

Curriculum vitae

PERSONAL INFORMATION

Rosana Maria Alves Dias

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JOB APPLIED FOR

Staff Researcher - MEMS and Micro/Nano Energy Harvesting Devices (Ref.04.16.27)

WORK EXPERIENCE

1 Apr 2014–Present

Post doctoral researcher (fellow) on MEMS and energy harvesting; funded by COFUND (Marie Curie Action) – NanoTrain for Growth program

INL – International Iberian Nanotechnology Laboratory, Braga (Portugal)

- Development of a bi-stable AlN-based MEMS piezoelectric energy harvester: Analytical and FEM modelling, design optimization, microfabrication and material and microstructure characterization.
- Fabrication and full electrical, mechanical and piezoelectric characterization of piezoelectric thin-film devices and other thin-film property characterization.
- Buckled membranes fabrication.
- Fabrication and characterization of magnetic field modulators with MTJs and spin valves.
- MEMS EMF (electromagnetic induction) generator modelling.
- Cleanroom and laboratory tools and techniques: Bulk and surface micromachining, DRIE, RIE, CVD, HF dry etching, wet Si and Al etching, photolithography, dicing, SEM, Polytec interference vibrometers, mask alignment, wire bonding, metrology, etc.

1 May 2013–31 Mar 2014

Post doctoral researcher on MEMS magnetic sensors; project funded by ESA

Algoritmi Center, University of Minho (in collaboration with Lusospace), Guimarães (Portugal)

Development of a MEMS magnetometer: Exploring new designs for beyond state-of-the-art performance, analytical and FEM modelling, layout design optimization.

1 Dec 2008–31 Mar 2009

Graduate researcher on inertial sensors; project funded by QREN

University of Minho (in collaboration with SpinWorks), Guimarães (Portugal)

- MEMS accelerometers and gyroscopes market overview, establishment of contacts with suppliers and samples acquisition.
- Development of an IMU - Inertial Measurement Unit for a MEMS-based Attitude and Heading Reference System.
- Readout electronics and printed circuit boards design and fabrication.

1 Feb 2008–30 Jul 2008

Graduate researcher on CMOS x-ray detectors

Physics Department, University of Minho, Guimarães (Portugal)

Development of a digital x-ray imaging sensor for medical purposes: optimization of a specific stage of the micromachining process concerning CVD aluminium patterning using SU-8 photoresist; planning and process implementation at the University's facilities (studying the equipment, managing material and equipment acquisition...).

EDUCATION AND TRAINING

1 Apr 2009–30 Apr 2013

Ph.D. in Electronics and Computer Engineering; Thesis title: Micro g

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MEMS Accelerometer Based on Time Measurement

University of Minho (Algoritmi and the I3N - Instituto de Nanoestruturas Nanomodelação e Nanofabricação research centers), University of the British Columbia (5 months), Delft University of Technology (8 months), INL – International Iberian Nanotechnology Laboratory (< 1 yr); Funding by FEDER through COMPETE and FCT (Fundação para a Ciência e a Tecnologia)

- Attendance to the Electronics Engineering Doctoral Program.
- Study of non-linear pull-in of electrostatically actuated parallel-plates.
- MEMS accelerometers design and modelling.
- Microfluidics: Squeeze-film dampers analytic and CFD modelling.
- Experimental characterization of accelerometers, closed-loop operation and noise analysis.
- Readout electronics implementation and PCB integration with sensor and actuation electronics.
- Development of a gas viscosity sensing application at TUDelft and ECN (Dutch energy research institute).

1 Sep 2002–20 Dec 2007

Integrated Master in Biomedical Engineering – Medical Electronics; Thesis title: Optical microsystem for auto-fluorescence characterization of gastro-intestinal mucosa

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University of Minho, Braga (Portugal)

- Autofluorescence spectroscopy.
- Dielectric Fabry-Perot filter design.
- Courses attended: Microelectronics, Image Processing, Signal Processing, Biosensors, Biophysics.

