Curriculum Vitae

PEDRO MANUEL PARRACHO SALOMÉ (P.M.P. Salomé)

ORCID: 0000-0002-1050-2958
Researcher ID: E-5562-2013
Scopus: P M P Salomé /

2019-06-03

SHORT SUMMARY

Pedro Salomé received his Diploma in Physics Engineering and Doctoral degree in the field of Applied Physics from the University of Aveiro, Portugal, in 2006 and 2011, respectively. During his PhD studies, he worked with growth and characterization of $Cu(In,Ga)Se_2$ and $Cu_2ZnSn(S,Se)_4$ thin films for solar cells and he performed short research stays at the Helmholtz Zentrum Berlin, Germany, and at the Federal University of Minas Gerais, Brazil. From February 2011 to February 2013, already holding a PhD, he was the project manager of an industrial collaboration between the Ångström Solar Center, at Uppsala University, Sweden, and Corning Inc., USA. The project dealt with the development of novel glass substrates with the intrinsic ability to dope $Cu(In,Ga)Se_2$. In 2013 he was awarded with an Individual Intra European (IEF) Marie Curie (150 k€) and moved to the International Iberian nanotechnology laboratory (INL) to work on chalcopyrite-based nanostructures for solar cells. In 2015 he was hired as a staff researcher by INL to be part of the Laboratory of Nanostructured Solar cells and in 2016 he was awarded by the Portuguese Foundation for science and technology (FCT) with an FCT Investigator starting grant to fund his independent group. To match this grant, in January 2017, INL promoted him to leader of the group Nanofabrication for Optoelectronic applications. Since 2017, Pedro also holds a guest Assistant Professorship position at the Department of Physics at the University of Aveiro.

To this date, Doctor Salomé has published over 60 papers in peer-reviewed international journals, according to Scopus he has over 3050 citations and an h-index of 29 and according to google scholar h-factor 31 and over 3650 citations. He has given 13 invited talks at institutes/workshops/conferences. Pedro has submitted 3 patents to the European patent office and he is very active in the development of solar energy and often contributes with talks at universities, schools and companies, doing science promotion, trying to connect the industry with the research community, and engaging with the general public about renewable energy.

CONTACT INFORMATION

email: pedro.salome@inl.int

Institutional Address: INL - International Iberian Nanotechnology Laboratory, Av. Mestre José Veiga, 4715-330 Braga, Portugal.

NATIONALITY

Portugal

CURRENT ACTIVITY

- **Since January 2017:** Group leader and staff researcher of Nanofabrication for optoelectronic applications at the International Iberian Nanotechnology Laboratory working on novel approaches for high efficiency thin film solar cells.
- **Since March 2017** – Guest Assistant Professor at the Department of Physics of University of Aveiro.

PREVIOUS POSITIONS

- **March 2015 to December 2015:** Staff Researcher at the International Iberian Nanotechnology Laboratory.

- **April 2013 to March 2015**: Researcher with an individual Marie Curie IEF: Intra-European Fellowship at the International Iberian Nanotechnology Laboratory. Main activities are related with growth and characterization of Nanostructured solar cells based in chalcogenide materials.
- **February 2011 – February 2013:** Researcher at the Ångström Solar Center, division of Solid State Electronics, Department of Engineering Sciences, Uppsala University. Project leader of a collaboration project with Corning Inc. and studying the incorporation of Na in Cu(In,Ga)Se_2 thin film solar cells.
- **January 2007 – January 2011**: PhD student at I3N – University of Aveiro, Portugal.

AREA OF EXPERTISE

Doctor Salomé has been focused on developing optoelectronic devices using novel fabrication processes that are industrially friendly and by incorporating nanotechnology on current devices for performance inctrease. In 2015 he submitted two patents to the European patent office and in 2016 a third one dealing with the introduction of nanotechnology and nanophotonic structures into the current solar cell architecture. Thus, nanofabrication of nanostructures to be incorporated in optoelectronic devices that can act as enhanced optical elements and allow for the passivation of interfaces is a topic of interest. These also include clean room micro and nano electronics technology like nano-lithograpy and self-assembly of optically active nanoparticles. In order to realize such task, the characterization of the resulting devices and of the individual elements is necessary, therefore Pedro continues to perform advanced optical, electrical and structural characterization of these structures with a special emphasis on manufacturing and industrial scale-up.

LANGUAGES

Portuguese: native
English: fluent

EDUCATION

- Doctoral Supervisor Training within the Faculty of Science and Technology of Uppsala University - Autumn 2012
- Ph.D. in Physics, at I3N – University of Aveiro, Portugal – January 2007 to January 2011.
- Advanced training course in Energy Efficiency and Renewable Energy, 56 ECTS – University of Aveiro, Portugal 2008-2009.
- Diploma in Physics Engineering (5 years degree) – University of Aveiro, Portugal. Class of 2006, First of Class.

OTHER COURSES

- First European Safeguards Research and Development Association (ESARDA) course: Nuclear Safeguards and Non Proliferation, 6-9 March 2006, JRC, **Ispra**, Italy.
- Energy Efficiency in Buildings, 14-16 July 2008 – UNAVE/**University of Aveiro**.
- Doctoral Supervisor Training – Faculty of Science and Technology of **Uppsala University**, Fall 2012.
- From the Lab to the Market: The next step for INL´s Researchers – **Porto Business schoo**l – January 2015.

THESIS AND ACADEMIC REPORTS

- P.M.P. Salomé, *Optimization of the growth of CIGS thin films by a hybrid method of rf sputtering/evaporation and study of its solar cell properties*" Diploma thesis; Physics Engineering; 2006, mark 19/20.

- P.M.P. Salomé and F. Marques; Painel Solar Híbrido; "*Hybrid Solar Module*", 2009; CFA final project mark 16/20.
- P.M.P. Salomé, "*Chalcogenide thin films for solar cells: growth and properties*" Ph.D thesis, January 2011.

PUBLICATIONS IN INTERNATIONAL JOURNALS WITH REFEREEING

* Publication without Ph.D Supervisor

Publication where Pedro Salomé is the corresponding author

[1] A. F. da Cunha, F. Kurdzesau and P.M.P. Salomé; *Cu(In,Ga)Se_2 prepared by a 2 and 3-stage hybrid RF-magnetron sputtering and Se evaporation method: Properties and solar cell performance*, **Materials Science Forum**, Vols. 514-516, pp. 93-97, 2006.

[2] A.F. da Cunha, F. Kurdesau, D. Rudmann and P.M.P. Salomé; *Performance comparison of hybrid sputtering/evaporation CIGS solar cells with different TCO window layers*, **Journal of Non-Crystalline Solids** 352 (2006) 1976-1980.

2008:

[3]# P.M.P. Salomé and A.F. da Cunha*; Incorporation of Ga in CIGS Absorber Layers Formed by RF-Magnetron Sputtering in Se Vapours*, **Materials Science Forum,** Vols. 587-588 (2008) pp 323-327.

2009:

[4] P.A. Fernandes, P.M.P. Salomé, A.F. da Cunha; *Growth And Raman Scattering Characterization Of Cu_2ZnSnS_4 thin films*, **Thin Solid Films,** 517 (2009) 2519–2523.

[5] P.M.P. Salomé, P.A. Fernandes and A.F. da Cunha; *Morphological and Structural Characterization of $Cu_2ZnSnSe_4$ Thin Films Grown by Selenization of Elemental Precursor Layers*; **Thin Solid Films**, 517(2009)2531–2534.

[6] P.A. Fernandes, P.M.P. Salomé, A.F. da Cunha; *Precursors' Order Effect on the Properties of Sulfurized Cu_2ZnSnS_4 Thin Films*, **Semicond. Sci. Technol.** 24 (2009) 105013 (7pp).

2010:

[7] P.A. Fernandes, P.M.P. Salomé, A.F. da Cunha; *A study of ternary Cu_2SnS_3 and Cu_3SnS_4 thin films prepared by sulfurizing stacked metal precursors*; **J. Phys. D: Appl. Phys.** 43 (2010) 215403.

[8] P. A. Fernandes , P. M. P. Salomé, and A. F. da Cunha; *Cu_xSnS_{x+1} (x = 2, 3) thin films grown by sulfurization of metallic precursors deposited by dc magnetron sputtering*; **Phys. Status Solidi C,** 1–4 (2010) / DOI 10.1002/pssc.200982746.

