterization do single-photon emitting defects in 2D materials by scanning probe microscopy	MAP-Fis
Eloy Arroyo	Jorge Jorge	Effectiveness of orthokeratology treatment in myopic children from Quito-Ecuador	Optometry and Vision Sciences
Estela Marisa Oliveira Carvalho	Margarida Fernandes, Clarisse Ribeiro, S. Lanceros-Mendez	Improving Titanium-Bone interfaces with electroactive and antimicrobial materials for effective orthopedic implants	Materials Engineering
Fábio Alberto Costa Lopes	Paulo J. G. Coutinho, Ana Rita Rodrigues, Paula Campelo	Development of multifunctional magnetic/plasmonic nanosystems for combination therapy and radiosensibilization	Materials Engineering
Filipe Miguel Gonçalves da Silva	Maria Madalena Cunha Faria Lira, João Manuel Maciel Linhares	The influence of ocular and external factor in measuring intraocular pressure	Optometry and Vision Sciences
Francesco Viviano	José M. González Méijome, Rute Araújo	Scleral lens fitting in keratoconus patients	Optometry and Vision Sciences
Francisca Marçal Pinheiro Guedes	Mário Rui Pereira, Susana Costa (DQ), Martin Lopez Garcia (INL)	Novel quantum materials inspired by natural photonic photosynthetic structures	Applied Chemistry
Henrique Emanuel Silva	Andreia Gomes (CBMA), Marlene Lúcio	2G4CANCER – Green graphene/lipid nanosystems for cancer imaging and treatment	Molecular and Environ. Biology
Iñaki Blanco Martínez	José M. González Méijome, Paulo R. Botelho Fernandes.	Off-axis wavefront model of young and ageing human eyes	Optometry and Vision Sciences
Ioana L Borsan	Filipe Vaz, Daniel Munteanu (Universidade de Brasov, Roménia)	The influence of the structural architecture on the mechanical and tribological properties of TiN, (Ti,Al)N and (Ti,Si)N coatings	Materials Engineering, Universidade de Brasov, Roménia
Irina Soraia Rainho Rio	Paulo Coutinho, Elisabete Coutinho, Fátima Baltazar (ICVS)	Lipid nanocarriers containing magnetic/gold nanoparticles coated with mesoporous silica for application in SCC skin cancer therapy	Materials Engineering
Isabel Alves Lopes	Rui Vilar e Luís Rebouta	Optical and tribological properties of femtosecond laser nanotextured surfaces	AdvaMTech
James Caleb Peters	Pedro Alpuim, Leonard Francis (INL)	Correlation do transport and structural properties do Graphene and Bismuth Telluride as a function CVD growth parameters	MAP-Fis
Jessica Gomes	Sandra Franco	Real-time changes in ocular optical properties with accommodation	Optometry and Vision Sciences
Joana Catarina Dias Moreira	S. Lanceros-Méndez; M.M. Fernandes; v	Physical active antimicrobial surfaces for preventing the spread of pathogenic microorganisms	Materials Engineering
Joana Margarida da Silva Ribeiro	Carlos J Tavares, Torbel Boll (KIT, Germany)	Transparent thermoelectric titanium dioxide-based thin films for thermal energy harvesting	Materials Engineering
Joana Marina Silva Queirós	S. Lanceros Mendez; Pedro Martins	Wide range polymeric membranes towards water remediation of contaminants of emerging concern	Materials Engineering
João Carlos Pacheco Barbosa	Carlos M. Costa, S. Lanceros Mendez	Development of three component solid-polymer electrolytes for energy storage applications	Materials Engineering
João Duarte Gonçalves Azevedo	Michael Scott Belsley	Development of nanophotonic computational devices inspired by neural circuits in insect brains	MAP-Fis
João Luís Rodrigues Teixeira	S. Lanceros Mendez, Gabriela Botelho e Pedro Manuel Martins	Multifunctional air filters based on emerging natural polymers for VOCs removal	Materials Engineering
João Miguel Peixoto Oliveira	Bernardo Almeida, Leonard Francis (INL)	Multiferroic bilayer composites for coupled magnetic-electric-optical functionalization	MAP-Fis
João Pedro Cruz Serra	Carlos Costa, Pedro Costa, S. Lanceros Mendez	Natural polymer based multifunctional materials for sensing applications	Materials Engineering
Jorge Manuel Pereira de Sousa	Elisabete Freitas/Joaquim Carneiro	Incorporation of Composite Phase Change Materials into Asphalt Mixtures for Cooler Pavements	Civil Engineering
José Alexandre Monteiro	João M.M Linhares e Sérgio M.C. Nascimento	Neural networks applied to the preservation and restoration of artistic paintings.	Optometry and Vision Sciences
José Diogo Guimaraes	Mikhail Vasilevskiy, Luís Brabosa	Investigation of quantum effects on energy and charge transport in photosynthetic systems using quantum simulations	MAP-Fis
Juliana Filipa Gouveia Marques	Carlos J Tavares	Difusão controlada de compostos ativos do interior de microcápsulas mediada por ativação solar	Materials Engineering
Liliana Sofia Fernandes	S. Lanceros-Mendez, Pedro Libânio Martins, Daniela Correia	Magnetic ionic liquid/polymer composites for printable sensors and actuators	Materials Engineering
Luis Amaro Ribeiro Martins	José Luis -Ribelles, S. Lanceros-Mendez, Clarisse Ribeiro	Microfluidic processing of Smart polymers for Tissue Engineering	Un. Politecnica de Valencia