PERSONAL SKILLS

Mother tongue(s) Portuguese

Other language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2
French	B1	B2	A2	A2	A2

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user
Common European Framework of Reference for Languages

Communication skills

Excellent communication skills and experience in the dissemination of results to the scientific community (several oral presentations on international conferences).

Organisational / managerial skills

- Participation in INL's Staff Council 2015/2016.
- Active participation in the organization of group sports activities and events.

Job-related skills

- Strong motivation to work both independently and as part of a team in an interdisciplinary environment, with the ability to keep the focus on the goals and to meet deadlines, acquired through the execution of different sized group projects.
- Self-instruction capability, acquired in the research periods of master and doctoral studies.

Digital competence

SELF-ASSESSMENT				
Information processing	Communication	Content creation	Safety	Problem solving

Proficient user	Proficient user	Proficient user	Independent user	Proficient user
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Digital competences - Self-assessment grid

- Competent with Microsoft Office applications (Word, Excel, PowerPoint and Outlook).
- Experienced and proficient user of Multisim, Rhinoceros, CAD, MATLAB, ANSYS and PADS software. Basic knowledge on LabView, Tanner, Mathematica and TFCalc applications.

ADDITIONAL INFORMATION

Research funding

Project awarded in collaboration with João Gaspar (INL) and INESC, FCT PTDC/CTM-NAN/5052/2014 entitled "uMEMS – Thin-film silicon MEMS electronics for ubiquitous sensors applications", with funding of 199.3 kEur in total, of which 70.2 kEur attributed to INL.

Publications

- R.A. Dias, F.S. Alves, M. Costa, H. Fonseca, J. Cabral, J. Gaspar and L.A. Rocha – Real-time operation and characterization of a high performance time-based accelerometer, *Journal of Microelectromechanical Systems*, vol. 24 (2015), pp. 1703-1711, 5yr IF 2.197 (<http://dx.doi.org/10.1109/JMEMS.2015.2487686>).
- F.S. Alves, R.A. Dias, J. M. Cabral, J. Gaspar and L.A. Rocha – High-resolution MEMS inclinometer based on pull-in voltage, *Journal of Microelectromechanical Systems*, vol. 24 (2015), pp. 931-939, 5yr IF 2.197 (<http://dx.doi.org/10.1109/JMEMS.2014.2359633>).
- R. A. Dias, G. de Graaf, R.F. Wolffenbuttel and L.A. Rocha – Gas viscosity sensing based on electrostatic pull-in time of microactuators, *Sensors and Actuators: A. Physical*, vol. 216 (2014), pp. 376–385, 5yr IF 2.214 (<http://dx.doi.org/10.1016/j.sna.2014.05.004>).
- R. A. Dias and L.A. Rocha – Improving capacitance/damping ratio in a capacitive MEMS transducer, *Journal of Micromechanics and Microengineering*, vol. 24 (2014), 15pp, 5yr IF 1.839 (<http://dx.doi.org/10.1088/0960-1317/24/1/015008>).
- L. A. Rocha, R. A. Dias, E. Cretu, L. Mol and R. F. Wolffenbuttel – Auto-calibration of capacitive MEMS accelerometers based on pull-in voltage, *Microsystems Technologies*: vol.11 (2011), pp. 429-436, 5yr IF 0.889 (<http://dx.doi.org/10.1007/s00542-011-1252-8>).
- R. A. Dias, E. Cretu, L. Mol, R. F. Wolffenbuttel and L.A. Rocha – Design of a time-based micro-g accelerometer, *IEEE Sensors Journal*: vol. 17 (2011), pp. 1677-1683, 5yr IF 1.988 (<http://dx.doi.org/10.1109/JSEN.2010.2103938>).
- R. A. Dias, E. Cretu, R. F. Wolffenbuttel and L.A. Rocha – Pull-in based μ g-resolution accelerometer: characterization and noise analysis, *Sensors and Actuators A*: vol. 172 (2011), pp. 47-53, 5yr IF 2.214 (<http://dx.doi.org/10.1016/j.sna.2011.01.027>).
- J. G. Rocha, R. A. Dias, L. Goncalves, G Minas A. Ferreira, C. M. Costa and S. Lanceros-Mendez – X-ray image detector based on light guides and scintillators. *IEEE Sensors Journal*: vol. 9 (2009), p. 1154-1159, 5yr IF 1.988 (<http://dx.doi.org/10.1109/JSEN.2009.2026520>).

