

PERSONAL INFORMATION

Family name: **Fernandes Cardoso**

Nationality: **Portuguese**

First name: **Vanessa**

Gender: **Female**

Date of birth: **28.05.1985**

Researcher ID: **L-8911-2013**

Email: **vanessa@dei.uminho.pt**

Researcher ORCID: **0000-0002-3039-5520**

CURRENT POSITION

Postdoctoral researcher (March 2014 until now) granted by the FCT- Fundação para a Ciência e Tecnologia Center of Microelectromechanical Systems (CMEMS) and Center of Physics, at University of Minho, Portugal

Keywords: microfluidic systems, smart materials, micro/nanotechnology, biomedical applications

PAST RELEVANT POSITIONS

- **Postdoctoral researcher** (2013-2014) under the project: "MyHealth - Multimodal platform for collection of clinical signs/information" funded by FEDER funds through the "Programa Operacional Factores de Competitividade – POFC.

School of Medicine, University of Minho, Portugal

Keywords: electrochemical sensors, point-of-care, diagnosis, iodide in human urine

- **Adjunct professor** (2010-2013)

Cooperative Higher Educational Polytechnic and University, Portugal

Keywords: professor, internships supervisor, biomedical engineering, hospital, companies, research centers

- **Researcher fellow** (2008) under the project "Lab-on-a-Chip with fluid acoustic microagitation" funds by the FCT-Fundação para a Ciência e Tecnologia

Department of Industrial Electronics, University of Minho, Portugal

Keywords: acoustic streaming, mixture, fluids, diagnostic, macroscale

- **Professional internship** (2007-2008)

Siemens SA, Healthcare, Portugal

Keywords: medical imaging equipments, workflows characterization, diagnostic support systems

EDUCATION

- **PhD in Biomedical Engineering** (2008-2012) granted by the FCT- Fundação para a Ciência e Tecnologia

Schools of Physics and Electronics, University of Minho, Portugal

Thesis title: "Point-of-care microfluidic system with polymer-based acoustic streaming for the quantification of uric acid and nitrite in human urine"

- **Integrated Master in Biomedical Engineering with specialization in Medical Electronic** (2003-2008) – 17 Out of 20

Schools of Physics and Industrial Electronics, University of Minho, Portugal

Thesis title: "Acoustic streaming of fluids based on electroactive polymers"

- **Extracurricular modules of the Micro and Nano technology Master** (2008-2000)

Engineering school, University of Minho, Portugal

NATIONAL AND INTERNATIONAL INTERNSHIPS

- **Nanochemistry Research Group at INL – International Iberian Nanotechnology Laboratory** (April 2017)

Supervisor: Dr. Yury Kolen'ko, Staff Researcher

Keywords: synthesis, functionalization and characterization of magnetic nanostructures

- **BCMaterials – Basque Center of Materials, Applications and Nanostructures** (March 2017)

Supervisor: Dr. Senentxu Lanceros-Méndez, Ikerbasque Professor

Keyword: 3D printing vs Photolithography for the fabrication of microfluidic systems

- **Indian Institute of Technology Jodhpur** (March 2017)

Supervisor: Dr. Rakesh Kumar Sharma, Assistant Professor at the Department of Chemistry

Keyword: characterization of functionalized polydimethylsiloxane surfaces

- **Institute of Nanoscience of Aragon, Zaragoza, Spain** (May/June 2014 and April/May 2016)

Supervisors: Dr. Silvia Irusta and Dr. Víctor Sebastian, Senior Researcher and Assistant Professor at the Department of Chemical/Environmental Engineering and Aragon Nanoscience Institute

Keyword: micro/nanoparticles synthesis and characterization

- **Fraunhofer Institute of Biomedical Engineering, St Ingbert, Germany** (July and December 2010)

Supervisor: Dr. Thomas Velten, Head of Department of Biomedical Microsystems

Keyword: microfluidic, soft lithography, microfabrication, cleanroom

HONOURS AND AWARDS

- **Education merit scholarship under the Integrated Master in Biomedical Engineering** (2008)

University of Minho, Portugal

- **Best rating in the 1st year of the Bachelor's degree in Biomedical Engineering** (2005)

University of Minho, Portugal

MAIN SKILLS

- **Languages:** Portuguese (native language), French (native language), English (fluent), Spanish (savvy).

