

Activity report
Centre of Physics

December 2014



Centre of Physics
Activity report 2014

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1. Introduction

The Physics Centre of Minho University (CFUM) is a research unit with a multi-disciplinary scientific activity in the fields of Pure and Applied Physics and adjacent areas. It involves both theoretical and experimental research as well as development for applications, and concerns four major scientific areas: (1) Condensed Matter Physics, (2) Nanomaterials and Applications, (3) Molecular Physics and Biophysics, and (4) Optics and Vision Sciences. The CFUM is also committed to advanced training of students at the Graduation, Master, and Ph.D. levels (see "Scientific Training"). In addition, CFUM members conduct outreach activities (beyond the walls of the University) aimed at promoting the scientific knowledge acquired within the Centre. Finally, the members of the Centre are involved in a range of industrial collaborations, both at the national and international levels. In the Centre one can find 32 research laboratories (see "Facilities and Infrastructure"), located in both Gualtar and Azurém campi.

The CFUM is organized in several research groups (seven in 2014), which involve most of the teaching staff of the Department of Physics of Minho University, several staff members of other Portuguese higher education institutions, a number of full time researchers contracted in the framework of the Ciência, Investigador FCT and Welcome II Programs, Post-Docs, PhD students enrolled at the School of Sciences, and research students with short-term grants (see "Summary characterization of the Centre" and group's sections for detailed information). Each group has a coordinator, who is responsible for certain research facilities and handles some portion of the Centre's basic funding provided by the Portuguese Foundation for Science and Technology. The scientific activity is performed along a number of strategic research lines of the Centre, which are described below.

CFUM's managing bodies are: (i) Director, elected among the Full or Associate Professors of the Physics Department, every three years direct election, (ii) Deputy Director (appointed by the Director), (iii) Executive Committee, composed by the Director and the coordinators of the research groups, (iv) Scientific Council, composed by all effective members holding a PhD, and (v) Steering Committee, an advisory board constituted by internationally recognized scientists that help to evaluate and improve the Centre activities. Currently, the composition of the Steering Committee is:

- 1.) Prof. Sir Konstantin Novoselov, School of Physics & Astronomy, University of Manchester, Manchester, United Kingdom.
- 2.) Prof. David Foster, School of Electrical and Electronic Engineering, University of Manchester, Manchester, United Kingdom.
- 3.) Prof Antti-Pekka Jauho, Department of Micro- and Nanotechnology, Technical University of Denmark, Denmark.
- 4.) Prof Emeritus David Barber, Physics Centre, University of Essex, United Kingdom.

Technical support is provided by the personnel of the Department of Physics, School of Science (one electronics engineer, one electronics technician, one specialized engineer supporting film deposition facilities and three general technicians in Gualtar plus two general technicians in Azurém).

Administration support is provided by two experienced collaborators (personnel of the School of Science), one full time and one part-time. In addition, the CFUM itself contracts an additional collaborator who provides administration support to several projects in course and to activities aimed at attracting external funds.

The scientific production of the CFUM in 2014 showed a minute decrease as compared to 2013 (see "Indicators of the Centre Performance"). This is in spite of the declining central funding of the Centre by the FCT (this year it saw a dramatic reduction of about 30%). The CFUM average impact factor of this year publications is slightly above 2.5, about the same as in 2013. We also remark that during this year 29 scientific projects were associated with the Centre of Physics (22 FCT/FP7/ADI, 1 Bilateral e 6 collaborations) in the sense that, but other more 15 projects are associate with other Centres and bring no funds to the Centre.



Beyond the regular Physics Seminar and the Physics Coloquia, the Centre has an annual meeting (“Jornadas do CFUM”), each year dedicated to a specific unifying theme. This year’s meeting (“Jornadas CFUM 2014”) was a continuation of the 2013 theme, devoted to the strategic lines identified by the Centre in 2013 (see report of 2013 for a detailed descriptions of each of the lines):

- (i) Plasmonics and coupled plasmon modes in nanostructures,
- (ii) Hybrid bionanosystems based on self-assembled structures, quantum dots, plasmonic and magnetic nanoparticles,
- (iii) Functional coatings and surface structure,
- (iv) Sensors and actuators: new materials and concepts;
- (v) Assessment and enhancing visual performances.

The main idea behind the “Jornadas CFUM 2014”, which took place in September, was to evaluate the advances made in research in the above strategic lines during 2014. The “Jornadas CFUM 2014” also counted with the presence of the Advisory Committee members, to whom it was asked a detailed report on the strategic research lines, aiming at correcting them if necessary. The detailed report was delivered by the end of October and a number of recommendations were made, some of them suggesting that changes are indeed necessary, both in the direction of the research and in the composition of the Centre. The diminishing funding by the FCT was identified by the Advisory Committee as a bottleneck to the improvement of the research carried on in the Centre.

The year of 2014 was also the year of the evaluation of the Centre by the FCT. The outcome of this evaluation was the downgrade of the Centre’s classification from “Excellent” to “Good”. The Centre’s managing bodies considered this evaluation result unjustified given the scientific track-record of the Centre during the last few years and the quality of the investigation proposed in the research lines. An appeal was filed in to the FCT and its final outcome is still awaited.



2. Summary characterization of the Centre

Unit designation: Physics Centre of the University of Minho

Period of activity: Year of 2014

Researchers of UM Centre of Physics

Members	Number
Effective Members with Ph.D	57
Effective Members without Ph.D	0
Associate Members (all with Ph.D)	4
Post-Docs and Research Fellows with PhD	24
Ph. D Students (enrolled at ECUM/ total)	37/62
Other Research Students (grant holders at CFUM)	48

3. Organization

3.1. Management Entities

Director: Nuno Peres

Deputy Director: Mikhail Vasilevskiy

Executive Committee Members:

1. Marta Maria Duarte Ramos
2. Jorge Jorge
3. Luis Rebouta
4. Maria Elisabete C.D. Real Oliveira
5. Bernardo Gonçalves Almeida
6. Mikhail Vasilevskiy
7. Mário António C. de Castro Pereira

Members of the Scientific Council (effective CFUM members):

1. Anabela Gomes Rolo
2. Ana Pinho
3. Anura Samantilleke
4. António Manuel Gonçalves Baptista
5. António Mário Lourenço da Fonseca Almeida
6. António Queirós
7. Bernardo Gonçalves Almeida
8. Cacilda Maria Lima de Moura
9. Carlos José de Macedo Tavares
10. Diego Martinez
11. Eduardo Jorge Nunes Pereira
12. Elisabete Maria Santos Castanheira Coutinho
13. Etelvina de Matos Gomes



14. Filipe Macedo
15. Francisco José Machado Macedo
16. Guerorgi Smirnov
17. Ivan Larkin
18. Jaime Santos
19. João Linhares
20. João Pedro dos Santos Hall de Agorreta de Alpuim
21. Joaquim Alexandre Carneiro
22. Jorge Manuel Martins Jorge
23. José Alberto Diaz Rey
24. José Carlos Viana Gomes
25. José Filipe Vilela Vaz
26. José Luís Pires Ribeiro
27. José Manuel González-Mejome
28. José Manuel Pereira Carmelo
29. Júlia Maria Simões Dias Barata Tovar Ayres Campos
30. Luís António Carvalho Gachineiro da Cunha
31. Luís Manuel Fernandes Rebouta
32. Luís Manuel Gomes Vieira
33. Luís Silvino Alves Marques
34. Manuel Filipe Pereira Cunha Martins Costa
35. Maria de Fátima Guimarães Cerqueira
36. Maria de Jesus Matos Gomes
37. Maria Elisabete da Cunha Dias Real Oliveira
38. Maria José Sampaio
39. Maria Madalena da Cunha Faria de Lira
40. Maria Teresa Pitta de Lacerda-Arôso
41. Mário António Caixeiro de Castro Pereira
42. Marlene Lucio
43. Mário Rui da Cunha Pereira
44. Marta Maria Duarte Ramos
45. Martin Andritschky
46. Michael Scott Belsley
47. Mikhail Vasilevskiy
48. Nuno Miguel Machado Reis Peres
49. Paulo José Gomes Coutinho
50. Ricardo Mendes Ribeiro
51. Sandra Maria de Braga Franco
52. Sandra Maria Fernandes Carvalho
53. Senen Lanceros-Méndez
54. Sérgio Miguel Cardoso Nascimento
55. Stanislav Ferdov
56. Teresa Maria dos Santos Ribeiro Viseu
57. Vasco Manuel Pinto Teixeira

Associate Members (emeritus members and teachers of other Portuguese universities):

1. José Manuel Martins Borges de Almeida (retired, UM)



2. Jorge António Silva Mendes (Polytechnic Institute, Vila do Conde)
3. Li-Jian Meng (Polytechnic Institute, Porto)
4. Vasco Almeida (UBI)

Post-Doctorate Researchers and Research Fellows

1. Bachu Rama Raju
2. Catarina Lopes
3. Clarisse Ribeiro
4. Fabricio Faita
5. Flavio Ferreira
6. Isabel Moura
7. João Pereira
8. João Viana
9. José Pedro Basto da Silva
10. Joel Borges
11. Kamakshi Koppole
12. Koppole Sekhar
13. Marcos Martins
14. Luís Alves
15. Paulo Rodrigues
16. Pedro Costa
17. Pedro Martins
18. Rosa Batista
19. Tilen Cadez
20. Vadim Ponomarenko
21. Vanessa Cardoso
22. Vitor Correia
23. Vitor Sencadas
24. Yuliy Bludov

3.2. Research Groups

According to the regulation of the Centre, the research activities have been developed within the following groups:

Research Group	Coordinator
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Group of Atomic and Molecular Physics and Optics (FAMO)	Maria Elisabete C.D. Real Oliveira
Group of Cooperative Phenomena in Dielectrics (FCD)	Bernardo Gonçalves Almeida
Group of Computational and Theoretical Physics (GFCT)	Marta Maria Duarte Ramos
Group of Physics of Nano Crystalline Materials (FMNC)	Mário António C. de Castro Pereira
Functional Coatings Group (GRF)	Luis Reboura
Complexity and Electronic Properties Group (GCEP)	Mikhail Vasilevskiy
Group of Optometry and Vision Science (OCV)	Jorge Jorge

4. Facilities and Infrastructure

4.1. Research Laboratories

Laboratory - location	Group	Responsible
Photophysics I - Gualtar	FAMO	Elisabete Coutinho
Photophysics II - Gualtar	FAMO	Elisabete Coutinho
Preparation I – Gualtar	FAMO	Elisabete Coutinho
Biophysics – Gualtar	FAMO	Paulo Coutinho
Femtoseconds -Gualtar	FAMO	Michael Belsley
Emission Life Time - Gualtar	FAMO	Mário Rui Pereira
Crystal Growth – Gualtar	FCD	Etelvina de Matos Gomes
Doelectric Properties – Gualtar	FCD	Bernardo Gonçalves Almeida
Infrared Spectroscopy – Gualtar	FCD	Luís Vieira
Magnetic Properties and Electromechanical – Gualtar	FCD	Bernardo Gonçalves Almeida
Computational Physics – Gualtar	FCT	Luís Silvino Marques
Thin Films I - Gualtar	FMNC	Maria Jesus M. Gomes
Investigation of Ceramic - Azurém	FMNC	Mário Pereira
Preparation II – Gualtar	FMNC	Maria de Jesus Gomes
Thin Films II - Gualtar	FMNC	Mário Pereira
Raman Spectroscopy and Photothermal measurement – Gualtar	GCEP/G RF	Cacilda Moura / Francisco Macedo
Photoconductivity - Gualtar	GCEP	Fátima Cerqueira
Cold Atoms - Gualtar	GCEP	José Carlos Gomes
Devices and microfabrication – Azurém	GCEP	Luís Rebouta/Senen Lanceros-Mendez
Preparation – Azurém	GRF	Sandra Carvalho
Mechanical Properties – Azurém	GRF	Joaquim Carneiro
Functional Coatings I – Azurém	GRF	Martin Andritschky
Functional Coatings II – Azurém	GRF	Luis Rebouta
Electromechanical properties of materials – Azurém	GRF	Senen Lanceros-Mendez
Corrosion and electrochemical testings - Azurém	GRF	Sandra Carvalho
Optoelectronics - Azurém	GRF	Carlos Tavares
Surface analysis - Azurém	GRF	Filipe Vaz



Visual Rehabilitation - Gualtar	OCV	António Baptista
Science of Vision and Colour – Gualtar	OCV	Sérgio Miguel Cardoso Nascimento
Ophthalmic Instrumentation – Gualtar	OCV	Sandra Maria Braga Franco
Microtopography – Gualtar	OCV	Manuel Filipe Costa
Research in Clinical and Experimental Optometry - Gualtar	OCV	Jorge Jorge/ José Manuel Meijome

5. Indicators of the Centre Performance

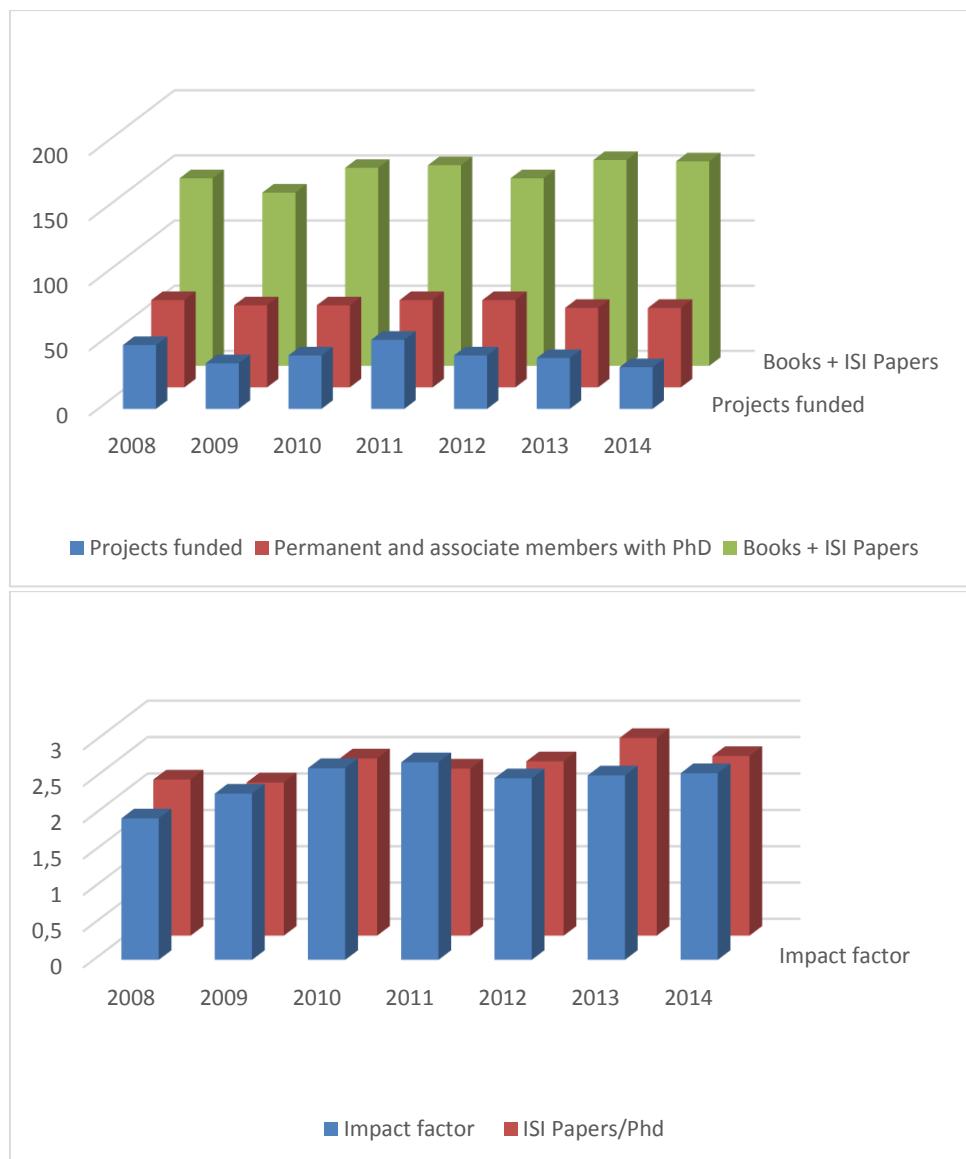
5.1. Publications

The following table presents data on the scientific production of the Center of Physics in 2014:

Publications	Number
ISI papers (regular journal articles/conference journal articles)	141/17
Book chapters	8
Patents (national /international)	1/0

The following figures show comparative data on the number of researchers (PhD) and scientific production since 2008.





5.2. Seminars organized by the Centre

5.2.1. Colloquia

Organizing Committee in the 1st semester:	Organizing Committee in the 2nd semester:
Martin Andritschky Fatima Cerqueira António Queirós	Bernardo Almeida Paulo Coutinho José Linhares

Titles and Speakers:

29 January 2014

Modificação Ótica da Resposta Neural do Olho Humano - José Manuel González-Méijome



26 February 2014

O Física nas Empresas – Mesa Redonda

26 March 2014

Papel da Física médica no Hospital – Fernanda Ponte

30 April 2014

New paths in optical sensing – José Santos

28 May 2014

Nanodispositivos de spin e sua integração em plataformas de uma perspectiva da realização de protótipos – Ricardo Ferreira

25 June 2014

Física em materiais bi-dimensionais – Ricardo Ribeiro

26 November 2014

A imagiologia hiperespectral na análise das pinturas de amadeo de souza-cardoso - cristina montagner

10 December 2014

Zen e a arte de construir espaços-tempo - Orfeu Bertolami

5.2.2. Physics Seminars

Coordinator in 2014: Jaime Santos

Titles and speakers:

Quantum structures of ZnMgO/ZnO/ZnMgO grown by molecular beam epitaxy

Adrian Kozanecki

Can a black hole have hair?

Carlos A. Herdeiro

Electrical transport through DNA

Carlos José Páez González

Terahertz response of patterned epitaxial graphene

Christian Sorger

CuInSe_x Nanocrystal Surface Characterization: Valence Band Tunability and Raman Spectroscopy

Douglas R. Pernik

Single-cycle light pulses: at the edge of ultrafast optics

Hélder Crespo



Hybrid bionanosystems based on self-assembled structures, quantum dots, plasmonic and magnetic nanoparticles

Investigation lines

Plasmonics and coupled plasmon modes in nanostructures

Investigation lines

Sensors and actuators: new materials and concepts

Investigation lines

Ab-initio modeling of hyperfine parameters and its relation with local and macroscopic properties

João Nuno Santos Gonçalves

Superspace symmetry and phenomenology of incommensurate type-II multiferroics

J. L. Ribeiro

Micromagnetic calculations of asymmetric nanorings and possible applications

J. I. Avila Osses

Absorption and emission of light in ensembles of nanocrystal quantum dots: electromagnetic coupling effects

M. I. Vasilevskiy

The top quark and the search for new physics at the LHC

Nuno Castro

Local quantum critical systems Response functions and transport in- and out-of-equilibrium

Pedro G. Ribeiro

From low-order to very high-order finite volume method

Stéphane L. Clain

Geometric phases and qubit manipulation in a driven quantum dot

Tilen Cadez

5.2.3. Annual Workshop “Jornadas” of the Centre of Physics

Mikhail Vasilevskiy

Plasmonics and coupled plasmon modes in nanostructures

Paulo Coutinho

Hybrid bionanosystems based on self-assembled structures, quantum dots, plasmonic and magnetic nanoparticles

Miguel Costa

Quantum Physics and Fields in High Energy and Condensed Matter Theory

Luis Rebouta

Functional Coatings and Surface Structure



Senen Lanceros Méndez

Sensors and actuators: new materials and concepts

Sérgio Nascimento

Assessing and enhancing visual performance

Organization:

Mikhail Vasilevskiy

Luis Rebouta

Nuno Peres

Paulo Coutinho

Sérgio Nascimento

Senentxu Lanceros-Mendes

5.3. Scientific Training

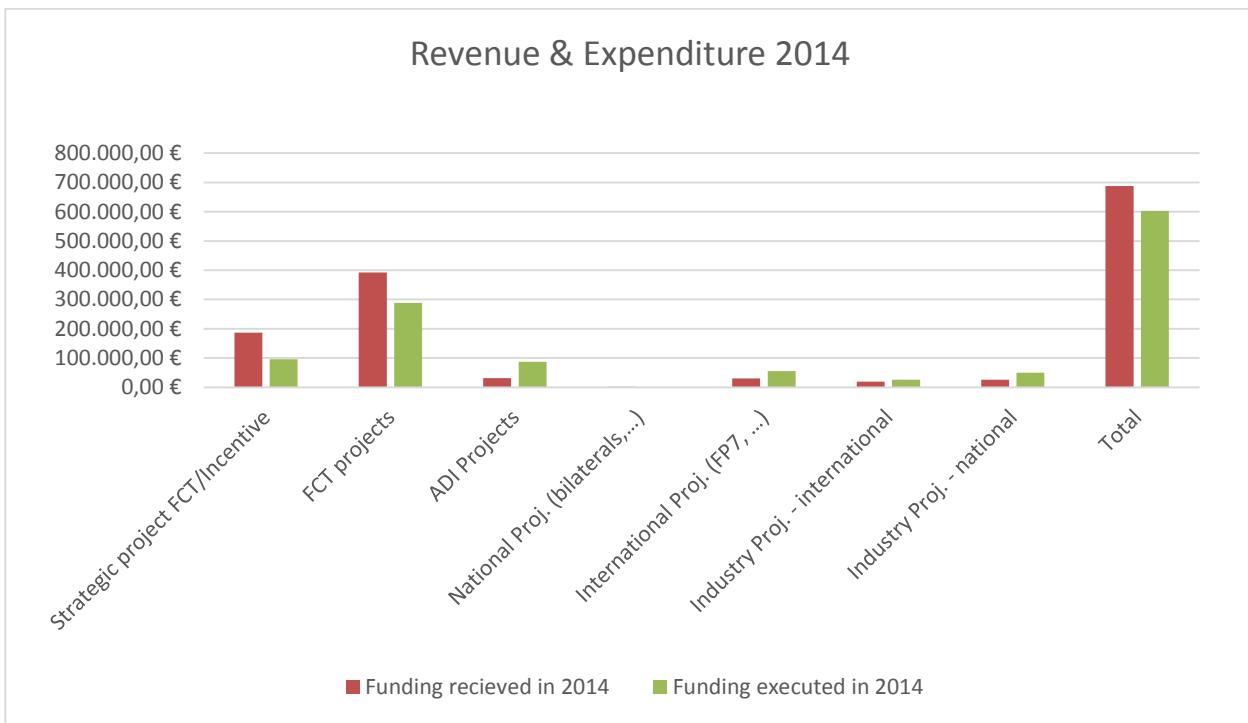
The following table presents the number os individual projects conducted at the Center of Physics, lead to the achievement of evidence the Masters and Ph.D.:

MASTERS THESES (ENROLLED ECUM/TOTAL)	AT	ONGOING	70/78
		COMPLETED	24/36
PH.D. THESES (ENROLLED ECUM/TOTAL)	AT	ONGOING	28/51
		COMPLETED	9/11

5.4. Funding



	Funding assigned in 2014	Funding received in 2014	Funding executed in 2014	Nº of ongoing projects
Strategic project FCT/Incentive	67784,00€	186953,00€	95948,00€	2
FCT projects	179665,00€	392672,31€	288695,94€	17
ADI Projects	119.128,66 €	31.029,64 €	86.520,49 €	2
National Proj. (bilaterals,...)	1500,00€	1500,00€	0,00€	1
International Proj. (FP7, ...)	91840,00€	30060,73€	55798,54€	3
Industry Proj. - international	19665,00€	19665,00€	25354,00€	1
Industry Proj. - national	34.999,34 €	26.036,91 €	50.000,00 €	5
Total	514582,00€	687917,65€	562792,66€	31



5.5. Scientific Production Indicators by group in 2014

	FAMO	FCD	FCT	FMNC	GRF	GCEP	OCV	TOTAL
Nº Effective Members with Ph.D.	9	5	2	3	12	14	12	57
Nº Associate Members	0	1	0	0	1	0	2	4
Nº Post-Docs (total in 2014 / as on 31.12.2014)	4 4	9 9	0 0	4 4	1 1	5 5	1 1	24 24
Book/ Book Chapters	0/½	0/0	0/0	0/½	0/2	0/1	4/8	4/12
Regular articles published in ISI Journals	20 ^{1/6}	40 ^{1/6}	2 ^{1/2}	7 ^{5/6}	31 ^{1/6}	20 ^{1/3}	18 ^{5/6}	141
Average Impact factor	2.75	3.16	1.96	2.01	2.43	2.64	2.09	2.57
Conference Proceedings published in ISI Journals	3 ^{1/3}	1/3	0	1/2	2	3 ^{5/6}	7	17
Invited Talks in Scientific Conferences	3	9	0	0	4	10	19	45
PhD Theses concluded (enrolled at ECUM / total)	0 0	3 4	0 0	0 0	2 3	1 1	3 3	9 11
PhD Theses in progress (enrolled at ECUM / total)	7 8	2 11	2 2	3 3	3 10	2 4	9 13	28 51
Externally funded projects (FP7, FCT, ADI)	3	3	1	0	5	8	2	22
Bilateral Cooperation Projects	0	0	0	0	1	0	0	1
Collaboration Projects with Industry	0	1	0	0	0	0	5	6
Patents (national/international)	½ 0	½ 0	0	0 0	0 0	0 0	0 0	1 0

- Strategic project included in the table 5.4

6. Research Groups

6.1. Atomic, Molecular and Optical Group (FAMO)



6.1.1. Summary description of the scientific work carried out by the group in 2014

- (i) Development of inexpensive processes of nanoparticle production based on microheterogeneous media templating under mild conditions and tailoring of nanoparticle response through appropriate surface functionalization, namely with benzophenoxazine derivatives (1 PhD in progress, 1 post-doc, 1 MSc in progress, 2 ISI papers published)..
 - (ii) Production of magnetoliposomes (liposomes with encapsulated magnetic nanoparticles) based on nickel/silica core/shell nanoparticles that are being evaluated both as drug nanocarriers and hyperthermia agents for cancer treatment (1 PhD in progress; 3 MSc in progress; 1 ISI paper).
 - (iii) Production of DNA carriers based on cationic liposomes (lipoplexes) with monoolein that can effectively transfect cells, with evaluation of its efficiency in specific cell lines and also a development of monoolein-based lipoplexes (DODAB:MO) to deliver antigenic peptides as a means of combating fungal infections. This work is done in collaboration with Centre of Molecular and Environmental Biology of University of Minho. From this research resulted, 4 ISI papers published, 2 PhD ongoing, 3 MsC concluded, 6 MsC ongoing, 5 oral communications (2 invited), 16 Poster communications).
- Based in this line of research is already established an international collaboration with Max-Planck Institute of Colloids and Interfaces (G. Brezesinski), Laboratory for General Biochemistry and Physical Pharmacy at Ghent University (K. Braeckmans) and IBILCE/UNESP - Brazil (E. Feitosa). A spin-off company (Nanodelivery, Lda.) has emerged from these research activities aiming at producing nanocarriers for therapeutic, nutrition and cosmetic agents based on a patented DODAX-Monoolein formulation.
- (iv) Characterization of novel cationic Gemini surfactants based on the amino acid serine, with the aim of more strongly sequestering nucleic acids using smaller amounts of lipid in order to reduce toxicity (1 MsC ongoing, 1 oral communication, 2 poster communications and 1 paper submitted). This work is done in collaboration with the Faculty of Science of University of Porto.
 - (v) Investigation of the photophysical behaviour of new fluorescent potential antitumor drugs (synthesized at Centre of Chemistry of Minho University, CQ/UM) when incorporated in nanoliposomes and their interactions with DNA and proteins (2 ISI papers).
 - (vi) Molecular ab initio quantum mechanical calculations of drugs, both new (synthesized at CQ/UM) or commercial, allowing a better understanding of their photophysical and physicochemical properties; docking simulations giving insight on drug/DNA binding interactions and computational modelling of molecular and nanoparticles ensembles using Molecular Mechanics/Quantum Mechanics calculations. This research was included in 3 ISI papers.
 - (vii) Fluorescence and diffuse reflectance measurements for the development of a miniaturized system for early dysplasia detection (1 PhD in progress; 2 ISI Proceedings; 1 paper submitted).