[9]# P. M. P. Salomé, P. A. Fernandes, and A. F. da Cunha; *Influence of selenization pressure on the growth of $Cu_2ZnSnSe_4$ films from stacked metallic layers*; **Phys. Status Solidi C**, 1–4 (2010) / DOI 10.1002/pssc.200982748.

[10]# P.M.P. Salomé, P.A. Fernandes , A.F. da Cunha, J.P. Leitão, J. Malaquias, A. Weber, J.C González and M.I.N. da Silva; *Growth pressure dependence of $Cu_2ZnSnSe_4$ properties*; **Solar Energy Materials & Solar Cells,** 94 (2010) 2176–218.

[11]# P.M.P. Salomé, J. Malaquias, P.A. Fernandes, and A.F. da Cunha; *Mo bilayer for thin film photovoltaics revisited*, **J. Phys. D: Appl. Phys.** 43 (2010) 345501 (7pp).

[12] P. A. Fernandes, P.M.P. Salomé, A.F. da Cunha, Björn-Arvid Schubert; *Cu_2ZnSnS_4 solar cells prepared with sulfurized dc-sputtered stacked metallic precursors*, **Thin Solid Films**, 519 (2010) 7382–7385.

2011:

[13] J.P. Leitão, N.M. Santos, P.A. Fernandes, P.M.P. Salomé, A.F. da Cunha, J.C. González, F.M. Matinaga; *Study of optical and structural properties of Cu_2ZnSnS_4 thin films*, **Thin Solid Films,** 519 (2011) 7390–7393.

[14] J. Malaquias, P.A. Fernandes, P.M.P. Salomé, A.F. da Cunha; *Assessment of the potential of tin sulphide thin films prepared by sulphurization of metallic precursors as cell absorbers*, **Thin Solid Films,** 519 (2011) 7416–7420.

[15] P.A. Fernandes, P.M.P. Salomé and A.F. da Cunha, *Study of polycrystalline Cu_2ZnSnS_4 films by Raman scattering*; **Journal of Alloys and Compounds**, 509 (2011) 7600–7606.

[16] J. P. Leitão, N. M. Santos, P. A. Fernandes, P. M. P. Salomé, A. F. da Cunha, J. C. Gonzalez, G. M. Ribeiro, and F. M. Matinaga; *Photoluminescence and electrical study of fluctuating potentials in Cu_2ZnSnS_4-based thin films*, **PHYSICAL REVIEW B** 84, 024120 (2011).

[17]# P.M.P. Salomé, J. Malaquias, P.A. Fernandes, M.S. Ferreira, J.P Leitão, A.F. da Cunha, J.C González, F.N. Matinaga, G.M. Ribeiro and E.R. Viana; *The influence of hydrogen in the incorporation of Zn during the growth of Cu_2ZnSnS_4 thin films*, **Solar Energy Materials & Solar Cells** 95 (2011) 3482–3489.

2012:

[18]# P.M.P. Salomé, J. Malaquias, P.A. Fernandes, M.S. Ferreira, A.F. da Cunha, J.P. Leitão, J.C. González, F.M. Matinaga; *Growth and characterization of $Cu_2ZnSn(S,Se)_4$ thin films for solar cells*, **Solar Energy Materials & Solar Cells** 101 (2012) 147–153.

[19] P. A. Fernandes, A. F. Sartori, P. M. P. Salomé, J. Malaquias, A. F. da Cunha, M. P. F. Graca, and J. C. González; *Admittance spectroscopy of Cu_2ZnSnS_4 based thin film solar cells*, **Applied Physics Letters**, 100, 233504 (2012).

2013:

[20]# P. M. P. Salomé, V. Fjällström, A. Hultqvist and M. Edoff*; Na Doping of CIGS Solar Cells Using Low Sodium Doped Mo layer*, **IEEE Journal of Photovoltaics**, VOL. 3, NO. 1, JANUARY 2013.

[21] M.G. Sousa, A.F. da Cunha, P.M.P. Salomé, P. A. Fernandes, J.P. Teixeira, J.P. Leitão, *CZTS Absorber Layers obtained through Sulphurization of metallic precursors: Graphite Box versus Sulphur Flux*, **Thin Solid Films** 535 (2013) 27–30.

[22]*# P.M.P. Salomé, V. Fjällström, A. Hultqvist, P. Szaniawski, U. Zimmermann and M. Edoff, *The effect of Mo back contact ageing on CIGS thin film solar cells*, **Progress in Photovoltaics: Research and Applications,** Volume 22, Issue 1, pages 83–89, January 2014.

[23]*# P.M.P. Salomé, A. Hultqvist, V. Fjällström, M. Edoff, B. Aitken, K. Vaidyanathan, K. Zhang, K. Fuller and C. Kosik Williams, *Cu(In,Ga)Se_2 solar cells with varying Na content prepared on nominally alkali-free glass substrates*, **IEEE Journal of Photovoltaics**, VOL. 3, NO. 2, APRIL 2013.

[24]* Johan Lindahl, Uwe Zimmermann, Piotr Szaniawski, Tobias Törndahl, Adam Hultqvist, Pedro Salomé, Charlotte Platzer-Björkman, and Marika Edoff, *In-line Cu(In,Ga)Se_2 Co-evaporation for High Efficiency Solar Cells and Modules*, **IEEE Journal of Photovoltaics**, VOL. 3, NO. 3, JULY 2013.

[25] J. C González, G. M. Ribeiro, E. R. Viana, P. A. Fernandes, P. M. P. Salomé, K. Gutiérrez Z. -B., A. A. Garcia, F. M. Matinaga, J. P. Leitão, and A. F. da Cunha, *Hopping Conduction and persistent Photoconductivity in Cu_2ZnSnS_4 Thin Films*, **J. Phys. D: Appl. Phys.** 46 (2013) 155107.

[26]* V. Fjällström, P.M.P. Salomé, A. Hultqvist, M. Edoff, T. Jarmar, B.G. Aitken, K. Zhang, K. Fuller and C. Kosik William, *Potential Induced degradation of $CuIn_{1-x}Ga_xSe2$ thin film solar cells,* **IEEE Journal of Photovoltaics**, VOL. 3, NO. 3, JULY 2013.

[27] P. A. Fernandes, P.M.P. Salomé, A.F. Sartori, J. Malaquias, A.F. da Cunha, Björn-Arvid Schubert, J. C. González, G. M.Ribeiro, *Effects of sulphurization time on Cu_2ZnSnS_4 absorbers and thin films solar cells obtained from metallic precursors*, **Solar Energy Materials & Solar Cells** 115 (2013) 157 – 165.

[28]* Bart Vermang, Viktor Fjällström, Jonas Pettersson, Pedro Salomé, and Marika Edoff, *Development of Rear Surface Passivated Cu(In,Ga)Se_2, Thin Film Solar Cells with Nano-Sized Local Rear Point Contacts*, **Solar Energy Materials & Solar Cells** 117 (2013) 505–511.

[29]* A. Hultqvist, P. M. P. Salomé, V. Fjällström, M. Edoff, B. Aitken, K. Zhang, Y. Shi, K. Fuller and C. Kosik Williams, *Performance of Cu(In,Ga)Se_2 solar cells using nominally alkali free glass substrates with varying coefficient of thermal expansion,* ***Journal of Applied Physics*** *114, 094501 (2013).*

[30] P. A. Fernandes, M. G. Sousa, P. M. P. Salomé, J. P. Leitão and A. F. da Cunha, *Thermodynamic pathway for the formation of SnSe and $SnSe_2$ polycrystalline thin films by selenization of metal precursors*, **CrystEngComm**, 2013, 15, 10278–10286.

2014:

[31]#* P.M.P. Salomé, A. Hultqvist, V. Fjällström, B. Vermang, M. Edoff, B. Aitken, K. Zhang, K. Fuller and C. Kosik Williams, *The effect of high growth temperature on Cu(In,Ga)Se_2 thin film solar cells*, **Solar Energy Materials & Solar Cells** 123 (2014) 166–170.

[32] J.C. González, P.A. Fernandes, G.M. Ribeiro, A. Abelenda, E.R. Viana, P.M.P. Salomé, A.F. da Cunha; *Influence of the sulphurization time on the morphological, chemical, structural and electrical properties of Cu_2ZnSnS_4 polycrystalline thin films*, **Solar Energy Materials & Solar Cells** 123 (2014) 58–64.