- **Computer:** Microsoft Office, Solidworks, CorelDraw, Autocad, Origin, Labview, Matlab.

- **Social and organizational:** adapt to new/different cultures, team spirit, capacity of interpersonal relationships, organisational capacity, team/project management, good stress tolerance, leadership capacity, punctuality and assiduity.

- **Main experimental processing skills:** Soft lithography, 3D printing, synthesis and functionalization of magnetic nanostructures, processing of (electroactive/biodegradable/patterned) polymer-based films and membranes (by spin-coating, solution cast, non-solvent induced phase inversion), physical vapour deposition (PVD) of transparent conductive oxide by, development of potentiometric sensors based on ion-selective electrodes.

- **Main experimental characterization skill:** Fourier Transform Infrared Spectroscopy (FTIR), Differential Scanning Calorimetry (DSC), Ultraviolet-Visible Spectroscopy (UV-VIS), Zeta potential, Dynamic light scattering (DLS), Vibrating Sample Magnetometry (VSM), Profilometer, Strain-stress characterization, Four-Point Collinear Probe Method for Measuring Resistivity, Contact Angle Measurement.

PARTICIPATION IN RESEARCH PROJECTS

- **Project title:** “*Multiplexpoint-of-care device for lung disease biomarkers in sputum*”, project LungChek ENMed/0049/2016, on the framework of EuroNanoMed 2016 (2017-2020).

- **Project title:** “*Next generation monitoring of coastal ecosystems in a scenario of global change*”, on the framework of Norte-45-2015-02 - Sistema de apoio à investigação científica e tecnológica - I&D&I (2016-2018).

- **Project title:** “MyHealth – Multimodal platform for collection of clinical signs/information”, project Do IT-13853, on the framework FEDER funds through the “Programa Operacional Factores de Competitividade – POFC (2012-2017).
- **Project title:** “Microsystem with integrated spectroscopy and (bio)sensors for the detection of gastrointestinal dysplasia”, PTDC/EBB-EBI/120334/2010, funds by FCT – Fundação para a Ciência e Tecnologia (2010).
- **Project title:** “Lab-on-a-chip with fluid acoustic microagitation”, PTDC/BIO/70017/2006, funds by FCT – Fundação para a Ciência e Tecnologia (2009-2010).

REVIEWER IN INTERNATIONAL JOURNALS

Journal *Lab-on-a-Chip* and Journal of *Heat Transfer*.

CHAPTERS IN BOOK

- A. Francesko[#], **V. F. Cardoso[#]**, S. Lanceros-Méndez. Book: “*Microfluidics for Pharmaceutical Applications: From Nano/Micro Systems Fabrication to Controlled Drug Delivery*”, Chapter: “*Principle of microfluidics*”. Elsevier. 2017 (Accepted).
- **V. F. Cardoso**, C. Ribeiro, S. Lanceros-Méndez. Book: “*Advanced Piezoelectric Materials*”, 2nd Edition, Chapter: “*Electroactive polymers as actuators*”. Elsevier. 2017 (Accepted).
- **V. F. Cardoso**, C. Ribeiro, S. Lanceros-Mendez. Book: “*Bioinspired materials for medical applications*”, Chapter 12 – “*Metamorphic biomaterials*”. Elsevier. 2017.
- **V. F. Cardoso**, G. Minas. Book: “*Microfluidics and Nanofluidics Handbook*”, Chapter: *Micro Total Analysis Systems*. CRC Press/Taylor & Francis Group, LLC, Cap. 12, pp 319-365. 2011.