6.1.2. Updated composition of the group

Principal investigator	Maria Elisabete C.D. Real Oliveira



<p>Research area</p>	<p>Photophysics, Photochemistry, Biophysics, Nanomaterials</p>
<p>Group Members</p>	<p><u>Effective members:</u></p> <ul style="list-style-type: none"> -Eduardo J. Nunes Pereira - Assistant Professor -Elisabete MS Castanheira Coutinho - Assistant Professor -Mário Rui C. Pereira - Assistant Professor -Paulo J. G. Coutinho - Assistant Professor -Maria Teresa R. Viseu - Assistant Professor -Julia B. Ayres de Campos Tovar - Assistant Professor - Maria Elisabete C.D. Real Oliveira- Associate Professor with Habilitation -Michael Scott Belsley - Associate Professor with Habilitation <p><u>Researchers:</u></p> <ul style="list-style-type: none"> -Marlene Susana Lúcio – Research Fellow with PhD <p><u>Post Doctoral Researchers and Research Fellows with Ph.D.</u></p> <ul style="list-style-type: none"> - Peter Schellenberg, Research Fellow with PhD (until March) - Bachu Rama Raju, FCT post-doc grant. - Luís Alves, FCT post-doc grant - Flávio Ferreira, FCT post-doctoral grant - Rosa Maria Ferreira Batista, FCT post-doctoral grant <p><u>PhD and other research students :</u></p> <ul style="list-style-type: none"> -Ana Cristina Norberto Gonçalves de Oliveira, PhD student (CF/CBMA) -Catarina Carneiro, PhD student (CF/CBMA) -Ana Rita O. Rodrigues, MAP-Fis PhD student -Arlindo M. Fontes Garcia, PhD student -Sara F. R. Pimenta, Biomedical Eng. PhD student (30% CFUM) -Hugo Gonçalves, PhD student -César Bernardo, PhD student

6.1.3. Scientific Production

6.1.3.1. Regular articles published in ISI Journals



A New Antitumoral Heteroarylaminothieno[3,2-b]pyridine Derivative: Incorporation in Liposomes and Interaction with Proteins Monitored by Fluorescence, C.N.C. Costa, A.C.L. Hortelão, J.M.F. Ramos, A.D.S. Oliveira, R.C. Calhelha, M.-J.R.P. Queiroz, P.J.G. Coutinho, E.M.S. Castanheira, Photochemical & Photobiological Sciences 13 (2014) 1730-1740; <http://dx.doi.org/10.1039/C4PP00287C>; <http://hdl.handle.net/1822/30742>. - IF:2,934 - FAMO

Application of Benzo[a]phenoxazinium Chlorides in Antimicrobial Photodynamic Therapy of *Candida albicans* Biofilms, Marisa Lopes, Carlos Tiago Alves, B. Rama Raju, M. Sameiro T. Gonçalves, Paulo J. G. Coutinho, Mariana Henriques, Isabel Belo, Journal of Photochemistry and Photobiology B: Biology 141 (2014) 93-99; <http://dx.doi.org/10.1016/j.jphotobiol.2014.09.006>. IF: 2,803 FAMO

Benzothienoquinolines: new one-pot synthesis and fluorescence studies of their interaction with DNA and polynucleotides, A. Rita O. Rodrigues, M. Solange D. Carvalho, J. André V. Cardoso, Ricardo C. Calhelha, Maria-João R. P. Queiroz, Paulo J. G. Coutinho, Elisabete M. S. Castanheira, Journal of Photochemistry and Photobiology A: Chemistry 294 (2014) 20-30; <http://dx.doi.org/10.1016/j.jphotochem.2014.08.001>; <http://hdl.handle.net/1822/30740>. - IF: 2,291 - FAMO

Diocadecyldimethylammonium: Monoolein Nanocarriers for Efficient in Vitro Gene Silencing, Ana Cristina Norberto Oliveira, Thomas Frans Martens, Koen Raemdonck, Renata Danielle Adati, Eloi Feitosa, Cláudia Botelho, Andreia Castro Gomes, Kevin Braeckmans and Maria Elisabete Cunha Dias Real Oliveira, ACS Appl. Mater. Interfaces 1014, 6, 6977-6989, (IF 5.0). dx.doi.org/10.1021/am500793y - IF: 5,9 - FAMO

Energy transfer via exciton transport in quantum dot based self-assembled fractal structures. C. Bernardo; I. Moura, Yu. Nuñez Fernandez; E. Pereira; P. Coutinho; A. Garcia; P. Schellenberg, M. Belsley, M. Costa, T. Stauber, and M. I. Vasilevskiy, J. Phys. Chem. C 118 (2014) 4982 - 4990. IF: 4.835. <http://hdl.handle.net/1822/30144>. - IF:4,835 - GCEP, FAMO, OCV

Enhancement of near infrared emission in La co-doped ZnO/Er nanoplates, Zamiri, R; Rebelo, A; Ahangar, HA; Belsley, MS and Ferreira, JMF, CERAMICS INTERNATIONAL 40(8) (2014) 12947-12951 DOI: 10.1016/j.ceramint.2014.04.155 - IF:2,086 - FAMO

Far-infrared optical constants of ZnO and ZnO/Ag nanostructures, Zamiri, R; Rebelo, A; Zamiri, G; Adnani, A; Kuashal, A; Belsley, MS ; Ferreira, JMF, RSC ADVANCES 4(40) (2014) 20902-20908 DOI: 10.1039/c4ra01563k - IF: 3,708 - FAMO

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One-pot Synthesis of CdSe nanoparticles exhibiting quantum size effect within a sol-gel derived ureasilicate matrix, Gonçalves, L. F. F. F., Kanodarwala, F. K., Stride, J. A., Silva, C. J. R., Pereira, M. R., Gomes, M. J. M.. Journal of Photochemistry and Photobiology A Chemistry, 285 (04/2014), 21-29. - IF: 2.291 - FMNC FAMO

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Structural Dynamics and Physicochemical Properties of pDNA/DODAB:MO Lipoplexes: Effect of pH and Anionic Lipids in Inverted Non-Lamellar Phases versus Lamellar Phases, J. P. Neves Silva, I.M.S.C. Oliveira, A. C. N. Oliveira, M. Lúcio, Andreia C. Gomes (2), P.J.G.Coutinho, M.E. C. D. Real Oliveira, " Biochimica et Biophysica Acta, 1838 (2014) 2555–2567 - IF 3.431 - FAMO

Study of far infrared optical properties and, photocatalytic activity of ZnO/ZnS hetero-nanocomposite structure, Zamiri, R; Tobaldi, DM; Ahangar, HA; Rebelo, A; Seabra, MP; Belsley, MS; Ferreira, JMF, RSC ADVANCES 4(67) (2014) 35383-35389 DOI: 10.1039/c4ra05325g - IF: 3,708 - FAMO

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Synthesis of an optically clear, flexible and stable hybrid ureasilicate matrix doped with CdSe nanoparticles produced by reverse micelles, Gonçalves, L. F. F. F., Silva, C. J. R., Kanodarwala, F. K., Stride, J. A., Pereira, M. R., Gomes, M. J. M., Materials Chemistry and Physics, 147 (05/2014), 86-94. - IF: 2.129 - FMNC FAMO

Synthesis of new benzo[a]phenoxazinium probes possessing carboxylic ester, hydroxyl and amino functional groups: photophysical studies in dry ethanol and conjugation with CdTe quantum dots, B. Rama Raju, Arlindo M. Fontes Garcia, A. Luísa S. Costa, Paulo J. G. Coutinho, M. Sameiro T. Gonçalves, Dyes and Pigments 110 (2014) 203-213 - IF: 3,468 - FAMO

Tunable pDNA/DODAB:MO lipoplexes: The effect of incubation temperature on pDNA/DODAB:MO lipoplexes structure and transfection efficiency, J. P. Neves Silva, A. C. N. Oliveira, M. Lúcio, Andreia C. Gomes, P.J.G.Coutinho, Maria Elisabete C.D. Real Oliveira, Colloids and Surfaces B: Biointerfaces, 121 (2014) 371–379. <http://dx.doi.org/10.1016/j.colsurfb.2014.06.019>. - IF: 4,287 - FAMO

Ultrasound promoted synthesis of Nile Blue derivatives, B. Rama Raju, Diogo M.F. Sampaio, M.M. Silva, Paulo J.G. Coutinho, M. Sameiro T. Gonçalves, Ultrasonics Sonochemistry 21 (2014) 360-366 - IF: 3,816 – FAMO

6.1.3.2. Conference Proceedings published in ISI Journals

A versatile Fluorescence Lifetime Imaging System for scanning large areas with high time and spatial resolution, Bernardo, C; Belsley, M; Gomes, EDM; Goncalves, H ; Isakov, D; Liebold, F; Pereira, E; Pires, V; Samantilleke, A; Vasilevskiy, M; Schellenberg, P, SECOND INTERNATIONAL CONFERENCE ON APPLICATIONS OF OPTICS AND PHOTONICS, Proceedings of SPIE 9286 (2014) 928637 DOI:10.1117/12.2063940 FAMO/GCEP/FCD



Preliminary Monte Carlo Based Inverse Model to Extract Optical Tissue Properties from Experimental Diffuse Reflectance Measurements – Coefficients Extraction for Gastrointestinal Dysplasia Detection, S. Pimenta, E.M.S. Castanheira, G. Minas, Proceedings of PHOTOPTICS 2014 – 2nd International Conference on Photonics, Optics and Laser Technology, pages 114-121; ISBN: 978-989-758-008-6 (Scopus indexed); <http://dx.doi.org/10.5220/0004790201140121>. FAMO

Study of the fluorescence signal for gastrointestinal dysplasia detection, S. Pimenta, E.M.S. Castanheira, G. Minas, Proceedings of the Second International Conference on Applications of Optics and Photonics, Proceedings of SPIE 9286, Artigo: 92864I, 2014 (ISI indexed); <http://dx.doi.org/10.1117/12.2061672>. FAMO

Synthesis and Photophysics of New Benzophenoxazine Derivatives Fused with Julolidine, B. Rama Raju, G. M. Ribeiro, Paulo J. G. Coutinho, M. Sameiro T. Gonçalves, Proceedings of the 18th Int. Electron. Conf. Synth. Org. Chem., 1-30 November 2014; in: Sciforum Electronic Conference Series, Vol. 18, 2014, a036; <http://dx.doi.org/10.3390/ecsoc-18-a036>; <http://hdl.handle.net/1822/32185>. FAMO

6.1.3.3. Books and book chapters

A luz e as cores que vemos: cores e sombras In Manuel F Costa (ed) Pri-Sci-Net. Sandra Franco, Júlia Ayres de Campos. 45 atividades IBSE de aprendizagem das ciências para crianças dos 3 aos 11 anos 2014 ISBN 978-989-98032-9-9

6.1.3.4. National Patents

National invention patent N° 106298 “Nanofibras poliméricas com nano-cristais de para-nitroanilina geradores de segunda harmónica ótica e respetivo processo de obtenção”. At 07 de July 2014. Dmitry Isakov, E. de Matos Gomes, Bernardo Almeida, Michael Belsley., FAMO, FCD

6.1.3.5. Master theses completed in 2014

Author: Ana Cândida Lopes Hortelão

Supervisor: Elisabete Coutinho

Title: Biocompatible peptide hydrogels as drug delivery systems

Terminated: in 2014 at ECUM

Author: Ann Van Dijck

Supervisor: Marlene Lúcio, Maria Elisabete C.D. Real Oliveira, Andreia F. Gomes (DB).

Title: Bovine serum albumin (BSA) encapsulated in DODAB:MO (1:2) liposomes for targeted drug delivery: development and characterization

Terminated: in 2014 at ECUM

Author: Eduarda Bárbara da Rocha

Supervisor: Marlene Lúcio, Maria Elisabete C.D. Real Oliveira (DF) e Andreia Ferreira Gomes (DB)

Title: Design of liposomal drug formulations for cancer therapy

Terminated: in 2014 at ECUM

Author: Diogo da Cunha Rodrigues



Co-Supervisor: Eduardo Pereira

Title: Simulação em ambientes paralelos da dispersão de fotões num guia de luz

Terminated: in 2014 at Engineering School

Author: Fátima Alexandra Meira Machado

Supervisor: Maria Elisabete C.D. Real Oliveira, Andreia Gomes (DB)

Title: Desenvolvimento de uma formulação lipossomal para a entrega de péptidos para servir como vacina contra a leucemia mieloide crónica

Terminated: in 2014 at ECUM

6.1.3.6. Master theses in progress in 2014

Author: Ana Catarina Pereira Correia

Supervisor: Eduardo Pereira

Title: Transporte de radiação superdifuso

Develloping since 2012 at ECUM

Author: Ana Margarida de Moura Pereira e Ferreira Carvalho

Supervisor: Marlene Lúcio, Maria Elisabete C.D. Real Oliveira, Andreia F. Gomes (DB).

Title: Otimização do perfil farmacocinético e farmacodinâmico de fármacos anticancerígenos através da sua veiculação em nanossistemas lipídicos

Develloping since September 2014 at ECUM

Author: Bruno Filipe Pereira da Silva

Supervisor: Paulo Coutinho

Title: Biosensores baseados na associação de enzimas a superfícies plasmónicas de ouro

Develloping since Semptember 2013 at ECUM and UP

Author: Fernando Henriques Almeida

Supervisor: Maria Elisabete C.D. Real Oliveira, Andreia Gomes (DB)

Title: Complexação simultânea de siRNA e pDNA em DODAB:MO para aumentar o silenciamento de genes.

Develloping since 2013 at ECUM

Author: Inês Soares Ferreira

Supervisor: Maria Elisabete C.D. Real Oliveira (DF) Hernâni Geros (DB), M. Manuela Corte Real (DB)

Title: Biotecnological applications in the study of Chemopreventive phenolic compounds

Develloping since September 2014 at ECUM

Author: José Mário Ferreira Ramos

Supervisor: Elisabete Coutinho, Paulo Coutinho

Title: Produção de magnetolipossomas sólidos baseados em ferrites dopadas com manganês para aplicação na entrega de fármacos antitumorais

Develloping since 2012 at ECUM

Author: Nélson Emanuel Salgado Teixeira

Supervisor: Paulo J. G. Coutinho

Title: Fotoconversão da água em hidrogénio usando filmes da perovskite BaSnO₃, pontos quânticos de CdSe como sensibilizantes e poluentes modelo como doadores sacrificiais.

Develloping since October 2014 at ECUM



Author: Pedro Filipe Ferreira de Sousa Moreira
Supervisor: Maria Elisabete C.D. Real Oliveira, Andreia F. Gomes (DB).
Title: Zebrafish embryos as in vivo model of toxicity: in vivo screening of nanoparticles with formulations DODAB:MO and DODAC:MO
Develloping since September 2014 at ECUM

Author: Sara Emanuela Silva Nogueira
Supervisor: Ana Preto (DB), Maria Elisabete C.D. Real Oliveira, Andreia Gomes (DB)
Title: Development of new DODAX:MO:DC-chol nanoparticles containing BRAF-siRNAs for colorectal carcinoma therapy
Develloping since September 2013 at ECUM and UP

Author: Sílvia Rodrigues Gavinho
Supervisor: Paulo Coutinho, Elisabete Coutinho
Title: Desenvolvimento de magneto-lipossomas de nanopartículas de óxidos de ferro e cálcio para transporte e entrega de fármacos antitumorais
Develloping since October 2013 at ECUM

Author: Tânia Sofia Oliveira Ferreira
Supervisor: Elisabete Coutinho, Paulo Coutinho
Title: Desenvolvimento de magneto-lipossomas de nanopartículas de óxidos de ferro e magnésio para transporte e entrega de fármacos
Develloping since October 2013 at ECUM

6.1.3.7. Ph.D. theses in progress in 2014

Author: Sara Filomena Ribeiro Pimenta
Supervisor: Graça Minas (C. Algoritmi), Elisabete Coutinho
Title: Espetroscopia integrada num microssistema para a deteção precoce de cancro
Develloping since Februaby 2013 at Engineering School

Author: Ana C. Oliveira
Supervisor: Elisabete Oliveira, Andreia Gomes (DB)
Title: Development of Monoolein-based lipofection vectors for therapeutic siRNA delivery
Develloping since 2011 at ECUM

Author: Ana Rita Oliveira Rodrigues
Supervisor: Elisabete Coutinho, Paulo Coutinho
Title: Magnetoliposomes of nickel-based nanoparticles for the delivery of potential antitumour drugs
Develloping since 2013 at ECUM

Author: Arlindo Miguel Fontes Garcia
Supervisor: Paulo Coutinho
Title: Preparação e caracterização fotofísica de nanopartículas semicondutoras de tipo núcleo/corona por moldagem com meios microheterogéneos
Develloping since 2008 at ECUM



Author: Catarina Carneiro

Supervisor: Maria Elisabete C.D. Real Oliveira, Paula Sampaio (DB), Andreia Gomes (DB)

Title: Cationic liposomes as antigenic delivery systems: development of an immunoprotective strategy against fungal infactions

Developing since 2011 at ECUM

Author: César Bernardo

Supervisor: Michael Belsley, Mikhail Vasilevskiy

Title: Energy transfer dynamics and light-harvesting in Quantum Dot structures

Developing since 2014 at ECUM

Author: Hugo Gonçalves

Supervisor: Michael Belsley, M. Manuela Raposo

Title: Two-photon absorption of a promising set of dyes for microscopy, micro-fabrication, 3d data storage and biomedical applications

Developing since 2014 at ECUM

Author: Rosa Cristina Moutinho Ferreira

Supervisor: Maria Manuela Raposo (DQ), Michael Belsley

Title: Innovative Two-Photon Absorbing (TPA) chromophores as sensors, photo-initiators or data storage elements: design, synthesis and development for applications

Developing since 2012 at ECUM

6.1.4. Other scientific activities

6.1.4.1. Invited Lectures/seminars delivered by members of the group in national or international conferences

International

Challenges in the design of drug delivery systems for cancer chemotherapy, Marlene Lúcio, Post Graduated Course: "Bionanotechnology for diagnosis and therapy of cancer", Universidade do Minho, Braga, 2014. FAMO.

Monoolein-based nanocarriers for siRNA delivery, Maria Elisabete C.D. Real Oliveira, Post Graduated Course: "Bionanotechnology for diagnosis and therapy of cancer", Universidade do Minho, Braga, 2014. FAMO.

Monoolein-based self-assembled nanosystems for biomedical applications, Maria Elisabete C.D. Real Oliveira, Ana C. N. Oliveira, Catarina Carneiro, João P. N. Silva, Paula Sampaio, Andreia C. Gomes, IC3EM, 2014, Costa da Caparica, Lisboa. FAMO

6.1.5. Funded projects ongoing

Title: Non-Linear Spectroscopy of organic donor-acceptor

Reference: PTDC/CTM/105 597/2008

Project Coordinator: Michael Scott Belsley

Funding awarded: 165 000.00 Euros

Start Date: March 2010

Duration: 3 years



Title: Polimeros fotocrómicos activados por exitação com dois fotões
Reference: PTDC/CTM-POL/114367/2009,
Project Coordinator: Eduardo Pereira
Fundins awarded: 12.840.00 Euros
Start date: April 2011
Duration: 3 years

Title: Bionanoparticles as grug delivery systems
Reference: IF/00498/2012/CP0177/CT0005
Coordenator:Marlene Lucio
Fundins awarded: 50000.00€
Start date: 01-01-2014
Duration: 2 years

6.1.6. Projects without funding to the Center of Physics

Title "HMIEXCEL - I&D crítica em torno do ciclo de desenvolvimento e produção de soluções multimédia avançadas para automóvel",
Bosch Car Multimedia,
Universidade do Minho – FEDER, Programa Operacional Fatores de Competitividade, Sistema de Incentivos à Investigação e Desenvolvimento Tecnológico (SII&DT).
Coordenação linhas de I&D de Inspeção Ótica Automática, em controle de qualidade.
Coordenador:Eduardo J. Nunes-Pereira, Michael Scott Belsley.
Duration: 2 years

Title: "NANOFOL"- Folate-based nanobiodevices for integrated diagnosis/therapy targeting chronic inflammatory diseases",
Reference: Projeto Europeu FP7-NMP-2008-LARGE-2, CP-IP 228827-2
Coordenador Maria Elisabete C.D. Real Oliveira (2009-2014) (consultora) (Responsável pelo Projecto Prof. Artur Cavaco Paulo do Departamento de Engª Têxtil da UM).
Start date: Dezembro 2009,
Ended: 2014. (consultor) <http://www.nanofol.eu/index.php?id=48>.

6.1.7. Other information

6.1.7.1. Other conference presentations given by members of the group in national or international conferences

**- International
Oral**



Development of Lipoplexes based on Serine Geminis and Monoolein for Intracellular delivery of siRNA, João P. N. Silva, Catarina Costa, Sandra G. Silva, M. Luísa C. do Vale, Andreia C. Gomes, Maria Elisabete C.D. Real Oliveira, Eduardo F. Marques, 20th International Symposium on Surfactants in Solution, SIS 2014, Coimbra. FAMO (oral)

Monoolein-based self-assembled nanosystems for biomedical applications, Maria Elisabete C.D. Real Oliveira, Ana C. N. Oliveira, Catarina Carneiro, João P. N. Silva, Paula Sampaio, Andreia C. Gomes, IC3EM, 2014, Costa da Caparica, Lisboa. FAMO (Oral)

PEGylation of DODAB:MO nanocarriers for optimized siRNA delivery, Ana C. N. Oliveira, Thomas Martens, Koen Raemdonck, Ivo Lopes, Cláudia Botelho, Marlene Lúcio, Andreia C. Gomes, Kevin Braeckmans, Maria Elisabete C.D. Real Oliveira, 20th International Symposium on Surfactants in Solution (SIS 2014) FAMO (oral)

Study of the fluorescence signal for gastrointestinal dysplasia detection, S. Pimenta, E.M.S. Castanheira, G. Minas, AOP2014 - II International Conference on Applications of Optics and Photonics, Aveiro (Portugal), 26-30 May, 2014. FAMO (Oral)

Magnetic liposomes based on nickel ferrite and manganese ferrite nanoparticles for biomedical applications, Ana Rita O. Rodrigues, José M.F. Ramos, B.G. Almeida, I.T. Gomes, J.P. Araújo, E.M.S. Castanheira, P.J.G. Coutinho, SIS-2014 - 20th International Symposium on Surfactants in Solution, Coimbra (Portugal), 22-27 June, 2014; <http://hdl.handle.net/1822/30445>. FAMO/FCD (Oral)

Exciton migration in self-assembled dendrite-type fractal superstructures of monodisperse Quantum Dots, César Bernardo, M. Belsley, Paulo Coutinho, Peter Schellenberg, Isabel Moura, Yuriel Núñez Fernández, Tobias Stauber, Mikhail Vasilevskiy, NanoPT2014 – International Conference in Nanoscience and Nanotechnology, Porto (Portugal), 12-14 February 2014; <http://hdl.handle.net/1822/28290>. FAMO/GCEP (Oral)

Adhesion of *Pseudomonas aeruginosa* to hydrogel contact lenses: roughness and wettability effect. Maria J. Giraldez, Maria A. Bermudez, Madalena Lira, Maria Elisabete C.D. Real Oliveira, Eva Yebra-Pimentel. Universidade de Minho. Congresso Internacional de Optometria e Ciências da Visão, 24 -25 maio 2014.(OCV, FAMO)

Poster

Aggregation Behavior of Mixtures of Serine-based Cationic Gemini Surfactants and Monoolein aimed at Gene Delivery Catarina Costa, Sandra G. Silva, João P. N. Silva, M. Luísa C. do Vale, Andreia C. Gomes, Maria Elisabete C.D. Real Oliveira, Eduardo F. Marques, 20th International Symposium on Surfactants in Solution, SIS 2014, Coimbra. FAMO. (Poster)

Biocompatible peptide-based hydrogels as nanocarriers for a new antitumoral drug, Ana C. L. Hortelão, Bruno F. C. Hermenegildo, Helena Vilaça, Goreti Pereira, Bing Xu, Maria-João R.P. Queiroz, José A. Martins, Paula M.T. Ferreira, Elisabete M.S. Castanheira, 15th Trends in Nanotechnology International Conference (TNT2014), Barcelona (Spain), 27-31 October 2014; <http://hdl.handle.net/1822/30743>. FAMO (Poster)

Bovine serum albumin (BSA) encapsulated in DODAB-MO (1:2) liposomes for targeted drug delivery: development and characterization, Fernando H. Almeida, Ann Van Dijck, João Neves Silva, Andreia C. Gomes, Marlene Lúcio, M.E.C.D. Real Oliveira, SIS 2014, Coimbra. FAMO. (Poster)

Cationic liposomes containing *Candida albicans* cell wall surface proteins: a novel adjuvant and delivery system, Catarina Carneiro, Alexandra Correia, Célia Pais, Manuel Vilanova, Andreia Gomes, Maria Elisabete C.D. Real Oliveira, Paula Sampaio, 12th ASM Conference on Candida and Candidiasis. March 26-30, 2014, New Orleans, Louisiana, USA. FAMO. (Poster)



Development of lipoplexes DODAC/MO/PEG-FOL for selective delivery of siRNA towards cells expressing folate receptor, vo Lopes, Ana C.N. Oliveira, Marisa P. Sárria, João P. Neves Silva, Odete Gonçalves, Andreia C. Gomes and Maria Elisabete C.D. Real Oliveira, 20th International Symposium on Surfactants in Solution, SIS 2014, Coimbra. FAMO. (Poster)

Effect of the counter-ion on DODAX:MO siRNA-lipoplexes gene silencing efficiency, Ana C. N. Oliveira, Thomas Martens, Koen Raemdonck, Ivo Lopes, Cláudia Botelho, Marlene Lúcio, Andreia C. Gomes, Kevin Braeckmans, Maria Elisabete C.D. Real Oliveira, IC3EM, Costa da Caparica, Jornadas do CFUM, Sep. 2014. FAMO (Poster)

Fluorescence quenching and anisotropy studies as a toolbox for pharmacokinetic evaluation of drug-delivery systems, Marlene Lúcio, Teresa Viseu, Julia Tovar, Peter Schellenberg and Maria Elisabete C.D. Real Oliveira, IC3EM, Costa da Caparica, 8-10 Sep. 2014. FAMO (Poster)

Monoolein/Serine-based Surfactant Aggregates for the Encapsulation of DNA: Chain Length and Mixing Ratio Effects, Isabel S. Oliveira, Sandra G. Silva, João P.N. Silva, Maria L. do Vale, Andreia C. Gomes, Maria Elisabete C.D. Real Oliveira, Eduardo F. Marques, 20th International Symposium on Surfactants in Solution, SIS 2014, Coimbra. FAMO. (Poster)

Nickel-based magnetoliposomes for delivery of new potential antitumor compounds, Maria-João R.P. Queiroz, A. Rita O. Rodrigues, E.M.S. Castanheira, P.J.G. Coutinho, 11th International Conference on Nanosciences & Nanotechnologies (NN14), Thessaloniki (Greece), 8-11 July 2014; <http://hdl.handle.net/1822/30978>. FAMO (Poster)

Optimization of DODAX/MO-Based Vectors for cancer treatment, Eduarda Bárbara, Maria Elisabete C.D. Real Oliveira, Andreia C. Gomes, Marlene Lúcio, 20th International Symposium on Surfactants in Solution, SIS 2014, Coimbra. FAMO. (Poster)

Preliminary Monte Carlo Based Inverse Model to Extract Optical Tissue Properties from Experimental Diffuse Reflectance Measurements: Coefficients Extraction for Gastrointestinal Dysplasia Detection, S. Pimenta, E.M.S. Castanheira, G. Minas, PHOTOPTICS 2014 – 2nd International Conference on Photonics, Optics and Laser Technology, Lisbon, Portugal, 7-9 January 2014. FAMO (Poster)

Tunable Self-Assembled Nanotubes for Protein Loading, Isabel S. Oliveira, João P.N. Silva, Andreia C. Gomes, Maria Elisabete C.D. Real Oliveira, Maria J. Araújo and Eduardo F. Marques, 20th International Symposium on Surfactants in Solution, SIS 2014, Coimbra. FAMO. (Poster)

Tuning lipid composition for less toxic and more efficient lipoplexes: effect of DC-Cholesterol and MO on DODAX lipid systems, Odete Gonçalves, Ana C. N. Oliveira, Hugo Carvalho, Ivo lopes, Renata D. Adati, Eloi Feitosa, Marlene Lúcio, Maria Elisabete C.D. Real Oliveira, Andreia C. Gomes, 20th International Symposium on Surfactants in Solution, SIS 2014, Coimbra. FAMO. (Poster)

Development of nickel-based magnetoliposomes, Ana Rita O. Rodrigues, B.G. Almeida, I.T. Gomes, J.P. Araújo, E.M.S. Castanheira, P.J.G. Coutinho, NanoPT2014 – International Conference in Nanoscience and Nanotechnology, Porto (Portugal), 12-14 February 2014; <http://hdl.handle.net/1822/28315>. FAMO/FCD (Poster)

Quantum Dot Sensitized Solar Cells with Cuprous Sulfide Counter Electrode, Nuno Marques Ferreira, César Bernardo, Isabel Moura, Paulo J. G. Coutinho, Anabela Rolo, Mikhail Vasilevskiy, Anura Samantilleke – E-MRS 2014 Fall Meeting, Warsaw (Poland), 15-19 September 2014. FAMO/GCEP (Poster)



Evaluation of optical properties of different types of contact lenses, Clara Pereira, Elisabete M. S. Castanheira, Maria Elisabete C.D. Real Oliveira, Madalena Lira, 11th International Congress of Optometry and Vision Sciences, Abril 2014. FAMO/OCV. (Poster)

Variation of surface roughness and wettability of daily disposable contact lens with wear, Maria J. Giraldez, Maria A. Bermudez, Madalena Lira, Maria Elisabete C.D. Real Oliveira, Eva Yebra-Pimentel, 11th Congresso International de Optometria e Ciências da Visão, Abril 2014. FAMO/OCV. (Poster)

Magneto-optical study of undoped and Mn doped ZnO thin films. F. Oliveira, M. F. Cerqueira, M. I. Vasilevskiy, T. Viseu, J. Ayres de Campos, A. G. Rolo, I. Bogdanovic-Radovic and E. Alves. E-MRS 2014 Spring Meeting, Lille, France. 27-29 May 2014. (GCEP, FAMO)

Adhesion of *Pseudomonas aeruginosa* to hydrogel contact lenses: roughness and wettability effect, Maria J. Giraldez, Maria A. Bermudez, Madalena Lira, Maria Elisabete C.D. Real Oliveira, Eva Yebra-Pimentel, 11th Congresso International de Optometria e Ciências da Visão, Abril 2014. FAMO/OCV. (Poster)

- National

Oral

Design of liposomal drug formulations for cancer therapy “Hybrid bionanosystems on self-structures, quantum dots, plasmonic and magnetic nanoparticles”, Jornadas da linha estratégica do CFUM, Marlene Lúcio, Eduarda Bárbara, Ana C. N. Oliveira, Andreia C. Gomes, Maria Elisabete C.D. Real Oliveira, Setembro, 2014. FAMO.

Fluorescence quenching and anisotropy studies as a toolbox for pharmacokinetic evaluation of drug-delivery systems”, Pré Jornadas da linha estratégica do CFUM “Hybrid bionanosystems on self-structures, quantum dots, plasmonic and magnetic nanoparticles”, Marlene Lúcio, Teresa Viseu, Júlia Tovar, Peter Schellenberg, Maria Elisabete C.D. Real Oliveira.

PEGylation of DODAB:MO nanocarriers for optimized siRNA delivery, Pré Jornadas da linha estratégica do CFUM “Hybrid bionanosystems on self-structures, quantum dots, plasmonic and magnetic nanoparticles”, Ana C. N. Oliveira, Thomas Martens, Koen Raemdonck, Ivo Lopes, Cláudia Botelho, Marlene Lúcio, Andreia C. Gomes, Kevin Braeckmans, Maria Elisabete C.D. Real Oliveira, Julho, 2014. FAMO.

Magnetic liposomes based on nickel ferrite and manganese ferrite nanoparticles for biomedical applications, Ana Rita O. Rodrigues, José M.F. Ramos, B.G. Almeida, I.T. Gomes, J.P. Araújo, E.M.S. Castanheira, P.J.G. Coutinho, Jornadas do Centro de Física da UM, 19 set. 2014. FAMO/FCD

Poster

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Desenvolvimento de lipoplexos estáveis de DODAC/MO/PEG-Folato para entrega selectiva de siRNA, Ivo Lopes, Ana C.N. Oliveira, Marisa P. Sárria, João P. Neves Silva, Odete Gonçalves, Andreia C. Gomes and Maria Elisabete C.D. Real Oliveira, Jornadas Bioquímica, UTAD, 2014. FAMO.

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Gemini surfactants for gene delivery - an improvement with MO, A. M. Carvalho, L. Gomes, J. Fernandes, Andreia C. Gomes, Eduardo F. Marques, Maria Elisabete C.D. Real Oliveira, Simpósio do Programa Doutoral de Biologia Molecular e Ambiental, Novembro 2014. FAMO.

Nanocarrier systems for delivery of chemopreventive phenolic compounds, Inês Soares, Marlene Lúcio, Hernâni V. Gerós, Maria Elisabete C.D. Real Oliveira, Simpósio do Programa Doutoral de Biologia Molecular e Ambiental, Novembro 2014. FAMO.

Paclitaxel encapsulation in DODAC:MO liposomes for pharmacokinetic profile improvement, AM Carvalho, Andreia C Gomes, Maria Elisabete C.D. Real Oliveira, M Lucio, Simpósio do Programa Doutoral de Biologia Molecular e Ambiental, Novembro 2014.. FAMO.

Photophysical studies of new benzophenoxazine fused julolidine NIR probes, G. Ribeiro, B. Rama Raju, Paulo J. G. Coutinho, M. Sameiro T. Gonçalves, III Encontro em Técnicas de Caracterização e Análise Química, Braga (Portugal), 6 junho 2014; <http://hdl.handle.net/1822/32191>. FAMO

Universidade e Escolas Secundárias em rede: Projeto “A minha Escola de Ciências, Sandra Paiva, Alice Dias, Ana Carvalho, Ana Cunha, Ana Isabel Pinheiro, Arminda Manuela Gonçalves, Carlos Silva, Elisabete Coutinho, Luís Cunha, Maria Cláudia Araújo, Maria Teresa Almeida, Pedro Pimenta Simões, Rui Baptista, Estrelita Vaz. SciCom Pt 2014 - Congresso de Comunicação de Ciência. 3 e 4 de Junho de 2014, Porto, Portugal GRF, FAMO

6.1.8. Future research

The synthesis of semiconductor quantum dots, magnetic and metallic nanoparticles will be continued. Surface functionalization towards the production of nanobiosensors will be optimized.

The investigation of the photophysical behavior of new thienopyridine derivatives, benzophenoxazine derivatives and peptide-based hydrogelators (all of them synthesized at CQ/UM) will be continued. The interaction of these new compounds/materials with models of biological membranes will be investigated.

The development of magnetoliposomes for dual cancer therapy will be continued. Both aqueous and dry magnetoliposomes will be prepared, to act both as antitumor drug nanocarriers and hyperthermia agents..

The expertise in lipoplexes will be used to further improve the development of hybrid tunable nanocarriers in an “one for all” perspective, being used to carry therapeutic, nutritional or cosmetic actives with high impact in many application fields. Explore and characterize the nonlinear response of graphene quantum dots.

Characterize the transfer of energy between fluorescent molecules and a nearby graphene sheet as a function of distance between them.

Develop a Z-scan experimental set-up capable of scanning from the near UV to the mid IR.

Photophysical study of the PSII incorporated in sol-gel biocompatible matrices. Possible optimization and stability enhancement will be investigated.

Characterize the transition between superdiffusive transport and Brownian diffusion with Truncated Lévy Flights.



6.2. Group of Cooperative Phenomena in Dielectrics (FCD)

6.2.1. Summary description of the scientific work carried out by the group in 2014

The main results obtained from the research performed in the group during 2014 were the following:

- It has been shown the possibility of using nanofibers of ferroelectric semi-organic materials as nanogenerators, by conversion of mechanical to electrical energy. The possibility to use nanofibers of centrosymmetric crystalline organic compounds as effective second-harmonic optical generators was demonstrated.
- The development and systematic study of new high performance magnetoelectric ceramics and composites has been performed. The magnetic phase diagram of EuLuMnO₃ multiferroic ceramics was studied by infrared spectroscopy. The dielectric relaxation in nanocomposite films with mixed connectivity was investigated. The characterization of the influence of the substrate induced mechanical stresses on the electrical and magnetic properties of manganite films with colossal magnetoresistence, was performed.
- Piezoelectric magnetoelectric porous polymeric backbones for sensor and transducer applications were developed. Cell differentiation in osteoblasts was demonstrated, promoted by the piezoelectric effect.
- The development of piezoelectric spherules for tissue engineering and of several types of bioreactors was investigated. Piezoresistive high strain and piezoresistive printed sensors were developed.