Luis Proença Oliveira	Jorge Jorge	Estudo da influencia da Visão no atletismo	Optometry and Vision Sciences
Mafalda Inês Abrantes	João Pedro Santos Hall Agorreta Alpuim, Luís Ricardo Jacinto	Graphene nanobioelectronics for neural interfacing	Materials Engineering
María Mechó García	José M. González Méijome, Rute J. Macedo de Araújo	Statistical wavefront model of accommodation: analysis and synthesis	Optometry and Vision Sciences
Maria João Fernandes Faria	Marlene Lúcio, M. Elisabete Oliveira, G. Carracedo	MeYeDEAR – Monoolein-based EYE DElivery systems for Age-related Retinopathies	Optometry and Vision Sciences
Maria Manuela Carvalho Proença	Filipe Vaz, Joel Borges	Nanoplasmonic thin films of Au-Ag/MOx functionalized with molecular recognition elements to enhance sensitivity and selectivity of LSPR gas sensors	MAP-Fis
Marina Alves	Joaquim Carneiro, Sascha Sadewasser (INL)	Fabrication and characterization of micro-concentrator solar cells based on Cu(In,Ga)Se2	Materials Engineering
Marta Sofia Vilela Barreira Teixeira	Alice Carvalho (CQUM), Elisabete M. S. Castanheira Coutinho	Development of a drug carrier nanosystem for a new anticancer drug and optimization of the new drug	Chemistry
Maurício Quintela	Nuno Peres	Excitons in 2D Materials	MAP-Fis
Miguel Alexandre Franco	S. Lanceros Mendez, Asal Kiazadeh	Development of printed and biocompatible synaptic devices	Materials Engineering
Misha Khalid	Michal Pawlak (Nicolaus Copernicus University), Carlos José Tavares (UMinho)	Thermoelectric properties of TiO2:Nb, Sb, Bi and ZnO:Sb, Bi transparent films	Nicolaus Copernicus University (Poland)
Muhammad Qasim	Paulo Fernandes, Jorge Manuel M. Jorge	Electroretinogram as a tool to measure efficacy in management of myopic young adults	Optometry and Vision Sciences
Nelsom Cunha	José Carlos Gomes, Luis Rebouta	Design and construction of a Rangefinder/LiDAR testbed	MAP-Fis
Nuno Pacheco	Luís Marques, Cândida Vilarinho	Desenvolvimento de um sistema de gasificação por plasma para a conversão termoquímica de lamas de depuração	Mechanical Enginnering
Orlando de Sousa Lima Júnior	Elisabete Fraga Freitas, Joaquim Alexandre dos Santos Almeida de Oliveira Carneiro, Iran Gomes da Rocha Segundo	Color-based road nanosensors based on thermochromic and self-cleaning abilities	Civil Engineering
Oswaldo Gramaxo de Freitas	António Joaquim Onofre Abreu Ribeiro Gonçalves	Application of deep learning networks to GW astronomy	MAP-Fis
Patrícia Pereira-Silva	Joel Borges, Paula Sampaio (CBMA)	Development of nanocomposite ZnO thin films with antibiofilm and antimicrobial properties to prevent pathogens' transmission.	Molecular and Environ. Biology
Paulo Tchimbumbuanjila Boano	Bernardo Gonçalves Almeida, Etelvina Gomes, Rosa Maria Ferreira Batista	Nanofibras por electrospinning com inclusões para as funcionalizações (magnéticas, ópticas)	MAP-Fis
Pedro Alexandre Ferreira Passos	António Joaquim Onofre Abreu Ribeiro Gonçalves	Search for Exotic Compact Objects in the Universe	MAP-Fis
Pedro Tiago Jesus	Jorge Jorge	O Efeito da compensação das disfunções acomodativa/vergenciais na progressão da miopia	Optometry and Vision Sciences
Rafael dos Santos Pinto	Carlos Costa, Senentxu Lanceros-Mendez, Renato Gonçalves	Two- and three-dimensional sustainable solid-state printed batteries for portable electronic devices	Materials Engineering
Rafael Wagner	Ernesto Galvão, Rui Soares Barbosa (INL), Mikhail Vasilevskiy	Coherence and contextuality as quantum resources	MAP-Fis
Rafaela Marques Meira	Clarisse Ribeiro, Senentxu Lanceros-Mendez, Daniela Correia	Electroactive polymer materials based heart-on-a-chip as a novel approach for cardiac tissue engineering	Materials Engineering
Raquel Gaudência Dias Andrade	Elisabete Coutinho, M. Côrte-Real (CBMA), Lígia Rodrigues (CEB)	Functionalized magnetoliposomes for enhanced anticancer activity of lactoferrin against triple negative breast cancer cells	Materials Engineering
Ricardo Jorge Cunha Fernandes	Paulo J. G. Coutinho, Luciana Pereira (CEB)	Photocatalytic degradation of PFAS under visible light: development of nanomaterials as novel photocatalysts and process scale-up	Materials Engineering
Ricardo José da Silva Lima	Pedro Costa, João Pereira, Senentxu Lanceros-Mendéz	Advanced self-sensing polymer composites with self-healing capabilities for high responsibility applications	Materials Engineering
Rita Maria Martins Alves	Fernanda Cássio, Madalena Lira, Ana Vera Machado	Contact lens materials: An ecosystem issue and a contribution to a circular economy	Molecular and Environ. Biology
Rita Policia	Pedro Martins, D. Correia, Senentxu Lanceros-Mendez	High-performance printable luminescent and chromic materials for improved device integration	Materials Engineering
Rui Guilherme Silva	Paulo Mendes (CMEMS), Pedro Alpuim	Software Defined Antenna for THz Applications	Electrical Engineering