PAPERS IN INTERNATIONAL SCIENTIFIC PERIODICALS

- R. Gonçalves, **V. F. Cardoso**, M. Sansebastian, J. Nunes-Pereira, C. Costa, S. Lanceros-Méndez. “*Tailoring piezoelectric poly(vinylidene fluoride-co-trifluoroethylene) microstructure for advanced applications*”. Applied Materials & Interfaces (2017). Submitted. IF: 7.332.
- C. Ribeiro[#], C. M. Costa[#], D. M. Daniela[#], J. Nunes-Pereira[#], J. Oliveira[#], P. Martins[#], R. Gonçalves[#], **V. F. Cardoso[#]**, S. Lanceros-Méndez. “*Electroactive PVDF-based structures for advanced applications*”. Nature Protocols. 2017 (Accepted). IF: 10.032.
- **V. F. Cardoso**, A. Francesko, C. Ribeiro, M. Bañobre-López, P. Martins, S. Lanceros-Mendez. “*Use of magnetic nanoparticles for advanced biomedical applications*”. Advanced Healthcare Materials. 2017 (Accepted). IF: 5.110
- **V. F. Cardoso**, D. Miranda, G. Botelho, G. Minas, S. Lanceros-Méndez. “*Highly effective clean-up of magnetic nanoparticles using microfluidic technology*”. Applied Materials & Interfaces (2017). **Corresponding author**. Accepted. IF: 5.401.
- **V. F. Cardoso**, V. Sebastian, C. J. R. Silva, G. Botelho, S. Lanceros-Mendez. “*Capture and separation of L-histidine through optimized zinc-decorated magnetic silica spheres*”. Colloids and Surfaces B: Biointerfaces, 157, pp. 48–55 (2017). DOI: 10.1016/j.colsurfb.2017.05.009. **Corresponding author**. IF: 3.887.
- **V. F. Cardoso**, S. Irusta, N. Navascues, S. Lanceros-Méndez. “*Comparative study of sol-gel methods for the facile synthesis of tailored magnetic silica spheres*”. Materials Research Express, 3, 075402 (2016). DOI: 10.1088/2053-1591/3/7/075402. **Corresponding author**. IF: 0.971.
- **V. F. Cardoso**, A. R. Machado, V. C. Pinto, P. J. Sousa, G. Botelho, G. Minas, S. Lanceros-Méndez. “*From superhydrophobic- to superhydrophilic-patterned poly(vinylidene fluoride-co-chlorotrifluoroethylene) architectures as a novel platform for biotechnological applications*”. Journal of Polymer Science, Part B: Polymer Physics (2016). DOI: 10.1002/polb.24099. **Corresponding author**. **Cover Jornal**. IF: 3.133.
- H. Salazar, J. Nunes-Pereira, D. M. Correia, **V. F. Cardoso**, R. Gonçalves, P. M. Martins, S. Ferdov, M. D. Martins, G. Botelho and S. Lanceros-Méndez. “*Poly(vinylidene fluoride-hexafluoropropylene)/bayerite composites membranes for efficient arsenic water removal*”. Materials Chemistry and Physics (2016). In Press. IF: 2.357.