6.2.2. Updated composition of the group

Research Group Title	Cooperative Phenomena in Dielectrics
Principal investigator	Bernardo Gonçalves Almeida
	Condensed Matter Physics, Materials Science:



Research area	<ul style="list-style-type: none"> - Novel dielectric and multiferroic materials: syntheses, dielectric and magnetic properties, cooperative phenomena - Nanoscopic materials: piezoelectric composites, nanofibres, thin films
Group Members	<p><u>Effective Members:</u></p> <ul style="list-style-type: none"> -José Luís Ribeiro – Associate Professor with Habilitation -Etelvina de Matos Gomes - Associate Professor -Senen Lanceros-Mendéz - Associate Professor -Bernardo Gonçalves Almeida - Assistant Professor -Luís Manuel Gomes Vieira - Assistant Professor <p><u>Associate Member:</u></p> <ul style="list-style-type: none"> -Jorge António Silva Mendes, Assistant Professor, Instituto Politécnico do Porto <p><u>Post-Doctorate Researchers and Research Fellows with PhD:</u></p> <ul style="list-style-type: none"> -Dmitry V. Isakov– Research Fellow with PhD -Vitor Sencadas – FCT Post-Doc grant -Pedro Libanio Martins - FCT Post-Doc grant -Vanessa Cardoso - FCT Post-Doc grant -Vitor Correia - FCT Post-Doc grant -Clarisse Ribeiro - FCT Post-Doc grant -Catarina Lopes- FCT Post-Doc grant -João Pereira - FCT Post-Doc Grant -Pedro Costa - FCT Post-Doc grant -Marcos Silva Martins - FCT Post-Doc grant <p><u>PhD and other Research Students:</u></p> <ul style="list-style-type: none"> -Atilla Goren, Ph-D student, FCT grant -Sofia Fernandez, Ph-D student, FCT grant -Susana Catarino, Ph-D student, FCT grant -Gabriel Mendes, Ph-D student, FCT grant -Juan Alberto Panadero, Ph-D student, FCT grant -Paulo Sousa, Ph-D student, FCT grant -Silvia Reis, Ph-D student, FCT grant -Armando Ferreira, Ph-D student, FCT grant -Carlos Costa, Ph-D student, FCT grant -Daniel Miranda, Ph-D student, FCT grant -Helder Castro, Ph-D student, FCT grant -Daniela Correia, Ph-D student, FCT grant



-Vania Pinto, Ph-D student, FCT grant
-Joana Oliveira, Ph-D student, FCT grant
-Ricardo Sousa - Ph-D student, FCT grant
-Juliana Dias, Ph-D student, FCT grant
-Juliana Oliveira, Ph-D student, FCT grant
-Marco Silva, Ph-D student, FCT grant
-Renato Gonçalves, Ph-D student, FCT grant

6.2.3. Scientific Production

6.2.3.1. Regular articles published in ISI Journals

Aluminosilicate and aluminosilicate based polymer composites: Present status, applications and future trends. Lopes, A.C., Martins, P., Lanceros-Mendez, S. Progress in Surface Science 89 (3-4), pp. 239-277, 2014, IF 4.913, FCD

Carbon Nanofiber Type and Content Dependence of the Physical Properties of Carbon Nanofiber Reinforced Polypropylene Composites. Paleo, A. J.; Sencadas, V.; van Hattum, F. W. J.; et al. POLYMER ENGINEERING AND SCIENCE Volume: 54 Issue: 1 Pages: 117-128 Published: JAN 2014, - IF 1.441,- FCD

Effect of carbon nanotube type and functionalization on the electrical, thermal, mechanical and electromechanical properties of carbon nanotube/styrene-butadiene-styrene composites for large strain sensor applications. Costa, P.; Silva, J.; Anson-Casaos, A.; et al. COMPOSITES PART B-ENGINEERING Volume: 61 Pages: 136-146 Published: MAY 2014 - IF 2.602 – FCD

Effect of cylindrical filler aggregation on the electrical conductivity of composites. Silva, Jaime; Lanceros-Mendez, S.; Simoes, R. PHYSICS LETTERS A Volume: 378 Issue: 40 Pages: 2985-2988 Published: AUG 14 2014 - IF 1.626 – FCD

Effect of filler content on morphology and physical-chemical characteristics of poly(vinylidene fluoride)/NaY zeolite-filled membranes. Lopes, A. C.; Ribeiro, C.; Sencadas, V.; et al. JOURNAL OF MATERIALS SCIENCE Volume: 49 Issue: 9 Pages: 3361-3370 Published: MAY 2014 , IF 2.305, FCD

Effect of filler dispersion and dispersion method on the piezoelectric and magnetoelectric response of CoFe₂O₄/P(VDF-TrFE) nanocomposites. Martins, P.; Goncalves, R.; Lanceros-Mendez, S.; et al. APPLIED SURFACE SCIENCE Volume: 313 Pages: 215-219 Published: SEP 15 2014 - IF 2.538 – FCD

Effect of neutralization and cross-linking on the thermal degradation of chitosan electrospun membranes. Correia, D. M.; Gamiz-Gonzalez, M. A.; Botelho, G.; et al. JOURNAL OF THERMAL ANALYSIS AND CALORIMETRY Volume: 117 Issue: 1 Pages: 123-130 Published: JUL 2014 - IF 2.206 – FCD

Electrical properties of intrinsically conductive core-shell polypyrrole/poly(vinylidene fluoride) electrospun fibers. Dias, J. C.; Correi, D. M.; Botelho, G.; et al. SYNTHETIC METALS Volume: 197 Pages: 198-203 Published: NOV 2014 - IF 2.222 – FCD

Electroactive phases of poly(vinylidene fluoride): Determination, processing and applications. Martins, P.; Lopes, A. C.; Lanceros-Mendez, S. PROGRESS IN POLYMER SCIENCE Volume: 39 Issue: 4 Pages: 683-706 Published: APR 2014, - IF 26.854 – FCD



Electrosprayed poly(vinylidene fluoride) microparticles for tissue engineering applications. Correia, D. M.; Goncalves, R.; Ribeiro, C.; et al. RSC ADVANCES Volume: 4 Issue: 62 Pages: 33013-33021 Published: 2014 - IF 3.708 – FCD

Electrospun styrene-butadiene-styrene elastomer copolymers for tissue engineering applications: Effect of butadiene/styrene ratio, block structure, hydrogenation and carbon nanotube loading on physical properties and cytotoxicity. Ribeiro, S.; Costa, P.; Ribeiro, C.; et al. COMPOSITES PART B-ENGINEERING Volume: 67 Pages: 30-38 Published: DEC 2014 - IF 2.602 – FCD

Energy harvesting from nanofibers of hybrid organic ferroelectric dabcoHReO₄", D Isakov, ED Gomes, B Almeida, AL Kholkin, P Zelenovskiy, M Neradovskiy, VY Shur, Applied Physics Letters, 104, 032907 (2014) - IF 3.515 – FCD

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Extruded thermoplastic elastomers styrene-butadiene-styrene/carbon nanotubes composites for strain sensor applications. Costa, P.; Silvia, C.; Viana, J. C.; et al. COMPOSITES PART B-ENGINEERING Volume: 57 Pages: 242-249 Published: FEB 2014 - IF 2.602 – FCD

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Improving Photocatalytic Performance and Recyclability by the Development of Er- Doped and Er/Pr-codoped TiO₂ PVDF-TrFE Composite Membranes, Pedro Martins; Virginia Gomez; Catarina Lopes; Carlos Tavares; Gabriela Botelho; Silvia Irusta; Senentxu Lanceros-Mendez, Journal of Physical Chemistry: C 118 (2014) 27944–27953. - IF: 4.835 - GRF FCD

Influence of different salts in poly(vinylidene fluoride-co-trifluoroethylene) electrolyte separator membranes for battery applications Costa, C. M.; Leones, R.; Silva, M. M.; et al. JOURNAL OF ELECTROANALYTICAL CHEMISTRY Volume: 727 Pages: 125-134 Published: AUG 1 2014 - IF 2.871 – FCD

Influence of Electrospinning Parameters on Poly(hydroxybutyrate) Electrospun Membranes Fiber Size and Distribution. Correia, Daniela M.; Ribeiro, Clarisse; Ferreira, Jose C. C.; et al. POLYMER ENGINEERING AND SCIENCE Volume: 54 Issue: 7 Pages: 1608-1617 Published: JUL 2014 - IF 1.441 – FCD

Influence of the porosity degree of poly(vinylidene fluoride-coh-exafluoropropylene) separators in the performance of Li-ion batteries. Sousa, R. E.; Nunes-Pereira, J.; Costa, C. M.; et al. JOURNAL OF POWER SOURCES Volume: 263 Pages: 29-36 Published: OCT 1 2014 - IF 5.211 – FCD

Intense optical second harmonic generation from centrosymmetric nanocrystalline para-nitroaniline, Isakov, DV; Belsley, MS; Gomes, ED; Goncalves, H; Schellenberg, P; Almeida, BG, APPLIED PHYSICS LETTERS 104 (18) (2014) 181903 DOI: 10.1063/1.4875908 - IF: 3,515 - FCD FAMO

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Li-ion battery separator membranes based on barium titanate and poly(vinylidene fluoride-co-trifluoroethylene): Filler size and concentration effects. Nunes-Pereira, J.; Costa, C. M.; Sousa, R. E.; et al. ELECTROCHIMICA ACTA Volume: 117 Pages: 276-284 Published: JAN 20 2014 - IF 4.086 – FCD

Magnetic phase diagram of multiferroic Eu_{1-x}L_xMnO₃ investigated by infrared spectroscopy, J.L. Ribeiro, L.G. Vieira, O. Santo, P.B. Tavares, Vibrational Spectroscopy, 70, 18-27 (2014), - IF 1,547 – FCD



Magnetoliposomes based on nickel/ silica core/shell nanoparticles: synthesis and characterization, Ana Rita O. Rodrigues, I. T. Gomes, Bernardo G. Almeida, J. P. Araújo, Elisabete M. S. Castanheira, Paulo J. G. Coutinho, Materials Chemistry and Physics 148 (2014) 978-987; <http://dx.doi.org/10.1016/j.matchemphys.2014.09.008>; <http://hdl.handle.net/1822/30739>. - IF: 2,129 - FAMO FCD

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NUMERICAL PREDICTION OF ACOUSTIC STREAMING IN A MICROCUVETTE. Catarino, Susana O.; Miranda, Joao M.; Lanceros-Mendez, Senentbu; et al. CANADIAN JOURNAL OF CHEMICAL ENGINEERING Volume: 92 Issue: 11 Pages: 1988-1998 Published: NOV 2014 - IF 1.313 – FCD

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PHB-PEO electrospun fiber membranes containing chlorhexidine for drug delivery applications. Fernandes, J. G.; Correia, D. M.; Botelho, G.; et al. POLYMER TESTING Volume: 34 Pages: 64-71 Published: APR 2014, - IF 1.816 – FCD

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Piezoelectric Coaxial Filaments Produced by Coextrusion of Poly(vinylidene fluoride) and Electrically Conductive Inner and Outer Layers. Martins, Rui S.; Goncalves, Renato; Azevedo, Tiago; et al. JOURNAL OF APPLIED POLYMER SCIENCE Volume: 131 Issue: 17 Article Number: 40710 Published: SEP 5 2014 - IF 1.64 – FCD

Poly(vinylidene fluoride)-based, co-polymer separator electrolyte membranes for lithium-ion battery systems. Costa, C. M.; Gomez Ribelles, J. L.; Lanceros-Mendez, S.; et al. JOURNAL OF POWER SOURCES Volume: 245 Pages: 779-786 Published: JAN 1 2014 - IF 5.211 – FCD

Polymer-based acoustic streaming for improving mixing and reaction times in microfluidic applications. Cardoso, V. F.; Knoll, T.; Velten, T.; et al. RSC ADVANCES Volume: 4 Issue: 9 Pages: 4292-4300 Published: 2014 - IF 3.708 - GRF FCD

Predicting the mechanical behavior of amorphous polymeric materials under strain through multi-scale simulation. Carvalho Araujo, M.; Martins, J. P.; Mirkhalaf, S. M.; et al. APPLIED SURFACE SCIENCE Volume: 306 Pages: 37-46 Published: JUL 1 2014 - IF 2.538 – FCD



Processing and characterization of alpha-elastin electrospun membranes. Araujo, J.; Padrao, J.; Silva, J. P.; et al. APPLIED PHYSICS A-MATERIALS SCIENCE & PROCESSING Volume: 115 Issue: 4 Pages: 1291-1298 Published: JUN 2014 IF 1.694 – FCD

Properties of electrospun TiO₂ nanofibers", B. Caratão, E. Carneiro, P. Sá, B. Almeida, S. Carvalho, Journal of Nanotechnology, 2014 (2014) 472132 (5 pp) - IF:3,672 GRF FCD

Sharing of classical and quantum correlations via XY interaction. Wang, Jieci; Silva, Jaime; Lanceros-Mendez, Senentxu ANNALS OF PHYSICS Volume: 348 Pages: 23-31 Published: SEP 2014 - IF 3.065 – FCD

Structural and dielectric properties of laser ablated BaTiO₃ films deposited over electrophoretically dispersed CoFe₂O₄ grains", J. G. Barbosa, I.T. Gomes, M.R. Pereira, C.Moura, J.A. Mendes, B.G. Almeida, J. Appl. Phys., 116, 164112 (2014) - IF 2.185 - GRF FAMO FCD

Synthesis and characterization of novel piezoelectric nitrile copolyimide films for high temperature sensor applications. Maceiras, A.; Martins, P.; Sebastian, M. San; et al. SMART MATERIALS AND STRUCTURES Volume: 23 Issue: 10 Article Number: 105015 Published: OCT 2014 , IF 2.449, FCD

Synthesis of iron-doped TiO₂ nanoparticles by ball-milling process: the influence of process parameters on the structural, optical, magnetic, and photocatalytic properties. Carneiro, J. O.; Azevedo, S.; Fernandes, F.; et al. JOURNAL OF MATERIALS SCIENCE Volume: 49 Issue: 21 Pages: 7476-7488 Published: NOV 2014 - IF 2.305 - GRF FMNC FCD

Thermo-sensitive chitosan-cellulose derivative hydrogels: swelling behaviour and morphologic studies. Barros, Sandra Cerqueira; da Silva, Ana Alves; Costa, Diana Barbosa; et al. CELLULOSE Volume: 21 Issue: 6 Pages: 4531-4544 Published: DEC 2014 - IF 3.033 – FCD

Ti_{1-x}Ag_x electrodes deposited on polymer based sensors, Marques, S.M., Manninen, N.K., Ferdov, S., Lanceros-Mendez, S., Carvalho, S. Applied Surface Science, 317 (2014) 490-495. - IF: 2.538 - GRF FCD

Unravelling the effect of SrTiO₃ antiferrodistortive phase transition on the magnetic properties of La_{0.7}Sr_{0.3}MnO₃ thin films", D. Mota, Y. Barclay, A. Senos, C. Fernandes, P. Tavares, I. Gomes, P. Sá, L. Fernandes, B. Almeida, F. Figueiras, S. Vaghefi, V. Amaral, A. Almeida, J. Perez de la Cruz, J. Agostinho Moreira, J. Phys. D Appl. Phys., 47, 435002 (2014), IF 2.521, FCD

6.2.3.2. Conferences Proceedings published in ISI Journals

A versatile Fluorescence Lifetime Imaging System for scanning large areas with high time and spatial resolution, Bernardo, C; Belsley, M; Gomes, EDM; Goncalves, H ; Isakov, D; Liebold, F; Pereira, E; Pires, V; Samantilleke, A; Vasilevskiy, M; Schellenberg, P, SECOND INTERNATIONAL CONFERENCE ON APPLICATIONS OF OPTICS AND PHOTONICS, Proceedings of SPIE 9286 (2014) 928637 DOI:10.1117/12.2063940 FAMO/GCEP/FCD All-Inkjet-Printed Bottom-Gate Thin-Film Transistors Using UV Curable Dielectric for Well-Defined Source-Drain Electrodes Castro, H. F.; Sowade, E.; Rocha, J. G.; et al. JOURNAL OF ELECTRONIC MATERIALS Volume: 43 Issue: 7 Pages: 2631-2636 Published: JUL 2014 , - IF 1.675, - GCEP,FCD

6.2.3.3. National Patents

National invention N° 106298 "Nanofibras poliméricas com nano-cristais de para-nitroanilina geradores de segunda harmónica ótica e respetivo processo de obtenção". At 07 de July 2014. Dmitry Isakov, E. de Matos Gomes, Bernardo Almeida, Michael Belsley., FAMO, FCD



6.2.3.4. Master Theses completed in 2014

Author: Diogo Manuel Freitas de Sousa

Supervisor: Gerardo Rocha, Senentxu Lanceros-Mendez, Pedro Martins

Title: Avaliação de compósitos magnetoelétricos para aplicações em Energy Harvesting e atuadores

Terminated at December 2014 at the Engineering School

Author: João Matos

Supervisor: José Rocha, Senentxu Lanceros-Mendez, Vítor Correia

Title: Desenvolvimento de biorreator eletromecânico para estímulo celular

Terminated December 2014 at the Engineering School

Author: Jorge Fernandes

Supervisor: José Rocha, Senentxu Lanceros-Mendez, Vítor Correia

Title: Dimensionamento e Configuração Magnética para a Levitação de uma Janela Deslizante

Terminated at December at the Engineering School

Author: Maria de Fátima Ribeiro Carvalho

Supervisor: José Rocha, Senentxu Lanceros-Méndez, Pedro Filipe Costa

Title: Desenvolvimento de matrizes de sensores piezoresistivos para aplicações avançadas

Terminated at December 2014 at the Engineering School

Author: Nelson Pereira

Supervisor: José Rocha, Senentxu Lanceros-Mendez, Vítor Correia

Title: Sistema de Levitação Magnética e Controlo, Aplicado a Janelas Deslizantes

Terminated at December 2014 at the Engineering School

Author: Wilson Alberto Fernandes Sampaio de Vasconcelos

Supervisor: José Gerardo Vieira da Rocha, Senentxu Lanceros-Méndez, Pedro Filipe Ribeiro da Costa

Title: Desenvolvimento de um sistema de geração de energia baseado em dielétricos elastoméricos

Terminated at December 2014 at the Engineering School

6.2.3.5. Ph.D. Theses completed in 2014

Author: Carlos M. Silva Costa

Supervisor: Senen L. Mendez, Vítor Sencadas, José Gerardo Rocha (DEI)

Title: Electroactive polymer based porous membranes for energy storage applications

Terminated in September 2014 at ECUM

Author: Joana M. Guimaraes Oliveira

Supervisor: Senen L. Mendez, M.Luis Neves, Júlio Santos (ESSE-Inst.Pol.Viana Castelo)

Title: Ensino das Ciências e Desenvolvimento: um estudo de caso na Guiné-Bissau

Terminated in September 2014 at ECUM

Author: Juan Alberto Panadero Pérez

Supervisor: Senen L. Mendez, José Luis Gomez Ribelles (Univ. Valênci – Espanha)

Title: Active biomaterials for cell culture under mechanical stimulus applied to cartilage tissue engineering

Terminated at December 2014 at ECUM

Author: Helder Castro

Supervisor: Gerardo Rocha, Senentxu Lanceros-Mendez

Title: Development of passive and chipless RFID tags for use in home-textile products

Terminated in July at the Engineering School



6.2.3.6. Ph.D Theses in progress in 2014

Author: Attila Gören

Supervisor: Manuela Silva (DQ), Senen L. Mendez

Title: Development of new organic electrodes for Lithium-ion rechargeable batteries

Develloping since September 2013 at ECUM

Author: Ricardo Jorge E. M. Gonçalves Sousa

Supervisor: Senen L. Mendez, Maria Manuela Silva (DQ)

Title: Polymer based batteries fabricated by printing technologies

Develloping since 2012 at ECUM

Author: Cláudia Sofia Lehman Fernández

Supervisor: Senen L. Mendez, Luís Rebouta

Title: Development of magnetoelectric polymer based laminated composites

Develloping since 2010, PhD Erasmus-Mundus Vecceu, Chile

Author: Daniela Maria Silva Correia

Supervisor: Gabriela Botelho (DQ), Senentxu Lanceros-Mendez, José Luis Gomez Ribelles

Title: Scaffolds tridimensionais baseados em nanofibras eletroativas biodegradáveis para aplicação em engenharia de tecidos

Develloping since 2014 at Engineering School

Author: Juliana Oliveira

Supervisor: Gerardo Rocha (DEI), Senentxu Lanceros-Mendez,

Title: Radiation detectors based in inkjet printing technologies

Develloping since 2014 at Engineering School

Author: Marco Aurélio Pinto da Silva

Supervisor: Senentxu Lanceros-Mendez, Gerardo Rocha (DEI)

Title: Application of Magnetoelectric Nanocomposites Based on Electroactive Polymers in Energy Harvesting Microsystems, Sensors and Actuators

Develloping since 2014 at Engineering School

Author: Paulo Jorge Teixeira de Sousa

Supervisor: Graça Minas (DEB), Senentxu Lanceros-Mendez

Title: Sensores piezorresistivos miniaturizados para aplicações biomédicas

Develloping since 2014 at Engineering School

Author: Renato Gonçalves

Supervisor: Gabriela Botelho (DQ), Senentxu Lanceros-Mendez

Title: High performance low dimensionality magnetoelectric nanocomposites for advanced applications

Develloping since 2014 at Engineering School

Author: Sílvia Clara Mesquita da Silva Reis

Supervisor: Gerardo Rocha (DEI), Senen Lanceros-Mendez

Title: Desenvolvimento e Caracterização de Sensores Magnetoelétricos Baseados em Polímeros Eletroativos

Develloping since 2014 at Engineering School

Author: Susana Oliveira Catarino

Supervisor: Senen L. Mendez

Title: Modelação, simulação e implementação do fenómeno de “acoustic streaming” produzido por polímeros piezoelectrónicos para microbombreamento e microagitação em micro dispositivos para análises de fluidos



Develloping since 2014 at Engineering School

Author: Vânia Cristina Gonçalves Pinto

Supervisor: Graça Minas (DEB), Senentxu Lanceros-Mendez

Title: Desenvolvimento de dispositivo microfluidico para deteção de cortisol salivar

Develloping since 2014 at Engineering School

6.2.3.7. Master Theses in progress in 2014

Author: João Oliveira

Supervisor: Bernardo Almeida

Title: Modelização de espectros de raios-X em filmes finos

Develloping since October 2014 at ECUM

Author: João Rodolfo Alves

Supervisor: Bernardo Almeida

Title: Filmes compósitos para junções de efeito túnel

Develloping since October 2014 at ECUM

Author: Luísa F. M. Lima

Supervisor: Etelvina Gomes, Teresa Viseu

Title: Nanofibras biológicas funcionais

Develloping since October 2014 at the Engineering School

Author: Vitor H. M. Fernandes

Supervisor: Bernardo Almeida, Etelvina Gomes

Title: Nanofibras de metais por electrospinning

Develloping since October 2014 at the Engineering School

6.2.4. Other scientific activities

6.2.4.1. Invited Lectures/seminars delivered by members of the group in national or international conferences

Electroactive polymers and polymer composites: insights, applications and challenges" Institute for Materials Science and Nanotechnology, Technische Universität Dresden, S. Lanceros-Méndez Germany. Prof. Cuniberti 26/1

Electroactive polymers for sensor and actuator applications, S. Lanceros-Mendez, Workshop "Materials For a Better Live" in the Bask Country University) 12/6

Fundamentals and Applications of Electroactive Materials Seminar at BCMaterials, S. Lanceros-Méndez Bizkaia, Spain, " ". 12/2

Multiferroic materials for sensor applications", B.G. Almeida, Oral communication presented at Jornadas do CFUM, 19 September, Braga (2014),

Phase morphology and crystallinity in poly(vinylidene fluoride)/ poly(ethylene oxide) piezoelectric blends for Tissue Engineering M.N. Tamaño Machiavello, C. M. Costa, J. Molina-Mateo, C. Torregrosa-Cabanilles, J.M Meseguer Dueñas, S. N. Kalkura, S. Lanceros-Méndez, J. L. Gómez Ribelles, 4th International Conference on Materials and Applications for Sensors and Transducers (Bilbao, Spain – June 2014)



Piezoelectric polymers and polymer composites based for sensor and actuator applications, S.Lanceros-Mendez, 4th International Conference on Materials and Applications for Sensors and Transducers (Bilbao, Spain – June 2014)

Polymer Based Smart Materials" S. Lanceros-Mendez in the scope of the Master on New Materials at the University of the Basque Country, Leioa, Spain. 9/4

Smart and Functional Polymer Based Materials and Devices, S. Lanceros-Mendez, Indian Institute of Technology, Johdpur, 28-04-2014

Superspace symmetry and phenomenology of incommensurate type-II multiferroics, Invited talk at the Congress and General Assembly of the International Union of Crystallography, IUCr-2014, Montréal

6.2.5. Other information

6.2.5.1. Other conference presentations given by members of the group in national or international conferences

International

Oral

Actuators Based in Ionic Electroactive Polymers, International Conference of Physics Students, Bruno Magalhães, Juliana Dias, Catarina Lopes, Marcos Martins, Gabriela Botelho, Senentxu Lanceros-Mendez, Heidelberg, Alemania, 10/08 – 17/08 de 2014, FCD

Appeteccchi, Influence of the degree of porosity of poly(vinylidene fluoride-co-hexafluoropropylene) separator membranes in the performance of Li-ion batteries, R. E. Sousa, J. Nunes-Pereira, C. M. Costa, M. M. Silva, S. Lanceros-Méndez, J. Hassoun, B. Scrosati, G. B. XIX Meeting of the Portuguese Electrochemical Society and XVI Iberic Meeting of Electrochemistry, Aveiro, Portugal, 1 July of 2014, FCD

Atuadores baseados em Polímeros Eletroativos Iónicos". B. Magalhães, J. Dias, M. Martins, A. C. Lopes, G. Botelho, S. Lanceros-Mendez, ENEF 2014, realizada na Universidade de Aveiro, Portugal, a 16 de Fevereiro de 2014. , FCD

Bacterial cellulose as a support for the growth of retinal pigment epithelium", Sara Gonçalves, Jorge Padrão, João P. Silva, I. P. Rodrigues, H. Girão, H., Fernando Dourado, Ligia Rodrigues, 26th European Conference on Biomaterials, Liverpool, United Kingdom, 31 – 3 Setembro, 2014, FCD

Edible lactoferrin bacterial cellulose films as an effective and low-cost antimicrobial active packaging", Jorge Padrão, Sara Gonçalves, João P. Silva, Vitor Sencadas, Senentxu Lanceros-Méndez, A. C. Pinheiro, António A. Vicente, Ligia R. Rodrigues, Fernando Dourado,XVIII Congress of the Portuguese Biochemical Society, Coimbra, Portugal, 17 – 20 Dezembro, 2014. , FCD

Gd203:Eu3+/PPO/POPOP/polystyrene composites for indirect X-ray detection: from thin films to printed inks, J. Oliveira, P.M. Martins, Pedro M. Martins, P. Martins, V. Correia, J.G. Rocha, S. Lanceros-Méndez, 4th International Conference on Materials and Applications for Sensors and Transducers(IC-MAST), Bilbao, Espanha, 8-11 de Junho, de 2014, FCD

High performance electromechanical actuators based on poly (vinylidene fluoride)/ionic liquid blends" J. Dias, B. Magalhães, M. Martins, C. M. Costa, A. C. Lopes, J.M.S.S. Esperança, G. Botelho, M. M. Silva, S. Lanceros-Méndez 5th International Conference on Advanced Nanomaterials, Aveiro, 2-4 July 2014, comunicação oral, FCD



"Highly stretchable styrene-ethylene-butadiene-styrene/carbon nanotube electrospun composite membranes". V. Sencadas, S. Ribeiro, P. Costa and S. Lanceros-Mendez. European Materials Research Society, Varsóvia-Polónia, 15-18 Setembro 2014. , FCD

Nano and sub-micron PLLA surface roughness effect on osteoblast and fibroblast cell response. C. Ribeiro, V. Sencadas, A. C. Areias, F. M. Gama, S. Lanceros-Méndez. IPFB2014 - 8th International conference on polymer and fiber biotechnology, Braga, 25-27 May 2014. Oral presentation. , FCD

Piezoelectric electrospun membranes as substrates for cell culture, Cláisse Ribeiro, Vitor Sencadas, Senentxu Lanceros-Méndez, José Luis Gómez Ribelles, COST Action MP1206, Electrospun Nano-fibres for bio inspired composite materials and innovative industrial applications Antalya meeting March 4th -5th, 2014, FCD

Porous composite membranes based on poly(vinylidene-trifluoroethylene) for Li-ion battery applications, J. Nunes-Pereira, C. M. Costa, M. M. Silva, S. Lanceros-Méndez, XIX Meeting of the Portuguese Electrochemical Society and XVI Iberic Meeting of Electrochemistry, Aveiro, Portugal, 1 July of 2014, FCD

Styrene-ethylene-butadiene-styrene/ carbon nanotube electrospun composite membranes for skeletal muscle tissue engineering". S. Ribeiro, C. Ribeiro, A. C. Gomes, P. Costa, V. Sencadas and S. Lanceros-Mendez. 5th International conference on Advanced Nanomaterials, Aveiro-Portugal, 2-4 Julho 2014. , FCD

Tailoring poly(vinylidene fluoride) microstructure and dimensionality for tissue engineering applications" D. Correia, R. Gonçalves, C. Ribeiro, V. Sencadas, G. Botelho, J. L. Gomez Ribelles, S. Lanceros-Méndez 8th International Conference on Polymers Fibers and Biotechnology, 25 a 27 de Maio de 2014, comunicação oral, FCD

Tailoring PVDF-based polymers for lithium ion battery separator membranes, C. M. Costa and S. Lanceros-Méndez, XIX Meeting of the Portuguese Electrochemical Society and XVI Iberic Meeting of Electrochemistry, Aveiro, Portugal, 1 July of 2014, FCD

Tailoring SBS-based materials for sensor, actuator and biomedical applications, P. Costa, A. Ferreira, V. Sencadas, S. Ribeiro, C. Ribeiro, V. Correia, G. Botelho, J. Viana, S. Lanceros-Mendez, EuroEAP 2014 International conference on Electromechanically Active Polymer (EAP) transducers & artificial muscles, Linköping, Suécia, 10-11 Julho 2014. , FCD

Tailoring smart material properties for printing technologies, Martins, P. and Lanceros-Mendez, S, 4th International Conference on Materials and Applications for Sensors and Transducers, Bilbao, Spain, Data 8-11 June, 2014, FCD

Towards "green" smart materials for force and strain sensors: The case of polyaniline" E. Falletta, S. Lanceros-Méndez, C. Della Pina, G. Busca, E. Zappa, P. Costa 4th, FCD

Magnetic liposomes based on nickel ferrite and manganese ferrite nanoparticles for biomedical applications, Ana Rita O. Rodrigues, José M.F. Ramos, B.G. Almeida, I.T. Gomes, J.P. Araújo, E.M.S. Castanheira, P.J.G. Coutinho, SIS-2014 - 20th International Symposium on Surfactants in Solution, Coimbra (Portugal), 22-27 June, 2014; <http://hdl.handle.net/1822/30445>. FAMO/FCD

Structural properties of PCMO thin films deposited on Lithium Niobate. I. T. Gomes, J. Rodolfo Alves, A. G. Rolo, C. T. Sousa, J. P. Araújo, B. G. Almeida. 13th European Vacuum Conference & 7th European Topical Conference on Hard Coatings, Aveiro, Portugal, 8 - 12 September 2014. (GCEP, FCD)



Nanomaterials modified membranes for environmental applications. P. M. Martins, J. Nunes-Pereira, V. Cardoso, G. Botelho, S. Ferdov and S. Lanceros-Méndez. Nanotechnology Applied to Environmental Geotechnics, Braga, Portugal, 2014. , GRF,FCD