[33]# P. M. P. Salomé, P. A. Fernandes, J. P. Leitão, M.G. Sousa, J. P. Teixeira and A. F. Cunha, *Secondary crystalline phases identification in Cu2ZnSnSe4 thin films: contributions from Raman scattering and photoluminescence*, **Journal of Material Science,** (2014) 49:7425–7436, DOI 10.1007/s10853-014-8446-2.

[34]* Bart Vermang, Jörn Timo Wätjen, Christopher Frisk, Viktor Fjällström, Fredrik Rostvall, Marika Edoff, Pedro Salomé, Jérôme Borme, Nicoleta Nicoara, Sascha Sadewasser, *Introduction of Si PERC rear contacting design to boost efficiency of Cu(In,Ga)Se_2 solar cells*, **IEEE Journal of Photovoltaics**, VOL. 4, NO. 6, NOVEMBER 2014.

[35]*# P.M.P. Salomé, A. Hultqvist, V. Fjällström, M. Edoff, B.G. Aitken, K. Zhang, K. Fuller and C. Kosik Williams, *Incorporation of Na in Cu(In,Ga)Se_2 thin film solar cells: a statistical comparison between Na from soda lime glass and from a precursor layer of NaF*, **IEEE Journal of Photovoltaics**, VOL. 4, NO. 6, NOVEMBER 2014.

[36]* Frisk, Christopher; Platzer Björkman, Charlotte; Olsson, Jörgen; Szaniawski, Piotr; Wätjen, Timö; Fjällström, Viktor; Salomé, Pedro; Edoff, Marika, *Optimizing Ga-profiles for highly efficient Cu(In,Ga)Se_2 thin film solar cells in simple and complex defect models*, **J. Phys. D: Appl. Phys.** 47 (2014) 485104 (12pp).

[37] J. P. Teixeira, R. A. Sousa, M. G. Sousa, A. F. da Cunha, P. A. Fernandes, P. M. P. Salomé, J. C. González, and J. P. Leitão, *Comparison of fluctuating potentials and DAP transitions in a Cu-poor Cu_2ZnSnS_4 based solar cell*, **Applied Physics Letters,** 105, 163901 (2014).

[38] J. P. Teixeira, R. A. Sousa, M. G. Sousa, A. F. da Cunha, P. A. Fernandes, P. M. P. Salomé and J. P. Leitão, *Radiative transitions in highly doped and compensated chalcopyrites and kesterites: The case of Cu_2ZnSnS_4*, **Physical Review B** 90 (23), 235202 (2014).

[39] H.V. Alberto, R.C. Vil, J.M. Gil, J. Piroto Duarte, R.B.L. Vieira, A. Weidinger J.P. Leitão, A.F. da Cunha, M.G. Sousa, J.P. Teixeira, P. A. Fernandes, P.M.P. Salomé, K. Timmo, M. Loorits, A. Amato, H.Luetkens, T. Prokscha, A. Suter and Z. Salman, *Muonium states in Cu_2ZnSnS_4 solar cell material*, muSR2014 proceedings, **Journal of Physics: Conference Series,** 551 (2014) 012045.

2015:

[40]* V. Fjällström, P. Szaniawski, B. Vermang, P.M.P. Salomé, F. Rostvall, U. Zimmermann and M.Edoff, *Recovery after potential induced degradation of Cu(In,Ga)Se_2 solar cells with CdS and Zn(O,S) buffer layers*, **IEEE Journal of Photovoltaics**, VOL. 5, NO. 2, MARCH 2015.

[41]# P.M.P. Salomé, V. Fjällström, P. Szaniawski, J.P. Leitão, A. Hultqvist, P.A. Fernandes, J. P. Teixeira, B. P. Falcão, U. Zimmermann, A.F. da Cunha and M. Edoff, *A comparison between thin film solar cells made from co-evaporated $CuIn_{1-x}Ga_xSe_2$ using a one-stage process versus a three-stage process*, **PROGRESS IN PHOTOVOLTAICS: RESEARCH AND APPLICATIONS**, 2015; 23:470–478.

[42] A. Abelenda, M. Sánchez, G.M. Ribeiro, P.A. Fernandes, P.M.P. Salomé, A.F. da Cunha, J.P. Leitão, M.I.N. da Silva, J.C. González, *Anomalous persistent photoconductivity in Cu_2ZnSnS_4 thin films and solar cells*, **Solar Energy Materials & Solar Cells**, 137 (2015) 164-168.

[43]*# P.M.P. Salomé, H. Rodriguez-Alvarez, S. Sadewasser, *Incorporation of alkali metals in chalcogenide solar cells,* **Solar Energy Materials & Solar Cells,** 143 (2015) 9–20.

[44] * Piotr Szaniawski, Pedro Salomé, Viktor Fjällström, Tobias Törndahl, Uwe Zimmermann, Marika Edoff, *Influence of varying Cu content on growth and performance of Ga-graded Cu(In,Ga)Se_2 solar cells*, **IEEE JOURNAL OF PHOTOVOLTAICS**, VOL. 5, NO. 6, NOVEMBER 2015.

2016:

[45] * Bart Vermang, Yi Ren, Olivier Donzel-Gargand, Christopher Frisk, Jonathan Joel, Pedro Salomé, Jérôme Borme, Sascha Sadewasser, Charlotte Platzer-Björkman and Marika Edoff, *Rear surface optimization of CZTS solar cells by use of a passivation layer with nano-sized point openings*, **IEEE JOURNAL OF PHOTOVOLTAICS**, VOL. 6, NO. 1, JANUARY 2016.

[46] Jennifer P. Teixeira, Pedro M. P. Salomé, Marta G. Sousa, Paulo A. Fernandes, Sascha Sadewasser, António F. da Cunha, and Joaquim P. Leitão, *Optical and structural investigation of Cu_2ZnSnS_4 based solar cells*, **Phys. Status Solidi B**, 1–7 (2016) / DOI 10.1002/pssb.201600453.

[47] * H. Limborço, P.M.P. Salomé, J.P. Teixeira, D.G. Stroppa, R-Ribeiro Andrade, N. Nicoara, K. Abderrafi, J.P. Leitão, J.C. Gonzalez, and S. Sadewasser, *Synthesis and formation mechanism of $CuInSe_2$ nanowires by onestep self-catalysed evaporation growth*, **CrystEngComm**, 2016, DOI: 10.1039/C6CE01317A

2017:

[48] * Pedro M. P. Salomé, Jennifer P. Teixeira, Jan Keller, Tobias Törndahl, Sascha Sadewasser, and Joaquim P. Leitão, *Influence of CdS and ZnSnO Buffer Layers on the Photoluminescence of Cu(In,Ga)Se_2 Thin Films*, **IEEE Journal of Photovoltaics** (Volume: 7, Issue: 2, March 2017).

[49] *# P.M.P. Salomé, J. Keller, T. Törndahl, J.P. Teixeira, N. Nicoara, R.-Ribeiro Andrade, D.G. Stroppa, J.C. González, M. Edoff, J.P. Leitão, S. Sadewasser, *CdS and $Zn_{1-x}Sn_xO_y$ buffer layers for CIGS solar cells*, **Solar Energy Materials & Solar Cells** 159 (2017) 272–281.

[50]* Sascha Sadewasser, Pedro M.P. Salomé, Humberto Rodriguez-Alvarez, *Materials efficient deposition and heat management of $CuInSe_2$ micro-concentrator solar cells*, **Solar Energy Materials & Solar Cells** 159 (2017) 496–502.

[51]* Pedro M. P. Salomé, Rodrigo Ribeiro-Andrade, Jennifer P. Teixeira, Jan Keller, Tobias Törndahl, Nicoleta Nicoara, Marika Edoff, Juan Carlos Gonzalez, Joaquim Pratas Leitão, and Sascha Sadewasser, *Cd and Cu Interdiffusion in Cu(In, Ga)Se_2/CdS Hetero-Interfaces*, **IEEE JOURNAL OF PHOTOVOLTAICS**, VOL. 7, NO. 3, MAY 2017.