Rui Miguel Carvalho	Pedro Martins, S. Lanceros Mendez, Joaquim Moreira	SuSprinting: Sustainable materials and technologies for printable spintronic applications	Materials Engineering
Salomé Aurora Pereira.	Paulo Fernandes	Objective Eye Care Measurements Obtainment with Eyetracker and their Influence on Ophthalmic Lens Adaptation	Optometry and Vision Sciences
Sara Leite	Paulo Fernandes, José M. González Méijome	Evaluation of the potential of the retinal electrical activity as a biomarker for the development of myopia control treatments	Optometry and Vision Sciences
Sérgio Rafael da Silva Veloso	Elisabete Coutinho, P.M.T. Ferreira, Miguel -Duarte (U.Vigo)	Development of multifunctional supramolecular magnetogels for multimodal cancer therapy	MAP-Fis
Solange da Silva Nunes	António Joaquim Onofre Abreu Ribeiro Gonçalves	Deep-Learning Classification and Parameter Inference of Rotational Core-Collapse Supernovae	MAP-Fis
Talita Nicolau de Oliveira Vidal de Negreiros	Andrea Zille (UMinho), Carlos Carlos José Tavares (UMinho), Nuno Osório (UMinho)	The development of synergistic ozone and light-emitting diode activation system for the disinfection of fiber-based materials	Doutoramento Maria de Sousa – 2022 (FCT)
Telma Campos Domingues	Pedro Alpuim, Jérôme Borme (INL), Bruno Costa (ICVS-UM)	Multiplex detection of circulating tumor DNA using graphene electrolyte-gate field-effect transistors	MAP-Fis
Tiago A. Queirós	Jana Nieder (INL), Pedro Alpuim	Single Photons on-Demand from a 2D Materials Heterostructure	MAP-Fis
Tiago André Marinho	Pedro Costa, Vitor Correia, S. Lanceros Mendez	Printable energy harvester systems for wearable sensors devices	Materials Engineering
Tiago Saraiva Fernandes	António Joaquim Onofre Abreu Ribeiro Gonçalves, Alejandro Torres-Forne, Jose Antonio Font Roda	Deep Learning for transient signals in gravitational-wave astronomy	MAP-Fis
Timothy Albert	José M. González Méijome, Rute Araújo	Validation of an Italian Language Vision-Related Quality of Life Questionnaire and Evaluation of Corneal and Retinal Modifications in Patients with Keratoconus	Optometry and Vision Sciences
Vítor Filipe da Silva	Paulo Mendes (DEIC-UM), Pedro Alpuim	RF graphene technology oscillators for biomedical devices	Electrical Engineering
Viviana Lima de Sousa	Pedro Alpuim, Yuri Kol'enko (INL)	Unconventional Thermoelectrics Based on Self-Organized Nanocrystal Superlattices	Materials Engineering
Yelko del Castillo Hernández	Joaquín Fernandez Rossier, Nuno Miguel Machado Reis Peres	Single spin resonance magnetometry with scanning tunneling microscopy	MAP-Fis