Ti_{1-x}Ag_x and TiN-Ag Electrodes Deposited on polymer Based Sensors for Biomedical Applications", S. M. Marques, N. K. Manninen, S. Lanceros-Mendez, A. Cavaleiro, S. Carvalho Xtreme Coat 2014, INTA, October 20-21, 2014, Madrid, Spain.. GRF, FCD

International Conference on Materials and Applications for Sensors and Transducers (Bilbao,Spain – June 2014) , FCD

Poster

Electrical properties of core-shell polypyrrole/poly(vinylidene fluoride) electrospun fibers" Juliana Dias, Daniela Correia, Gabriela Botelho, Senentxu Lanceros-Méndez, Vitor Sencadas 5th International Conference on Advanced Nanomaterials, Aveiro, 2-4 July 2014, FCD

Development of nickel-based magnetoliposomes, Ana Rita O. Rodrigues, B.G. Almeida, I.T. Gomes, J.P. Araújo, E.M.S. Castanheira, P.J.G. Coutinho, NanoPT2014 – International Conference in Nanoscience and Nanotechnology, Porto (Portugal), 12-14 February 2014; <http://hdl.handle.net/1822/28315>. FAMO/FCD (Poster)

Antibacterial performance of bovine lactoferrin-fish gelatin electrospun nanocomposites, Jorge Padrão, Raul Machado, Margarida Casal, Ligia Rodrigues, Fernando Dourado, Senentxu Lanceros-Mendez, Vitor Sencadas, ICAR, Madrid, 1-3 Outubro 2014. , FCD

Cuniberti, Gianaurelio, "Photocatalytical degradation of antibiotics present in water", S. Teixeira, K. Kuehn, P.M. Martins, A.C. Lopes, M. Botelho, S. Lanceros-Mendez, NanoPortugal 2014 - Nanoscience and Nanotechnology International Conference, Porto, Portugal, 2014, FCD

Desenvolvimento de tintas para impressão de sensores" Bruna Gonçalves, Gabriela Botelho, Senentxu Lanceros Mendez III Encontro de técnicas de caracterização e Análise Química, Universidade do Minho, 6 de Junho de 2014, FCD

Development of high performance PANI-based piezoresistive films for sensor applications", E. Falletta, S. Lanceros-Mendez. P. Costa, C. Della Pina ICSM 2014 (Turku, Finland, July 2014)

Edible lactoferrin bacterial cellulose films as an effective and low-cost antimicrobial active packaging", Jorge Padrão, Sara Gonçalves, João P. Silva, Vitor Sencadas, Senentxu Lanceros-Méndez,A. C. Pinheiro, António A. Vicente, Ligia Rodrigues, Fernando Dourado, 1st Congress on Food Structure Design – Porto, Portugal, 15 – 17 Outubro, 2014, FCD

Effect of poling state and morphology of piezoelectric poly(vinylidene fluoride) membranes for skeletal muscle tissue engineering". S. Ribeiro, P. M. Martins, C. Ribeiro, V. Sencadas, A. C. Gomes, F. M. Gama and S. Lanceros-Mendez. 8th International conference on Polymer and Fiber Biotechnology, Braga-Portugal, 25-27 Maio 2014. FCD

Fabrication of SELP/Ag nanocomposite materials with antimicrobial properties by electrospinning and solvent casting Andreia Silva, André Costa, R. Chitas, Andreia C. Gomes, J. C. Rodrigues Cabello, Senentxu Lanceros-Mendez, Vitor Sencadas, Margarida Casal, Raul Machado,, ICAR, Madrid, 1-3 Outubro 2014. , FCD



Gd₂O₃:Eu³⁺/polystyrene composites for indirect X-ray detection; J. Oliveira, P.M. Martins, Pedro M. Martins, P. Martins; V. Correia, J.G. Rocha, S. Lanceros-Méndez; ANM 2014, Aveiro, Portugal, 2-4 Julho de 2014. , FCD

"Improving recyclability of photocatalytic TiO₂ by its incorporation into PVDF-TrFE membranes" P.M. Martins, R. Miranda, A. C. Lopes, C.J. Tavares, G. Botelho and S. Lanceros-Mendez 2nd International Conference on Bioinspired and Biobased Chemistry & Materials, Nice, França, 14 a 17 de outubro de 2014, comunicação em painel, FCD

Influence of drying conditions on cathode characteristics and performance for battery applications, A. Gören, C. M. Costa, M. M. Silva and S. Lanceros-Méndez, XIX Meeting of the Portuguese Electrochemical Society and XVI Iberic Meeting of Electrochemistry, Aveiro, Portugal, 1 July of 2014, FCD

Influence of strontium titanate antiferrodistortive phase transition on the magnetic properties of La_{0.7}Sr_{0.3}MnO₃ thin films", D.A. Mota, Y. Romaguera Barcelay, A. M. R. Senos, C. M. Fernandes, P. B. Tavares, I. T. Gomes, P. Sá, L. Fernandes, B. G. Almeida, F. Figueiras, P. Mirzadeh Vaghefi, V. S. Amaral, J. Fontcuberta, A. Almeida, J.A. Moreira, E-MRS 2014 Spring meeting, May 26-30, Lille, France, (2014), FCD

Magnetoelectric CoFe₂O₄/polyvinylidene fluoride electrospun nanofibers" R. Gonçalves, D. M. Correia, P. Martins, X. Moya, M. Ghidini, V. Sencadas, G. Botelho, N. D. Mathur, S. Lanceros Mendez 8th International Conference on Polymers Fibers and Biotechnology, Braga, 25 a 27 de Maio de 2014, FCD

Magnetoelectric electrospun fibers for biomedical applications, R. Gonçalves, D. M. Correia, C. Ribeiro, P. Martins, V. Sencadas, G. Botelho, S. Lanceros Mendez, 8th International Conference on Polymer and Fiber Biotechnology (IPFB), Braga, 24-27 May, 2014. , FCD

Modelling dimensional effects on lithium ion battery performance Daniel Miranda, Carlos M. Costa, António M. Almeida and Senentxu Lanceros-Mendez 19th Meeting of the Portuguese Electrochemical Society / XVI Iberic Meeting of Electrochemistry, Aveiro, Portugal, 30 june-2 july, 2014

Modification of PVDF-TrFE membranes for drug release" G. Botelho, H. Salazar, A. C. Lima, A. C. Lopes, S. Lanceros Mendez 8th International Conference on Polymer Modification, Degradation and Stabilization, Portoroz, Eslovénia, 31 de Agosto a 4 de Setembro de 2014, FCD

Novos Materiais Foto-catalíticos" Hugo Salazar, Gabriela Botelho, Senentxu Lanceros Mendez III Encontro de técnicas de caracterização e Análise Química, Universidade do Minho, 6 de Junho de 2014, , FCD

One step transformation of microorganisms. Mendes, G. P.; Vieira, P.; Hatton T. A.; Lanceros-Méndez S.; Kluskens L. D.; Mota, M. 4th MIT-Portugal Conference - Coimbra, Portugal June 27th 2014, FCD

Osteogenic differentiation of human adipose stem cells by dynamic piezoelectric stimulation. C. Ribeiro, J. Pärssinen, V. Sencadas, V. P. Hytönen, S. Lanceros-Méndez.2nd International conference on bioinspired and biobased chemistry & materials. Nice, 15-17 October 2014. Poster presentation. , FCD

Processing and characterization of Gd₂O₃:Eu³⁺/PPO/POPOP/PVDF composites, J. Oliveira, P.M. Martins, Pedro M. Martins, P. Martins; V. Correia, J.G. Rocha, S. Lanceros-Méndez; 2nd International Conference on Bioinspired and Biobased Chemistry & Materials, Nice, France, 15-17 de Outubro de 2014. , FCD

Processing of piezoelectric poly(vinylidene fluoride) electrosprayed microspheres for tissue engineering applications, D. M. Correia, R. Gonçalves, C. Ribeiro, V. Sencadas, G. Botelho, J. L. Gomez Ribelles , S. Lanceros-



Méndez, 2nd International Conference on Bioinspired and Biobased Chemistry & Materials, Nice, France, 15-17 October, 2014. , FCD

Styrene-ethylene-butadiene-styrene/carbon nanotube electrospun composite membranes for skeletal muscle tissue engineering. S. Ribeiro, C. Ribeiro, A. C. Gomes, P. Costa, V. Sencadas, S. Lanceros-Mendez. 5th International conference on advanced nanomaterials (ANM 2014), Aveiro, 2-4 July 2014. Poster presentation. , FCD

Tailoring SBS-based materials for sensor, actuator and biomedical applications, P. Costa, A. Ferreira, V. Sencadas, S. Ribeiro, C. Ribeiro, V. Correia, G. Botelho, J. Viana, S. Lanceros-Mendez, EuroEAP 2014 International conference on Electromechanically Active Polymer (EAP) transducers & artificial muscles, Linköping, Suécia, 10-11 Julho 2014. , FCD

Modelling of separator dimensional effects on lithium ion battery performance, D. Miranda, C. M. Costa, A. M. Almeida, S. Lanceros-Méndez, XIX Meeting of the Portuguese Electrochemical Society and XVI Iberic Meeting of Electrochemistry, Aveiro, Portugal, 1 July of 2014. , FCD

Ferroelectric properties of Barium Titanate nanofibers. Pedro Sá, José Barbosa, Igor Bdikin, Bernardo Almeida, Anabela G. Rolo, Andrei Kholkin, Dmitry Isakov. 13th European Vacuum Conference & 7th European Topical Conference on Hard Coatings, Aveiro, Portugal, 8 - 12 September 2014. (GCEP, FCD)

Ferroelectric properties of Barium Titanate nanofibers", Pedro Sá, J. Barbosa, I. Bdikin, B. Almeida, A.G. Rolo, A. Kholkin, D. Isakov, E-MRS 2014 Spring meeting, May 26-30, Lille, France, (2014), GCEP,FCD

Production of a touch sensor based on anodic aluminum oxide (AAO) structures". J.O. Carneiro, F. Machado, C. Silva, D. Silva, A. Samantilleke, S. Lanceros-Mendez, V. Teixeira. 13th European Vacuum Conference, 8-12 September 2014, Aveiro, Portugal.

Improving photocatalytic performance and recyclability by the development of Er- doped and Er/Pr-codoped TiO₂ PVDF-TrFE composite membranes, P.M. Martins¹, V. Gomez², A. C. Lopes¹, C.Tavares¹, G.Botelho³, S. Irusta² and S. Lanceros-Mendez¹, 4th International Conference on Materials and Applications for Sensors and Transducers, Bilbao-Spain, 2014, GRF,FCD

Improving photocatalytic performance and recyclability by the development of Er- doped and Er/Pr-codoped TiO₂ PVDF-TrFE composite membranes" P.M. Martins, V. Gomez, A. C. Lopes, C.Tavares, G.Botelho, S. Irusta and S. Lanceros-Mendez 5th International Conference on Advanced Nanomaterials, Aveiro, 2-4 July 2014, GRF, FCD

National Oral

Magnetic liposomes based on nickel ferrite and manganese ferrite nanoparticles for biomedical applications, Ana Rita O. Rodrigues, José M.F. Ramos, B.G. Almeida, I.T. Gomes, J.P. Araújo, E.M.S. Castanheira, P.J.G. Coutinho, Jornadas do Centro de Física da UM, 19 set. 2014. FAMO/FCD

XV ENEC Algarve Guião de atividades do Kit "Energia, Ambiente e Sustentabilidade" uma estratégia de inovação didática na Guiné-Bissau, 5, março 2014, FCD

6.2.6. Funded Projects Ongoing



Title: Micro e nanoestruturas com efeito magnetoestrítivo gigante: produção, optimização em dispositivos multifuncionais (Strictive4Device)

Reference: PTDC/CTM-NAN/115125/2009

Project Coordenator: Bernardo Almeida

Funding awarded: 29.662.00 Euros

Start Date: March 2011

Duration: 1 year

Title: Nano estruturas de baixa dimensão para aplicações em óptica não-linear

Reference: PTDC/CTM-NAN/114269/2009

Project Coordenator: Dmitry Vladimirovich Isakov

Funding awarded: 78.461.00 Euros

Start Date: January 2011

Duration: 3 years

Title: Simple

Reference: 23122

Project Coordenator: Senen Lanceros Mendez

Funding Awarded: 306353.13 Euros

Start date: January 2013

Duration: 2,5 years

Title: Vicer

Reference: Vicer

Project Coordenator: Senen Lanceros Mendez

Funding Awarded: 37752.00 Euros

Start date: January 2013

Duration: 2 years

6.2.7. Future Research

The FCD group will be focused on the production and study of new dielectric materials (functionalized nanofibers, thin films, polymers, ceramics), with enhanced polar order.

The production of low dimensional functionalized nanostructures (nanofibers, films, nanocomposites), will be explored and their cooperative behavior (ferroelectric, non-linear optical, multiferroic, electromechanical) will be characterized.

The phase transitions and relaxational phenomena in multiferroic ceramics and films will be studied and modeled.

The investigation of phase transitions, lattice dynamics and relaxational phenomena in novel H-bonded compounds and nanostructures will be performed.

The synthesis of high strain polymers and polymer composites, based on PVDF, and the relationship between their structure, morphology and electromechanical properties of will be characterized.



6.3. Group of Computational and Theoretical Physics (GFCT)

6.3.1. Summary description of the scientific work carried out by the group in 2014

Characterization of Magnetron sputtering plasma .

Development of a model to investigate the mechanical properties of polymer/carbon nanotubes composites.

Development of a multiscale model to investigate the functioning of organic solar cells.

6.3.2. Updated composition of the group

Research Group Title	Computational and Theoretical Physics Group
Principal investigator	Marta Maia Duarte Ramos
Research area	Computational and theoretical study of organic, inorganic and biological material properties and processes at different length scales to improve the performance of existing materials and to help the design of new materials for technological applications
Group Members	<p><u>Effective members:</u></p> <p>-Marta Maria Duarte Ramos – Associate Professor with Habilitation -Luis Silvino Alves Marques – Assistant Professor</p> <p><u>PhD and Research students:</u></p> <p>-Sergey Pyrlin - PhD student with Marie Curie grant</p>

6.3.3. Scientific Production

6.3.3.1. Regular articles published in ISI Journals

Influence of waviness and curliness of fibres on mechanical properties of composites. AY Matveeva, SV Pyrlin, MMD Ramos, HJ Böhm, FWJ Van Hattum, Computational Materials Science. 2014;87:1-11. - IF: 1,879 – FCT

Process monitoring during AlN_xO_y deposition by reactive magnetron sputtering and correlation with the film's properties", Joel Borges, Nicolas Martin, Filipe Vaz and Luis Marques, J. Vac. Sci. Technol. A 32 (2014) 021307. - IF:2.140 - GRF GFCT



Understand the importance of molecular organization at polymer-polymer interfaces in excitonic solar cells, Helena M. G. Correia; Helder M. C. Barbosa; Luis Marques; Marta MD Ramos, Thin Solid Films 560, 59-64 (2014) - IF: 1,867 - FCT

6.3.3.2. Ph.D. theses in progress in 2014

Author: Sergey Vladimirovich Pyrlin

Supervisor: Marta Ramos

Title: Modeling the physical properties of nanostructures and composites

Develloping since 2011 at ECUM

Author: Vitor Vasco Lourenço Vasconcelos

Supervisor: Jorge Pacheco (DMAT), Marta Ramos, Francisco C. Santos (DEI-IST)

Title: Processos de sinalização na emergência e auto-organização da cooperação

Develloping since 2012 at ECUM

6.4 Funded Projects Ongoing

Title: TheLink – European Training Network to Acelerate the Developmentchain of Nanostructured Polymers

Referencea: H2020-MSCA-ITN-2014

Coordinator: Marta Ramos

6.5 Future Research

- Multiscale materials modeling
- Modelling plasma and electronic devices
- Computational Biology



6.6 Group of Physics of Nano Crystalline Materials (FMNC)

6.6.1 Summary description of the scientific work carried out by the group in 2014

BST films were grown by pulse laser ablation on bare glass and platinized substrates and the crystalline phase was obtained with the help of laser-assisted annealing (LAA) at room temperature, in air environment. By adjusting LAA conditions we were able to grow crack-free BST thin films with pure perovskite phase on bare glass and platinized substrates and the crystalline layer was found to be the same irrespective of the substrate used, c.a. 250 nm thick. The electric characteristics of the amorphous and LAA crystalline BST films deposited on platinized substrate have been studied and analyzed. While in amorphous films, the oxygen defects are responsible for conduction, in LAA films the amorphous/crystalline interface layer plays an important role in current leakage.

Silver nanoparticle (AgNP) thin films were deposited by pulsed laser deposition onto glass substrates, at different fixed temperatures, under inert gas ambience and vacuum. Their morphology, surface plasmon resonance (SPR) and surface-enhanced Raman scattering (SERS) activities were investigated. AFM analysis of the films showed the formation of densely packed nanoparticles of varying size and shape by changing the ambience and deposition temperature (T-s). A SPR peak is not evidently observed in the spectrum of films deposited at room temperature, in either high vacuum or neon ambience. The SPR frequency blue shifts from 569 to 470 nm and from 581 to 574 nm with increasing T-s for the films processed in high vacuum and in neon ambience, respectively, while the absorption band becomes narrower with increasing T-s. The SERS intensity of Rhodamine B (RhB) adsorbed on a AgNP substrate grown at 600 degrees C in neon ambience exhibits a higher intensity compared with that of RhB adsorbed on the SERS active substrates at other values of T-s. Good correlation has been observed between the SPR and SERS activities and the morphology of the NPs.

The aim of this study is to identify and characterize the major factors that influence the characteristics of the electrolyte solutions/separators and electrodes (anode and cathode) for rechargeable magnesium and sodium batteries. Use models of mass and ionic diffusion, optimized parameters of electrodes based on lithium, magnesium and sodium in order to evaluate the best performance with the separator optimized corresponding to each electrode. Compare the theoretical results obtained for the optimization of electrodes and separators with experimental results. After optimization of the models for the separator and electrodes, the battery model will be implemented. After this implementation, the influence of temperature, pressure and geometry in its performance will be studied.

6.6.2 Updated composition of the group

Research Group Title	Physics of Nanocrystalline Materials
Principal investigator	Mário A. C. Castro Pereira
Research area	Nanomaterials Physics and Nanotechnology
Group Members	<u>Effective members:</u> -M. Jesus M. Gomes – Full Professor



-António Mário Almeida – Assistant Professor
-Mário A. C. Castro Pereira – Assistant Professor

Post-doctorate researchers and Research Fellows with Ph. D :

-Koppole Sekhar – Pos-Doc (FCT)
-Kamakshi Koppole – Pós Doc (FCT)
-Fabricio Faita, Pos- Doc (FCT)
-José Pedro Basto da Silva, Pos-Doc (FCT)

Ph. D and other Research Students:

-Ouiame Karzazi – PhD student

6.6.3 Scientific Production

6.6.3.1 Regular articles Published in ISI Journals

Ba_{0.8}Sr_{0.2}TiO₃ films crystallized on glass and platinized substrates by laser-assisted annealing at room temperature, J. P. B. Silva; A. Khodorov, A. Almeida, J. Agostinho Moreira, M. Pereira, M.J.M. Gomes. APPLIED PHYSICS A-MATERIALS SCIENCE & PROCESSING 116 n°3 (2014) 1271-1280 . - IF: 1,694 – FMNC

Effect of annealing temperature on photoluminescence and resistive switching characteristics of ZnO/Al₂O₃ multilayer nanostructures" K. C. Sekhar, K. Kamakshi, Sigrid Bernstorff, Maria J.M. Gomes. JOURNAL OF ALLOYS AND COMPOUNDS 619, 248 (2014). DOI: 10.1016/j.jallcom.2014.09.067 .URL: <http://www.sciencedirect.com/science/article/pii/S0925838814022014#> - IF: 2,726 – FMNC

Effect of bi-layer ratio in ZnO/Al₂O₃ multilayers on microstructure and functional properties of ZnO nanocrystals embedded in Al₂O₃ matrix" K. C. Sekhar, S. Levichev, M. Buljan, S. Bernstroff, K. Kamakshi, A. Chahboun, A. Almeida, J. A. Moreira, M. Pereira. M. J. M. Gomes, Appl. Phys. A 115, 283-289 (2014). IF:1,694 - FMNC

Ferroelectric properties of pulsed laser deposited PZT (92/8) thin films, J.P.B. Silva, S.A.S. Rodrigues, K.C. Sekhar, M. Pereira, M.J.M. Gomes. JOURNAL OF MATERIALS SCIENCE-MATERIALS IN ELECTRONICS. Vol. 24 n°12 (2014) 5097-5101. - IF 1.966 –FMNC

IBA study of SiGe/SiO₂ nanostructured multilayers. Nuno P. Barradas, E. Alves, E.M.F. Vieira, A. Parisini, O. Conde; J. Martin-Sanchez, A.G. Rolo, A. Chahboun, M.J.M. Gomes. Nuclear Instruments and Methods in Physics Research B, 331 (2014) 89-92. - IF: 1.186 - GCEP, FMNC

Influence of Cd²⁺/S²⁻ molar ratio and of different capping environments in the optical properties of CdS nanoparticles incorporated within a hybrid diureasil matrix, Goncalves, L., Silva, C. J. R., Kanodarwala, F. K., Stride, J. A., Pereira, M. R., & Gomes, M. J. M., Applied Surface Science, 314 (2014), 877-887. - IF: 2538 - FMNC FAMO

One-pot Synthesis of CdSe nanoparticles exhibiting quantum size effect within a sol-gel derived ureasilicate matrix, Gonçalves, L. F. F. F., Kanodarwala, F. K., Stride, J. A., Silva, C. J. R., Pereira, M. R., Gomes, M. J. M.. Journal of Photochemistry and Photobiology A Chemistry, 285 (04/2014), 21-29. - IF: 2.291 - FMNC FAMO

Optical and electrical behavior of organic/inorganic hybrid with embedded gold nanoparticles" S. D. F. C. Moreira, J. P. B Silva, Carlos J. R. Silva, Manuel F. M. Costa, M. J. M. Gomes J Sol-Gel Science and Technology, Vol. 69, p.52–60 (2014) - IF: 1.547 - FMNC OCV



Synthesis of an optically clear, flexible and stable hybrid ureasilicate matrix doped with CdSe nanoparticles produced by reverse micelles, Gonçalves, L. F. F. F., Silva, C. J. R., Kanodarwala, F. K., Stride, J. A., Pereira, M. R., Gomes, M. J. M., Materials Chemistry and Physics, 147 (05/2014), 86-94. - IF:2.129 - FMNC FAMO

Synthesis of iron-doped TiO₂ nanoparticles by ball-milling process: the influence of process parameters on the structural, optical, magnetic, and photocatalytic properties. Carneiro, J. O.; Azevedo, S.; Fernandes, F.; et al. JOURNAL OF MATERIALS SCIENCE Volume: 49 Issue: 21 Pages: 7476-7488 Published: NOV 2014 - IF 2.305 - GRF FMNC FCD

Tuning the surface plasmon resonance and surface-enhanced Raman Scattering of pulsed laser deposited silver nanoparticle films by ambience and deposition temperature", JOURNAL OF OPTICS 16 (5) 055002 (5 pp) (2014) (I.F.2.010). K. Kamakshi, K. C. Sekhar, A. Almeida, J. A. Moreira and M. J. M. Gomes, FMNC

6.6.3.2 Conferences Proceedings published in ISI Journals

Complementary Eigenvalue Problem in systems with frictional contact: the Stiffness Matrix for the contact nodes between different materials Maria Antónia Forjaz, Mário Almeida, Teresa Lacerda-Arôso, Jorge Pamplona, 14th International Conference on Computational Science and Its Applications (ICCSA 2014), Guimarães, Portugal, June 30 - July 3, 2014, Proceedings, Part IV, pp 268 – 271 ISBN 978-3-319-09147-1 DOI: 10.1109/ICCSA.2014.62 FMNC GRF

6.6.3.3 Books and book chapters

Numbers and elementary concepts for biology students, Ana B. Norberto Ferreira, A. Mário Almeida, Isabel A-P Mina, Edited by Manuel Filipe P. C. Martins Costa, Pedro Miguel Marques Pombo, José Benito Vazquez Dorrio, Hands-on Science - Science Education with and for Society, pp 444-451. ISBN 978-989-98032-5-1

6.6.3.4 Master theses completed in 2014

Author: Eduardo Paulo da Silva Santos

Supervisor: António Mário Almeida

Title: Lei da Conservação da Energia Mecânica (Relatório de Atividade)

Terminated at December 2014 at ECUM

6.6.3.5 Master theses in progress in 2014

Author: Antonieta Dias

Supervisor: Maria de Jesus Gomes

Title: Som e Luz no 8º ano de escolaridade (Relatório de Atividade Profissional)

Developing since September 2013 at ECUM

Author: Sérgio Soeiro Miranda

Supervisor: António Mário Lourenço da Fonseca Almeida

Title: Cinemática, Dinâmica e Energia

Developing since October 2014 at ECUM

Author: Bruno Danilson Lobo Marques

Supervisor: Mario Pereira

Title: Novas matrizes para abrasivos baseados em diamante sintético

Developing since December 2014 at Engineering School



Author: Filipe da Silva Machado
Supervisor: Mario Pereira
Title: Organização de nano-partículas de parta a partir duma pre-forma de alumina
Develloping since March 2013 at Engineering School

6.6.3.6 Ph.D. theses in progress in 2014

Author: Arup Kumar Kunti
Supervisor: Maria de Jesus Gomes
Title: Development and optimization of optical properties of TiO₂ based hybrid thin films for White LED application
Develloping since September 2014 at ECUM

Author: Daniel António da Silva Miranda
Supervisor: Mário Almeida, Senen L. Mendez, M. Manuela Silva (DQ)
Title: Optimizing performance of rechargeable lithium, magnesium and sodium-ion batteries through computer simulations
Develloping since January 2014 at ECUM

Author: Ouiame Karzazi
Supervisor: Maria Jesus M. Gomes
Title: Growth and characterization of structural, optical, and magnetic properties of doped ZnO nanocrystals embedded in high-k dielectrics
Develloping since October 2009 at ECUM

6.6.4 Other information

6.6.4.1 Other conference presentations given by members of the group in national or international conferences

International

Oral

Zinc oxide (ZnO) based nanostructures for memory applications KC.Sekhar¹, S.Levichev¹, S. Bernstorff², M. Buljan³, J. Agostinho Moreira⁴, A. Almeida⁴, M.J.M. Gomes¹ COST NanoTP14 NanoTP: Scientific Meeting 2014, 2-5 April 2014, Nantes, France <http://www.nanotp.org/news/128/23/NanoTP14-Final-Meeting.html>

Poster

Numbers and elementary concepts for biology students Ana B. Norberto Ferreira, A. Mário Almeida, Isabel A-P Mina 11th International Conference on Hands-on Science, Aveiro, Portugal, 21 a 25 de julho de 2014.

Modelling of separator dimensional effects on lithium ion battery performance, D. Miranda, C. M. Costa, A. M. Almeida, S. Lanceros-Méndez, XIX Meeting of the Portuguese Electrochemical Society and XVI Iberic Meeting of Electrochemistry, Aveiro, Portugal, 1 July of 2014. , FCD

Complementary Eigenvalue Problem in systems with frictional contact: the Stiffness Matrix for the contact nodes between different materials Maria Antónia Forjaz, Mário Almeida, Teresa Lacerda-Arôso, Jorge Pamplona 14th International Conference on Computational Science and Its Applications (ICCSA 2014), Guimarães, Portugal, June 30 - July 3, 2014



National**Oral**

O caso português no projeto CLS, António Mário Almeida, Manuel F. M. Costa, Maria Teresa Malheiro, Paulo A. Pereira, Mário Zamith Silva, Paulo. I. Varela, Marta Marques, Paulo Machado, II Congresso de Ciência e Desenvolvimento dos Açores & VII Congresso de Gestão e Conservação da Natureza, Angra do Heroísmo, 27 a 29 de junho de 2014.

6.6.5 Future Research

- (i) Processing of Ferroelectric thin films based on BST-BT-BCZT deposited by PLAD on different substrates.
Characterization as potential memories and capacitors.
- (ii) Silver nanoparticle films and multilayer structures of substrate/SiC/Ag NPs/SiC.
- (iii) Computational simulations of rechargeable lithium, magnesium and sodium-ion batteries



6.7 Functional Coatings Group (GRF)

6.7.1 Summary description of the scientific work carried out by the group in 2014

Development of coatings for orthopedic prostheses with corrosion, wear and fatigue resistance and antimicrobial properties.

Development and manufacture of "scaffolds" by electrospinning for tissue engineering;

(Nano) structuring of surfaces by anodizing process to increase the osseointegration rate for dental implants;

Development of coatings for metallic surgical instruments with high corrosion resistance to withstand sterilization and cleaning processes.

Development of coatings or nanomaterials with antimicrobial properties for use in hybrid or metallic stents, or leather for the footwear industry.

Development of nanostructured coatings with low friction, high wear resistance, high resistance to fracture, fatigue and corrosion, for the oil industry.