[52] * K. Abderrafi, R.Ribeiro-Andrade, N. Nicoara, M.F. Cerqueira, M. Gonzalez Debs, H. Limborço, P.M.P. Salomé, J.C. Gonzalez, F. Briones, J.M. Garcia, and S. Sadewasser, *Epitaxial $CuInSe_2$ thin films grown by molecular beam epitaxy and migration enhanced epitaxy*, **Journal of Crystal Growth** 475 (2017) 300–306.

2018:

[53]* N. Ben Sedrine, R. Ribeiro-Andrade, A. Gustafsson, M. R. Soares, J. Bourgard,a J. P. Teixeira, P. M. P. Salomé, M. R. Correia, M. V. B. Moreira, A. G. De Oliveira, J. C. González and J. P. Leitão, *Fluctuating potentials in GaAs:Si nanowires:*

critical reduction of the influence of polytypism on the electronic structure, **Nanoscale**, 2018, 10, 3697.

[54]* H. V. Alberto, R. C. Vilão, R. B. L. Vieira, J. M. Gil, A. Weidinger, M. G. Sousa, J. P. Teixeira, A. F. da Cunha, J. P. Leitão, P. M. P. Salomé, P. A. Fernandes, T. Törndahl, T. Prokscha, A. Suter, and Z. Salman, *Slow-muon study of quaternary solar-cell materials: Single layers and p-n junctions*, **PHYSICAL REVIEW MATERIALS** 2, 025402 (2018).

[55] *# Pedro M. P. Salomé, Bart Vermang, Rodrigo Ribeiro-Andrade, Jennifer P. Teixeira, José M. V. Cunha, Manuel J. Mendes, Sirazul Haque, Jêrome Borme, Hugo Águas, Elvira Fortunato, Rodrigo Martins, Juan C. González, Joaquim P. Leitão, Paulo A. Fernandes, Marika Edoff and Sascha Sadewasser, *Passivation of Interfaces in Thin Film Solar Cells: Understanding the Effects of a Nanostructured Rear Point Contact Layer*, **Advanced Materials Interfaces**, Volume 5, Issue 2, January 23, 2018.

[56]* D Ledinek, P Salomé, C Hägglund, U Zimmermann, M Edoff, *Rear Contact Passivation for High Bandgap Cu(In, Ga)Se_2 Solar Cells With a Flat Ga profile*, **IEEE Journal of Photovoltaics**, Volume: 8, Issue: 3, May 2018.

[57]* A. Shongalova, M.R. Correia, B. Vermang, J.M.V. Cunha, P.M.P. Salomé, P.A. Fernandes, *On the identification of Sb_2Se_3 using Raman scattering*, **MRS Communications** Materials, Materials Research Society, Cambridge University Press , pp. 1–6, 2018.

[58]*# J. M. V. Cunha, P. A. Fernandes, A. Hultqvist, J. P. Teixeira, S. Bose, B. Vermang, S. Garud, D. Buldu, J. Gaspar, M. Edoff, J. P. Leitão and P. M. P. Salomé, *Insulator materials for interface passivation of Cu(In,Ga)Se_2 thin films*, accepted in **IEEE JOURNAL OF PHOTOVOLTAICS,** VOL. 8, NO. 5, SEPTEMBER 2018.

[59]* Sourav Bose, José M. V. Cunha, Sunil Suresh, Jessica De Wild, Tomás S. Lopes, João R. S. Barbosa, Ricardo Silva, Jérôme Borme, Paulo A. Fernandes, Bart Vermang, and Pedro M. P. Salomé, *Optical Lithography Patterning of SiO_2 Layers for Interface Passivation of Thin Film Solar Cells*, **Sol. RRL** 2018, 1800212.

[60]* A. Shongalova, M.R. Correia, J.P. Teixeira, J.P. Leitão, J.C. González, S. Ranjbar, S. Garud, B. Vermang, J.M.V. Cunha, P.M.P. Salomé, P.A. Fernandes, *Growth of Sb_2Se_3 thin films by selenization of RF sputtered binary precursors*, **Solar Energy Materials and Solar Cells** 187 (2018) 219–226

2019: [61]*# R. Ribeiro-Andrade, S. Sahayaraj, B. Vermang, M. R. Correia, S. Sadewasser, J. C. González, P.A. Fernandes, P. M. P. Salomé, Voids in kesterites and the influence of lamellae preparation by focused ion beam for transmission electron microscopy analyses, **IEEE JOURNAL OF PHOTOVOLTAICS**, VOL. 9, NO. 2, MARCH 2019.

[62]* S. Bose, J.M.V. Cunha, J. Borme, W.C. Chen, N.S. Nilsson, J.P. Teixeira, J. Gaspar, J.P. Leitão, M. Edoff, P.A. Fernandes, P.M.P. Salomé , A morphological and electronic study of ultrathin rear passivated Cu(In,Ga)Se_2 solar cells, 2019, **Thin Solid Films 671, pp. 77-84**.

[63]* Correia, D., Siopa, D., Colombara, D., Tombolato, S., Salomé, P.M.P., Abderrafi, K., Anacleto, P., Dale, P.J., Sadewasser, S., *Area-selective electrodeposition of micro islands for $CuInSe_2$ -based photovoltaics*, **Results in Physics**, Volume 12, March 2019, Pages 2136-2140.

[64]]* J.P. Teixeira, P.M.P. Salomé, B. Alves, M. Edoff, and J.P. Leitão, *Evidence of Limiting Effects of Fluctuating Potentials on V_{OC} of Cu(In,Ga)Se_2 Thin-Film Solar Cells*, **PHYSICAL REVIEW APPLIED** 11, 054013 (2019).

PUBLICATIONS IN CONFERENCE

[1] F. Kurdesau, AF Da Cunha, D Rudmann, PMP Salomé, *Growth and characterization of CIGS solar cells by RF magnetron sputtering with continuous Se evaporation and end point detection,* 20th European Photovoltaic Solar Energy Conference and Exhibition, Barcelona, 2005.

PROCEEDINGS WITH REFEREEING

[2] AF Da Cunha, D Rudmann, PMP Salomé, *Formation of high-quality CIGS absorber layers by two-stage RF-magnetron sputtering in Se vapours*, E-MRS Spring Meeting, Strasbourg, 31.05-3.06.

[3] CI Cardoso, MG Cardoso, PMP Salomé, AF Da Cunha, *$CuInSe_2$ thin Film Growth and Characterization by Selenization of DC-sputtered Cu/In Elemental layers*, Materials 2007, Porto 1-4 April 2007.

[4] M. Edoff, P.M.P. Salomé, A. Hultqvist, V. Fjällström, *Analysis of NaF precursor layers during the different stages of the Cu(In,Ga)Se_2 co-evaporation process*, 2013 MRS Spring Meeting & Exhibit April 1-5, 2013 San Francisco, California, U.S.A.

[5] C. Frisk, C. Platzer-Björkman, V. Fjällström, P. Salomé, J. Olsson, M. Edoff, *Modeling Ga-profiles for Cu(In,Ga)Se_2 thin film solar cells with varying defect density*, PVSEC-23; 23rd International Photovoltaic Science Engineering Conference; Taipei, Taiwan; October 28 - Nov 1, 2013.

[6] H. Limborço, P.M.P. Salomé, D. Stroppa, R-Ribeiro Andrade, J.P. Teixeira, N. Nicoara, K. Abderrafi, J.P. Leitão, J.C. González, and S. Sadewasser, *Growth of $CuInSe_2$ nanowires without external catalyst by molecular beam epitaxy*, Photovoltaic Specialists Conference (PVSC), 2016 IEEE 43rd DOI: 10.1109/PVSC.2016.7750163

[6] Bart Vermang, Yi Ren, Jonathan Joel, Christopher Frisk, Olivier Donzel-Gargand, Pedro Salomé, Jerome Borme, Sascha Sadewasser, Charlotte Platzer-Bjorkman, and Marika Edoff, *Rear surface optimization of CZTS solar cells by use of a passivation layer with nano-sized point openings*, Photovoltaic Specialist Conference (PVSC), 2015 IEEE 42nd, DOI: 10.1109/PVSC.2015.7355624.

[7] J. P. Leitão, J. P. Teixeira, J. Keller, T. Törndahl, S. Sadewasser, and P. M. P. Salomé, *Influence of CdS and $Zn_xSn_{1-x}O_y$ Buffer Layers on the Photoluminescence of Cu(In,Ga)Se_2 Thin Films*, 2017 IEEE 44th Photovoltaic Specialist Conference, PVSC 2017 DOI 10.1109/PVSC.2017.8366726.