- J. Nunes-Pereira, P. Martins, **V. F. Cardoso**, C. M. Costa, S. Lanceros-Méndez. "A green solvent strategy for the development of piezoelectric poly(vinylidene fluoride-trifluoroethylene) films for sensors and actuators applications". *Materials and Design*, 104, pp. 183-189 (2016). DOI: 10.1016/j.matdes.2016.05.023. IF: 4.023.
- **V. F. Cardoso**, G. Botelho, S. Lanceros-Méndez. "Nonsolvent induced phase separation preparation of poly(vinylidene fluoride-co-chlorotrifluoroethylene) membranes with tailored morphology, piezoelectric phase content and mechanical properties". *Materials and Design*, 88, pp. 390-397 (2015). DOI: 10.1016/j.matdes.2015.09.018. **Corresponding author**. IF: 4.023.
- **V. F. Cardoso**, A. C. Lopes, G. Botelho, S. Lanceros-Méndez. "Poly(vinylidene fluoride-trifluoroethylene) porous films: Tailoring microstructure and physical properties by solvent casting strategies". *Soft Materials*, 13 (4), pp. 243-253 (2015). DOI: 10.1080/1539445X.2015.1083444. **Corresponding author**. IF: 1.449.
- C. G. Ferreira, **V. F. Cardoso**, A. C. Lopes, G. Botelho, S. Lanceros-Méndez. "Tailoring microstructure and physical properties of poly(vinylidene fluoride-hexafluoropropylene) porous films". *Journal of Materials Science*, 50 (14), pp. 5047-5058 (2015). DOI: 10.1007/s10853-015-9054-5. **Corresponding author**. IF: 2.288.
- J. Nunes-Pereira, V. Sencadas, V. Correia, **V.F. Cardoso**, W.H. Han, J. G. Rocha, S. Lanceros-Mendez. "Energy harvesting performance of BaTiO₃/poly(vinylidene fluoride-trifluoroethylene) spin coated nanocomposites". *Composites Part B-Engineering*, Vol. 72 (2015), pp. 130-136. DOI: 10.1016/j.compositesb.2014.12.001. IF: 3.901.
- V. C. Pinto, P. J. Sousa, **V. F. Cardoso**, and G. Minas. "Optimized SU-8 Processing for Low-Cost Microstructures Fabrication without Cleanroom Facilities". *Micromachines*, Vol. 5 (2) (2014), pp. 738-755. DOI: 10.3390/mi5030738. IF: 1.860.
- **V.F.Cardoso**, T. Knoll, T. Velten, L. Rebouta, P. M. Mendes, S. Lanceros-Méndez, G. Minas. "Polymer-based acoustic streaming for microfluidic applications". *RSC Advances*. Vol. 4 (9) (2014). DOI: 10.1039/c3ra46420b. **Corresponding author**. IF: 3.485.
- **V. F. Cardoso**, G. Minas and S. Lanceros-Méndez. "Multilayer spin-coating deposition of poly(vinylidene fluoride) films for controlling thickness and piezoelectric response". *Sensors and Actuators A-physical*, Vol. 192, pp. 76-80 (2013). DOI: 10.1016/j.sna.2012.12.019. IF: 2.214.
- **V. F. Cardoso**, C. M. Costa, G. Minas, S. Lanceros-Mendez. "Improving optical and electroactive response of poly(vinylidene fluoride-trifluoroethylene) spin coated films for sensor and actuator applications". *IOP Science – Smart Materials and Structures*. Vol. 21 085020 (2012). DOI: 10.1088/0964-1726/21/8/085020. IF: 2.876.
- C. M. Costa, A. California, **V. F. Cardoso**, V. Sencadas, L. C. Rodrigues, M. M. Silva & S. Lanceros-Méndez. "Electroactive poly(vinylidene fluoride-trifluoroethylene) (PVDF-TrFE) microporous membranes for lithium-ion battery applications". *Ferroelectrics*, Vol. 430, pp.103–107 (2012). DOI: 10.1080/00150193.2012.677729. IF: 0.535.
- **V. F. Cardoso**, C. M. Costa, C. J. Tavares, G. Minas, S. Lanceros-Méndez. "Micro and nanofilms of poly(vinylidene fluoride) with controlled thickness, morphology and electroactive crystalline phase for sensors and actuators applications". *IOP Science – Smart Materials and Structures*. Vol. 20, 087002 (2011). DOI: 10.1088/0964-1726/20/8/087002. IF: 2.876.
- A. California, **V. F. Cardoso**, C. M. Costa, V. Sencadas, G. Botelho, J. L. Gómez-Ribelles, S.Lanceros-Mendez. "Tailoring porous structure of ferroelectric poly(vinylidene fluoride-trifluoroethylene) by controlling solvent/polymer ratio and solvent evaporation rate". *European Polymer Journal*. Vol 47, pp. 2442–2450 (2011). DOI:10.1016/j.eurpolymj.2011.10.005. IF: 3.477.
- **V. F. Cardoso**, S. O. Catarino, J. Serrado. Nunes, L. Rebouta, J. G. Rocha, S. Lanceros-Méndez, G. Minas. "Lab-on-a-chip with β -PVDF based acoustic microagitation". *IEEE Transactions on Biomedical Engineering*. Vol. 57, pp. 1184-1190 (2010). DOI: 10.1109/TBME.2009.2035054. IF: 2.719.
- **V. F. Cardoso**, P. Martins, G. Botelho, J. Serrado Nunes, L. Rebouta, S. Lanceros-Méndez, G. Minas. "Degradation studies of transparent conductive electrodes on electroactive poly(vinylidene fluoride) used for lab-on-a-chip uric acid determination applications". *Science and Technology of Advanced Materials*. Vol. 11 (2010). DOI: 10.1088/1468-6996/11/4/045006. IF: 3.846.
- A. V. Fernandes, **V. F. Cardoso**, J. G. Rocha, J. Cabral, G. Minas. "Smart-Optical Detector CMOS Array for Biochemical Parameters Analysis in Physiological Fluids". *IEEE Transactions on Industrial Electronics*. Vol. 55, N°9, p. 3192-3200 (2008). DOI: 10.1109/TIE.2008.927962. IF: 5.985.