Development of multilayer coatings for the selective absorption of solar radiation

Projects funded by Robbialac companies, SAPEC-Agrochemicals, APMEI (Gamisol), FCT (Devan Micropolis) for research in controlled release of encapsulated diffusers activated by solar activation

6.7.2 Updated composition of the group

Research Group Title	Functional Coating Group (GRF)
Principal investigator	Luis Rebouta
Research area	Materials Physics of Thin Films
Group Members	<p><u>Effective Members:</u></p> <p>-Martin Andritschky, Full Professor -Luis Rebouta, Associate Professor with Habilitation -Filipe Vaz, Associate Professor with Habilitation -Vasco Teixeira, Associate professor -Cacilda Moura, Assistant Professor -Carlos Tavares, Assistant Professor -Joaquim Carneiro, Assistant Professor -Luis Cunha, Assistant Professor -Sandra Carvalho, Assistant Professor -Teresa Aroso, Assistant Professor</p> <p><u>Researchers:</u></p> <p>-Stanislav Ferdov, Researcher - Diego Martinez, Researcher</p> <p><u>Associate Member:</u></p> <p>-Li-Jian Meng (ISEP)</p> <p><u>Post-Doctorate Researchers and Research Fellows with PhD:</u></p>



-Joel Borges, Pos Doc

PhD Students:

- Armando Ferreira, FCT Grant
- Cláudia Lopes, FCT Grant (BI)
- Cibeli Garcia, FCT Grant
- Fernando Ribeiro, FCT Grant
- Isabel Carvalho, FCT Grant
- Isabel Ferreri, FCT Grant
- Mariana Marques, FCT Grant
- Noora Manninen, FCT Grant
- Rita Rebelo, FCT Grant
- Paulo Batista Pedrosa, FCT Grant
- Sebastian Calderon Velasquez, FCT Grant
- Salmon Landi, FCT Grant

6.7.3 Scientific Production

6.7.3.1 Regular articles published in ISI Journals

Ag:TiN nanocomposite thin films for bioelectrodes: the effect of annealing treatments on the electrical and mechanical behavior, Paulo Pedrosa, Diogo Machado, Manuel Evaristo, Albano Cavaleiro, Carlos Fonseca and Filipe Vaz, *J. Vac. Sci. Technol. A* 32 (2014) 031515. - IF:2.140 - GRF

Agy:TiNx thin films for dry biopotential electrodes: the effect of composition and structural changes on the electrical and mechanical behaviours", P. Pedrosa, D. Machado, J. Borges, M.S. Rodrigues, E. Alves, N.P. Barradas, N. Martin, M. Evaristo, A. Cavaleiro, C. Fonseca, F. Vaz, *Applied Physics A: Materials Science & Processing*. DOI 10.1007/s00339-014-8943-9. IF:1.694 GRF

Bifacial dye-sensitized solar cells: A strategy to enhance overall efficiency based on transparent polyaniline electrode; Jihuai Wu, Yan Li, Qunwei Tang, Gentian Yue, Jianming Lin, Miaoliang Huang and Lijian Meng, *Sci. Rep.* 4, 4028; DOI:10.1038/srep04028 (2014). - IF: 5.078 – GRF

Deposition of Pd-Ag thin film membranes on ceramic supports for hydrogen purification/separation, A.I. Pereira, P. Pérez, S.C. Rodrigues, A. Mendes, L.M. Madeira, C.J. Tavares, *Materials Research Bulletin* 61 (2014) 528–533. IF:1.968 GRF

Development of braided fiber-based stents", R. Rebelo, N. Vila, R. Fangueiro, S. Carvalho, M. Henriques, *Studies in Health technology and informatics*, 207 (2014) 135-44. - NO IF – GRF

Electrical characterization of Ag:TiN thin films produced by glancing angle deposition, P. Pedrosa, C. Lopes, N. Martin, C. Fonseca, F. Vaz, *Materials Letters* 115 (2014) 136–139. - IF:2.269 – GRF

Electrochemical behaviour of nanocomposite Agx:TiN thin films for dry biopotential electrodes", P. Pedrosa, E. Alves, N.P. Barradas, N. Martin, P. Fiedler, J. Haueisen, F. Vaz, C. Fonseca, *Electrochimica Acta* 125 (2014) 48–57. - IF:4.086 – GRF



Evolution of the surface plasmon resonance of Au:TiO₂ nanocomposite thin films with annealing temperature", J. Borges, M. Buljan, J. Sancho-Parramon, I. Bogdanovic-Radovic, Z. Siketic, T. Scherer, C. Kübel, S. Bernstorff, A. Cavaleiro, F. Vaz, A.G. Rolo, J. Nanoparticle Research 16 (2014) 1-14. IF:2.278 GRF, GCEP

Growth and size distribution of Au nanoparticles in annealed Au/TiO₂ thin films, S. Reymond-Laruinaz, L. Saviot, V. Potin, C. Lopes, F. Vaz, M.C. Marco de Lucas, Thin Solid Films 553 (2014) 138–143. - IF:1.867 – GRF

Growth of the [110] oriented TiO₂ nanorods on ITO substrates by sputtering technique for dye-sensitized solar cells; Lijian Meng, Hong Chen, Can Li and M. P. dos Santos, Frontiers in Materials – Thin Solid Films, ISSN: 2296-8016, Article number: 14 (2014). doi: 10.3389/fmats.2014.00014 GRF

Improving Photocatalytic Performance and Recyclability by the Development of Er- Doped and Er/Pr-codoped TiO₂ PVDF-TrFE Composite Membranes, Pedro Martins; Virginia Gomez; Catarina Lopes; Carlos Tavares; Gabriela Botelho; Silvia Irusta; Senentxu Lanceros-Mendez, Journal of Physical Chemistry: C 118 (2014) 27944–27953. - IF: 4.835 - GRF FCD

Influence of albumin on the tribological behavior of Ag-Ti(C, N) thin films for orthopedic implants", C. F. A. Alves, F. Oliveira, I. Carvalho, A. P. Piedade, S. Carvalho, Materials Science and Engineering C: Materials for Biological Applications, 34 (2014) 22-28. - IF: 2.736 – GRF

Influence of culture media on physical and chemical properties of Ag-TiCN coatings", I. Carvalho, R. Escobar Galindo, M. Henriques, C. Palacio, S. Carvalho, J. Physics D - Applied Physics, 47 (2014) 335401 (9 pp). - IF: 2.521 – GRF

Influence of hydrogen plasma thermal treatment on the properties of ZnO:Al thin films prepared by dc magnetron sputtering", M. V. Castro, M.F. Cerqueira, L. Rebouta, P. Alpuim, C.B. Garcia, G.L. Júnior, C.J. Tavares, Vacuum, 107 (2014) 145-154. - IF:1.426 - GRF GCEP

Influence of the composition of titanium oxynitride layers on the fretting behavior of functionalized titanium substrates: PVD films versus surface laser treatments", F. Torrent, L. Lavisse, P. Berger, G. Pillon, C. Lopes, F. Vaz, M.C. Marco de Lucas, Surf. Coat. Technol. 255 (2014) 146–152. - IF:2.199 – GRF

Influence of thickness and coatings morphology in the antimicrobial performance of zinc oxide coatings, Carvalho, P; Sampaio, P; Azevedo, S; Vaz, C; Espinos, JP; Teixeira, V; Carneiro, JO; Applied Surface Science, 307 (2014) 548-557 - IF:2.538 – GRF

Layered titanosilicates for size- and pattern-controlled overgrowth of MFI zeolite, Ferdov, S., Cryst. Eng. Comm, 16 (2014) 4467-4471. - IF: 3.858 - GRF

Methods of incorporation of antimicrobial agents in stents", R. Rebelo, R. Fangueiro, S. Carvalho, M. Henriques, S. Rana, "International Journal of Engineering Science and Innovative Technology, 3 (2014) 409-422. - IF: 0.481 – GRF

Modulated IR radiometry for determining thermal properties and basic characteristics of titanium thin films", Mihai Apreutesei, Claudia Lopes, Joel Borges, Filipe Vaz and Francisco Macedo, J. Vac. Sci. Technol. A 32 (2014) 041511-1 to 041511-7. - IF:2.140 - GRF GCEP

Nanostructured functional Ti-Ag electrodes for large deformation sensor applications", A. Ferreira, C. Lopes, N. Martin, S. Lanceros-Méndez, F. Vaz Sensors & Actuators: A. Physical 220 (2014) 204–212. - IF:1.943 - GRF FCD



Nanostructured Materials: Formation, Characterization, and Properties—Latest Advances in 1D, 2D, and 3D Nanostructures , Luís Cunha, Denis Chaumont, Aldo Craievich, Advances in Materials Science and Engineering, Editorial of Special issue Volume 2014 (2014) Article ID 164174 - IF: 0.897 – GRF

Optimisation of surface treatments of TiO₂:Nb transparent conductive coatings by a post hot-wire annealing in a reducing H₂ atmosphere. M. V. Castro , L. Rebouta , P. Alpuim, M. F. Cerqueira, M. Benelmekki , C. B. Garcia , E. Alves , N. P. Barradas, E. Xuriguera , C. J. Tavares. Thin Solid Films, 550 (2014) 404-412. - IF=1.867 - GCEP, GRF

Polymer-based acoustic streaming for improving mixing and reaction times in microfluidic applications. Cardoso, V. F.; Knoll, T.; Velten, T.; et al. RSC ADVANCES Volume: 4 Issue: 9 Pages: 4292-4300 Published: 2014 - IF 3.708 - GRF FCD

Prediction of Optimized Composition for Enhanced Mechanical and Electrochemical Response of Zr-C-N-Ag Coatings for Medical Devices", S. Calderon V; J. C. Oliveira; M. Evaristo; A. Cavaleiro; S. Carvalho, Applied Surface Science, 320 (2014) 570-580. - IF: 2.538 – GRF

Process monitoring during AlN_xO_y deposition by reactive magnetron sputtering and correlation with the film's properties", Joel Borges, Nicolas Martin, Filipe Vaz and Luis Marques, J. Vac. Sci. Technol. A 32 (2014) 021307. - IF:2.140 - GRF GFCT

Production and Characterization of Ag Nanoclusters Produced by Plasma Gas Condensation", N. K. Manninen, N. M. Figueiredo, S. Carvalho, A. Cavaleiro, Plasma Processes and Polymers, 11 (2014) 629-638. - IF: 2.964 – GRF

Properties of electrospun TiO₂ nanofibers", B. Caratão, E. Carneiro, P. Sá, B. Almeida, S. Carvalho, Journal of Nanotechnology, 2014 (2014) 472132 (5 pp) - IF:3,672 GRF FCD

Protective Ag:TiO₂ thin films for pressure sensors in orthopedic prosthesis: the effects of composition, structural and morphological changes on the biological response of the coatings", C. Lopes, P. Fonseca, T. Matamá, A. Gomes, C. Louro, S. Paiva, F. Vaz J. Materials Science: Materials in Medicine 25 (2014) 2069–2081. - IF:2.379 – GRF

Room temperature synthesis of Bi₂₅FeO₃₉ and hydrothermal kinetic relations between sillenite-and distorted perovskite-type bismuth ferrites, Lopes, A.M.L., Araújo, J.P., Ferdov, S., Dalton Transactions, 43 (2014) 18010-18016. - IF: 4.097 - GRF

Structural and dielectric properties of laser ablated BaTiO₃ films deposited over electrophoretically dispersed CoFe₂O₄ grains", J. G. Barbosa, I.T. Gomes, M.R. Pereira, C.Moura, J.A. Mendes, B.G. Almeida, J. Appl. Phys., 116, 164112 (2014) - IF 2.185 - GRF FAMO FCD

Structural and Electrochemical characterization of Zr-C-N-Ag coatings deposited by DC Dual Magentron Sputtering", S. Calderon V, V. Lopez, C. F. A. Alves, A. Cavaleiro, S. Carvalho, Corrosion Science, 80 (2014) 229-236. - IF: 3.686 – GRF

Structural, chemical, optical and mechanical properties of Au doped Al-N sputtered coatings", N.M. Figueiredo, F. Vaz, L. Cunha, S.E. Rodil, A. Cavaleiro, Surf. Coat. Technol. 255 (2014) 130-139. - IF:2.199 - GRF

Study of the effect of the silver content on the structural and mechanical behavior of Ag-ZrCN coatings for orthopedic prostheses", I. Ferreri, V. Lopes, S. Calderon V., C. J. Tavares, A. Cavaleiro, S. Carvalho, Materials Science and Engineering C: Materials for Biological Applications, 42 (2014) 782-790. - IF: 2.736 – GRF



Synthesis and characterization of organic-inorganic hybrid materials prepared by sol-gel and containing CdS nanoparticles prepared by a colloidal method using poly(N-vinyl-2-pyrrolidone)". L.F. F. Gonçalves, C. J. R. Silva, F. K. Kanodarwala, J. A. Stride, M. J. M. Gomes. *J Sol-Gel Science and Technology* Vol. 71, p. 69–78 (2014) (I. F. 1.547). URL: <http://link.springer.com/article/10.1007%2Fs10971-014-3334-4> - IF: 1,547 – GRF

Synthesis of iron-doped TiO₂ nanoparticles by ball-milling process: the influence of process parameters on the structural, optical, magnetic, and photocatalytic properties. Carneiro, J. O.; Azevedo, S.; Fernandes, F.; et al. *JOURNAL OF MATERIALS SCIENCE* Volume: 49 Issue: 21 Pages: 7476-7488 Published: NOV 2014 - IF 2.305 - GRF FMNC FCD

Tantalum oxynitride thin films: mechanical properties and wear behaviour dependence on growth conditions, D. Cristea, A. Crisan, D. Munteanu, M. Apreutesei, M.F. Costa, L. Cunha. *Surf. Coat. Technol.* 258 (2014) 587-596. - IF: 2.199 - GRF OCV

The evaluation of the thermal behaviour of a mortar based brick masonry wall coated with TiO₂ nanoparticles: An experimental assessment towards energy efficient buildings, Carneiro, JO; Vasconcelos, G ; Azevedo, S; Jesus, C; Palha, C; Gomes, N ; Teixeira, V, *Energy and Buildings*, 81 (2014) 1-8 - IF: 2.465 – GRF

Ti_{1-x}Ag_x electrodes deposited on polymer based sensors, Marques, S.M., Manninen, N.K., Ferdov, S., Lanceros-Mendez, S., Carvalho, S. *Applied Surface Science*, 317 (2014) 490-495. - IF: 2.538 - GRF FCD

6.7.3.2 Conferences Proceedings published in ISI Journals

Complementary Eigenvalue Problem in systems with frictional contact: the Stiffness Matrix for the contact nodes between different materials Maria Antónia Forjaz, Mário Almeida, Teresa Lacerda-Arôso, Jorge Pamplona, 14th International Conference on Computational Science and Its Applications (ICCSA 2014), Guimarães, Portugal, June 30 - July 3, 2014, Proceedings, Part IV, pp 268 – 271 ISBN 978-3-319-09147-1 DOI: 10.1109/ICCSA.2014.62 FMNC GRF

Experimental analysis on the functional properties of rendering mortars with superficial addition of TiO₂ nanoparticles", G. Vasconcelos, J. Carneiro, F. Fernandes, C. Jesus, C. Palha, "Proc of the 9th International Masonry Conference 7-9 July 2014 Guimarães, Portugal. URI: URL: <http://hdl.handle.net/1822/30422> (GRF)

Optical response of fractal aggregates of polarizable particles. R. M. S. Pereira, J. N. P. Borges, P. A. S. Pereira, G. V. Smirnov, F. Vaz, A. Cavaleiro, and M. I. Vasilevskiy. Proc. SPIE, 9286 (2014) 92865M
(doi:10.1117/12.2060292) <http://hdl.handle.net/1822/31976> (GCEP, GRF)

6.7.3.3 Books and book chapters

Residual Stresses in Thin Films Evaluated by Different Experimental Techniques", Joaquim O. Carneiro, Vasco Teixeira, S. Azevedo, "R.B. Hetnarski (Ed.), Encyclopedia of Thermal Stresses, DOI 10.1007/978-94-007-2739-7_64, © Springer Science + Business Media Dordrecht, 2014.



Smart self-cleaning coatings for corrosion protection", J.O. Carneiro, V. Teixeira, S. Azevedo, M. Maltez-da Costa, "Abdel Salam Hamdy Makhlouf (Ed.), Handbook of Smart Coatings for Materials Protection, DOI: 10.1533/9780857096883.3.489, ISBN: 978-0-85709-680-7, © Woodhead Publishing Limited, 2014.

6.7.3.4 Master theses completed in 2014

Author: Ana Correia

Supervisor: Joaquim Carneiro, Vasco Teixeira

Title: Tratamento de águas industriais através da utilização de nanopartículas de TiO₂

Terminated: December 2014 at ECUM

Author: Armando Libânio Fernandes Sá

Supervisor: Cacilda Moura, Luís Cunha

Title: Experiências didáticas para o Ensino da Física de 11º ano escolaridade

Terminated January 2014 at ECUM

Author: Julião da Costa Belo

Supervisor: Cacilda Moura

Title: Radiação Nuclear: Riscos e Benefícios na Sociedade. Elaboração de conteúdos científico-pedagógicos para a lecionação no 12º ano de escolaridade em Timor-Leste

Terminated July 2014 at ECUM

Author: Miguel Ângelo Costa

Supervisor: Luís Cunha, Filipe Vaz

Title: Ressonância de Plasmões de Superfície. Aplicações a filmes finos

Terminated December 2014 at ECUM

Author: Bianca Castanheira Caratão

Supervisor: Carlos Tavares

Title: Improving the tightness of the metallization used on top of the cell and its electrical connection with the wire

Terminated November 2014 at Engineering School

Author: Duarte Nuno Ferreira Dias

Supervisor: Luís Rebouta

Title: Desenvolvimento de sistemas óticos baseados em multicamada cerâmico/metal para aplicações de absorção da radiação solar

Terminated November 2014 at Engineering School

Author: Tiago Alexandre Lima Pereira

Supervisor: Carlos Tavares

Title: Desenvolvimento de sistemas óticos baseados em multicamada cerâmico/metal para aplicações de absorção da radiação solar

Terminated November 2014 at Engineering School

6.7.3.5 Ph.D. theses completed in 2014

Author: Armando J. Barros Ferreira



Author: Filipe Vaz, Senen L. Mendez

Title: Development of a pressure sensor network system for static and dynamic pressure measurements. Application to the limb/prostheses pressure mapping

Terminated December 2014 at ECUM

Author: Isabel Soares Carvalho

Supervisor: Sandra Carvalho, Mariana Henriques (DEB)

Title: Development of anti-microbial multifunctional coatings based on Ag-Ti(C,O,N)

Terminated July 2014 at ECUM

Author: Paulo Eduardo Teixeira Batista Pedrosa

Co-supervisor: José Filipe Vaz

Title: Conductive thin-film coated flexible polymers: a new materials approach for designing biomedical electrodes and beyond

Terminated December 2014 at UP

6.7.3.6 Master theses in progress in 2014

Author: Luís Pedro Monteiro Gonçalves

Supervisor: Carlos Tavares, Pedro Alpuim

Title: Superfícies photocatalíticas sobre grafeno

Developing since October 2013 at ECUM

Author: Pedro Carvalho Martins

Supervisor: Mário Zamith

Title: Relatório de Atividade Profissional

Developing since November 2013 at ECUM

Author: Sara Manuela Fernandes Machado

Supervisor: Filipe Vaz, Luís Rocha (DEM)

Title: Tribocorrosion behaviour of the antimicrobial thin films on titanium dental implant materials

Developing since September 2013 at ECUM

Author: Tiago Lima Pereira

Supervisor: Carlos Tavares

Title: Desenvolvimento de revestimentos photocatalíticos de TiO₂ com rugosidade controlada

Developing since October 2013 at ECUM

Author: Andreia Bastos Pires de Lima

Supervisor: Carlos Tavares

Title: Improving the tightness of the metallization used on top of the cell and its electrical connection with the wire

Developing since October 2014 at Engineering School

Author: David Ribeiro

Supervisor: Carlos Tavares

Title: Painéis cerâmicos com propriedades antimosquito



Develloping since October 2014 at Engineering School

Author: David Silva

Supervisor: Joaquim Carneiro, Vasco Teixeira

Title: Photocatalytic degradation of petroleum and its derivatives by using pure titanium dioxide nanoparticles (TiO₂) and mixed with reduced graphene oxide (TiO₂/rGO)

Develloping since October 2014 at Engineering School

6.7.3.7 Ph.D. theses in progress in 2014

Author: Cláudia de Jesus Ribeiro Lopes

Supervisor: Filipe Vaz, José Fonseca

Title: Estudo das Propriedades Físicas e Eletroquímicas de Filmes Finos Aplicados a sensores de pressão em próteses ortopédicas

Develloping since November 2011 at ECUM

Author: Isabel Maria Ferreri Gusmão e Silva

Supervisor: Sandra Carvalho, Mariana Henriques (DEB)

Title: Development of AG-Zr(C,O,N) multifuncional coatings for biomedical devices

Develloping since October 2011 at ECUM

Author: Salmon Landi

Supervisor: Joaquim Carneiro

Title: Tratamento de efluentes industriais através de processos fotocatalíticos com dióxido de titânio

Develloping since September 2014 at ECUM

Author: Cibeli Navarro Belleti Garcia

Supervisor: Carlos Tavares

Title: Estudo da utilização da microscopia electrónica de varrimento em materiais com aplicações emergentes em nanotecnologia

Develloping since October 2009 at Engineering School

Author: Cristiana Alves

Supervisor: Sandra Carvalho

Title: Desenvolvimento de superfícies bioativas para o crescimento ósseo em implantes dentários

Develloping since March 2014 at Engineering School

Author: Mariana Kristiina Marques

Supervisor: Sandra Carvalho, Senen L. Mendez, Mariana Henriques (DEB)

Title: Development of multifunctional coatings deposited on polymer substrates

Develloping since October 2011 at Engineering School

Author: Noora Manninen

Supervisor: Albano Cavaleiro (EngMEC-Univ. Coimbra), Sandra Carvalho

Title: Development of a barrier for controlling the AG+ realese for antimicrobial activity on DLC-nlAg-DLC-Au based coatings for biomedical implants

Develloping since October 2011 at UC



Author: Rita Daniela Nogueira Rebelo
Supervisor: Raul Fangueiro (DEC), Sandra Carvalho, Mariana Henriques (DEB)
Title: Hybrid braided stent with antimicrobial properties
Develloping since October 2011 at Engineering School

Author: Sebastian Calderon Velasco
Supervisor: Sandra Carvalho, Albano Cavaleiro (Eng.Mec.- FCTUC)
Title: Development of a diffusion barrier for controlling the Ag⁺ release on Zr(C,N)-nAg system for antimicrrobial activity
Develloping since March 2011 at Engineering School

Author: Simone Rodrigues
Supervisor: Albano Cavaleiro, Sandra Carvalho
Title: Development of hidrophilic / oleophobic treatments for self-cleaning anti-greasy surfaces
Develloping since November 2014 at UC

6.7.4 Other scientific activities

6.7.4.1 Invited Lectures/seminars delivered by members of the group, in national or international

Investigação Científica: Orientações para a preparação de propostas de sucesso". Joaquim Carneiro. SONANGOL Oil Company Workshop. December 3, 2014 Luanda, Angola.

IThe role of Ag on ZrCN coatings performance in harsh biological environments, Sandra Carvalho, XtremeCOAT 2014: Surface engineering for functional applications under extreme conditions, October 20 – 21, 2014, Madrid, Spain

The use of advanced nanomaterials for oil industry". Joaquim Carneiro. TOTAL Oil Company Workshop on new petroleum processes, December 8, 2014 Luanda, Angola.

Thin Films Composed of Gold Nanoclusters Dispersed in a Dielectric Matrix , José Filipe Vaz, 13th European Vacuum Conference | 9th Iberian Vacuum Meeting | 7th European Topical Conference on Hard Coatings, Aveiro, Portugal, 8-12 September 2014. GRF

6.7.5 Funded Projects Ongoing

Title: Protsensor – Um novo sistema de sensores em rede para medidas de pressão estática dinâmica. Aplicação no mapeamento de pressões exercidas em membros amputados/próteses.

Reference: PTDC/CTM-NAN/112574/2009

Project Coordenator: Filipe Vaz

Funding awarded: 77.232.00 Euros

Start Date: March2011

Duration: 3 years

Title: Syntesis of solar-activated materials for the controlled release of volatile compounds

Reference: PTDC/CTM-NAN/119979/2010



Project Coordenator: Carlos Tavares
Funding awarded: 89904.00 Euros
Start Date: March 2012
Duration: 3 years

Title: NanoEcoBuil- Nanobased concepts for Innovative & Ecosustainable constructive material's Surfaces
Reference: PTDC/FIS/120412/2010
Project Coordenator: Joaquim Carneiro
Funding awarded: 31632.00 Euros
Start Date: April 2012
Duration: 3 years

Title: Windsc
Project Coordenator: Carlos Tavares
Funding awarded: 72382.07 Euros
Start Date: October de 2011
Duration: 3 years

Title: Wickeeg- Um novo electrodo para EEG baseado num polímero poroso para registo de EEG: do desenvolvimento dos materiais até aos testes in-vivo
Reference: PTDC/SAU-ENB/116850/2010
Project Coordinator: Filipe Vaz
Funding awarded: 37825.00 Euros
Start Date: March de 2012
Duration: 3 years

Title: PROGRAMA DE AÇÕES UNIVERSITÁRIAS INTEGRADAS LUSO-FRANCESAS – PAUILF -“Development of bioactive surfaces for bone ingrowth on dental implant”-
Coordinator: Sandra Carvalho
Funding: 3000 €
Year: 2014

6.7.6 Projects without funding to the Center of Physics

Title: TECNOLOGIAS INOVADORAS NA PRODUÇÃO, PROTOTIPAGEM E/OU AUMENTO DE ESCALA EM NANOTECNOLOGIA - Desenvolvimento de Titânio e Liga de Titânio Nanoestruturados com Tratamentos de Superfície para Aplicação em Implantes Ósseos
Reference: MCTI/CNPQ N ° 16/2012
Coordinator: Sandra Carvalho
Funding: 79136,00 €

SAPEC-AGROQÍMICOS: “Controlled release of paint additives”.
Coordinator: Carlos Tavares



Coordinating entity: TecMinho

Funding: 7.000,00 €

Title: EUREKA PROJECT E! Surf - Surface Engineering for Sustainable Production and Products

Coordinator: Sandra Carvalho

Funding: 29.800 €

Title: DEPOSITION OF THIN HARD Zr, ZrN AND ZrCN COATINGS ON SS316L SUBSTRATES

Reference: 12202271 (12102879)

Coordinator: Sandra Carvalho (UM)

Coordinator entity KFUPM - KING FAHD UNIVERSITY OF PETROLEUM & MINERALS, SAUDI ARABIA

Funding: 16.236,00 €

Robbialac: "Controlled release of paint additives".

Coordinator: Carlos Tavares

Coordinating entity: Tec/Minho

Funding: 7.000,00 €

Vale IAPMEI nº 2013/Gamisol: "Controlled release of varnish additives in the resin".

Coordinator: IAPMEI

Coordinator: Carlos Tavares

Funding: 15.000,00 €

6.7.7 Other information

6.7.7.1 Other Conference Presentations given by members of the group in national or international conferences

International

Oral

Optical response of fractal aggregates of polarizable particles. R. M. S. Pereira, J. N. P. Borges, P. A. S. Pereira, G. V. Smirnov, F. Vaz, A. Cavaleiro, and M. I. Vasilevskiy. II Int. Conf. on Applications of Optics and Photonics (AOP2014), Aveiro, Portugal, May 26-30-th, 2014. (GCEP, GRF)



Deposition of TiO₂ nanocomposites on PET and PLA foils for food packaging applications". V. Teixeira, B. Morais, S. Azevedo, C. Silva, A. V. Machado, J.O. Carneiro. 13th European Vacuum Conference, 8-12 September 2014, Aveiro, Portugal.

Development of a prototype based on TiO₂ coated textile substrates with photocatalytic and self-cleaning properties". Joaquim Carneiro, S. Azevedo, C. Silva, T.M. Barbosa, F. Fernandes, J. Neves, V. Teixeira. NanoPT 2014, 12-14 February 2014 Porto, Portugal.

Development of braided fiber-based stents", International Conference on Innovation in Medicine & Healthcare, San Sebastian, July, 2014. R. Rebelo, N. Vila, R. Fangueiro, S. Carvalho, M. Henriques. GRF

Silver activation effect in the antibacterial activity in multifunctional coatings", I. Ferreri, S. Calderon, R. Escobar Galindo, C. Palacio, M. Henriques, S. Carvalho, 13th European Vacuum Conference & 9th Iberian Vacuum Meeting & 7th European Topical Conference on Hard Coatings, 8 to 12 September 2014, Aveiro, Portugal GRF

Solar selective absorber coatings for high temperature applications", L. Rebouta, A. Sousa, M. Andritschky, P. Santilli, K. Pisched, 13th European Vacuum Conference & 9th Iberian Vacuum Meeting & 7th European Topical Conference on Hard Coatings, 8 to 12 September 2014, Aveiro, Portugal GRF

Transparent and electrically-conductive Ga-doped ZnO thin films deposited by pulsed sputtering, 13th European Vacuum Conference (EVC13), Carlos Tavares September 8-12, University of Aveiro, Portugal.

Transparent and electrically-conductive Ga-doped ZnO thin films deposited by pulsed sputtering, European Conference on Surface Science (ECOSS30), Carlos Tavares; August 31-September 5, Antalya, Turkey.

Nanomaterials modified membranes for environmental applications. P. M. Martins, J. Nunes-Pereira, V. Cardoso, G. Botelho, S. Ferdov and S. Lanceros-Méndez. Nanotechnology Applied to Environmental Geotechnics, Braga, Portugal, 2014. , GRF,FCD

Ti_{1-x}Ag_x and TiN-Ag Electrodes Deposited on polymer Based Sensors for Biomedical Applications", S. M. Marques, N. K. Manninen, S. Lanceros-Mendez, A. Cavaleiro, S. Carvalho Xtreme Coat 2014, INTA, October 20-21, 2014, Madrid, Spain.. GRF, FCD

Magnetron Sputtering Deposition of Pd-Ag Thin Film Membranes onto Tubular Ceramic Supports for Hydrogen Separation, International conference on metallurgical coatings and thin films 2014 (ICMCTF'2014), April 28 – May 2 2014, San Diego CA, United States. GRF

Poster

Complementary Eigenvalue Problem in systems with frictional contact: the Stiffness Matrix for the contact nodes between different materials Maria Antónia Forjaz, Mário Almeida, Teresa Lacerda-Arôso, Jorge Pamplona 14th International Conference on Computational Science and Its Applications (ICCSA 2014), Guimarães, Portugal, June 30 - July 3, 2014

(Synthesis of iron doped TiO₂ nanoparticles by ball-milling process: the influence of process parameters on the photocatalytic efficiency". J. O. Carneiro, F. Fernandes, S. Azevedo. M. Pereira, E. Freitas, V. Teixeira. NanoPT 2014, 12-14 February 2014 Porto, Portugal.



Biological Behaviour Of Thin Films Consisting of Au Nanoparticles Dispersed in a TiO₂ Dielectric Matrix, J. Borges, E. Antunes, C. Lopes, C. Moura, L. Cunha, D. Costa, J.Gonçalves, P. Sampaio, F. Vaz, 13th European Vacuum Conference (EVC'13), in Aveiro (Portugal), 8 to 12 September 2014

Development of Water Purification System based on Photocatalytic Process by using TiO₂ Nanoparticles". M. Pastor, Rafael Simão Sousa, Marco Lopes, Amaral Nunes, A. Correia, V. Teixeira, P. Parpot, J. O. Carneiro. NanoPT 2014, 12-14 February 2014 Porto, Portugal.

Effect of the oxygen content on the bioactivity of Ta-based coatings", C. F. Almeida Alves, A. Cavaleiro, S. Carvalho, 14th International Conference on Plasma Surface Engineering, September 15 - 19, 2014, Garmisch-Partenkirchen, Germany. GRF

Electrical Properties of Tantalum oxynitride thin films produced by magnetron sputtering, Daniel MUNTEANU, Daniel CRISTEA, Aurel CRISAN, Luis CUNHA, Nicolae CRETU, Valentin ION, Maria DINESCU, 30th European Conference on Surface Science (ECOSS'30), in Antalya (Turkey), 31 August 2014 to 5 September 2014GRF

Fibrous Stents With Antimicrobial Properties", R. Rebelo, N. Manninen, R. Fangueiro, A. Cavaleiro, S. Carvalho. 14th International Conference on Plasma Surface Engineering, September 15 - 19, 2014, Garmisch-Partenkirchen, Germany. GRF

Multifunctional Ti-Me (Me = Ag, Au, Cu, Al, Zn) Thin Film Systems for Biosensors Devices", C. Lopes, M. Vieira, J. Borges, F. Vaz, 13th European Vacuum Conference | 9th Iberian Vacuum Meeting | 7th European Topical Conference on Hard Coatings, Aveiro, Portugal, 8-12 September 2014. GRF

Improving photocatalytic performance and recyclability by the development of Er- doped and Er/Pr-codoped TiO₂ PVDF-TrFE composite membranes, P.M. Martins¹, V. Gomez², A. C. Lopes¹, C.Tavares¹, G.Botelho³, S. Irusta² and S. Lanceros-Mendez¹, 4th International Conference on Materials and Applications for Sensors and Transducers, Bilbao-Spain, 2014, GRF,FCD

Improving photocatalytic performance and recyclability by the development of Er- doped and Er/Pr-codoped TiO₂ PVDF-TrFE composite membranes" P.M. Martins, V. Gomez, A. C. Lopes, C.Tavares, G.Botelho, S. Irusta and S. Lanceros-Mendez 5th International Conference on Advanced Nanomaterials, Aveiro, 2-4 July 2014, GRF, FCD

TiO₂:Nb Transparent Conductive Thin Films Treated by a Post Hot-wire Annealing in a Reducing H₂ Atmosphere, Carlos J. Tavares, Maria V. Castro, Luis Rebouta, Pedro Alpuim, Fatima Cerqueira, Eduardo Alves, Nuno Barradas , International conference on metallurgical coatings and thin films 2014 (ICMCTF'2014), April 28 – May 2 2014, San Diego CA, United States. GRF, GCEP.

TiO₂:Nb transparent conductive thin films treated by a post hot-wire annealing in a reducing H₂ atmosphere, Carlos J. Tavares, Maria V. Castro, Luis Rebouta, Pedro Alpuim, Fatima Cerqueira, Eduardo Alves, Nuno Barradas, European Conference on Surface Science (ECOSS30), August 31-September 5, Antalya, Turkey. GRF, GCEP

Structure optimization on the photoelectric and photocatalytic properties of Cu₂S and ZnO complex films; Feng Xu, Manuel F. Costa, Shengnan Sun, Vasco Teixeira, Yixin Wang, Fengling Bian, He Wang, Haining Cui; 5th International Conference on Advanced Nanomaterials, Aveiro, Portugal, July 2-4, 2014.

Production of a touch sensor based on anodic aluminum oxide (AAO) structures". J.O. Carneiro, F. Machado, C. Silva, D. Silva, A. Samantilleke, S. Lanceros-Mendez, V. Teixeira. 13th European Vacuum Conference, 8-12 September 2014, Aveiro, Portugal.



National

Poster

Universidade e Escolas Secundárias em rede: Projeto “A minha Escola de Ciências, Sandra Paiva, Alice Dias, Ana Carvalho, Ana Cunha, Ana Isabel Pinheiro, Arminda Manuela Gonçalves, Carlos Silva, Elisabete Coutinho, Luís Cunha, Maria Cláudia Araújo, Maria Teresa Almeida, Pedro Pimenta Simões, Rui Baptista, Estelita Vaz. SciCom Pt 2014 - Congresso de Comunicação de Ciência. 3 e 4 de Junho de 2014, Porto, Portugal GRF, FAMO

6.7.8 Future Research

Development of 2D and 3D nanostructures for incorporation into flexible devices such as polymers and textile substrates for the development of biosensors, food packaging and active smart textiles

6.8 Complexity and Electronic Properties Group (GCEP)

6.8.1 Summary description of the scientific work carried out by the group in 2014

The research activities developed by the GCEP members in 2014 yielded some 27 papers published in peer reviewed journals listed in the ISI Wok database, one book chapter, 4 articles published in peer-reviewed conference proceedings, and 32 presentations in international conference (10 by invitation). The main scientific results are summarized below.