[8] Limborco, H, Salome, P.M.P., Stroppa, D., Andrade, R.-R., Teixeira, J.P, Nicoara, N., Abderrafi, K., Leitao, J.P., Gonzalez, J.C., Sadewasser, S., *Growth of $CuInSe_2$ nanowires without external catalyst by molecular beam epitaxy*, 2017 IEEE 44th Photovoltaic Specialist Conference, PVSC 201 DOI: 10.1109/PVSC.2017.8366655

[9] Correia, D., Siopa, D., Salomé, P.M.P., Tombolato, S., Abderrafi, K., Babbe, F., Colombara, D., Anacleto, P., Dale, P.J., Sadewasser, S, *Locally-confined electrodeposition of Cu(In,Ga)Se_2 micro islands for micro-concentrator solar cells*, 2018 IEEE 7th World Conference on Photovoltaic Energy Conversion, WCPEC 2018 - A Joint Conference of 45th IEEE PVSC, 28th PVSEC and 34th EU PVSEC, DOI: 10.1109/PVSC.2018.8547833.

BOOK CHAPTERS

- António F. da Cunha and P. M. P. Salomé; CIGS ABSORBER LAYERS PREPARED BY SPUTTERING BASED METHODS; Thin Film Solar Cells: Current Status and Future Trends; 2010 Nova Science Publishers, Inc; ISBN 978-1-61668-326-9.
- P. A. Fernandes and P. M. P. Salomé, Chapter 7. Impedance Spectroscopy of Thin Film Solar Cells, Electrical Measurements: Introduction, Concepts and Applications, Nova Science Publishers, 2018, 978-1-53612-973-1

REVIEWER IN THE FOLLOWING JOURNALS

- Physical review Letters (PRL), Physical review B (PRB), Physical Review Applied (PRA), Applied Physics Letters (APL); Advanced Optical Materials; Progress in Photovoltaics: Research and Applications; Solar Energy Materials & Solar Cells (SOLMAT); IEEE Journal of Photovoltaics; Journal of Applied Physics (JAP); Thin Solid Films (TSF); Journal of Physics and Chemistry of Solids; Applied Surface

Science; Journal of Alloys and Compounds; Journal of Crystal Growth; Sensors & Actuators: A. Physical; Vacuum.

- Golden Reviewer in 2013 and 2014 of the IEEE Journal of Photovoltaics.

INVITED SPEAKER

2019 – *Limitations of Ultrathin CIGS solar cells,* **Global Photovoltaic Conference**, March 13-15, 2019; Kimdaejung Convention Center, Gwangju, Korea
2019 - *Limitations of Ultrathin CIGS solar cells,* **Innovation Cluster International Conference,** March 15 2019, Chungbuk Technology Park, Korean National
2017 - *Thin film solar cells: vacuum processes and application of nanotechnology*, **VIII European Topical Conference on Hard Coating, X Iberian Vacuum Conference**, RIVA, 4-6/10/2017, Bilbao, Spain
2017 - *Cu(In,Ga)Se_2 Thin film solar cells fully processed using vacuum technologies*, **SOPORVAC annual meeting**, 2017-07-21, Coimbra, Portugal.
2016 – *We want you for Photovoltaics: thin film CIGS based solar cells*– 2016-05-26, Aveiro, Portugal
2015 – *Status of research at INL*, GNRATION, Braga, Portugal
2015 –*Photovoltaics and thin film solar cells*, University of Minho, Braga, Portugal
2015 – Trends in high efficiency solar cells, **Coffee with Physicists**, University of Coimbra, Department of Physics Coimbra
2014 – *Chalcogenide nanostructures for solar cells*; **INL-University of Aveiro workshop**, Braga, Portugal
2014 –*Current trends of photovoltaics*, **International Workshop on Nanostructures for Photovoltaics** – INL – Braga, Portugal
2013 – *High Efficiency solar cells*, **Alumni convention**, University of Aveiro, Department of Physics
2011 – *Doping effects in thin film solar cells*, **Corning INC and University of Uppsala workshop,** 22 June 2011, Seattle, U.S.A.
2010 – *Identification of secondary phases in kesterites*, **University of Aveiro-HZB workshop**, Helmholtz Zentrum Berlin, Berlin, Germany

PLENARY SPEAKER

2018 - *Artificial Intelligence, Quantum Mechanics and Ethics: A step back: where did we come from, how does all this work and where are we going*? 2018 AHRMIO Annual Conference - Do People still matter? - 10-12 September 2018, Braga, Portugal

ORALS PRESENTATIONS BY PEDRO AT INTERNATIONAL CONFERENCES AND WORKSHOPS

- P.M.P. Salomé et al., Incorporation of Na in Cu(In,Ga)Se2 thin film solar cells: a statistical comparison between Na from soda lime glass and from a precursor layer of NaF, 40th IEEE Photovoltaic Specialists Conference, June 8-13, 2014, Colorado, USA.
- P.M.P. Salomé et al., Intermediate Band Solar cells - INL-Japan Workshop, Braga, Portugal 2014-10-07
- P. M. P. Salomé et al, MBE for solar cells - International Workshop of the Angstrom Solar centre – Uppsala, Sweden 2014-12-18
- P. M. P. Salomé et al., Point contact thin film solar cells – INL Energy day - 2015-09-21
- P.M.P. Salomé - Nanostructured chalcopyrite semiconductors for photovoltaic energy generation - China - INL International Workshop – Braga, Portugal 2015-04-28

- P. M. P. Salomé et al., Defects on CIGS and absorber/CdS interface: influence of post-growth annealing, 2016 E-MRS Spring Meeting, France, Lille, May 2 to 6, 2016.
- P.M.P. Salomé et al., Cd and Cu interdiffusion in CIGS/CdS hetero-interfaces - PVSEC-26th Singapore 24 October 2016
- P.M.P. Salomé et al.Science Communication Course – University of Minho, Braga, Portugal 2016-11-30
- P. M. P. Salomé et al, *Understanding the effects of Rear Contact Passivation in Cu(In,Ga)Se2 Solar Cells*, 2017 MRS Spring Meeting and Exhibit, April 17-21, 2017 Phoenix, Arizona, USA.
- P. M. P. Salomé et al, *Understanding the effects of Rear Contact Passivation in Cu(In,Ga)Se2 Solar Cells*, 2018 EMRS Spring Meeting, Strasbourg, France June 18 to 22, 2018
- P. M. P. Salomé et al, *ALD processes for thin film solar cells*, HERALD SUMMIT 2018, Braga, Portugal, 25 Sep 2018 to 28 Sep 2018
- P. M. P. Salomé et al, Nanofabrication of optoelectronic devices, Israel and INL international workshop, Bar Ilan University, Ramat Gan, Telaviv, Israel, 01-02 May 2018