Master theses completed in 2023

Name	Supervisor	Title	Master Course
Rafaela da Silva Alves de Carvallho	Rute Juliana Ferreira Macedo de Araújo José Manuel González Méijome	Fiabilidade da refração subjetiva com um algoritmo automático em usuários de lentes de contacto esclerais e hidrofílicas tóricas	Advanced Optometry
Mariana Machado de Sousa	Paulo Rodrigues Botelho Fernandes José Manuel González Méijome	Resposta retiniana ao desfocado ótico e digital	Advanced Optometry
Silvia Touças.	Rute Juliana Ferreira Macedo de Araújo José Manuel González Méijome	Desempenho visual e qualidade ótica na compensação do astigmatismo ocular com lentes de contacto	Advanced Optometry
Carla Sofia Pereira Antunes	Paulo Fernandes	Efeito feedback na atividade biolétrica da retina''	Advanced Optometry
Patrícia Manuela Hilário Oliveira	Sérgio MC Nascimento	Color preference for simple and complex compositions	Advanced Optometry
Ana Margarida Roriz Gomes.	Sandra Franco	Importância da sintomatologia no diagnóstico de disfunções de visão binocula	Advanced Optometry
Cátia Isabel Ferreira Magalhães	João M. M. Linhares	A influência de monitores e condições de iluminação ambiental na perceção da cor de objetos	Advanced Optometry
Sara Fernandes Lima	João M. M. Linhares	The influence of the rotation of human faces in their colour perception	Advanced Optometry
Tomasina Rita Fernando Nchuaki	Madalena Lira e Jorge Jorge	Avaliação da Flexibilidade de vergência	Advanced Optometry
Sara Filipa Miranda Senra	Madalena Lira e Elisabete Coutinho	Nanopartículas para encapsulamento e libertação de fármacos em lentes de contacto	Advanced Optometry
Adelino Carlos Handa	Bernardo Almeida, Rosa Baptista	Nanofibras funcionalizadas com dipéptidos lineares para aplicações em biossensores	Biophysics and Bionanosystems
Adriana Fernandes Pereira	Elisabete Castanheira Coutinho, Helena Macedo (INL)	Mimicking the inflamed human intestine: a multicellular in vitro model	Biophysics and Bionanosystems
Bruna Daniela Gonçalves Martins	Marlene Lúcio, Andreia Gomes (CBMA)	Green graphene quantum dots for cancer imaging and treatment	Biophysics and Bionanosystems
Diogo Alexandre Rocha Moreira	Elisabete Castanheira Coutinho, Alexandre Chícharo (INL)	Biorecognition of single cancer cells in microdroplets through a plasmonic sensor	Biophysics and Bionanosystems
Francisco Ricardo Lobo Ribeiro	Bruno Amorim, Nuno Peres	Excitonic properties of hBN from a time-dependent Hartree-Fock mean-field theory	Physics
Hugo Macedo Rodrigues	Elisabete Castanheira Coutinho, Paulo J. G. Coutinho	Desenvolvimento de magnetolipossomas contendo nanovaras magnéticas para a terapia dual do cancro	Biophysics and Bionanosystems
João Filipe Martins Moreira	Bernardo Almeida, José Basto Silva	Propriedades elétricas em heteroestruturas multiferroicas	Physics Engineering
Jorge Miguel Leite Gonçalves	Alice M. Dias (CQUM), Elisabete Castanheira Coutinho	Novos derivados de purina como sondas fluorescentes para sistemas biológicos	Applied Biochemistry
Maria Francisca Fernandes Araújo	Elisabete Castanheira Coutinho, Sérgio F. Sousa (F.Med./UPorto)	In Silico Identification of Protein Targets associated to the Insecticide Activity of Natural Products	Biophysics and Bionanosystems
Paulo Alexandre Cardoso Teles	Marlene Lúcio, Vanessa Cardoso (CMEMS)	Desenvolvimento e otimização de modelos lipídicos para avaliação da permeação cutânea de fármacos	Biophysics and Bionanosystems
Ricardo Manuel Sousa Barbosa	Bruno Amorim, Rui Silva (ICMM-CSIC, Spain)	Excitonic Effects in Optical Response of Semiconductors via Real Space Time-Resolved Methods	Physics
Rui Jorge Pinto Dias	M. I. Vasilevskiy, J.C. Viana Gomes	Excitation of plasmon-polaritons in Graphene via non-linear mixing of optical waves	Physics
Sara Coelho Ribeiro	Fátima Cerqueira, Ricardo Campos (CeNTI)	Fabrication of PEDOT:PSS/silver nanowire based films for the development of transparent heating systems	Physics Engineering
Bruno Gonçalo Neiva Fernandes	Carlos José Tavares e Sascha Sadewasser (INL)	Matriz de pilares termoelétricos transparentes para colheita de energia térmica	Phyisics Engineering