- Theoretical description of different aspects of non-linear optics in graphene;
- Theoretical description of several plasmonic effects in graphene;
- Theoretical description of the optical response of a graphene trilayer;
- Description of the dynamics of a nanoparticle (e.g. quantum dot) influenced by its interaction with surface plasmons on a metal-dielectric interface or in graphene;



- Calculation and analysis of full counting statistics for electron tunneling through a quantum dot;
- Description of the temporal evolution of the expectation value of the energy in a quantum system subjected to a periodic force;
- Analysis of different aspects of spin transport in anisotropic Heisenberg chains;
- Theoretical description of new aspects of charge and spin transport in low-dimensional strongly correlated electronic systems;
- Elaboration of new stability criteria for control systems using the mediazation method;
- Estimation of the complexity of the Newton method for multivalued applications;
- Evaluation of the interaction of H₂, O₂, OH and H₂O molecules on the surface of MoS₂ using DFT and tight-binding methods;
- Description, based on numerical methods, of the interplay between confinement and disorder effects on phonons in Si-Ge nanocrystals;
- Fabrication, on scale of a 200 mm wafer, of field effect transistors on graphene (GFETs) with a liquid gate dielectric and integrated source and drain contacts;
- Measurement of the response of the SG-GFETs to variations of the ionic force from the dielectric solution in terms of its transfer curve characteristics, in particular, the position of the Dirac point;
- Fabrication of high performance barrier devices for protection against humidity and oxygen, based on multilayer silicon nitride films (WVTR = 6 × 10⁻⁶ g/m².day);
- Development of a direct imprinting process for doped a-Si films using a laser and based on the crystallization and dopant activation;
- Fabrication of solar cells sensitized with quantum dots (a conversion rate of 2.8% was achieved under AM1.5 conditions) using organic nanophosphors (work performed in the framework of the NanoCIS project involving two visiting scientists from India);
- Synthesis of titania nanorods and alumina nanostructures (collaboration with GRF).

6.8.2 Updated composition of the group

Research GroupTitle	Complexity and electronic properties
Principal investigator	Mikhail Vasilevskiy
Research area	Condensed Matter Physics
Group Members	<p><u>Effective Members:</u></p> <p>-Anabela G Rolo – Assistant Professor -Francisco J M Macedo – Assistant Professor -João Pedro H A Alpuim – Assistant Professor -José Carlos V Gomes – Assistant Professor -José M P Carmelo – Full Professor -Gueorgui V Smirnov– Full Professor</p>



-Maria Fátima G Cerqueira – Assistant Professor
-Maria José F A F Sampaio – Assistant Professor
-Mikhail I Vasilevskiy– Full Professor
-Nuno M R Peres– Full Professor
-Ricardo P L M M Ribeiro – Assistant Professor

Researchers:

-Ivan Larkin- Senior Researcher (Wellcome II)
-Jaime E V S M Santos - Researcher
-Anura P Samantilleke – Researcher

Post-doctorate researchers and research Fellows with PhD:

-Yuliy Bludov, Post-Doc Fellow
-Vadim Ponomarenko, Post-Doc Fellow
-Isabel Moura, Post-Doc
-Tilen Cadez, Post Doc
-João Viana, Pós Doc

PhD and other research students:

-Filipe Oliveira, PhD student with FCT grant
-Bruno Amorim, PhD student with FCT grant

6.8.3 Scientific Production

6.8.3.1 Regular Articles Published in ISI Journals

Absence of finite-temperature ballistic charge (and spin) transport in the 1D Hubbard model at half filling (and zero spin density). J. M. P. Carmelo, Shi-Jian Gu, M. J. Sampaio, Journal of Physics A 47 (2014) 255004. - IF: 1.687. - (GCEP)

All-Inkjet-Printed Bottom-Gate Thin-Film Transistors Using UV Curable Dielectric for Well-Defined Source-Drain Electrodes Castro, H. F.; Sowade, E.; Rocha, J. G.; et al. JOURNAL OF ELECTRONIC MATERIALS Volume: 43 Issue: 7 Pages: 2631-2636 Published: JUL 2014 , - IF 1.675, - GCEP,FCD

Attitude Dynamics and Stability of a Simple Solar Photon Thruster, A. Guerman, M.C. Pereira, G. Smirnov. Mathematical Problems in Engineering, 2013 (2013) 943107. IF=1.082. (GCEP)

Complexity of the Newton method for set-valued maps. G. Smirnov. Optimization Methods and Software, 29 (2014) 1163-1180. IF: 1,210 – GCEP



Computer simulation of breast reduction surgery, A. Cardoso, G. Coelho, H. Zenha, V. Sá, G. Smirnov, H. Costa. Aesthetic Plastic Surgery, 37 (2013) 68–76. - IF: 1.189. – GCEP

Effects of alloy disorder and confinement on phonon modes and Raman scattering in SixGe_{1-x} nanocrystals: a microscopic modelling. A. S. Vasin, O. V. Vikhrova, and M. I. Vasilevskiy, J. Appl. Phys. 115 (2014) 143505. IF: 2.186. <http://hdl.handle.net/1822/32172> - IF: 2,185 - GCEP

Energy transfer via exciton transport in quantum dot based self-assembled fractal structures. C. Bernardo; I. Moura, Yu. Nuñez Fernandez; E. Pereira; P. Coutinho; A. Garcia; P. Schellenberg, M. Belsley, M. Costa, T. Stauber, and M. I. Vasilevskiy, J. Phys. Chem. C 118 (2014) 4982 - 4990. IF: 4.835. <http://hdl.handle.net/1822/30144>. - IF:4,835 - GCEP, FAMO, OCV

Evolution of the surface plasmon resonance of Au:TiO₂ nanocomposite thin films with annealing temperature", J. Borges, M. Buljan, J. Sancho-Parramon, I. Bogdanovic-Radovic, Z. Siketic, T. Scherer, C. Kübel, S. Bernstorff, A. Cavaleiro, F. Vaz, A.G. Rolo, J. Nanoparticle Research 16 (2014) 1-14. IF:2.278 GRF, GCEP

Excited states of exciton-polariton condensates in 2D and 1D harmonic traps. C. Trallero-Giner, M. V. Durnev, Yu. Núñez Fernández, M. I. Vasilevskiy, V. López-Richard, and A. Kavokin. Physical Review B 89 (2014) 205317. IF: 3.664. <http://repositorium.sdum.uminho.pt/handle/1822/32122> - IF:3,664 - GCEP

Flexible n-i-p thin film silicon solar cells on polyimide foils with textured ZnO:Ga back reflector. E. Marins, M. Warzecha, S. Micharda, J. Hotovy, W. Böttler, P. Alpuim, F. Finger, Thin Solid Films, 571 (A) (2014) 9-12. - IF=1.867 – GCEP

IBA study of SiGe/SiO₂ nanostructured multilayers. Nuno P. Barradas, E. Alves, E.M.F. Vieira, A. Parisini, O. Conde; J. Martin-Sánchez, A.G. Rolo, A. Chahboun, M.J.M. Gomes. Nuclear Instruments and Methods in Physics Research B, 331 (2014) 89-92. - IF: 1.186 - GCEP, FMNC

Influence of hydrogen plasma thermal treatment on the properties of ZnO:Al thin films prepared by dc magnetron sputtering", M. V. Castro, M.F. Cerqueira, L. Rebouta, P. Alpuim, C.B. Garcia, G.L. Júnior, C.J. Tavares, Vacuum, 107 (2014) 145-154. - IF:1.426 - GRF GCEP

Influence of low energy argon plasma treatment on the moisture barrier performance of hot wire-CVD grown SiNx multilayers", Subimal Majee, Maria Fátima Cerqueira, Denis Tondelier, Bernard Geffroy, Yvan Bonnassieux, Pedro Alpuim, and Jean Eric Bourée. Japanese Journal of Applied Physics, 53 (2014) 05FM05. - IF=1.057 - GCEP

Large-Scale Synthesis of Colloidal Fe₃O₄ Nanoparticles Exhibiting High Heating Efficiency in Magnetic Hyperthermia. Yury V. Kolen'ko, Manuel Bañobre-López, Carlos Rodríguez-Abreu, Enrique Carbó-Argibay, Alexandra Sailsman, Yolanda Piñeiro-Redondo, M. Fátima Cerqueira, Dmitri Y. Petrovykh, Kirill Kovnir, Oleg I. Lebedev, and José Rivas. J. Phys. Chem. C, 118 (2014) 8691-8701. - IF=4.835 – GCEP

Modulated IR radiometry for determining thermal properties and basic characteristics of titanium thin films", Mihai Apreutesei, Claudia Lopes, Joel Borges, Filipe Vaz and Francisco Macedo, J. Vac. Sci. Technol. A 32 (2014) 041511-1 to 041511-7. - IF:2.140 - GRF GCEP

Nonlinear TE-polarized surface polaritons on graphene. Yu. V. Bludov, D. A. Smirnova, Y. S. Kivshar, N. M. R. Peres, M. I. Vasilevskiy, Physical Review B 89 (2014), 035406. IF: 3.664. <http://hdl.handle.net/1822/32294> - IF: 3,664 - GCEP



Optical bistability of graphene in the terahertz range. N. M. R. Peres, Yu. V. Bludov, J. E. Santos, A.-P. Jauho, M. I. Vasilevskiy, Physical Review B, 90 (2014), 125425. - IF: 3.664 – GCEP

Optical conductivity of ABA stacked graphene trilayer: mid-IR resonance due to band nesting. Z. Rashidian, Yu. V. Bludov, R. M. Ribeiro, N. M. R. Peres, M. I. Vasilevskiy, Journal of Physics: Condensed Matter, 26 (2014), 395301. IF: 2.223. <http://hdl.handle.net/1822/32087> - IF: 2.223 - GCEP

Optimisation of surface treatments of TiO₂:Nb transparent conductive coatings by a post hot-wire annealing in a reducing H₂ atmosphere. M. V. Castro , L. Rebouta , P. Alpuim, M. F. Cerqueira, M. Benelmekki , C. B. Garcia , E. Alves , N. P. Barradas, E. Xuriguera , C. J. Tavares. Thin Solid Films, 550 (2014) 404-412. - IF=1.867 - GCEP, GRF

Orbital symmetry fingerprints for magnetic adatoms in graphene. Bruno Uchoa, Ling Yang, S-W Tsai, N. M. R. Peres e A. H. Castro Neto, New J. Phys., 16 (2014) 013045. - IF: 3.671 – GCEP

Photocarrier relaxation pathway in two-dimensional semiconducting transition metal dichalcogenides. D. Kozawa, R. Kumar, A. Carvalho, A. Kiran Kumar, W. Zhao, S. Wang, M. Toh, R. M. Ribeiro, A. H. Castro Neto, K. Matsuda, G. Eda. Nature Communications, 5 (2014) 4543. - IF: 10.742 – GCEP

PT-symmetric coupler with a coupling defect: soliton interaction with exceptional point. Yu. V. Bludov, C. Hang, G. Huang, V. V. Konotop, Optics Letters 39 (2014) 3382–3385. IF: 3.179. <http://hdl.handle.net/1822/32097> - IF: 3,179 - GCEP

Renormalization of nanoparticle polarizability in the vicinity of a graphene-covered interface. J. E. Santos, M. I. Vasilevskiy, N. M. R. Peres, G. Smirnov, Yu. V. Bludov, Physical Review B, 90 (2014), 235420. IF: 3.664. <http://hdl.handle.net/1822/32290> - IF: 3,664 - GCEP

Stability and Optimality of Solutions to Differential Inclusions via Averaging Method. R. Gama, and G. Smirnov. Set-Valued Var. Anal, 22 (2014) 349-374. - IF=0.918 – GCEP

6.8.3.2 Conference Proceedings published in ISI Journals

High-Precision Single-Input Control of Relative Motion in Spacecraft Formation. A. Guerman, M. Ovchinnikov, G. Smirnov, S. Trofimov. Acta Astronautica, 94 (2014) 375–382. - IF: 0.816 – GCEP

A versatile Fluorescence Lifetime Imaging System for scanning large areas with high time and spatial resolution, Bernardo, C; Belsley, M; Gomes, EDM; Goncalves, H ; Isakov, D; Liebold, F; Pereira, E; Pires, V; Samantilleke, A; Vasilevskiy, M; Schellenberg, P, SECOND INTERNATIONAL CONFERENCE ON APPLICATIONS OF OPTICS AND PHOTONICS, Proceedings of SPIE 9286 (2014) 928637 DOI:10.1117/12.2063940 FAMO/GCEP/FCD

Dynamics of two-dimensional electron gas in non-uniform magnetic field. O. G. Balev and I. A. Larkin. J. Phys.: Journal of Physics: Conference Series, 510 (2014) 012034 (doi:10.1088/1742-6596/510/1/012034). (GCEP)

Near-field resonant energy transfer between spherical quantum dots. Filipa C. R. Peres and Mikhail I. Vasilevskiy. Proc. SPIE, 9286 (2014) 92860P (doi:10.1117/12.2060888) <http://hdl.handle.net/1822/32168> (GCEP)

Optical response of fractal aggregates of polarizable particles. R. M. S. Pereira, J. N. P. Borges, P. A. S. Pereira, G. V. Smirnov, F. Vaz, A. Cavaleiro, and M. I. Vasilevskiy. Proc. SPIE, 9286 (2014) 92865M (doi:10.1117/12.2060292) <http://hdl.handle.net/1822/31976> (GCEP, GRF)

6.8.3.3 Books and Book chapters



Optical Properties of Bulk and Nanocrystalline Cadmium Telluride. Yuriel Núñez Fernández and Mikhail I. Vasilevskiy. In: "Cadmium Telluride Quantum Dots: Advances and Applications", eds. J. Donegan and Yu. Rakovich, Pan Stanford Publishing, USA, 2014 (ISBN 978-981-4316-05-7). Chapter 1, pp. 1-22. <http://www.crcpress.com/product/isbn/9789814316057>

6.8.3.4 Master theses in progress in 2014

Author: João Tiago Costa Silva

Supervisor: Nuno Peres, Ricardo Ribeiro

Title: Propriedades eletrónicas e óticas de dicalcogenetos de metais de transição

Develloping since October 2013 at ECUM

Author: Luís Pedro Monteiro Gonçalves

Supervisor: Pedro Alpuim, Carlos Tavares

Title: Superfícies fotocatalíticas sobre grafeno

Develloping since October 2013 at Engineering School

6.8.3.5 Ph.D Theses in progress in 2014

Author: Filipe André Peixoto Oliveira

Supervisor: Mikhail Vasilevskiy, Fátima Cerqueira, Jorg Scgulze, Univ.Estugarda (Germany)

Title: Photonic integrated circuit (PIC) devices for inter-chip optical communication using GsSn alloy layers grown on Silicon substrates

Develloping since 2010 at ECUM

Author: Flávio Luís Portas Pinheiro

Supervisor: Jorge Pacheco (DMAT), Nuno Peres

Title: Caracterização de processos de auto-organização em redes complexas adaptativas

Develloping since 2012 at ECUM

Author: Bruno Amorim

Supervisor: Francisco Guinea (Univ. Autónoma de Madrid), Nuno Peres

Title: Tailoring the opto-electronic properties of grapheme by mechanical deformations

Develloping since 2012 at U A Madrid

Author: George Luiz Machado Junior

Supervisor: Pedro Alpuim

Title: Dispositivos nanoeletrónicos de grafeno para aplicações em biossensores e em electrónica flexível

Develloping since January 2013 at Engineering School

6.8.3.6 Master theses completed in 2014

Author: Paulo André Gonçalves

Supervisor: Nuno Peres, João Lopes do Santos (Univ. Porto)

Title: Efeitos plasmónicos em grafeno

Terminated October 2014 at UP



6.8.3.7 Ph.D Theses in completed in 2014

Author: Emílio Marins Vieira Pinto

Supervisor: João Pedro Alpuim

Title: Células solares de filme fino de silício depositadas sobre substratos flexíveis

Terminated at December 2014 at ECUM

6.8.4 Other scientific activities

6.8.4.1 Invited Lectures/seminars delivered by members of the group, in national or international

Absorption and emission of light in ensembles of nanocrystal quantum dots: electromagnetic coupling effects. M. I. Vasilevskiy. V Conf. on Physical and Physico-chemical Foundations of Ion Implantation, Nizhniy Novgorod, Russia, October 27-th - 31-st, 2014.

Basic Notions of Graphene Physics. N. M. R. Peres. 1-st Spinograph School, Braga, Portugal, 25 a 28 de Março 2014.

Collective effects in absorption and emission of light in ensembles of nanocrystal quantum dots. M. I. Vasilevskiy. II Int. Conf. on Applications of Optics and Photonics (AOP2014), Aveiro, Portugal, May 26-30-th, 2014.

Extraordinary localization of TE-waves on graphene", M. I. Vasilevskiy. XVIII International Symposium "Nanophysics & Nanoelectronics. Nizhny Novgorod, Russia, March 10-14-th, 2014.

Full relativistic calculations on 2D materials. Workshop on Correlations, criticality, and coherence in quantum systems, R. M. Ribeiro. Évora, Portugal, 6-10 de Outubro.

Manipulating terahertz radiation in graphene. N. M. R. Peres. 5-th International Conference on Advanced Nanomaterials, Aveiro, Portugal, 2 a 4 de Julho de 2014.

Manipulating terahertz radiation in graphene. N. M. R. Peres. UP SPIE Student Chapter – One day meeting: Let's Talk about Science, Porto, Portugal, 14 de Novembro de 2014.

Nonlinear surface polaritons in graphene metamaterials. Yu. V. Bludov. III Dynamics Days South America, Viña del Mar, Chile, 3-7 November, 2014.

Vanishing spin stiffness in the spin-1/2 Heisenberg chain for any nonzero temperature. "NORDITA program on Quantum Engineering of States and Devices", J. M. Carmelo. Stockholm, Sweden, 24 August - 5 September 2014.

Variational Problems of Plastic Surgery. G. Smirnov. EURO Mini-conference on Optimization in the Natural Sciences, Aveiro, Portugal, February 5-9, 2014.

6.8.5 Funded Projects Ongoing

Title: Variant – Análise Variacional: Teoria e Aplicações

Reference: PTDC/MAT/111809/2009

Project Coordinator: Gueorgui Smirnov

Funding awarded: 22.248.00 Euros



Start Date: April 2011

Duration: 3 Years

Title: Estruturação Funcional, Interacção entre Partículas e Transferências de Energia em Conjuntos de Pontos Quânticos Nanocristalinos

Reference: PTDC/FIS/113199/2009

Project Coordenator: Mikhail Vasilevskiy

Funding awarded: 141.247.00 Euros

Start Date: February 2011

Duration: 3 Years

Title: Construction of a chip-scale SERF-type atomic magnetometer

Reference: PTDC/FIS/122689/2010

Project Coordenator: José Carlos Viana Gomes

Funding awarded: 79000.00 Euros

Start Date: February 2011

Duration: 3 Years

Title: Modos guiados em estruturas com simetria paridade tempo

Reference: PTDC/FIS-OPT/1918/2012

Project Coordenator: Yuliy Bludov

Funding awarded: 7080.00 Euros

Start Date: June de 2013

Duration: 2 Years

Title: NanoCIS – Development of a new generation of CIGS- based solar cells

Reference: FP7-People-2010-IRSES

Coordinator: Anura Samantilleke

Funding: 105.000.00 Euros

Starting date: 2011

Duration: 4 Years

Title: Graphene Flagship

Reference: FP7-ICT-2013-FET-F (604391)

Coordinator: Nuno Peres

Funding: 275520.00 Euros

Starting date: 2013

Duration: 3.5 Years

Title: Estados quânticos emergentes de novos materiais 2D

Reference: EXPL/FIS-NAN/1728/2013

Coordinator: Nuno Peres

Funding: 7572.00€

Starting date: 10-03-2014

Duration: 1 ano

Title: VAPS – Abordagem variacional para cirurgia plástica

Reference: EXPL/MAT-NAN/0606/2013

Coordinator: Gueorgui Smirnov

Funding: 17016.00€

Starting date: 01-01-2014

Duration: 1 ano e meio



6.8.6 Projects without funding to the Center of Physics

Chinese-Portuguese CSRC-Portugal Project “Correlations and Topology in Quantum Matter”, funded by the CSRC (Beijing, China, URL: <http://www.csrc.ac.cn>),

Funfing: 79136,00 €

Coordinator: J. M. Carmelo

Title: Designing novel materials for nanodevices: From Theory to Practice”,

Reference: COST Action MP0901, NanoTP

Coordinator: R. Ribeiro e A. G. Rolo

Title: “Many body interaction effects in nanostructures combining semiconductor quantum dots with degenerate electron systems” (Complementary support scheme of FCT to the Marie Curie Actions),

Reference: “Welcome II” Research Project DFRH/WIIA/64/2011

Coordinator: I. Larkin

Ends in 2015

6.8.7 Other information

6.8.7.1 Other Conference Presentations given by members of the group in national or international conferences

International

Oral

Absorption and emission of light in ensembles of nanocrystal quantum dots: electromagnetic coupling effects. M. I. Vasilevskiy. V Conf. on Physical and Physico-chemical Foundations of Ion Implantation, Nizhniy Novgorod, Russia, October 27-th - 31-st, 2014.

Dark solitons in PT-symmetric coupled waveguides. Yu. Bludov, V. Konotop, B. Malomed. The 5th International Conference on Metamaterials, Photonic Crystals and Plasmonics -META14, Singapore, May 20 – 23, 2014.

Effect of argon ion energy on the quality of Hot-Wire CVD grown silicon-nitride permeation barriers. P. Alpuim, S. Majee, M. F. Cerqueira, B. Geffroy, Y. Bonnassieux, J. E. Bourée. HWCVD-8, Braunschweig, Germany, October 13-16, 2014.

Extraordinary localization of TE-waves on graphene. Yu. Bludov, D. Smirnova, Y. Kivshar, N. Peres, M. Vasilevskiy. Graphene2014, Lanzarote, Spain, 18 - 21 February 2014.

Extraordinary localization of TE-waves on graphene. Yu. Bludov, D. Smirnova, Y. Kivshar, N. Peres, M. Vasilevskiy. The 5th International Conference on Metamaterials, Photonic Crystals and Plasmonics -META14, Singapore, May 20 – 23, 2014.



Extraordinary localization of TE-waves on graphene", XVIII International Symposium "Nanophysics & Nanoelectronics. Yu. V. Bludov, D. A. Smirnova, Yu. S. Kivshar, N. M. R. Peres, and M. I. Vasilevskiy, Nizhny Novgorod, Russia, March 10-14-th, 2014

Growth and overgrowth of few monolayers of Sn on Ge with molecular beam epitaxy. F. Oliveira, Inga Fischer, Stefan Stefanov, Stefano Chiussi, M. F. Cerqueira, M. I. Vasilevskiy, and Jorg Schulze. E-MRS 2014 Fall Meeting - Warsaw, Poland, 15-19 September 2014 (presented by J. Schulze).

Interaction of soliton with an exceptional point in PT -symmetric coupler with a coupling defect. Yu. V. Bludov, C. Hang, G. Huang, V. V. Konotop, III Dynamics Days South America, Viña del Mar, Chile, 3-7 November, 2014.

Light transmission and reflection from a thin metallic film. I. Larkin. NanoPortugal 2014 Int. Conf. (NanoPt2014), Porto, February 12 – 14, 2014.

Optical response of fractal aggregates of polarizable particles", R. Pereira, J. Borges, P. Pereira, G.V. Smirnov, F. Vaz, A.Cavaleiro, Mikhaill Vasilevskiy, II International Conference on Applications in Optics and Photonics, AOP2014, Aveiro, Portugal, May 26 to 30, 2014. GRF, GCEP

Self-assembling tetrakis-Schiff base compounds for CNT reinforced composites: combined MD, DFT & charge transfer study, SV Pyrlin; NMD Hine; MMD Ramos; MV Escárcega-Bobadilla, GA Zelada-Guillén, Condensed Matter Conference, Paris, 2014.

Self-assembly of CdTe nanocrystals into fluorescent structures with electro-magnetic energy funneling properties, I. Moura, D. Melnikau, D. Savateeva, Y.P. Rakovich and M. I. Vasilevskiy, International Conference on Optics - ICO23, Santiago de Compostela, Spain, 26-29 August 2014.

Sub-wavelength confinement of nonlinear TE-polaritons on graphene", Yu. V. Bludov, D. A. Smirnova, Yu. S. Kivshar, N. M. R. Peres, and M. I. Vasilevskiy, International Conference on Optics - ICO23, Santiago de Compostela, Spain, 26-29 August 2014.

Variational Problems of Plastic Surgery. G. Smirnov. EURO Mini-conference on Optimization in the Natural Sciences, Aveiro, Portugal, February 5-9, 2014.

Why are 2D Dichalcogenides promising for light absorption applications? Ricardo Mendes Ribeiro. NanoTP: Final Scientific Meeting, Nantes, France, 2-5 Abril, 2014.

Exciton migration in self-assembled dendrite-type fractal superstructures of monodisperse Quantum Dots, César Bernardo, M. Belsley, Paulo Coutinho, Peter Schellenberg, Isabel Moura, Yuriel Núñez Fernández, Tobias Stauber, Mikhail Vasilevskiy, NanoPT2014 – International Conference in Nanoscience and Nanotechnology, Porto (Portugal), 12-14 February 2014; <http://hdl.handle.net/1822/28290>. FAMO/GCEP

Structural properties of PCMO thin films deposited on Lithium Niobate. I. T. Gomes, J. Rodolfo Alves, A. G. Rolo, C. T. Sousa, J. P. Araújo, B. G. Almeida. 13th European Vacuum Conference & 7th European Topical Conference on Hard Coatings, Aveiro, Portugal, 8 - 12 September 2014. (GCEP, FCD)

Optical response of fractal aggregates of polarizable particles. R. M. S. Pereira, J. N. P. Borges, P. A. S. Pereira, G. V. Smirnov, F. Vaz, A. Cavaleiro, and M. I. Vasilevskiy. II Int. Conf. on Applications of Optics and Photonics (AOP2014), Aveiro, Portugal, May 26-30-th, 2014. (GCEP, GRF)

Poster



Quantum Dot Sensitized Solar Cells with Cuprous Sulfide Counter Electrode, Nuno Marques Ferreira, César Bernardo, Isabel Moura, Paulo J. G. Coutinho, Anabela Rolo, Mikhail Vasilevskiy, Anura Samantilleke – E-MRS 2014 Fall Meeting, Warsaw (Poland), 15-19 September 2014. FAMO/GCEP (Poster)

Dynamics of a Quantum Dot due to Interaction with Surface Plasmons. I. Larkin. Workshop on Nanostructures for solar cells, INL, Braga, Portugal, October 2014.

Dynamics of a Quantum Dot in close proximity to a metal surface. I. Larkin. 8-th International Conference on Quantum Dots (QD - 2014), Pisa, Italy, May 2014

Laser patterning by crystallization and dopant activation of amorphous silicon thin films deposited on flexible plastic substrates. P. Alpuim, M.F. Cerqueira, J. Gaspar, H. Fonseca and J. Borme. HWCVD-8, Braunschweig, Germany, October 13-16, 2014.

Multiple Use of High Purity Copper Foils as Catalyst Substrates for Graphene Growth, G.M. Junior, P. Alpuim, M.F. Cerqueira, J. Borme, Graphene 2014, May 6-9 (2014), Toulouse, France

Near-field resonant energy transfer between spherical quantum dots. F. C. R. Peres and M. I. Vasilevskiy. II Int. Conf. on Applications of Optics and Photonics (AOP2014), Aveiro, Portugal, May 26-30-th, 2014.

Nonlinear surface polaritons, supported by graphene structures. Yu. V. Bludov, D. A. Smirnova, Yu. S. Kivshar, N. M. R. Peres, M. I. Valsilevskiy. Workshop on Correlations, Criticality, and Coherence in Quantum Systems, Évora, Portugal, 6-10 October 2014.

Magneto-optical study of undoped and Mn doped ZnO thin films. F. Oliveira, M. F. Cerqueira, M. I. Vasilevskiy, T. Viseu, J. Ayres de Campos, A. G. Rolo, I. Bogdanovic-Radovic and E. Alves. E-MRS 2014 Spring Meeting, Lille, France. 27-29 May 2014. (GCEP, FAMO)

Ferroelectric properties of Barium Titanate nanofibers. Pedro Sá, José Barbosa, Igor Bdikin, Bernardo Almeida, Anabela G. Rolo, Andrei Khoklin, Dmitry Isakov. 13th European Vacuum Conference & 7th European Topical Conference on Hard Coatings, Aveiro, Portugal, 8 - 12 September 2014. (GCEP, FCD)

Ferroelectric properties of Barium Titanate nanofibers", Pedro Sá, J. Barbosa, I. Bdikin, B. Almeida, A.G. Rolo, A. Khoklin, D. Isakov, E-MRS 2014 Spring meeting, May 26-30, Lille, France, (2014), GCEP,FCD

Production of a touch sensor based on anodic aluminum oxide (AAO) structures". J.O. Carneiro, F. Machado, C. Silva, D. Silva, A. Samantilleke, S. Lanceros-Mendez, V. Teixeira. 13th European Vacuum Conference, 8-12 September 2014, Aveiro, Portugal.

TiO₂:Nb Transparent Conductive Thin Films Treated by a Post Hot-wire Annealing in a Reducing H₂ Atmosphere, Carlos J. Tavares, Maria V. Castro, Luis Rebouta, Pedro Alpuim, Fatima Cerqueira, Eduardo Alves, Nuno Barradas , International conference on metallurgical coatings and thin films 2014 (ICMCTF'2014), April 28 – May 2 2014, San Diego CA, United States. GRF, GCEP.

TiO₂:Nb transparent conductive thin films treated by a post hot-wire annealing in a reducing H₂ atmosphere, Carlos J. Tavares, Maria V. Castro, Luis Rebouta, Pedro Alpuim, Fatima Cerqueira, Eduardo Alves, Nuno Barradas, European Conference on Surface Science (ECOSS30), August 31-September 5, Antalya, Turkey. GRF, GCEP



6.8.8 Future Research

Future research falls into four strategic lines for the Center of Physics of the University of Minho and Porto (CF-AUP): (i) Plasmonics and coupled plasmon modes in nanostructures, (ii) Sensors and actuators, (iii) Hybrid bio-nanosystems based on self-assembled structures, quantum dots, plasmonic and magnetic nanoparticles, (iv) Quantum Physics in Condensed Matter Theory.

The theoretical studies will be dedicated to: (1) Graphene-based nanostructures with extension to other two-dimensional materials (dichalcogenides of transition metals), including analysis of new concepts and modelling of operation of (bio) sensors and photodetectors for the THz (graphene) and visible (WS₂ and other two-dimensional semiconductors) spectral regions; (2) Electronic spectra and excitonic effects in the emerging two-dimensional semiconductors (dichalcogenides) using DFT and analytical methods; (3) Structures based on nanocrystalline quantum dots involving plasmonic substrates (in particular, graphene) coupled by electromagnetic interaction, with emphasis on energy transfer processes and photon conversion and including its thermodynamic analysis; (4) Composite materials involving metal nanoparticles with different geometry and topology, in particular, the analysis and modelling of potential applications in sensors; (5) Mathematical optimisation of the optical response of devices based on plasmonic nanostructures based ("gratings" and ensembles of polarisable particles).

On the experimental side, efforts will be devoted to: (6) Implementation of (bio-) sensors whose operating principle involves surface plasmons in graphene-based structures (nanoribbons, microfluidic channels covered with a sheet of graphene, gratings, etc.) using the facilities and infrastructure of the INL; (7) Synthesis and studies of self-organised structures based on quantum dots, formed on plasmonic platforms (such as graphene and dielectric films doped with metal nanoparticles), using time resolved (photoluminescence, PL) and in steady-state (absorption, PL and Raman) spectroscopic techniques; (8) Continuation of development of quantum dot sensitised solar cells and the analysis and evaluation of the potential impact of the energy transfer effect on the increase of the device output; (9) Studies of photothermal effects in composite materials with metallic nanoparticles and evaluation of their thermal properties using the mirage effect .