POSTERS

1. *P.M.P Salomé et al.; CuInSe2 thin Film Growth and Characterization by Selenization of DC sputtered Cu/In Elemental layers; Materials 2007, Porto 1-4 April 2007.*
2. *P.M.P. Salomé et al.; Incorporation Of Ga In Cigs Absorber Layers Formed By Two-Stage Rf-Magnetron Sputtering In Se Vapours; Materials 2007, Porto 1-4 April 2007.*
3. *P.M.P. Salomé et al.; Growth of Cu2ZnSnS4 Thin Films by Sulfurization of Metallic Precursors; 2nd workshop on low-dimensional structures: properties and applications; Aveiro, January, 31, February, 1, 2008*
4. *P.M.P. Salomé et al.; Morphological and Structural Characterization of Cu2ZnSnSe4 Thin Films Grown by Selenization of Elemental Precursor Layers; E-MRS 2008 Spring Meeting, May 26-30, 2008, Congress Center, Strasbourg, France.*
5. *P. M. P. Salomé et al.; Influence of selenization pressure on the growth of Cu2ZnSnSe4 films from stacked metallic layers, 23rd International Conference on Amorphous and Nanocrystalline Semiconductors, August 23 - 28, 2009, Utrecht - Netherlands.*
6. *P.M.P. Salomé, et al., Study of optical and structural properties of Cu2ZnSnS4 thin films, European Materials Research Society Spring Meeting June 7-11, 2010 Strasbourg France.*
7. *P.M.P. Salomé et al., Incorporation of Na in Cu(In,Ga)Se2 thin films grown on nominally alkali-free glass substrates using an in-line process, E-MRS 2012 Spring Meeting, May 14-18, 2012, Congress Center, Strasbourg, France.*
8. M. G. Sousa, A. F. da Cunha, P. M. P. Salomé, P. A. Fernandes, J. P. Teixeira, J. P. Leitão, *CZTS absorber layers obtained through sulphurization of metallic precursors: Graphite box versus Sulphur flux*, European Materials Research Society-Spring Meeting, Strasbourg,France, May 2012.
9. J. P. Teixeira, J. P. Leitão, M. G. Sousa, A. F. da Cunha, P. M. P. Salomé, P. A. Fernandes, *Influence of the growth parameters on the optical properties of CZTS thin films*, Física 2012, Aveiro, Portugal, September 2012.
10. J. P. Teixeira, J. P. Leitão, M. G. Sousa, A. F. da Cunha, P. M. P. Salomé, P. A. Fernandes*, Optical properties of Cu_2ZnSnS_4 thin films grown from multi-period metallic precursors*, Materials Research Society-Spring Meeting, San Francisco, United States of America, April 2013
11. P. A. Fernandes, M. G. Sousa, P. M. P. Salomé, J. P. Teixeira, J. P. Leitão, A. F. da Cunha, *Growth and characterization of $SnSe_2$ by selenization of sputtered metallic precursors* European Materials Research Society-Spring Meeting, Lille, France, May 2014;
12. J. P. Teixeira, R. A. Sousa, J. P. Leitão, M. G. Sousa, A. F. da Cunha, P. A. Fernandes, P. M. P. Salomé *Influence of defects on photoluminescence from Cu_2ZnSnS_4 thin films*, European Materials Research Society-Spring Meeting, Lille, France, May 2014;
13. J. P. Teixeira, R. A. Sousa, M. G. Sousa, A. F. da Cunha, P. A. Fernandes, P. M. P.
14. Salomé, J. C. González, J. P. Leitão *Comparison of fluctuating potentials and DAP transitions in a Cu-poor Cu_2ZnSnS_4 based solar cells*, Workshop on Nanostructures

for Solar Cells, International Iberian Nanotechnology Laboratory (INL), Braga, Portugal, October 2014

15. *P.M.P. Salomé et al., Transient surface photovoltage on the nanometer scale on Cu(In,Ga)Se2 solar cells, E-MRS 2014 SPRING MEETING, May 26-30, Lille, France.*
16. *P.M.P. Salomé et al., Influence of defects on photoluminescence from Cu2ZnSnS4 thin films, E-MRS 2014 SPRING MEETING, May 26-30, Lille, France.*
17. *P.M.P. Salomé et al., Growth and Characterization of SnSe2 by selenization of sputtered metallic precursors, E-MRS 2014 SPRING MEETING, May 26-30, Lille, France.*
18. *J. P. Teixeira, P. M. P. Salomé, M. G. Sousa, A. F. da Cunha, P. A. Fernandes, Gustafsson, S. Sadewasser, J. C. González, J. P. Leitão, Optical properties of solar cells based on Cu2ZnSnS4 thin films grown from multi-period metallic precursors, European Materials Research Society-Spring Meeting, Lille, France, May 2015;*
19. J. P. Teixeira, P. M. P. Salomé, R. A. Sousa, M. G. Sousa, A. F. da Cunha,P. A. Fernandes, S. Sadewasser, J. P. Leitão,*Radiative transitions in highly doped and compensated chalcopyrites and kesterites: the case of Cu_2ZnSnS_4*, European Materials Research Society-Spring Meeting, Lille, France, May 2015;
20. J. P. Teixeira, P.M.P. Salomé, J. Keller, R. Ribeiro Andrade, N. Nicoara, D.G. Stroppa, M. Edoff, T. Törndahl, S. Sadewasser, J. P. Leitão*, Evaluation of CdS and $Zn_{0:8}Sn_{0:2}O_y$ buffer layers in $CuIn_{1-x}Ga_xSe_2$ thin film solar cells*, nanoPT2016 Conference, International Iberian Nanotechnology Laboratory (INL), Braga, Portugal, February 2016;
21. J. P. Teixeira, P. M. P. Salomé, M. G. Sousa, P. A. Fernandes, S. Sadewasser, A. F. da Cunha, J. P. Leitão, *Influence of defects on the optical properties of Cu_2ZnSnS_4 based solar cells*, European Materials Research Society-Spring Meeting, Lille, France, May 2016;
22. V. Corregidor, L.C. Alves, P.M.P. Salomé, M.A. Barreiros, Nuclear microprobe for the study of lateral inhomogeneities in CIGS solar cells, 15th ICNMTA, 31 July-5 August 2016, Lanzhou, China
23. J. P. Teixeira, P. M. P. Salomé, R. A. Sousa, M. G. Sousa, A. F. da Cunha, P. A. Fernandes, S. Sadewasser, J. P. Leitão,*Radiative transitions in highly doped and compensated chalcopyrites and kesterites: the case of $Cu(In,Ga)Se_2$*, European Materials Research Society-Spring Meeting, Lille, France, May 2016
24. J. P. Teixeira, P. M. P. Salomé, S. Sadewasser, J. P. Leitão *The influence of post-growth annealing on the optical properties of a $Cu(In,Ga)Se_2$/CdS heterojunction*, 13th EXMATECExpert Evaluation and Control of Compound Semiconductor Materials and Technologies, Aveiro, Portugal, June 2016
25. P. M. P. Salomé, Jan Keller, Tobias Törndahl, J. P. Teixeira, N. Nicoara, R-R. Andrade, D. Stroppa, J. González, M. Edoff, J. P. Leitão, S. Sadewasser,*CdS and $Zn_{1-x}Sn_xO_y$ buffer layers for $Cu(In,Ga)Se_2$ solar cells*, European Materials Research Society-Spring Meeting, Lille, France, May 2016;
26. J. P. Leitão, J. P. Teixeira, J. Keller, T. Törndahl, S. Sadewasser, P. M. P. Salomé, *Influence of CdS and ZnSnO Buffer Layers on Photoluminescence of $Cu(In,Ga)Se_2$ ThinFilms*, IEEE 43rd Photovoltaic Specialists Conference (PVSC), Portland, United States of America, June 2016;
27. P. M. P. Salomé, D. Stroppa, R-R. Andrade, J. P. Teixeira, N. Nicoara, K. Abderrafi, J. P. Leitão, J.C. González, and S. Sadewasser, *Growth of $CuInSe_2$ nanowires without external catalyst by molecular beam epitaxy*, H. Limborço, IEEE 43rd Photovoltaic Specialists Conference (PVSC), Portland, United States of America, June 2016;
28. J. P. Teixeira, J. Keller, T.Törndahl, N. Nicoara, R.-R. Andrade, D. G. Stroppa, J. González, M. Edoff, S. Sadewasser, P.M. P. Salomé, J. P. Leitão*, CdS and $Zn_{1-x}Sn_xO_y$ buffer layers for $Cu(In,Ga)Se_2$ solar cells*, Research Day, Universidade de Aveiro, Portugal, June 2016
29. J. P. Teixeira, J. P. Leitão, J. Keller, T. Törndahl, S. Sadewasser, P. M. P. Salomé, *Influence of CdS and ZnSnO Buffer Layers on Photoluminescence of $Cu(In,Ga)Se_2$ Thin Films*, MAP-FIS Conference, Aveiro, Portugal, July 2016
30. J. P. Teixeira, J. Keller, T. Törndahl, N. Nicoara, R.-R. Andrade, D. G. Stroppa, J. González, M. Edoff, S. Sadewasser, P. M. P. Salomé, J. P. Leitão,*CdS and $Zn_{1-x}Sn_xO_y$ buffer layers for $Cu(In,Ga)Se_2$ solar cells*, Ciência2016, Lisboa, Portugal, July 2016
31. J. P. Teixeira, P. M. P. Salomé, B. Alves, P. Szaniawski, V. Fjällström, Marika Edoff, S. Sadewasser, J. P. Leitão*, Effect of Varying the Cu Content on Cu(In,Ga)Se2 Solar Cells*,nanoPT2017 Conference, International Iberian Nanotechnology Laboratory (INL), Braga, Portugal, February 2017