Conferences

- R. A. Dias, I. R. B. Ribeiro, L. A. Rocha, H. Fonseca, E. Paz, R. Ferreira, S. Cardoso, P.P. Freitas and J. Gaspar – MEMS magnetic field modulators for ultra-low DC field detection, *Micro and Nano Engineering 2016*, Vienna, Austria, September 2016 (accepted).
- L.R Pires, R. Gill, H. Fonseca, R.A. Dias, P. Freitas and J Gaspar – Fabrication of biodegradable microneedles for peptide delivery, 2016 nanoPortugal International Conference, Braga, Portugal, February 2016.
- R.A. Dias, H. Fonseca, M. Costa, L. A. Rocha and J. Gaspar – AlN layers for bistable energy harvesting microdevices, 2016 nanoPortugal International Conference, Braga, Portugal, February 2016.
- R. A. Dias, H. Fonseca, M. Costa, L. A. Rocha and J. Gaspar – AlN layers for bistable energy harvesting microdevices, *Micro and Nano Engineering 2015*, The Hague, Netherlands, September 2015.
- I. R. B. Ribeiro, R. A. Dias, L. A. Rocha, H. Fonseca and J. Gaspar – Large-Stroke MEMS Electrostatic Comb Drive Actuators for Magnetic Field Modulators, *Micro and Nano Engineering 2015*, The Hague, Netherlands, September 2015.
- R.A. Dias, F. S. Alves, M. Costa, H. Fonseca, J. Cabral, J. Gaspar, L.A. Rocha – High performance

pull-in time accelerometer, 18th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers), Anchorage, Alaska, June 2015.

E. E. Moreira, F. S. Alves, R. A. Dias, M. Costa, H. Fonseca, J. Cabral, J. Gaspar, L. A. Rocha – Bi-directional extended range parallel plate electrostatic actuator based on feedback linearization, IEEE International Conference on Micro Electro Mechanical Systems (MEMS), Estoril, Portugal, January 2015.

E.E. Moreira, F.S. Alves, R.A. Dias, J. Cabral, J. Gaspar and L.A. Rocha – Full-gap tracking system for parallel-plate electrostatic microactuators, *Procedia Engineering* Volume: 87 Pages: 1386-1389, 2014.

F.S. Alves, R.A. Dias, J. Cabral, J. Gaspar and L.A. Rocha – Thermal compensated pull-in voltage MEMS inclinometers, *Procedia Engineering* Volume: 87 Pages: 831-834, 2014.

F.S. Alves, R.A. Dias, J. Cabral, L.A. Rocha and J. Monteiro – FPGA controlled MEMS inclinometer, IEEE International Symposium on Industrial Electronics 2013, Taipei, Taiwan, 2013.

R. A. Dias, G. de Graaf, R.F. Wolffenbuttel and L.A. Rocha, – Gas viscosity MEMS sensor based on pull-in, *Transducers 2013*, Barcelona, 16-20 June 2013.

F. S. Alves, R.A. Dias, J. Cabral, J. Gaspar and L.A. Rocha – High resolution pull-in inclinometer, *Transducers 2013*, Barcelona, 16-20 June 2013.

F.S. Alves, R.A. Dias, J. Cabral and L.A. Rocha – Autonomous MEMS inclinometer, *Lecture Notes in Computer Science*, vol. 7326, pp. 26-33 2012.

R. A. Dias, P. J. Macedo, H. D. Silva, R. F. Wolffenbuttel, E. Cretu and L.A. Rocha – Closed-loop operated time-based accelerometer, *Procedia Engineering*, vol. 47 (2012) pp. 398-401.

F.S. Alves, R.A. Dias, J. Cabral and L.A. Rocha – Pull-in MEMS Inclinometer, *Procedia Engineering*, vol. 47 (2012) pp. 1239-1242 (EuroSensors XXVI, Kraków, Poland, September 9-12 2012).