Helder Filipe Vilaça Faria	Carlos José Tavares	Avaliação da figura de mérito termoelétrica de filmes finos à base de óxidos de zinco dopados com antimónio	Phyisics Engineering
João António Lopes de Magalhães	Carlos José Tavares, Miguel Ângelo Magalhães Oliveira (AMKOR)	Study and characterization of contaminations in eWLB products	Materials Engineering
Maria do Carmo Mourato Leitão Vinagre Lucas	Carlos M. Costa	Polymeric-based ternary solid-state electrolytes for Lithium-ion batteries. Computer modeling of solid-state batteries	Environmental Sciences and Technologies
Maria Inês Fernandes Monteiro	Carlos M. Costa	Novos elétrodos para baterias de ião de lítio com propriedades de "thermal shutdown"	Chemical Analyses and Characterisation Techniques
José Miguel Sousa Claudino	Clarisse Ribeiro Sylvie Ribeiro	Avaliação da influência de estímulos mecano-elétricos para novas terapias de regeneração neuronal	Biofísica e Bionanossistemas
Giorgia Schmidt de Siqueira	Armando Ferreira, Márcio Correa (UFRN)	Influence of Nonmagnetic Metal Layers on Thermomagnetic Behavior in Co2FeAl Films: An Experimental Study	Materials Engineering
Ana Beatriz Ribeiro Camarinha	Alexandra Alves (DEM) e Cláudia Lopes	Study of the Tribocorrosion Behaviour of Electrodes for the Diagnosis of Musculoskeletal Disorders and Muscle Rehabilitation	Materials Engineering
Nuno Manuel Estrócio e Silva	José P. B. Silva e Luís S. Marques	Non-volatile memory devices based on ferroelectric oxides thin films	Physics Engineering
João Filipe Martins Moreira	Bernardo G. Almeida e José P. B. Silva	Propriedades eléctricas em heteroestruturas multiferróicas	Physics Engineering
Nuno Manuel Estrócio e Silva	José P. B. Silva e Luís S. Marques	Non-volatile memory devices based on ferroelectric oxides thin films	Physics Engineering
Anaís Sofia Resende Pinto	José Manuel Ramos Gomes (DEM/CMEMS), Luís Cunha	Desenvolvimento e caracterização de filmes finos de nitreto de titânio e silício, mono e multicamada, obtidos por PVD, para aplicação em ferramentas de corte	Materials Engineering

Externally funded projects

Projects finished in 2023

In 2023, 17 research projects were completed with CF-UM-UP as a partner

Funding entity	Title	Researcher	Global Budget - UM
CE	INDESMOF	Pedro Libânio Abreu Martins	166 500,00 €
ANI	ReleaseME	Carlos José Macedo Tavares	301 959,36 €
ANI	ORAIDEA - 39985	Luís Silvino Marques - Resp Dimensão (Sandra Maria Fernandes Carvalho - IR)	114 101,17 €
ANI	GREENCoat - 42785	Martin Andritschky	319 819,47 €
CE	GrapheneCore3 - 881603	Nuno Miguel Machado Reis Peres	202 400,00 €
Bilateral	CTA_PT/Sérvia	Margarida Maria Macedo Francesko Fernandes	4 000,00 €
ANI	45940 - MCTools21	Luís Silvino Alves Marques	258 535,27 €
ANI	45908 - NanoStim	José Filipe Vilela Vaz	252 003,39 €
ANI	POCI-01-0247-FEDER-045939	Nuno Miguel Machado Reis Peres	250 004,41 €
ANI	I4REV - 042783	Sandra Maria Fernandes Carvalho (Luís Silvino)	143 524,79 €
ANI	4NoPressure - 39869 - CFUM	Carlos José Macedo Tavares	82 549,60 €
FCT	LOWSEY	Maria Fátima Guimarães Cerqueira	4 750,00 €
ANI	REPEL+-47036	Carlos José Macedo Tavares	296 556,88 €
FCT	CVTwithNN	João Manuel Maciel Linhares	49 934,55 €
FCT	CO2Plasmon	Joel Nuno Pinto Borges	49 994,99 €
ANI	NanoID	José Filipe Vilela Vaz	526 191,03 €
FCT	AMONGLIB	Carlos Miguel Silva Costa	47 890,00 €