32. J. P. Teixeira, P. M. P. Salomé, B. M. Alves, S. Sadewasser, J. P. Leitão, *Electronic transitions in highly doped and compensated chalcopyrites and kesterites*, Materials Society-Spring Meeting 2017, Phoenix, United States of America, April 2017
33. P.M.P. Salomé, P.A. Fernandes, S. Bose, J.M.V. Cunha, "Development of nanopatterning for thin film solar cells", presented in 2017, September 18-22, MNE at INL in Braga, Portugal.
34. P. M. P. Salomé, J. P. Teixeira, M.A.M. Cardoso, V. Fjällström, M. Edoff, N. Nicoara, J. P. Leitão, S. Sadewasser, *Analysis of waiting times between CIGS and CdS and in-diffusion of Na on the properties of Cu(In,Ga)Se_2 materials and solar cells* , Materials Research Society-Spring Meeting 2017, Phoenix, United States of America, April 2017
35. J. P. Teixeira, P. M. P. Salomé, R-Ribeiro Andrade, J. Keller, J. González, Tobias Törndahl, S. Sadewasser, J. P. Leitão, *Role of Defects in Cu(In,Ga)Se_2 Solar Cells with CdS and $Zn_{1-x}Sn_xO_y$ Buffer Layers: Microscopy and Photoluminescence Study*, Materials Research Society-Spring Meeting 2017, Phoenix, United States of America, April 2017
36. B. Alves , P. M. P. Salomé, J. P. Teixeira, P. Szaniawski, V. Fjällström, Marika Edoff, S. Sadewasser,*Effect of Varying the Cu Content on Cu(In,Ga)Se_2 Solar Cells* , J. P. Leitão, Materials Research Society-Spring Meeting 2017, Phoenix, United States of America, April 2017
37. J. M. V. Cunha, P. A. P.Fernandes, J. P. Teixeira, S. Bose, J. P. Leitão, P. M. P. Salomé, *Metal-Insulator-Semiconductor structures using dielectric materials for passivation of Cu(In,Ga)Se_2 solar cells*, MNE2017, Braga, Portugal, 2017;
38. J. P. Leitão, M. G. Sousa, J. P. Teixeira, A. F. da Cunha, P. M. P. Salomé, P. A. Fernandes, T. Törndahl, T. Prokscha, A. Suter, Z. Salman,*Muon study of p-n junctions used in solar cells*,H. V. Alberto, R. C. Vilão, J. M. Gil, A. Weidinger, 29th International Conference on Defects in Semiconductors (ICDS) 2017, Matsue, Japan, 2017
39. S. Sadewasser, N. Nicoara,T. Lepetit, L. Arzel, S. Harel, H. Limborço, P. M.P. Salomé, J. P. Teixeira, D. Stroppa, R.- Ribeiro Andrade, K. Abderrafi, J. P. Leitão, N. Barreau, J. C. González,*The solar cell material Cu(In,Ga)Se_2 at the nanometer scale*, ChinaNano 2017,Beijing, China, 2017
40. Shongalova, M. R. Correia, J.M.V. Cunha, P.M.P. Salomé, P. A. Fernandes, "Growth and characterization of Sb_2Se_3 thin film films for optoelectronic applications", presented in 2017, September 18-22, MNE at INL in Braga, Portugal.
41. J. M. V. Cunha, P. A. Fernandes, B. Vermang, J. P. Teixeira, S. Bose, J. Gaspar, M. Edoff, J.P. Leitão, P.M.P. Salomé, *Metal-Insulator-Semiconductor structures using insulator materials for passivation of thin film Cu(In,Ga)Se_2 solar cells*, European Materials Research Society-Spring Meeting, Strasbourg, France, June 2018
42. Shongalova, M. R. Correia, B. Vermang, S. Ranjbar, S. Garud, J. M. V. Cunha, J. P. Teixeira, J. P. Leitão, J. C. González, P.M.P. Salomé, P. A. Fernandes,Growth and Raman characterization of Sb2Se3 thin films, European Materials Research Society-Spring Meeting, Strasbourg, France, June 2018
43. J. M. V. Cunha, P. A. Fernandes, S. Bose, T. S. Lopes, P. M. P. Salomé, "Comparison of several deposition methods, including ALD, for Metal-Insulator-Semiconductor structures to be used in thin film solar cells ", presented in 2018, September 25-28, Herald Summit in Braga, Portugal.
44. S. Bose, J.M.V. Cunha, J. Borme, T.Lopes, P.A. Fernandes, M. Edoff, P.M.P. Salomé, "Interface Passivation of ultrathin Cu(In,Ga)Se_2 solar cells by ALD deposited Al2O3", presented in 2018, September 25-28, Herald Summit in Braga, Portugal.
45. D. Correia, D. Sioppa, S. Tombolato, K. Abderrafi, F. Babbe, D. Colombara, P.M.P. Salomé, P. Anacleto, P.J. Dale, and S. Sadewasser, Area-selective electrodeposition of Cu(In,Ga)Se_2 micro islands for micro-concentrator solar cells, WORLD CONFERENCE ON PHOTOVOLTAIC ENERGY CONVERSION (WCPEC-7)JUNE 10-15, 2018 WAIKOLOA, HAWAII
46. S. Bose, J. M. V. Cunha, J. Borme, W. C. Chen, N. S. Nilsson, J. P. Teixeira, J. Gaspar, J. P., Leitão, M. Edoff, P. A. Fernandes, P. M. P. Salomé, *A morphological and electronic study of ultrathin rear passivated Cu(In,Ga)Se_2 solar cells*, European Materials Research Society-Spring Meeting, Strasbourg, France, June 2018
47. J. M. V. Cunha, S. Bose, T. S. Lopes, J. R. Barbosa, P. A. Fernandes, and P. M. P. Salomé, "Advanced Optoelectronic Characterization and Novel Materials", presented in 2018, November 14-15, 1st Annual INL Research Symposium in Braga, Portugal.
48. J. P. Teixeira, P. A. Fernandes, B. P. Falcão, M. Edoff, P. M. P. Salomé, J. P. Leitão, *The influence of the Ga profile on the photoluminescence of CIGS thin films*, European Materials Research Society-Spring Meeting, Strasbourg, France, June 2018

49. S. Bose, J. M. V. Cunha, T. S. Lopes, J. R. Barbosa, P. A. Fernandes and P. M. P. Salomé, “New Solar Cell Architectures”, presented in 2018, November 14-15, 1st Annual INL Research Symposium in Braga, Portugal.
50. J. P. Teixeira, P. M. P. Salomé, J. M. V. Cunha, M. A. M. Cardoso, V. Fjällström, P. A. Fernandes, M. Edoff, J. P. Leitão, *New insights on the impact of Na on the optoelectronic properties of CIGS based solar cell*, European Materials Research Society-Spring Meeting, Strasbourg, France, June 2018
51. J. P. Leitão, J. P. Teixeira, B. Alves, M. Edoff, P. M. P. Salomé, *Experimental evidence of fluctuating potentials influence on the electrical performance of thin film solar cells*, European Materials Research Society-Spring Meeting, Strasbourg, France, June 2018
52. J. P. Leitão, J. P. Teixeira, M. Edoff, P. M. P. Salomé, *Modifications to traditional Cu(In,Ga)Se₂ solar cell architecture: contributions from photoluminescence*,2nd Sharc25 Workshop on CIGS solar cells - Advanced Characterization and Novel Concepts, Zurich, Switzerland, 2018
53. S. Bose, P.A. Fernandes, J.M.V. Cunha, J.P. Teixeira, J. P. Leitão, M. Edoff, and P.M.P. Salomé, DEVELOPMENT OF NANOPATTERNING FOR THIN FILM SOLAR CELLS, IW-CIGSTech 9, 18th June 2018, Stuttgart, Germany.