C.S. Silva, R.A. Dias, J.C. Viana, A.J. Pontes and L.A. Rocha – Static and Dynamic Modeling of a 3-Axis Thermal Accelerometer, *Procedia Engineering*, vol. 47 (2012) pp. 973–976 (EuroSensors XXVI, Kraków, Poland, September 2012).

R. A. Dias, R. F. Wolffenbuttel, E. Cretu and L.A. Rocha – Closed loop operation of time-based accelerometers, *MME 2012*, Ilmenau, Germany, September 9-12 2012.

V. Rajaraman, B.S. Hau, L.A. Rocha, R.A. Dias, R. Dekker and K.A.A. Makinwa – A novel micro-g, extended range, SOI-MEMS piezoresistive time-accelerometer operating in two distinct time-based transduction modes, *Transducers 2011*, Beijing, June 2011.

R. A. Dias, R. F. Wolffenbuttel, E. Cretu and L.A. Rocha – Sensitivity linearization technique for a time-based MEMS accelerometer, *Transducers 2011*, Beijing, 5-9 June, pp. 715-718.

R. A. Dias, R. F. Wolffenbuttel, E. Cretu and L.A. Rocha – Squeeze-film damper design with air channels: experimental verification, *Procedia Engineering*, vol. 25 (2011) pp. 47-50.

R. A. Dias, R. F. Wolffenbuttel, E. Cretu and L.A. Rocha – Noise analysis of a micro-g pull-in time accelerometer, *Proceedings of MME 2011*, Toensberg, 19-22 June, pp. 258-261.

R. A. Dias, E. Cretu, R. F. Wolffenbuttel and L.A. Rocha – Characterization of a pull-in based μ g-resolution accelerometer, *Procedia Engineering*, vol. 5 (2010) pp. 1075-1078.

R. A. Dias, L. A. Rocha, L. Mol, R. F. Wolffenbuttel and E. Cretu – Time-based micro-g accelerometer with improved damper geometry, *Instrumentation and Measurement Technology Conference (I2MTC)*, 2010 IEEE, (2010) pp. 672-675.

R. A. Dias, L. Mol, E. Cretu, R. F. Wolffenbuttel and L.A. Rocha – Improved Damper Geometry for Parallel-Plate MEMS. In *MicroMechanics Europe 2009*, Toulouse, France, 20-22 September 2009.

J. G. Rocha, A. V. Fernandes, R. A. Dias, L. Goncalves, P. Goncalves, A. J. Ferreira, S. Lanceros-Mendez - X-Ray CMOS Detector Array With Scintillating Light Guides. In "Proceedings of IEEE Sensors 2008", Lecce, Italy, October 2008, p. 1398-1401.

R. A. Dias, J. H. Correia, G. Minas - CMOS optical sensors for being incorporated in endoscopic capsule for cancer cells detection. In "Proceedings of ISIE 2007", Vigo, Spain, June 2007.

R. A. Dias, J. H. Correia, G. Minas - On-Chip Integrated Optical Sensors for Fluorescence Detection of Cancer Tissue: Application to Capsule Endoscopy. In "Proceedings of ICECS 2007", Marrakech, Morocco, December 2007.

Courses

- Invitation for technical presentation on the Third STIMESI Workshop on MEMS and Microsystems Research and Teaching, held in Prague, Czech Republic, on 13th of November, 2009. The presentation was entitled "MEMS Accelerometer Design on SOIMUMPS and MEMSOI".

- Participation on the Program From the Lab to the Market, held at INL, by Porto Business School.

Honours and awards Funding from 04/2014 to 09/2016, European Commission Marie-Curie Actions FP7, NanoTRAINforGrowth Fellowship COFUND, Project name:" Design and fabrication of an AlN-based broadband oscillator with piezoelectric transduction for microenergy harvesting applications".

References References available upon request (from Luis A. Rocha, Reinoud F. Wolffenbuttel, Higinio C. Correia).