Projects in progress at December 31, 2023

30 projects with CF-UM-UP as a partner, which worked in 2023, are still active in 2024:

Funding entity	Title	Researcher	Start date	End date	Global Budget - UM
European Commission	Opto-Biomechanical Eye Research Network - OBERON - 956720	José González Meijome	01/01/2021	31/12/2024	721 680,48 €
FCT	Electric-Field Engineered Lattice Distortions (E-FiELD) for optoelectronic devices - PTDC/NAN-MAT/0098/2020	Bernardo Almeida	01/01/2020	28/03/2024	61 986,47 €
FCT	Nanomaterials Applied on Innovative Road Pavements for Air-Cleaning PTDC/FIS-MAC/6606/2020	Joaquim Carneiro	29/03/2021	28/03/2024	249 531.73 €
FCT	Films On Cork & Rubber PTDC/CTM-REF/0155/2020	Diego Martínez Martínez	1/02/2021	31/01/2024	202 719.44 €
Dopavision GmbH	MyopiaX Treatment for the Reduction of Myopia Progression in Children and Adolescents: Safety and Efficacy Investigation	José Manuel González Meijome	27/09/2021	31/12/2025	140 811.09 €
FCT	Coaxial Microfibers Embedded with Phase Change Materials for Road Paving EXPL/EQU-EQU/1110/2021	Manuel Filipe Costa	25/07/2022	24/01/2024	49 912.30 €
FCT	Excitations in 2D Materials PTDC/FIS-MAC/2045/2021	Ricardo Ribeiro	1/01/2022	31/12/2024	49 163.95 €
FCT	Designing superior CIGSe solar cells through understanding and controlling growth - PTDC/CTM-CTM/2241/2021	Maria Fátima Cerqueira	1/01/2022	31/12/2024	69 472.05 €
Precilens	Clinical Study to evaluate the clinical efficacy of DRL orthokeratology lenses compared to SV monofocal ophthalmic lenses	António Queirós Pereira	16/02/2022	15/02/2025	44 913.00 €
FCT-Bilateral	Nanoscale (pseudo-)binary oxide ferroelectric thin films without pre-activation for memory and energy storage applications - 2021.09183.CBM	José Pedro Basto Silva	12/04/2022	11/04/2024	4 000.00 €
European Commission	Nanoscaled ferroelectric (pseudo)-binary oxide thin film supercapacitors for flexible and ultrafast pulsed power electronics- NanOx4EStor- M-ERA-NET3/0003/2021	José Pedro Basto Silva	4/9/2022	3/09/2025	207 819.00 €
FCT	Laboratory of Physics for Materials and Emerging Technologies -LA/P/0095/2020	António Onofre	1/01/2021	31/12/2025	216 148.62 €
FCT - PE	CF-UM-UP Strategic Project - Base Funding - UIDB/04650/2020	António Onofre	01/01/2020	31/12/2023	1 052 616,28 €
FCT - PE	CF-UM-UP Strategic Project - Programmatic Funding - UIDP/04650/2020	António Onofre	01/01/2020	31/12/2023	496 616,96 €
FCT	3D-BATADEL	Carlos Miguel Silva Costa	01/01/2023	31/12/2025	186 262,94€
FCT	SATRAP-PLUS	Luis Silvino Alves Marques	17/01/2022	16/01/2024	49 993,99 €
FCT	QNEEX2D	Bruno António Campos Amorim	10/01/2022	09/01/2024	49 946,38 €