PRINCIPAL INVITED PRESENTATIONS

- **Title:** “*Microfluidic systems for biomedical applications*”. Workshop New materials for a better life, Facultad de Ciencia y Tecnología, Universidad del País Vasco, Spain. 18 November 2016.
- **Title:** “*Synthesis and parameters optimization of iron-oxide magnetic silica spheres for biomedical applications*”. Program The best student in University of Minho, Portugal. 29-31 March 2015.
- **Title:** “*Novel materials and concepts for biomedical applications*”. From Dark Matter to Vision Sciences. University of Minho, Portugal. 19 September 2014.
- **Title:** “*Improving mixing and reaction times in lab-on-a-chip devices for medical applications*”. School of Engineering, University of Minho, Portugal. 24-27 October 2012.
- **Title:** “*Miniaturized systems for clinical diagnosis purposes*”. Workshop of the Master in biophysics and bionanosystems. University of Minho, Portugal. 15 June 2011.

OTHERS RELEVANT PRESENTATIONS

- **V. F. Cardoso**, D. Miranda, G. Botelho, G. Minas, S. Lanceros-Mendez. Microfluidic technology as efficient strategy for the automated and effective cleaning of magnetic entities. ANM 2017. University of Aveiro, Aveiro, Portugal, 19-21 July 2017.
- **V. F. Cardoso**, C. Ribeiro. Advanced strategies in biomedicine based on smart and functional materials. 5^o Current topic in Biophysics. University of Minho, Braga, Portugal. 21 January 2016.
- **V. F. Cardoso**, S. Irusta, N. Navascues, G. Botelho, G. Minas, S. Lanceros-Méndez. Synthesis parameters optimization of iron-oxide magnetic silica spheres for biomedical applications. Materiais 2015. Porto, Portugal. 21-23 June 2015.
- **V.F. Cardoso**, T. Knoll, T. Velten, G. Minas, S. Lanceros-Méndez - Improving reaction and mixing times in macro- and microfluidic devices for medical applications - 6th International Conference on Surfaces, Coating and nano-Structured Materials. 17-20 October 2011, Krakow, Poland.
- **V.F. Cardoso**; G. Minas, S. Lanceros-Méndez - Functionally graded electroactive poly(vinylidene fluoride) by multilayer spin-coating deposition with controlled crystalline phase content. MM&FGM2010 - 11th International Symposium on Multiscale, Multifunctional and Functionally Graded Materials, Guimarães, Portugal, 26-29 September 2010.
- **V. F. Cardoso**, C. M. Costa, S. Lanceros-Méndez, G. Minas - Micro and nanofabrication of β -poly(vinylidene fluoride) sensors and actuators. ANM2010 - 3rd International Conference on Advanced Nano Materials, Agadir, Morocco, 12-15 September 2010.
- **V.F. Cardoso**, P. Martins, J. Serrado Nunes, L. Rebouta, J. G. Rocha, S. Lanceros-Mendez, G. Minas – Lab-on-a-chip with β -PVDF based acoustic microagitation. The 22nd International Conference EUROSENSORS 2008, Dresden, Germany, 07-10 September 2008.