6.9 Group of Optics and Vision Science (OCV)

6.9.1 Summary description of the scientific work carried out by the group in 2014

- Advances in computational determination of the theoretical value of the "color volume" for observers with alterations in color perception and spectrum of light that maximizes the Roesch-MacAdam parameter;
- Development of functional visual training techniques in elite athletes, particularly the reaction time, peripheral awareness and decision making process;
- Measurement and characterization "in vivo" of ocular aberration in the dynamics of accommodation;
- Characterization of the clinical performance of new types of contact lenses and their interference with the anterior ocular surface;
- The use of biomarkers to quantify the effects on vision of optical devices;
- Study of the parameters can influence the onset and development of myopia in particular the importance of peripheral refraction;
- Modelization of the myopic eye.

6.9.2 Updated composition of the group

Research Group Title	Optics and Vision Sciences
Principal investigator	Jorge Jorge
Research area	Optics, Optometry and Vision Sciences
Group Members	<p><u>Effective members:</u></p> <p>Alberto Diaz Rey MD PhD, Assistant professor Ana Pinho PhD, Research and Teaching Assistant</p>



António Baptista PhD, Assistant Professor
António Queirós PhD, Assistant professor
Filipe Costa PhD, Assistant professor
Filipe Macedo PhD, Assistant professor
Jorge Jorge PhD, Assistant professor
José Meijome PhD, Associated professor with Habilitation
Madalena Lira PhD, Assistant professor
Sandra Franco PhD, Assistant professor
Sérgio Nascimento PhD, Associate professor with Habilitation
João Linhares – PhD, Assistant Professor

Associate members:

Borges de Almeida – Retired Full professor
Vasco de Almeida – Assistant professor at UBI

Colaborator

Paulo Rodrigues Botelho Fernandes - Pos Doc (since November)

Ph.D and Other Research Students:

Zita Esteves, PhD student
Miguel Ribeiro, PhD student
Alberto Manuel, PhD student
Kishor Sapktota, PhD student
Helena Neves, PhD student
Sofia Matos, research assistant (BI)

6.9.3 Scientific Production

6.9.3.1 Regular Articles Published in ISI Journals

Best lighting for visual appreciation of artistic paintings—experiments with real paintings and real illumination. Sérgio MC Nascimento, Osamu Masuda. Journal of the Optical Society of America A, 31(4), 214-219(2014). - IF 1.448 – OCV

Changes in spatial extent and peak double optical density of human macular pigment with age. António Baptista, Sérgio MC Nascimento. Journal of the Optical Society of America A, 31(4), 87-92 (2014). - IF 1.448 – OCV

Clinical performance of a new hybrid contact lens for keratoconus Carracedo G, González-Méijome JM, Lopes-Ferreira D, Carballo J, Batres L. Eye & Contact Lens. 2014;40:2-6. - IF: 1.679 – OCV

Computing retinal contour from optical biometry. Faria-Ribeiro M1, López-Gil N, Navarro R, Lopes-Ferreira D, Jorge J, González-Méijome JM.; Optom Vis Sci. 2014 Apr;91(4):430-6. doi: 10.1097/OPX.0000000000000225. - IF: 2,038 – OCV

Corneal biomechanical properties in different ocular conditions and new measurement techniques. Garcia-Porta N, Fernandes P, Queiros A, Salgado-Borges J, Parafita-Mato M, González-Méijome JM. ISRN Ophthalmol. 2014 Mar 4;2014:724546. doi: 10.1155/2014/724546. eCollection 2014. Review. NO IF – OCV



Corneal cross-linking for acanthamoeba keratitis in an orthokeratology patient after swimming in contaminated water. Arance-Gil A, Gutiérrez-Ortega R, Villa-Collar C, Nieto-Bona A, Lopes-Ferreira D, Gonzalez-Mejome JM. Contact Lens Anterior Eye 2014; 37:224-7. - IF: 2.000 – OCV

Energy transfer via exciton transport in quantum dot based self-assembled fractal structures. C. Bernardo; I. Moura, Yu. Nuñez Fernandez; E. Pereira; P. Coutinho; A. Garcia; P. Schellenberg, M. Belsley, M. Costa, T. Stauber, and M. I. Vasilevskiy, J. Phys. Chem. C 118 (2014) 4982 - 4990. IF: 4.835. <http://hdl.handle.net/1822/30144>. - IF:4,835 - GCEP, FAMO, OCV

Errors associated with IOLMaster biometry as a function of internal ocular dimensions,.Faria-Ribeiro M, Lopes-Ferreira D, López-Gil N, Jorge J, González-Méijome JM.; J Optom. 2014 Apr-Jun;7(2):75-8. doi: 10.1016/j.joptom.2013.12.005. Epub 2014 Jan 28. - NO IF – OCV

Influence of environmental factors in the in vitro dehydration of hydrogel and silicone hydrogel contact lenses. Martín-Montañez V, López-Miguel A, Arroyo C, Mateo ME, González-Méijome JM, Calonge M, González-García MJ. Journal of Biomedical Materials Research: Part B - Applied Biomaterials. 2014; 102:764-71. - IF: 2.328 – OCV

Intraocular pressure measurement with ocular response analyzer over soft contact lens. Sapkota K, Franco S, Lira M. Contact Lens &Anterior Eye.;37 (2014):415-419. - IF: 2 – OCV

Microtopographic non-invasive inspection for determining roughness parameters of dental biomaterials; Fernández-Oliveras, A., Costa, M.F.M., del Mar Pérez, M.; Optica Pura y Aplicada 47 (2), pp. 131 (2014). OCV

Modern scleral contact lenses: a review. van der Worp E, Bornman D, Lopes-Ferreira D, Faria-Ribeiro M, Garcia-Porta N, Gonzalez-Mejome JM. Contact Lens Anterior Eye 2014;37:240-50. - IF: 2.000 – OCV

Optical and electrical behavior of organic/inorganic hybrid with embedded gold nanoparticles" S. D. F. C. Moreira, J. P. B Silva, Carlos J. R. Silva, Manuel F. M. Costa, M. J. M. Gomes J Sol-Gel Science and Technology, Vol. 69, p.52–60 (2014) - IF: 1.547 - FMNC OCV

Oxygen and ionic transport in hydrogel and silicone-hydrogel contact lens materials: an experimental and theoretical study. Pozuelo J, Compañ V, González-Méijome JM , González M, Molla S. Journal of Membrane Science 2014;452:62-72. - IF: 4.908 – OCV

Oxygen Diffusion and Edema with Modern Scleral Rigid Gas Permeable Contact Lenses. Compan V, Molla S, Peixoto-de-Matos S.C, Oliveira C, Gonzalez-Mejome JM. Invest Ophthalmol Vis Sci. 2014;55:6421-9. - IF: 3.661 – OCV

Peripheral myopization and visual performance with experimental rigid gas permeable and soft contact lens design. Pauné J, Queiros A, Quevedo L, Neves H, Lopes-Ferreira D, González-Méijome JM. Cont Lens Anterior Eye. 2014 Dec;37(6):455-60. doi: 10.1016/j.clae.2014.08.001. - IF: 2 – OCV

Robust Single Trial Identification of Conscious Percepts Triggered by Sensory Events of Variable Saliency. Marta Teixeira, Gabriel Pires, Miguel Raimundo, Sérgio MC Nascimento, Vasco Almeida, Miguel Castelo-Branco, PLOS ONE, Volume 9, Issue 1, e86201(2014). - IF 3,534 – OCV

Smartphone, tablet computer and e-reader use by people with vision impairment. Crossland, M. D., S Silva, R., & Macedo, A. F. (2014).Ophthalmic and Physiological Optics, 34(5), 552-557. - IF: 2,664 – OCV



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Tantalum oxynitride thin films: mechanical properties and wear behaviour dependence on growth conditions, D. Cristea, A. Crisan, D. Munteanu, M. Apreutesei, M.F. Costa, L. Cunha. Surf. Coat. Technol. 258 (2014) 587-596. - IF: 2.199 - GRF OCV

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6.9.3.2 ISI Conference Proceedings published in Conference books

Light: an experiments based learning approach with primary school children", Cádia Abreu; Silvana Noversa ; Paulo Varela ; Manuel F. Costa; 12th Education and Training in Optics and Photonics Conference; Manuel F. M. Costa, Mourad Zghal (eds.); Proceedings of SPIE Vol. 9289 (SPIE, Bellingham, WA, 2014), 92892N (2014). ISI OCV

Why do shadows change length? An IBSE approach with primary school children"; Paulo Varela, Silvana Noversa, Manuel F. M. Costa; Second International Conference on Applications of Optics and Photonics, edited by Manuel Filipe P. C. Martins Costa, Rogério Nunes Nogueira, Proceedings of SPIE Vol. 9286 (SPIE, Bellingham, WA, 2014), 92862J, pp. 1-7 (2014). ISI OCV

ETOP, the reference conference in Education and Training in Optics and Photonics. An overview of the 12th edition", Manuel F. M. Costa; Optics Education and Outreach III San Diego, California, United States, 18 - 20 August 2014, Proceedings of SPIE Vol. 9188 (SPIE, Bellingham, WA, 2014), 9188_1 (2014). ISI OCV

Investigating shadows: a pedagogical intervention project with primary school children", Silvana Noversa, Cádia Abreu, Paulo Varela and Manuel F. M. Costa; 12th Education and Training in Optics and Photonics Conference; Manuel F. M. Costa, Mourad Zghal (eds.); Proceedings of SPIE Vol. 9289 (SPIE, Bellingham, WA, 2014), 92892M (2014). ISI OCV

Optical non-invasive 3D characterization of pottery of pre-colonial Paranaiba valley' tribes"; Wagner Magalhães, Márcia Angelina Alves, Manuel F. M. Costa;Second International Conference on Applications of Optics and Photonics, edited by Manuel Filipe P. C. Martins Costa, Rogério Nunes Nogueira, Proceedings of SPIE Vol. 9286 (SPIE, Bellingham, WA, 2014), 928658, pp. 1-9 (2014). ISI OCV

Reflection of light: a teaching and learning activity with primary school children"; Paulo Varela, Cádia Abreu, Manuel F. M. Costa; Second International Conference on Applications of Optics and Photonics, edited by Manuel Filipe P. C. Martins Costa, Rogério Nunes Nogueira, Proceedings of SPIE Vol. 9286 (SPIE, Bellingham, WA, 2014), 92862I, pp. 1-6 (2014). ISI OCV

Teaching optical dimensional metrology of surfaces and international standards", Manuel F. M. Costa; 12th Education and Training in Optics and Photonics Conference; Manuel F. M. Costa, Mourad Zghal (eds.); Proceedings of SPIE Vol. 9289 (SPIE, Bellingham, WA, 2014), 92890F (2014). ISI OCV

6.9.3.3 Books and book chapters



A luz e as cores que vemos: cores e sombras In Manuel F Costa (ed) Pri-Sci-Net. Sandra Franco, Júlia Ayres de Campos. 45 atividades IBSE de aprendizagem das ciências para crianças dos 3 aos 11 anos 2014 ISBN 978-989-98032-9-9

Física em Physlets: Ilustrações, Explorações e Problemas para um Ensino Interativo em Física Introdutória; Paulo Simeão Carvalho, Edite Pereira Briosa, Wolfgang Christian, Mario Belloni, Manuel Filipe Costa; Edição Kindle (2014).

Silicone Hydrogel Materials for Contact Lens Applications", J.M. González-Méijome, J. González-Pérez, P. Fernandes, D. Lopes-Ferreira, S. Molla, V. Compañ. Chapter 19 of "Concise Encyclopedia of High Performance Hydrogels", M. Atul Tiwari and Mark D. Soucek (eds.), Scrivener Publishing LLC (John Wiley & Sons, Inc), p:293-308 (2014) (ISBN: 978-1-118-46965-1),
<http://onlinelibrary.wiley.com/doi/10.1002/9781118938478.ch19/summary>

An IBSE approach for teaching the concept of density in Preschool and Primary School". Hands-on Science. Science Education with and for Society; Machado, P. & Costa, M. F. "Costa, MF, Pombo, F. & Dorrio, BV (Eds.), International Hands-on Science Network. ISBN: 978-989-98032-5-1; pp. 72-81. (2014).

Creativity in Early Science Education. A Case Study". Hands-on Science. Science Education with and for Society; Marques, M. & Costa, M. F. "Costa, MF, Pombo, F. & Dorrio, BV (Eds.), International Hands-on Science Network. ISBN: 978-989-98032-5-1; pp. 42-49. (2014).

From teacher training to inquiry-based science teaching in primary school: analysis of the case "the reflection of light". Hands-on Science. Science Education with and for Society; Costa, MF, Pombo, F. & Dorrio, BV Varela, P. & Costa, M. F. " (Eds.), International Hands-on Science Network. ISBN: 978-989-98032-5-1; pp. 3-12. (2014).

Entrepreneurship in "Sciences": Mini-Entrepreneurs; Hands-on Science. Science Education with and for Society; V Martins, MFM Costa; Costa, MF, Pombo, F. & Dorrio, BV (Eds.), International Hands-on Science Network. ISBN: 978-989-98032-5-1; pp. 188-194. (2014).

Numbers and elementary concepts for biology students, Ana B. Norberto Ferreira, A. Mário Almeida, Isabel A-P Mina, Edited by Manuel Filipe P. C. Martins Costa, Pedro Miguel Marques Pombo, José Benito Vazquez Dorrio, Hands-on Science - Science Education with and for Society, pp 444-451. ISBN 978-989-98032-5-1

Science Education with and for Society; Hands-on Science. Science Education with and for Society; Costa, MF, Pombo, F. & Dorrio, BV MFM Costa; (Eds.), International Hands-on Science Network. ISBN: 978-989-98032-5-1; pp. Foreword. (2014).

Water Condensation: An Inquiry-Based Approach to Science Teaching with Primary School Children; Hands-on Science. Science Education with and for Society; P Varela, F Serra, MFM Costa; Costa, MF, Pombo, F. & Dorrio, BV (Eds.), International Hands-on Science Network. ISBN: 978-989-98032-5-1; pp. 33-41. (2014).

6.9.3.4 Edition of books

Pri-Sci-Net. Activități bazate pe investigație pentru copii preșcolari și din învățământul primar, din categoria de vîrstă 3 – 11 ani", Manuel F. M. Costa ed., International Hands-on Science Network. ISBN 978-989-8798-00-8 (formato eletrônico), 2014.

Second International Conference on Applications of Optics and Photonics, edited by Manuel Filipe P. C. Martins Costa, Rogério Nunes Nogueira, Proceedings of SPIE Vol. 9286 (SPIE, Bellingham, WA, 2014). ISSN: 0277-786X, ISBN: 9781628413618 (2014).



Hands-on Science. Science Education with and for Society. Costa, MF, Pombo, F. & Dorrio, BV (Eds.). International Hands-on Science Network. ISBN: 978-989-98032-5-1 (2014).

6.9.3.5 Master theses completed in 2014

Author: Alexandra Marina Silva Moreira

Supervisor: Sandra Franco

Title: A acomodação nas diferentes ametropias

Terminated May 2014 at ECUM

Author: Ana Isabel Perestrelo Fernandes

Supervisor: José Meijome, José Alberto Rey

Title: Efeito da Instilação Tópica de Fenilefrina nas Aberrações Oculares e Refração Objectiva e Subjectiva

Terminated November 2014 at ECUM

Author: Ana Paula Duarte Pinto Azevedo

Supervisor: Madalena Lira

Title: Relatório de Atividade Profissional

Terminated June 2014 at ECUM

Author: Angelina Soares Ferreira

Supervisor: Madalena Lira

Title: Relatório de atividade profissional

Terminated December 2014 at ECUM

Author: Annie Afonso Teixeira

Supervisor: António Macedo, António Baptista

Title: Auto percepção da função visual e acesso a cuidados visuais em lares de idosos no nordeste transmontano:
estudo piloto

Terminated December 2014 at ECUM

Author: Carla Patrícia Correia Fernandes

Supervisor: Jorge Jorge, Paulo Fernandes

Title: Análise da influência da concentração na velocidade de leitura

Terminated October 2014 at ECUM

Author: Carlos Manuel Lima Reis da Silva

Supervisor: António M G Baptista

Title: Relatório de Atividade Profissional

Terminated Cecember 2014 at ECUM

Author: Catarina da Conceição Freitas Vieira

Supervisor: Jorge Jorge, Paulo Fernandes

Title: Validação de um novo dispositivo de medida do tempo de reacção visual

Terminated October 2014 at ECUM

Author: Cátia Isabel Pereira Sousa

Supervisor: Madalena Lira, Sandra Franco



Title: Caracterização dos parâmetros da película lacrimal e da topografia na população adulta portuguesa
Terminated March 2014 at ECUM

Author: Conceição do Céu Cardoso da Silva
Supervisor: António Queirós, José Meijome
Title: Alterações Sazonais no Crescimento do Globo Ocular em Escolares do Ensino Primário
Terminated June 2014 at ECUM

Author: Filipa Manuela Silva Correia
Supervisor: José Meijome, António Queirós
Title: Crescimento do globo ocular em adolescentes dos 10 aos 16 anos
Terminated 2014 at ECUM

Author: José Carlos Ribeiro Silva
Supervisor: António Macedo, António Baptista
Title: Efeito da insuficiência de convergência sintomática (ICS) na velocidade de leitura/movimentos oculares numa população universitária jovem
Terminated April 2014 at ECUM

Author: Maria Francisca Pinto Peixoto
Supervisor: Madalena Lira, Sandra Franco
Title: Promover o uso saudável das lentes de contacto
Terminated April 2014 at ECUM

Author: Rute Juliana F. Macedo Araújo
Supervisor: José Meijome
Title: Avaliação In vitro e In vivo da desidratação de lentes de contacto, estabilidade lacrimal e qualidade óptica
Terminated December 2014 at ECUM

Author: Sara Patrícia Macedo Castro
Supervisor: Madalena Lira
Title: Relatório de atividade profissional
Terminated December 2014 at ECUM

Author: Ana Sofia Sousa
Supervisor: António Filipe Macedo
Title: Características Clínicas e Funcionais de uma População com Deficiência Visual
Terminated December 2014 at ECS

6.9.3.6 Ph.D. theses completed in 2014

Author: Ana Maria Pinho
Supervisor: Jorge Jorge, José Meijome
Title: Estudo da variação longitudinal da refração central e periférica e dos componentes ópticos oculares em miopes adolescentes e jovens adultos
Terminated May 2014 at ECUM



Author: Leticia Isla Paradelo

Supervisor: José Meijome, Jorge Jorge, David Madrid-Costa (Univ. Valencia – Espanha)

Title: Influência do Diâmetro Pupilar no Rendimento Visual e Óptico das Lentes de Contacto Multifocais

Terminated July 2014 ECUM

Author: Miguel Pablo R. Jiménez

Supervisor: José Meijome, Jacinto S. Rubido

Title: Comparison of Two Contact Lens Fitting Strategies for Keratoconus

Terminated December 2014 at ECUM

6.9.3.7 Master theses in progress in 2014

Author: Ana Catarina Costa Esteves

Supervisor: António Macedo, António Baptista

Title: Adaptação oculomotora em escotoma central simulado

Develloping since October 2013 at ECUM

Author: Ana Catarina Gonçalves Fernandes

Supervisor: António Queirós, José Méijome

Title: Alterações na biometria e na refração durante o ano letivo III

Develloping since 2014 at ECUM

Author: Ana de Fátima Pereira Meira

Supervisor: António M G Baptista

Title: Fatores atencionais na adaptação a escotoma central simulado

Develloping since October 2013 at ECUM

Author: Ana Inês Rei Silva

Supervisor: Sandra Franco

Title: Estudo de disfunções acomodativas numa população de não presbita

Develloping since October 2013 at ECUM

Author: Ana Lúcia Ribeiro Braga

Supervisor: Jorge Jorge, António Queirós

Title: Análise da prevalência da miopia em estudantes universitários

Develloping since 2013 at ECUM

Author: Ana Meira

Supervisor: António Macedo, António Baptista

Title: Fatores atencionais na adaptação a escotoma central simulado

Develloping since 2013 at ECUM

Author: Ana Rita Abreu

Supervisor: Sérgio Nascimento

Title: Realização de filme didático sobre as anomalias genéticas da visão das cores

Develloping since March 2014 at ECUM



Author: Ana Rita Araújo da Silva
Supervisor: Madalena Lira
Title: Lentes de contacto e soluções de manutenção: alterações na humectabilidade
Develloping since 2012 at ECUM

Author: Ana Sofia Costa Macedo
Supervisor: António Macedo, António Baptista
Title: História da Optometria em Portugal
Develloping since October 2013 at ECUM

Author: Andrea Cristina Coelho
Supervisor: Paula Sampaio (DB), Madalena Lira
Title: Avaliação da resposta inflamatória induzida por diferentes tipos de LC diárias
Develloping since October 2014 at ECUM

Author: Andreia Isabel Cardoso Matos
Supervisor: António M G Baptista
Title: Caraterização das necessidades visuais de árbitros de futebol
Develloping since October 2013 at ECUM

Author: Bárbara da Silva Borges
Supervisor: António Queirós, José Meijome
Title: Alterações na biometria e na refração durante o ano letivo II, em crianças
Develloping since 2013 at ECUM

Author: Catarina Esteves
Supervisor: Filipe Macedo, António Baptista
Title: Adaptação oclomotora em escotoma central simulado
Develloping since 2013 at ECUM

Author: Cátia Patrícia de Brito Lourenço
Supervisor: Madalena Lira
Title: Alterações da superfície ocular durante a gravidez
Develloping since October 2014 at ECUM

Author: Daniel Secundino Vilaça Vilarinho
Supervisor: António M G Baptista
Title: Efeito de crowding em diferentes zonas da retina
Develloping since October 2014 at ECUM

Author: Diana Clarisse Lourenço
Supervisor: Madalena Lira
Title: Relatório de actividade profissional
Develloping since January 2014 at ECUM

Author: Eduarda Cistina da Cruz Guimarães Duque
Supervisor: Madalena Lira, Elisabete Coutinho, Sandra Franco
Title: Avaliação da transmitância e sensibilidade visual ao contraste em lentes de proteção solar
Develloping since January 2014 at ECUM



Author: Eduardo Jorge Silvestre Ínsua Pereira

Supervisor: Madalena Lira

Title: Avaliação da performance clínica de lentes de contacto descartáveis em regime de uso diário

Develloping since January 2014 at ECUM

Author: Fátima Sampaio

Supervisor: José Meijome

Title: Relação entre Sinais e Sintomas em Pacientes com Disfunções da Visão Binocular, Acomodativas e Oculomotoras

Develloping since 2012 at ECUM

Author: Helena Manuel Ferreira Montenegro de Andrade

Supervisor: António Baptista, António Macedo

Title: Avaliação de parâmetros oculares em pacientes diabéticos

Develloping since October 2012 at ECUM

Author: Isabel Santos Fernandes

Supervisor: Madalena Lira

Title: Relatório de Atividade Profissional

Develloping since January 2014 at ECUM

Author: Ismael Araújo Neiva

Supervisor: Jorge M. M. Jorge

Title: Relatório de Atividade Profissional

Develloping since October 2014 at ECUM

Author: Jéssica Rafaela Moreira Gomes

Supervisor: Sandra Franco, Sérgio Nascimento

Title: Variação das aberrações oculares com a acomodação em tempo real

Develloping since October 2014 at ECUM

Author: João Pedro Marques Aniceto Santos

Supervisor: Madalena Lira, Sandra Franco

Title: Variação dos parâmetros acomodativos com a realização de tarefas em visão de perto

Develloping since November 2013 at ECUM

Author: José Duarte Cunha Gomes

Supervisor: José Meijome, Paulo Fernandes

Title: Profundidade de Foco Monocular e Binocular com Lentes de Contacto Multifocais de Adição Média e Alta

Develloping since 2013 at ECUM

Author: Laura Rico del Viejo

Supervisor: José Meijome, António Queirós

Title: Integrated Assessment of Tear Film with Tearscope, Corneal Topography and Optical Quality

Develloping since April 2014 at ECUM

Author: Liliana Reis

Supervisor: António Queirós, Jorge Jorge

Title: Influência da Iluminação na Medição da Pressão Intra-Ocular com Tonômetro de Sopro

Develloping since 2014 at ECUM



Author: Lúcia Maria Silva Ferreira
Supervisor: Sandra Franco
Title: Aberrações oculares em présbitas
Develloping since October 2014 at ECUM

Author: Luís Carlos Rodrigues Couto
Supervisor: Jorge Jorge, Paulo Fernandes
Title: Estudo do efeito dos prismas de base gémea na localização espacial
Develloping since October 2013 at ECUM

Author: Luís Filipe Proença de Oliveira
Supervisor: Jorge M. M. Jorge
Title: Relatório de Atividade Profissional
Develloping since October 2014 at ECUM

Author: Luís Miguel Castro Felgueiras Alves
Supervisor: António Macedo, António Baptista
Title: The natural history of PAL adaptation in naive users
Develloping since 2013 at ECUM

Author: Manuel Fernando Dias Vilas Boas
Supervisor: Madalena Lira
Title: Influência da utilização de suplementos vitamínicos nos parâmetros da película lacrimal e Sensibilidade Visual ao Contraste
Develloping since January 2014 at ECUM

Author: Maria de Fátima Teixeira Sampaio
Supervisor: José Meijome, Jorge Jorge
Title: Relação entre Sinais e Sintomas em Pacientes com Disfunções da Visão Binocular, Acomodativas e Oculomotoras
Develloping since 2013 at ECUM

Author: Maria Eduarda Tomás Martins
Supervisor: Sandra Franco, António Baptista
Title: A Visão Binocular na realização de tarefas de leitura
Develloping since October 2014 at ECUM

Author: Maria Helena A. Brito Lopez
Supervisor: António Queirós, José Meijome
Title: Alterações na biometria e na refração durante o ano letivo II, em jovens
Develloping since 2013 at ECUM

Author: Marisa Borges Ferreira
Supervisor: António Filipe Macedo
Title: Caracterização de alterações oculomotoras na fase inicial da esclerose múltipla
Develloping since November 2014 at ECUM

Author: Nádia Lurdes Machado Silva
Supervisor: António Macedo, António Baptista



Title: Efeito de combinações de cor de ecrãs na performance visual dos observadores
Develloping since October 2013 at ECUM

Author: Otilia Maria Gonçalves Lopes
Supervisor: Elisabete Coutinho, M. Elisabete Oliveira, Madalena Lira
Title: Estudo da adesão de proteínas a diferentes tipos de lentes de contacto
Develloping since 2012 at ECUM

Author: Patrícia Passos
Supervisor: José Méijome, António Queirós
Title: Alterações na biometria e na refração durante o ano letivo III
Develloping since 2014 at ECUM

Author: Paula Cristina Gonçalves Portela
Supervisor: Manuel Filipe Costa
Title: Ensino das Ciências no Ensino Básico, numa perspetiva IBSE - AR
Develloping since November 2013 at ECUM

Author: Pedro Ferreira
Supervisor: António M G Baptista
Title: Relatório de Atividade Profissional
Develloping since October 2013 at ECUM

Author: Raúl Alberto Correia de Sousa
Supervisor: Jorge M. M. Jorge
Title: Relatório de Atividade Profissional
Develloping since October 2013 at ECUM

Author: Rui Carlos de Oliveira Pinos Barros
Supervisor: Jorge M. M. Jorge
Title: Relatório de Atividade Profissional
Develloping since October 2013 at ECUM

Author: Rui Ferreira
Supervisor: A. Filipe Macedo, António Baptista
Title: Padrões oculomotores durante a leitura e a sua relação com os testes usados na prática clínica
Develloping since 2012 at ECUM

Author: Sabrina Silva Oliveira
Supervisor: António M G Baptista
Title: Characterization of vision and visual needs on elite football referees
Develloping since October 2013 at ECUM

Author: Susana Manuela Martins
Supervisor: António Filipe Macedo
Title: O efeito da polaridade do monitor durante a leitura de textos com escotoma central simulado
Develloping since November 2013 at ECUM

Author: Telma Isabel Peres Nunes
Supervisor: Madalena Lira



Title: Relatório de Atividade Profissional
Develloping since October 2013 at ECUM

Author: Vânia Manuela Paleja Costa
Supervisor: Jorge M. M. Jorge
Title: Relatório de Atividade Profissional
Develloping since October 2013 at ECUM

Author: Vera Mendinhas Loureiro
Supervisor: Jorge M. M. Jorge, António Queirós
Title: Alimentação e Miopia
Develloping since October 2013 at ECUM

6.9.3.8 Ph.D. theses in progress in 2014

Author: Alberto Manuel S. Augusto Alves Silva
Supervisor: Jorge Jorge, José Meijome
Title: Avaliação da adaptação a sistemas oftálmicos de adição progressiva para compensação da presbiopia
Develloping since 2011 at ECUM

Author: Daniela Lopes Ferreira
Supervisor: José Meijome, António Queirós
Title: Efeitos na refração periférica de dispositivos para o controlo da progressão da miopia
Develloping since September 2013 at ECUM

Author: Helena Isabel Ferreira Neves
Supervisor: José Meijome, António Queirós
Title: Analysis of light visual distortion and quality of vision with different multifocal lens designs for the compensation of presbyopia
Develloping since 2013 at ECUM

Author: João Paulo Morais da Costa
Supervisor: António Filipe Macedo,
Title: Modulating eye movements in neuro-ophthalmological conditions
Develloping since December 2014 at ECUM

Author: Kishor Sapkota
Supervisor: Madalena Lira, Sandra Franco
Title: Modulating eye movements in neuro-ophthalmological conditions
Develloping since December 2014 at ECUM

Author: Miguel António Faria Ribeiro
Supervisor: José Meijome, Jorge Jorge, Norberto López-Gil (Univ. Murcia)
Title: Alteração da refração periférica para retenção da progressão da miopia
Develloping since 2013 at ECUM

Author: Rui Jorge Ramoa Marques
Supervisor: Jorge Jorge, António Queirós



Title: Estudo da Influência da Luz no aparecimento e desenvolvimento da miopia em crianças
Develloping since 2014 at ECUM

Author: Santiago Escandón Garcia

Supervisor: José Meijome

Title: Neuroadaptação em cirurgia refrativa: Qualidade de Visão após a implantação bilateral de lentes Intraoculares em indivíduos Presbiopes
Develloping since September 2013 at ECUM

Author: Zita Quesado Esteves

Supervisor: M. Filipe Costa

Title: Atividades informais no ensino das Ciências nas Escolas

Develloping since 2009 at ECUM

Author: Ana Patrícia Marques

Supervisor: António Filipe Macedo, Rui Santana (UNL)

Title: Os custos da deficiência visual em Portugal

Develloping since 2013 at ENSP - UNL

Author: Elena Santolaria Sanz

Supervisor: Alejandro Cerviño Expósito (Univ. Valencia, Espanha), José Meijome

Title: Adaptation to light Distortion in Orthokeratology Patients

Develloping since June 2012 at Universidad de Valencia, Spain

Author: Nery García Porta

Supervisor: María Teresa R. Ares (Univ. Santiago, Espanha), José Meijome

Title: Interações Biológicas e Biomecânicas das Lentes de Contacto para Ortoqueratología na Superfície Ocular

Develloping since March 2011 at Universidad Santiago Compostela, Spain

Author: Vicente Salvador Martín Montañez

Supervisor: María González García Univ. Santiago, Espanha), José Meijome

Title: Influênciade los factores ambientales en la Superficie Ocular en usuarios de Lentes de contacto de hidrogel

Develloping since 2012 at Universidad Valladolid, Spain

6.9.4 Other scientific activities

6.9.4.1 Invited Lectures/seminars delivered by members of the group, in national or international

Alguns Desafios Atuais da Física na Área das Ciências da Visão. Gonzalez-Mejome JM. Ciclo de Conferências "Física às Quartas". Departamento de Física. Facultade de Ciências da Universidade do Porto. December 3rd, 2014.

Compensações óticas e visão periférica, António Queirós. VIII Colóquio de Optometria. Portugal. 2014. Covilhã, 25-26 de abril de 2014; NEOUBI - Nucleo de Estudantes Optometria Universidade Beira Interior.

Control de Miopía. Gonzalez-Mejome JM. II Jornadas Hispanolusas de la Visión. Lisboa, Portugal. November 8-9th, 2014.



Decoding the secret of confort: bulk properties. Gonzalez-Mejome JM. Netherlands Contact Lens Conference (NCC). Eindhoven, Netherlands. March 16-17, 2014.