FCT	BioPiezoSenAct	Carlos Miguel Silva Costa	01/02/2023	31/01/2026	93 290,00 €	
FCT	FerrOx4Power	José Pedro Basto Silva	12/03/2023	11/09/2024	49 982,31 €	
FCT	B-EAMs	Margarida Maria Macedo Francesko Fernandes	01/03/2023	31/08/2024	49 375,00 €	
FCT	Spin me	Pedro Libânio Abreu Martins	01/01/2023	31/12/2025	137 550,00 €	
FCT	DrivenPhonon4Me	Bernardo Gonçalves Almeida	01/03/2023	28/02/2026	22 137,50 €	
FCT	PSI . COM	Luis Silvino Alves Marques	01/01/2023	31/12/2026	10 601,25 €	
PRR	PRR n.º 58 - NGS – New Generation Storage	Carlos Miguel Silva Costa	01/01/2023	31/12/2025	1 046,59 €	346
PRR	Agenda Drivolution 01/C05-i01/202	Armando José Barros Ferreira	01/10/2022	30/09/2025	1 133,99 €	245
ANI	NeMoRehab	Cláudia Jesus Ribeiro Lopes	01/09/2023	31/08/2026	256 941,32 €	
Direct	AuraProject	José Manuel González Meijome	01/10/2023	30/09/2024	62 401,14 €	
CCDR-N	BioimpACE+	Senen Lanceros Mendez Sylvie de Oliveira Ribeiro	01/07/2023	30/06/2026	221 378,80 €	
CE	ADAPTATION	Sara Núñez Sánchez	01/04/2024	31/03/2028	569 900,00 €	

Patents

David Alexandre Micael Pereira, Maria do Sameiro Torres Gonçalves, António Belmiro Gil Silva Fortes, Elisabete Maria dos Santos Castanheira Coutinho, Renato Joel Barros Pereira, "Low Toxicity Compounds for Use as Insecticides and Method of Producing Said Compounds", WO2022224026A1 WIPO. https://patents.google.com/patent/WO2022224026A1/en?oq=WO+2022%2f224026+A1

Luis Fernando Vázquez Burgos, Irene Palacio Rodríguez, José Ángel Martín Gago, María Francisca López Fagúndez, Mª del Mar García Hernández; Carlos Briones Llorente, Miguel Moreno Molina, Almudena Nañez Cabrero, Beatriz Torres Vázquez, Pedro Alpuim, Telma Domingues, Patrícia Cabral, Jérôme Borme, "Biosensor for the detection do hepatitis C virus", WO/2023/006865. https://patentscope.wipo.int/search/pt/detail.jsf?docId=WO2023006865&_cid=P12-LQTYUN-03726-1

Alarcon Heredia, Aixa; Faria Ribeiro, Miguel; Gounou, Franck (...) (AMO Groningen B.V.). Lenses Having Diffractive Profiles with Parabolic Transition Zones. United States Patent and Trademark Office Pre-Granted Publication, 2023. Patent number: US20230190451. https://patents.google.com/patent/US20230190451A1/en?inventor=Miguel+Faria+Ribeiro

Alarcon Heredia, Aixa; Faria Ribeiro, Miguel; Gounou, Franck (...) (AMO Groningen B.V.). Lenses Having Multi-Ring Design for Vision Treatment. United States Patent and Trademark Office Pre-Granted Publication, 2023. Patent number: US20230172705. https://patents.google.com/patent/US20230172705A1/en?inventor=Miguel+Faria+Ribeiro

ESTÉVEZ CARIDE, Irene; PEIXOTO OLIVEIRA, Filipe André, J. NUNES-PEREIRA, Eduardo; ROMANYSHYN, Nazar, FERNANDEZ CUNHA, Nelssom, DE LIMA FERREIRA RODRIGUES, Manuel José, SILVA TELES OLIVEIRA, Nuno Miguel, BRAGA FERNANDES, Pedro, VIANA GOMES, José Carlos, SOARES PEREIRA, Rui Miguel, PEREIRA DA CUNHA MARTINS COSTA, Manuel Filipe, DA CUNHA PEREIRA, Mário Rui, VITALIEVITCH SMIRNOV, Gueorgui, FERNANDES REBOUTA, Luis Manuel, SILVA DUARTE, Moisés Alexandre, IGOREVICH VASILEVSKIY, Mikhail; "Polarimetric Multifunctional LiDAR Sensor for target recognition", WO/2023/002237, 26.01.2023 . https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2023002237&_cid=P12-LE4GHY-16909-1

Faria Ribeiro, Miguel; Jenkins Sanchez, Mark (AMO Groningen B.V.). Diffractive Lenses with Diffractive Order Shift. United States Patent and Trademark Office Pre-Granted Publication, 2023. Patent number: US20230255750. https://patents.google.com/patent/US20230255750A1/en?inventor=Miguel+Faria+Ribeiro

I. Estévez Caride, F. A. Peixoto Oliveira, E. Nunes-Pereira, N. Romanyshyn, N. Fernandez da Cunha, M. J. Ferreira Rodrigues, N. Teles Oliveira, P. Braga Fernandes, J. C. Viana Gomes,, R. Soares Pereira, M. F. Martins Costa, M. Cunha Pereira, G. Vitalievitch Smirnov, L. Rebouta, M. A. Silva Duarte, M. Igorevich Vasilevskiy, "Road monitoring with Polarimetry by multifunctional LIDAR", WO/2023/047175, 30 March 2023. https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2023047175&_cid=P10-LJMYPQ-21020-1