LASTEST SUPERVISIONS OF UNGRADUATE AND GRADUATE STUDENTS

- **Project title:** “*Development of patterned polymer-based scaffolds based on microfluidic technology for tissue engineering application*”, Student: Teresa Almeida (2016/2017).
- **Project title:** “*Design of polymer-based electromagnetic microstructures for microfluidic applications*”, Student: Tiago Marinho (2016/2017).
- **Project title:** “*Porous and non-porous three-dimensional microstructures of poly(vinylidene fluoride-co-chlorotrifluoroethylene)*”, Student: Ana Machado (2015/2016).
- **Project title:** “*Development of polymer-based magnetic nanoparticles composites for biomedical applications*”, Student: Liliana Fernandes (2015/2016).

- **Project title:** “*Development of photocatalytic materials based on TiO₂ and magnetic nanoparticles*”, Student: Henrique Mora (2015/2016).
- **Project title:** “*Development of poly(vinylidene fluoride)-based membranes for the filtration of biological entities*”, Student: João Teixeira (2014/2015).
- **Project title:** “*Microfluidic system for the cleaning and separation of magnetic nanoparticles*”, Student: Diego Estévez (2014/2015).
- **Project title:** “*Preparation and characterization of poly(vinylidene fluoride-co-chlorotrifluoroethylene) porous membranes*”, Student: Catarina Ferreira (2013/2014).

OPPONENT IN ACADEMIC PROOF READER

- **Project title:** “Biosensor devices based on the association of biomolecules to gold surfaces”, Research project proposal for Master thesis in Biophysics and Bionanosystems at the University of Minho, Portugal, Applicant: Margarida Cautela (27.02.2017).
- **Project title:** “Study and Spectrophotometric Characterization of Malaria Biomarkers”, Research project proposal for Master thesis in Micro and Nanotechnologies at the University of Minho, Portugal, Applicant: Ivo Silva (29.11.2016).
- **Project title:** “Tailoring Magnetolectric materials for biomedical applications”, Research project proposal for Master thesis in Biomedical Engineering at the University of Minho, Portugal, Applicant: Ricardo Pereira (23.11.2016).
- **Project title:** “Radiation detectors based on printing technologies”, Defence of project proposal for PhD thesis in Material Engineering at the University of Minho, Portugal, Applicant: Juliana Oliveira (12.01.2016).
- **Project title:** “Electronic circuit for data reading and acquisition of a chemical sensor”, Research project proposal for Master thesis in Computer and Industrial Electronic at the University of Minho, Portugal, Applicant: Rui Martins (20.11.2013).
- **Project title:** “Development and implementation of a portable lab-on-a-chip for the measurement of salivary cortisol”, Defense of project proposal for PhD thesis in Biomedical Engineering at the University of Minho, Portugal, Applicant: Vânia Pinto (17.07.2013).

OTHER MERITS

- Volunteering at the Hospital de Braga, Portugal (2016-2017).
- Volunteering at the Hospital *Santa Casa da Misericórdia de Fão*, Portugal (2014-2016).