Eficacia y seguridad de la ortoqueratología. Gonzalez-Mejome JM. Simposio de Ortoqueratología Nocturna. Madrid, Spain. October 4, 2014.

ETOP, the reference conference in Education and Training in Optics and Photonics. An overview of the 12th edition”, Manuel F. M. Costa; “SPIE Symposium2014 - Optics Education and Outreach III, San Diego, California, United States, 18 - 20 August 2014, Proceedings of SPIE Vol. 9188 (SPIE, Bellingham, WA, 2014)

Evidence for other contact lens strategies in myopia control, Netherlands Contact Lens Conference (NCC). Gonzalez-Mejome JM. Eindhoven, Netherlands. March 16-17, 2014.

Influência das compensações óticas na evolução da miopia, Queirós, António; Jorge Jorge. SIYO 2014- Congreso Internacional Online de Jóvenes Optometristas - del 11 al 27 de noviembre de 2014.. Espanha. 2014. Valencia; Homepage: <http://www.uv.es/siyo>; Universidad de Valencia, en colaboración con otras universidades españolas y extranjeras;

Medida de la distorsión luminosa en la Cirugía Implanto-refractiva premium. Gonzalez-Mejome JM, Peixoto-de-Matos SC, Ferreira-Neves H, Dias L, Queiros A, Salgado-Borges J . (Vision Sciences and Eye Research (ViSER) Conference. Santiago de Compomstela, Spain. November 22-23th, 2014.

Microtopographic characterization of arqueological ceramics”; Manuel F.M. Costa; “International Conference on Optics, Photonics & Photosciences (CIOFF), Hotel Nacional de Cuba, Habana, Cuba, 14-17 de outubro de 2014. Invited Lecture

New opportunities for orthokeratology: astigmatism, hyperopia, presbyopia and myopia control, Gonzalez-Mejome JM. Netherlands Contact Lens Conference (NCC). Eindhoven, Netherlands. March 16-17, 2014.

Nuevas tendencias en la prescripción de lentes de contacto, Gonzalez-Mejome JM. Congresso OPTOM2014. Madrid, Spain. April 4-6, 2014.

Optical Methods for Myopia Control. Gonzalez-Mejome JM, Queiros A, Jorge J, Fernandes P, Faria-Ribeiro M, Lopes-Ferreira D. (Vision Sciences and Eye Research (ViSER) Conference. Santiago de Compomstela, Spain. November 22-23th, 2014.

Orthokeratology: histological and physiological aspects, efficacy, safety and recovery, Gonzalez-Mejome JM. Netherlands Contact Lens Conference (NCC). Eindhoven, Netherlands. March 16-17, 2014.

Peripheral Refraction and Myopia Control. Gonzalez-Mejome JM. Global Special Lens Symposium (GSLS). Las Vegas, USA. January 23-27, 2014.

Prevalence of ametropia in subjects with intellectual disabilities, António M. G. Baptista; Filipa A. D. Oliveira; António F. Macedo; Pedro M. Serra. II International Conference on Applications of Optics and Photonics,Aveiro,2014.OCV

Refracción periférica en OKN, António Queirós. I Jornadas Clínicas de Ortoqueratología Nocturna. Espanha. 4 Outubro 2014; Universidad Complutense de Madrid - EuroOK;



Refracción periférica y su relación con la evolución de la miopía. António Queirós, 23º Congreso Internacional de Optometría, Contactología y Óptica Oftálmica, OPTOM 2014. Espanha. 2014. Colégio Optometría, Contactología y Óptica Oftálmica;

TFOS International Workshop on Contact Lens Discomfort. Global Special Lens Symposium (GSL). Gonzalez-Mejome JM. Las Vegas, USA. January 23-27, 2014.

6.9.5 Funded Projects Ongoing

Title: Prevalence and costs of visual impairment in Portugal: a hospital based studt

Reference: PTDC/DTP-EPI/0412/2012

Project Coordenator: Filipe Macedo

Funding awarded: 96533.00 Euros

Start Date: June de 2013

Duration: 2 years

Title: Modelização da percepção cromática de tricromatas anómalos e optimização da sua discriminação de objetos naturais com lentes coloridas

Reference: PTDC/mhc-pcn/4731/2012

Project Coordenator: Sérgio Nascimento

Funding awarded: 33745.00 Euros

Start Date: June de 2013

Duration: 2 years

Title: Coopervision

Project Coordenator: José Mejome

6.9.6 Projects without funding to the Center of Physics

Title: Colour and Space in Cultural Heritage (COSCH).

Reference: COST-Action TD 1201

Coordinator: Sérgio Nascimento National Representative, Member of the Management Committee and Vice-Chair of Working Group 1 Spectral object documentation.

Title: Second Language Sentence Processing: Syntactic Ambiguity Resulution in Late English Learners at Diferente Proficiency Levels

Reference: EXPL/MHC-PNC/0859/2013

Coordinator entity: Escola de Psicologia

Coordinator CFUM: Filipe Macedo

Title: Caraterization of visual and neuropsicological changes in early stages of multiple sclerosis

Networking Primary Science Educators as a means to provide training and professional development in Inquiry Based Teaching (PriSciNet) SECVS-083/2013 /



Reference: SiS-2010-2.2.1.1, CSA-GA-266647. 2011- 2014 – Europeu

Coordinator: Filipe Costa

Funding: 46813,82€

Start date: 01-01-2014

Duration: 2 anos

Title: Projetc Creative Little Scientists.

Reference: SIS-CP-2011-289081. 2011-2014 – Europeu

Coordinator: Filipe Costa

Funding: 40260,34€

Start date: 01-01-2014

Duration: 1 ano

6.9.7 Other information

6.9.7.1 Other Conference Presentations given by members of the group in national or international conferences

International

Oral

Accommodative response to different fixation targets. (Vision Sciences and Eye Research (ViSER) Lopes-Ferreira D, Osorio R, Gonzalez-Mejome JM. Conference. Santiago de Compomstela, Spain. November 22-23th, 2014.

Cambios en la biomecánica corneal con dos modalidades diferentes de uso LC. (Vision Sciences and Eye Research (ViSER) Rico-del-Viejo L, Garcia-Porta N, Faria-Ribeiro A, González-Pérez J, Queiros A, Gonzalez-Mejome JM. Conference. Santiago de Compomstela, Spain. November 22-23th, 2014.

Characterization of vision of elite football referees & Assistant Referees, António M. G. Baptista; Sabrina S. Oliveira; Nuno Catarino; António F. Macedo; Pedro M. Serra; Brendan T. Barrett. Science and Practice of Sports Refereeing, Clermont-Ferrand, 2014

Curvas de desfocado com lentes de contato multifocais e "mix and match", Neves, Helena; Rico-del-Viejo, Laura; Queirós, António; Fernandes Paulo; González-Méijome JM. Vision Sciences and Eye Research Meeting, ViSER 2014. Espanha. 2014. Sociedad Gallega de Optometria Clínica (SGOC).

Do snails prefer cabbage or lettuce?; Victor Martins and Manuel F.M. Costa; "2nd International Conference PriSciNet. How can we engage children in primary science inquiry?"; Old University Building Valletta, Malta, 16 a 18 de julho de 2014.

EFFECTO DE LA PIO Y EL ECC EN LOS PARÁMETROS BIOMECÁNICOS DE CORVIS ST, José Salgado-Borges; Filipe Esteves; Patrícia Neves; Helena Ferreira-Neves; Laura Rico-del-Viejo; José González-Méijome 5º Congreso ASETCIRC. Madrid, 14-15 de novembro de 2014.

Entrepreneurship in "Sciences": Mini-Entrepreneurs; "V Martins, MFM Costa; 11th International Conference on Hands-on Science. Science Communication with and for Science", University of Aveiro, Aveiro, Portugal, 21-25 de julho de 2014.



Exposure time and illuminance effect on photostress recovery time, Raul A. R. C. Sousa; Ana Silva; Vânia Fernandes; Juan Arroyo; António F. Macedo; António M. G. Baptista, II International Conference on Applications of Optics and Photonics,Aveiro,2014.

IBSE and Science fairs"; Pri-Sci-Net Third International Training Course on Informal and Non-Formal Learning in IBSE at Primary Level; Manuel F. M. Costa, Zita Esteves; "University of Education of Salzburg, Austria, 17-20 de fevereiro de 2014.

Influênciadas compensações óticas na evolução da miopia, Queirós, António; Jorge Jorge.. SIYO 2014- Congreso Internacional Online de Jóvenes Optometristas - del 11 al 27 de noviembre de 2014.. Espanha. 2014. Valencia; Homepage: <http://www.uv.es/siyo>; Universidad de Valencia, en colaboración con otras universidades españolas y extranjeras;

Light Distortion Analysis: Psychophysical Perspective, Gonzalez-Mejome JM. ESCRS Meeting. London. September 14th, 2014. Director: Prof. José Salgado Borges.

Mix and Match" vs Symmetrical Adaptation of Multifocal Soft Contact Lenses in Presbyopes Neves, Helena; Rico-del-Viejo, Laura; Queirós, António; Fernandes Paulo; González-Méijome JM. CIOCV 2014-XI Congresso Internacional de Optometria. Portugal. 2014. Universidade do Minho, Portugal.

Patrones refractivos periféricos con diferentes lentes de contacto, Queirós, António; Jorge Jorge; Lopes-Ferreira, Daniela; Faria-Ribeiro, Miguel; Peixoto-de-Matos, Sofia Claudia; González-Méijome JM. 23º Congreso Internacional de Optometría,

Contactología y Óptica Oftálmica, OPTOM 2014. Espanha. 2014. Colégio Optometría, Contactología y Óptica Oftálmica;

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Refracción periférica y su relación con la evolución de la miopía António Queirós, 23º Congreso Internacional de Optometría, Contactología y Óptica Oftálmica, OPTOM 2014. Espanha. 2014. Colégio Optometría, Contactología y Óptica Oftálmica;

Relationship of goblet cell density with tear function tests and ocular surface physiology. Sapkota K, Franco S, Sampaio P, Lira M Universidade de Minho. Congresso Internacional de Optometria e Ciências da Visão, 24 -25 maio 2014, Portugal, 2014.

SINTOMATOLOGIA VISUAL SUBJETIVA TRAS CIRUGIA DE CATARATA PREMIUM Prof. Jose Manuel Salgado Borges

The concept of density: An IBSE approach for preschool and primary school; "Paulo Machado and Manuel F.M. Costa; 2nd International Conference PriSciNet. How can we engage children in primary science inquiry?"; Old University Building Valletta, Malta, 16 a 18 de julho de 2014.

Three month soft contact lens wear changes conjunctival cytology. Sapkota K, Franco S, Sampaio P, Lira M Annual meeting of the American Academy of Optometry, Denver, USA, 12-14 november 2014



Validación de un sistema badal binocular para medición de curvas de desenfoque, Neves H et al. Congresso OPTOM2014. Madrid, Spain. April 4-6, 2014.

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Adhesion of Pseudomonas aeruginosa to hydrogel contact lenses: roughness and wettability effect. Maria J. Giraldez, Maria A. Bermudez, Madalena Lira, M. Elisabete C. D. Real Oliveira, Eva Yebra-Pimentel. Universidade de Minho. Congresso Internacional de Optometria e Ciências da Visão, 24 -25 maio 2014.(OCV, FAMO)

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Variation of surface roughness and wettability of daily disposable contact lens with wear, Maria J. Giraldez, Maria A. Bermudez, Madalena Lira, M.E.C.D. Real Oliveira, Eva Yebra-Pimentel, 11th Congresso International de Optometria e Ciências da Visão, Abril 2014. FAMO/OCV. (Poster)

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Efecto de la aberración esférica en el tamaño del halo sin y con ciclopléjico con pupila natural y con pupila dilatada, Araújo R et al. Congresso OPTOM2014. Madrid, Spain. April 4-6, 2014.

Effect of soft contact lenses wear on intraocular pressure. Kishor Sapkota, Sandra Franco, Madalena Lira. Congresso Internacional de Optometria e Ciências da Visão, Universidade de Minho, 24 -25 maio 2014. (OCV)

Effect of Spherical Aberration in Accommodation and Subjective Focus under Normal and Reverse Contrast Stimulus. Peixoto-de-Matos SC et al. Association for Research in Vision and Ophthalmology (ARVO) Meeting. Orlando. May 4-7th, 2014.

Emergence of intravitreal injections in a National Health System. Ana P. Marques; António F. Macedo; Amândio A. Rocha-Sousa; Julian Perelman; Antonio M. G. Baptista; Rui Santana: 2002-2012, ARVO 2014, Orlando, 2014. OCV

EYE GROWTH IN CHILDREN FROM 6 TO 9 YEARS. Conceição, Silva; Filipa, Correia; Jorge, Jorge; JM, González-Méijome; Queirós, António., CIOCV 2014 – XI Congresso Internacional de Optometria, Braga, 2014.

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INFLUENCE OF LIGHT ON MEASURING THE INTRAOULAR PRESSURE WITH AIR-PUFF TONOMETER, Liliana, Reis; Martins, José M. F; Jorge, Jorge; Queirós, António., CIOCV 2014 – XI Congresso Internacional de Optometria, Braga, 2014.

INFLUENCE OF PHYSICAL EXERCISE IN THE VISUAL SYSTEM OF YOUNG FOOTBALL PLAYERS Jorge, Jorge; João, Esteves; Paulo, Fernandes; Queirós, António., CIOCV 2014 – XI Congresso Internacional de Optometria, Braga, 2014.

INFLUENCIA DE LA LATERALIDAD EN EL TIEMPO DE REACCIÓN VISUAL EN JUGADORES DE FÚTBOL, Jorge, Jorge; Paulo, Fernandes; Queirós, António., 23º Congreso Internacional de Optometría, Contactología y Óptica Oftálmica, OPTOM 2014, Madrid, 2014.

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"MIX AND MATCH" CON LENTES BLANDAS MULTIFOCALES PARA LA PRESBICIA, Neves, Helena; Rico-del-Viejo, Laura; Queirós, António; Paulo, Fernandes; JM, González-Méijome.,23º Congreso Internacional de Optometría, Contactología y Óptica Oftálmica, OPTOM 2014, Madrid, 2014.

Optical non-invasive 3D characterization of pottery of pre-colonial Paranaiba valley' tribes". Wagner Magalhães, Márcia Angelina Alves, Manuel F. M. Costa;" Second International Conference on Applications of Optics and Photonics, AOP2014", Aveiro, Portugal, 26-30 de Maio de 2014.

Prevalence of ametropia in subjects with an intellectual disability, António M. G. Baptista; Filipa A. D. Oliveira; António F. Macedo; Pedro M. Serra,Warsaw 2014 (European Academy of Optometry and Optics Annual Conference), Varsóvia, 2014 OCV

PriSciNet in a Brazilian School; L. Andreucci, MFMCosta, MTMalheiro; "11th International Conference on Hands-on Science. Science Communication with and for Science", University of Aveiro, Aveiro, Portugal, 21-25 de julho de 2014.

Reflection of light: a teaching and learning activity with primary school children"; Paulo Varela, Cátia Abreu, Manuel F. M. Costa; "Second International Conference on Applications of Optics and Photonics, AOP2014", Aveiro, Portugal, 26-30 de Maio de 2014.

Semi-automatic Segmentation of the anterior ocular surfasse corneal layers and contact lenses. Rodrigues P, Catarino A, Lopes-Ferreira D, Queiros A, Cerviño A, González-Méijome JM. Vision Science and Eye Research (ViSER). Santiago de Compostela. November 22-23rd, 2014.

The Construction of Meanings about the"Light": an IBSE approach with primary school children; Cátia Abreu, Paulo Varela and Manuel Filipe Costa; 23rd triennial ICO' Congress "Enlightening the future", Santiago de Compostela 26-29 August 2014, ISBN: 978-84-697-1027-2; educ_188_260, pps 6 (2014).

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Water Condensation: An Inquiry-Based Approach to Science Teaching with Primary School Children; P Varela, F Serra, MFM Costa; "11th International Conference on Hands-on Science. Science Communication with and for Science", University of Aveiro, Aveiro, Portugal, 21-25 de julho de 2014.

WAVEFRONT ABERRATIONS DURING ORTHOKERATOLOGY, Queirós, António; Jorge, Jorge; Lopes-Ferreira, Daniela; Paulo, Fernandes; Neves, Helena; JM, González-Méijome., CIOCV 2014 – XI Congresso Internacional de Optometria, Braga, 2014.

What happens to the shadow if the distance between the light source and the object changes? An IBSE approach with primary school children; Paulo Varela, Silvana Noversa and Manuel F. M. Costa; 23rd triennial ICO' Congress "Enlightening the future", Santiago de Compostela 26-29 August 2014, ISBN: 978-84-697-1027-2; educ_188-259 pps. 7 (2014).

Why do shadows change length? An IBSE approach with primary school children"; Paulo Varela, Silvana Noversa, Manuel F. M. Costa; "Second International Conference on Applications of Optics and Photonics, AOP2014", Aveiro, Portugal, 26-30 de Maio de 2014.



Adhesion of *Pseudomonas aeruginosa* to hydrogel contact lenses: roughness and wettability effect, Maria J. Giraldez, Maria A. Bermudez, Madalena Lira, M.E.C.D. Real Oliveira, Eva Yebra-Pimentel, 11th Congresso International de Optometria e Ciências da Visão, Abril 2014. FAMO/OCV.

Structure optimization on the photoelectric and photocatalytic properties of Cu₂S and ZnO complex films; Feng Xu, Manuel F. Costa, Shengnan Sun, Vasco Teixeira, Yixin Wang, Fengling Bian, He Wang, Haining Cui; 5th International Conference on Advanced Nanomaterials, Aveiro, Portugal, July 2-4, 2014.

National

Oral

O caso português no projeto CLS, António Mário Almeida, Manuel F. M. Costa, Maria Teresa Malheiro, Paulo A. Pereira, Mário Zamith Silva, Paulo. I. Varela, Marta Marques, Paulo Machado, II Congresso de Ciência e Desenvolvimento dos Açores & VII Congresso de Gestão e Conservação da Natureza, Angra do Heroísmo, 27 a 29 de junho de 2014.

A saúde visual na deficiência visual em Portugal, António M. G. Baptista; Pedro M. Serra, Curso Avançado de Saúde Visual na Deficiência Intelectual, Covilhã, 2014. OCV

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Compensações óticas e visão periférica, António Queirós. VIII Colóquio de Optometria. Portugal. 2014. Covilhã, 25-26 de abril de 2014; NEOUBI - Núcleo de Estudantes Optometria Universidade Beira Interior. (OCV)

O olho em ação da percepção ao treino de decisão: caracterização visual dos árbitros, António M. G. Baptista; X Conferências Abertas de Optometria, Lisboa, 2014. OCV

O olho em ação: caracterização da visão dos árbitros de futebol onze, António M. G. Baptista; Sabrina S. Oliveira; Nuno Catarino; António F. Macedo; Pedro M. Serra; Brendan T. Barrett, A Ciéncia da Arbitragem em Portugal, Lisboa, 2014. OCV

O olho em ação: da percepção ao treino de decisão, António M. G. Baptista, Associação de Futebol de Braga, Braga, 2014. OCV

Poster

Mostrar o mundo microbiano que nos rodeia a crianças: desafios e conquistas. A Rebelo, A Ribeiro, P Ribeiro, MFM Costa, C Almeida Aguiar. SciCom PT 2014, Reitoria da Universidade do Porto, Porto, Portugal, 3- 4 Junho 2014.

6.9.8 Future Research

The general goal is to develop techniques and methodologies for the Assessment and Enhancing Visual Performance. More specifically:

1. To develop biomarkers to quantify the effects of optical devices in vision:
 - a. To establish the baseline characterization of the regional retinal response in different populations and under different conditions



- b. To model of optical elements (multifocal ophthalmic lenses/contact lenses, phase plates, apertures, density filters, spectral filters,...) aiming to alter the retinal response under different conditions through defocus/change in image quality
 - c. To evaluate the electrophysiological response of the retina exposed to different optical stimulation.
2. To study dynamic and real-time aspects of the human lens optical and morphological properties during accommodation:
- a. To characterize crystalline lens' optical and geometrical properties during accommodation.
 - b. To establish the relationship between the geometrical changes of the crystalline lens induced by accommodation and its optical effects on the overall eye aberrations, through the analysis of its wavefront aberrations.
3. To study of automatic assessment eye parameter, e.g. blinking:
- a. To adapt imaging devices to image several aspects of the eye
 - b. To develop analysis software to extract the relevant eye parameters, e.g. blinking rate
4. To develop methodologies to improve visual skills in elite athletes:
- a. To implement a national survey of the prevalence of eye injuries related to sports and their socio-economic implications
 - b. To develop equipment that allows to evaluate and training several visual capabilities
 - c. To implement clinical application of the new training techniques
5. To develop of techniques to enhancing color discrimination of color deficient observers:
- a. To develop and test colour vision models of the colour deficient
 - b. To use spectral imaging data of natural scenes to simulate the vision of colour vision deficient
 - c. To develop theoretical the spectral transmittance of colored lens to improve colour discrimination in real scenes
 - d. To use the spectral imaging data of natural scenes to test the lens developed in c.
6. To develop cross-modal approaches to improve normal and low vision
- a. to conduct epidemiologic studies that will determine the needs for vision rehabilitation in the Portuguese population;
 - b. to continue to investigate how optics, eye movements and vision to perception and action is affected by visual disorders;
 - c. to optimize of training protocols
 - d. to conduct randomized control trials to test the efficacy of training protocols.



7 Financial Report

CFUM Expenses by economic classifier - 2014

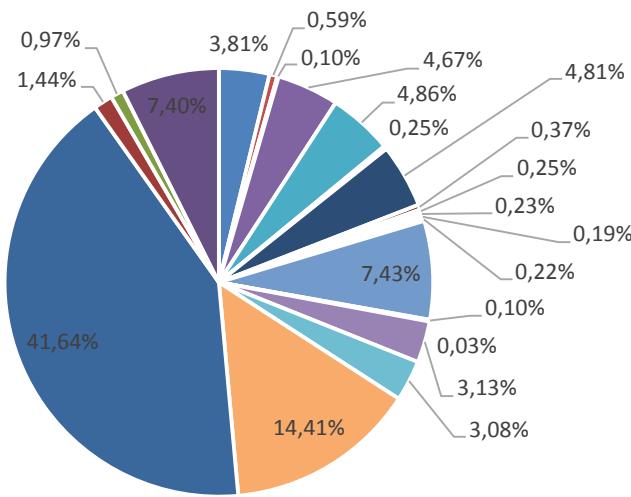
Economic classifier	Total Expense CFUM 2014	Expense in %
010204 – Travel allownace	22.932,97 €	3,81%
020102 – Fuels and lucricants (gases)	3.581,18 €	0,59%
020108 – Office Supplies	610,66 €	0,10%
020109 - Chemicals and Pharmaceuticals	28.150,06 €	4,67%
020117 - Tools and Utensils (Matt. Laboratory)	29.256,43 €	4,86%
020121 – Other assets	1.522,61 €	0,25%
020203 - Assets conservation	28.994,41 €	4,81%
020205B000 – Computer software	2.228,76 €	0,37%
020205C000 - Data base and online access	1.526,95 €	0,25%
020208 – Other assets	1.388,58 €	0,23%
020210 - Transportation	1.153,05 €	0,19%
020212B000 – Ensurance - others	1.340,34 €	0,22%
020213 – Travels ans stays	44.742,27 €	7,43%
020217 - Advertising	628,98 €	0,10%
020220A000 – Other spec. work – Computing services	184,50 €	0,03%
020220C000 – Other spec. works	18.855,81 €	3,13%



020225 – Other Services	18.559,36 €	3,08%
Transfers to partners	86.792,54 €	14,41%
040802B000 - Families - Scholarships Research and Mobility	250.776,19 €	41,64%
070107B0B0 - Computer Equip. - Other	8.682,17 €	1,44%
070108B0B0 - Computer Sof. -Other	5.827,87 €	0,97%
070110B0B0 - Basic Eq. -Other	44.581,65 €	7,40%
Total expenditure	602.317,34 €	100,00%

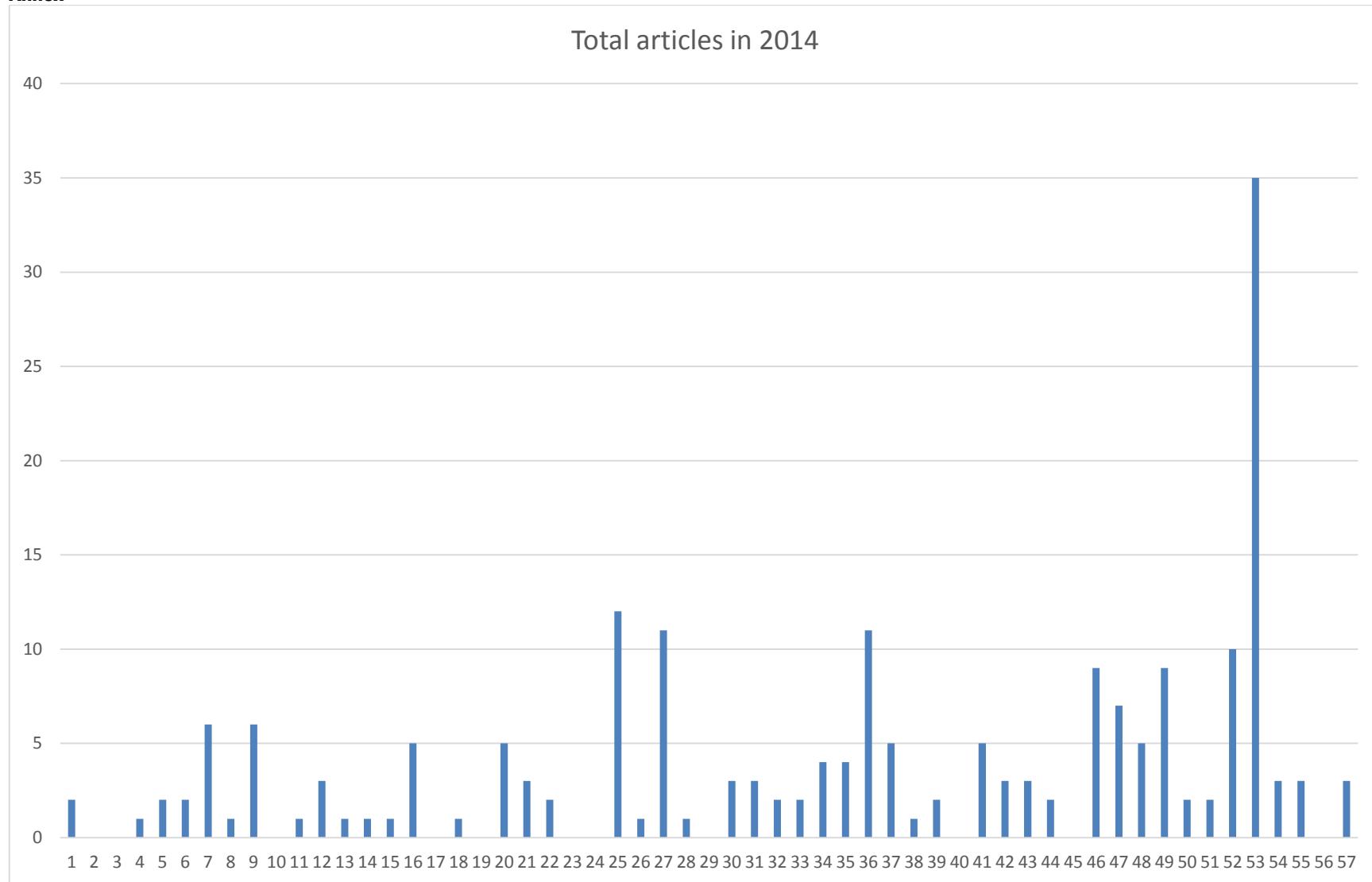


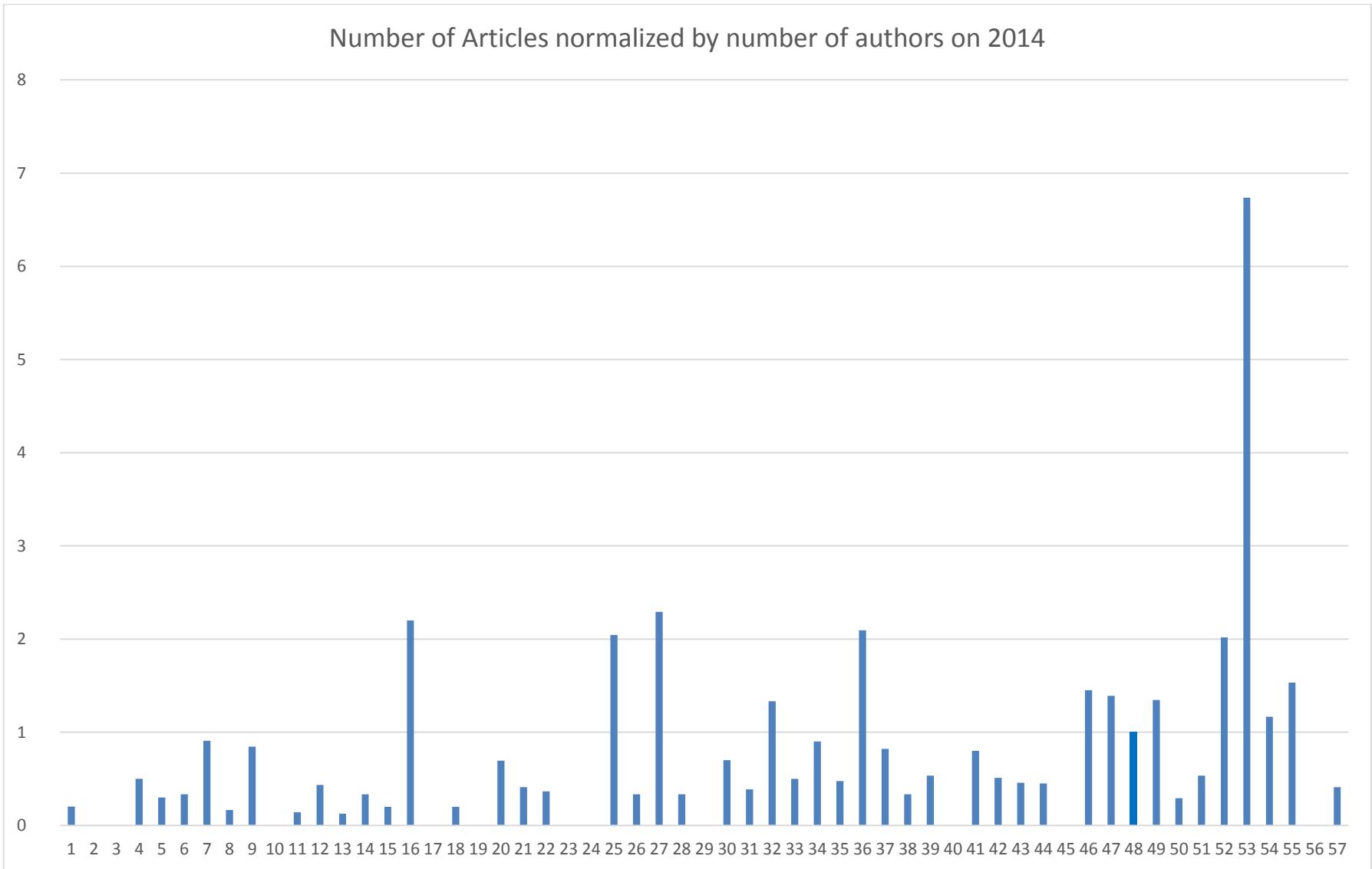
Expenditure CFUM 2014



- 010204 – Travel allowance
- 020108 – Office Supplies
- 020117 - Tools and Utensils (Matt. Laboratory)
- 020203 - Assets conservation
- 020205C000 - Data base and online access
- 020210 - Transportation
- 020213 – Travels ans stays
- 020220A000 – Other spec. work – Computing services
- 020225 – Other Services
- 040802B000 - Families - Scholarships Research and Mobility
- 070108B0B0 - Computer Sof. -Other
- 020102 – Fuels and lubricants (gases)
- 020109 - Chemicals and Pharmaceuticals
- 020121 – Other assets
- 020205B000 – Computer software
- 020208 – Other assets
- 020212B000 – Ensurance - others
- 020217 - Advertising
- 020220C000 – Other spec. works
- Transfers to partners
- 070107B0B0 - Computer Equip. - Other
- 070110B0B0 - Basic Eq. -Other



8 Annex





Centre of Physics
Activity report 2014