Jenkins Sanchez, Mark; Weeber, Hendrik A, Faria Ribeiro, Miguel (AMO Groningen B.V.). Diffractive Lenses for Range of Vision. United States Patent and Trademark Office Pre-Granted Publication, 2023. Patent number: US20230011320. https://patents.google.com/patent/US20230011320A1/en?inventor=Miguel+Faria+Ribeiro

N. Fernandez da Cunha, J. C. Viana Gomes, F. A. Peixoto Oliveira, L. Rebouta, M. J. Ferreira Rodrigues, N. A. Gouveia Soares, F. Fernandes Ferreira, "System to determine the maximum range of a LIDAR sensor", WO/2023/285860, 19.01.2023 https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2023285860&_cid=P10-LE4H2F-28481-1

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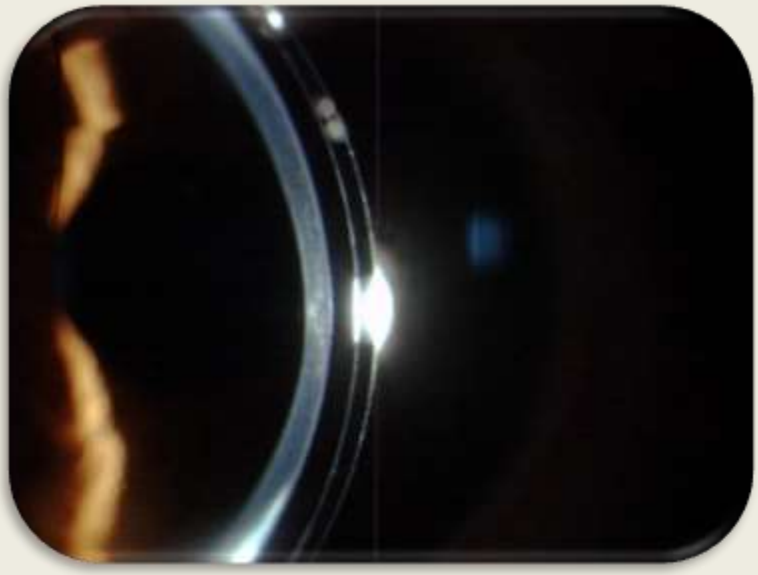

2023 Affiliated Publications

3D-Printed Carrageenan-Based Nanocomposites for Force-Sensing Applications (2023) Advanced Engineering Materials, 25 (11), art. no. 2201806, DOI: 10.1002/adem.202201806, Macedo, V.M., Pereira, N., Tubio, C.R., Martins, P., Costa, C.M., Lanceros-Mendez, S.;

A Maximum Principle for Optimal Control Problems Involving Sweeping Processes with a Nonsmooth Set; Maria do Rosário de Pinho, Maria Margarida A. Ferreira, Georgi Smirnov; Journal of Optimization Theory and Applications 199 (2023) 273; doi:10.1007/s10957-023-02283-4

A Polymorph of Dipeptide Halide Glycyl-L-Alanine Hydroiodide Monohydrate: Crystal Structure, Optical Second Harmonic Generation, Piezoelectricity and Pyroelectricity; R.M.F. Baptista, C.S.B. Gomes, B. Silva, J. Oliveira, B. Almeida, C. Castro, P.V. Rodrigues, A. Machado, R.B. Freitas, M.J.L.F. Rodrigues, E.M. Gomes, M. Belsley; Materials 16 (2023) 3690; doi:10.3390/ma16103690

Acrylonitrile Butadiene Styrene-Based Composites with Permalloy with Tailored Magnetic Response (2023) Polymers, 15 (3), art. no. 626, . DOI: 10.3390/polym15030626, Merazzo, K.J., Díez, A.G., Tubio, C.R., Manchado, J.C., Malet, R., Pérez, M., Costa, P., Lanceros-Mendez, S.;

Advancements in Phase Change Materials in Asphalt Pavements for Mitigation of Urban Heat Island Effect: Bibliometric Analysis and Systematic Review. Claver Pinheiro, Salmon Landi Jr, Orlando Lima Jr, Larissa Ribas, Nathalia Hammes, Iran Rocha Segundo, Natália Cândido Homem, Verônica Castelo Branco, Elisabete Freitas, Manuel Filipe Costa, Joaquim Carneiro. Sensors 2023, 23, 7741.DOI: https://doi.org/10.3390/s23187741

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