PAPERS ACHIEVEMENTS

- As of July 2013, “*Na Doping of CIGS Solar Cells Using Low Sodium-Doped Mo Layer*” was among the **TOP 20 MOST POPULAR PAPERS** of IEEE Journal of Photovoltaics.
- As of January 2014, "*Growth and Raman scattering characterization of Cu_2ZnSnS_4 thin films*" was the 6th most cited paper and 22th most downloaded paper in **Thin Solid Films**.
- As of April 2015, *“Study of polycrystalline Cu_2ZnSnS_4 films by Raman scattering”* is **most Cited** paper in Journal of Alloys and Compounds Articles.
- "*A study of ternary Cu_2SnS_3 and Cu_3SnS_4 thin films prepared by sulfurizing stacked metal precursors"* was on the **2010 Highlights of Journal of Physics D: Applied Physics**.
- “*Hopping conduction and persistent photoconductivity in Cu_2ZnSnS_4 thin films*” was on the **2013 Highlights of Journal of Physics D: Applied Physics**.
- *“Thermodynamic pathway for the formation of SnSe and $SnSe_2$ polycrystalline thin films by selenization of metal precursors”* was selected **as November 2013 *CrystEngComm* Hot Article.**
- “*Optical and structural investigation of Cu_2ZnSnS_4 based solar cells* “was the cover page of the November issue *of physica status solidi (b)*.
- “*Passivation of Interfaces in Thin Film Solar Cells: Understanding the Effects of a Nanostructured Rear Point Contact Layer” in January 2018 was Frontispiece of Advanced Materials Interfaces*

PARTICIPATION IN SCIENTIFIC PROJECTS

- 2004-2006: POCTI/CTM/38721/01: Optimisation of Growth, Optical and Electrical properties of RF-magnetron Sputtered thin films of CuIn1-xGaxSe2 for Photovoltaics.
- 2008-2011 Member of project Institute for Nanostructures, Nanomodelling and Nanofabrication - I3N - University of Aveiro.
- 2008-2009: Collaboration Project GRICES/CNCPRST with Université Hassan II – Mohamédia, FST de Mohamédia, Marrocos, intitulado “Preparação e caracterização de filmes CIS e CIGS com estrutura de calcopirite para aplicação fotovoltaica”.
- 2008-2009: Collaboration Project GRICES/DAAD on CZTS based solar cells development with Helmholtz Zentrum Berlin (HZB), Germany.

- 2009 - 2010: Collaboration project FCT/CAPES – UA/UFMG-Brazil: Novos materiais para células fotovoltaicas: calcopirites, kesterites e nanoestruturas de semicondutores III-V
- 2009-2011: PTDC/CTM-MET/113486/2009 - Cu2ZnSn(S,Se)4 a novel In free absorber for thin film solar cells.
- 2011-2012 - Project manager of a collaboration between Corning Inc. (USA) and Uppsala University.
- 2011-2013 - Angstrom Solar Center - Swedish Energy Agengy
- 2011-2012 StandUP for Energy, Uppsala University, The Royal Institute of Technology, The Swedish University of Agricultural Sciences and Luleå University of Technology.
- 2011-2014 PTDC/CTM-MET/113486/2009 Cu2ZnSn(S,Se)4, a Novel In Free Absorber for Thin Film Solar Cells
- 2014 EXPL/FIS-NAN/2014/2013 Scanning tunnelling luminescence for semiconductor quantum dot characterization
- 2014-2016 INL-Spain Collaboration - IMM-CSIC (AIC-B-2011-0806) – Colaboración IMM-CSIC con INL en desarrollo deinstrumentación para procesos de recubrimientos especiales en sensors
- 2015-2018 - sharc 25 - Super high efficiency Cu(In, Ga)Se2 thin-film solar cells approaching 25%, H2020 - LCE-02-2014 - Developing the next generation technologies of renewable electricity and heating/cooling. Project reference: 641004, 2015-05-01 to 2018-10-31
- 2016-PTDC/FIS-NAN/3668/2014-Large area two dimensional heterostructures for photodetectors, FCT Calls for R&D Projects, Project reference: 016903, 01-07-2016 to 30-06-2019
- 2016-PTDC/CTM-ENE/5387/2014-Large-scale printing of novel photovoltaics based on Cu(In,Ga)Se_2 chalcopyrite, FCT Calls for R&D Projects Project reference: 016663, 01-06-2016 to 31-05-2019
- 2017-2018 - INL2020 - PT2020 - SAICT - Internacionalização de I&D
- 2016-2019 - NaNo4Sence, RE: NORTE-01-0145-FEDER-000019 Research line within a structured program funded under the European regional development fund (ERDF) – call North2020 – INL

<u>Project Coordinator as Principal investigator (PI) and CO-PI:</u>

- 2007-2011 - Chalcogenide Thin Films for Solar Cells: Growth and Properties, FCT PhD individual grant - ~50 k€.
- 2013-2015 FP7-PEOPLE-2012-IEF - Intra-European Fellowships, Intra-European Fellowships; 327367, project ChaldQD, **PI**, ~150 k€.
- Brazilian Committee for the improvement of high-educated staff (Capes) – program CAPES/LABORATÓRIO IBÉRICO INTERNACIONAL DE NANOTECNOLOGIA (INL) Project number Nº 34/2013 **CO-PI** 2013-2015 – Quantum dots for Solar cells 150 k€.
- 2017-2020 - H2020 GRANT AGREEMENT NO. 720887, ARCIGS-M Advanced aRchitectures for ultra-thin high-efficiency CIGS solar cells with high Manufacturability, or ARCIGS-M, - **CO-writer of the proposal** – 365 k€ for INL from a total of 3 M€.
- 2017-2021 - IF/00133/2015 FCT Investigator - **PI** Novel Architectures For Improved thin film Solar Sells (NAFISC) - ~270k€
- 2017-2020 – 028075 - FCT Research Projects, NovaCell, **PI** 028075 – 240 k€
- FCT Research Projects, - 029696 -InovSolarCells, **co-PI** 028075 – 240 k€

AWARDS AND GRANTS

- **Best Student award of Physics Engineering**, class 2006, University of Aveiro.
- **Ph.D grant** from FCT- Fundação Ciência e Tecnologia - 2006-2011 ~ 50k€ - competition involving 82 participants where 30 were funded.
- Granted a **Marie Curie IEF: Intra-European Fellowship** with the value of 147k€, December 2012.
- Granted a FCT Investigator grant with the value ~300 k€, August 2016.
- FCT Research Projects, NovaCell, (PI) 028075 – 240 k€
- FCT Research Projects, InovSolarCells, (co-PI) 028075 – 240 k€

SUPERVISION

- **Main Supervisor of Summer/Winter Internships of Licenciados (2 months)**
  - 2016 –José Cunha
  - 2016 –Miriam Ahlberg
  - 2017 –João Barbosa
  - 2018 –Célia Rocha
  - 2018 –André Violas
  - 2018 –João Barbosa
  - 2018 – Beatriz Valença
  - 2019 –Ronja Baumeister
  - 2019 –Evelina Roxner
- **Main Supervisor of Licenciatura Thesis/Final Internship**
  - 2017 –João Barbosa from Universidade Nova de Lisboa
  - 2018 –Margarida Ribeiro from Universidade Nova de Lisboa
  - 2018 –Célia Rocha from Universidade Nova de Lisboa
  - 2019 – Filipe Bernadino from Universidade Nova de Lisboa
  - 2019 – Maria Cruz from Universidade Nova de Lisboa
- **Co-Supervisor of Licenciatura Thesis/Final Internship**
  - 2016 Miguel Cardoso – Universidade de Aveiro
  - 2018 Maria Batista – Universidade de Aveiro
  - 2018 Diogo Amaral – Universidade de Aveiro
- **Main Supervisor of Master Students: 5**
  - 2017– José Cunha Universidade Nova de Lisboa
  - 2018 – Ricardo Silva Universidade Nova de Lisboa
  - 2018 –Tomás Lopes Universidade Nova de Lisboa
  - 2019 – António Oliveira Universidade Nova de Lisboa
  - 2019 – Rodrigo Ribeiro Universidade Nova de Lisboa
- **Co-Supervisor Master Students**
  - 2016 – Bruno Alves – University of Aveiro
- **Main Supervisor of PhD Students: 4**
  - 2017- Sourav Bose University of Uppsala
  - 2018- Jose Cunha University of Aveiro
  - 2019- Tomás Lopes University of Hasselt
  - 2019 – Marco Alberto Universidade de Coimbra
- **Co-orientation of Ph.D Students:**
  - 2013-2019 Jennifer Teixeira
- **Supervisor Post-docs**
  - 2018-2019 Olivier Donzel (within ARCIGS-M Project)

EVALUATOR

- **Co-Supervisor Post-docs**
  - 2015-2016 Rodrigo Ribeiro (Within INL-Capes Project)

- Evaluator for the 2018 Kazakhstan National Center of Science and Technology Evaluation
- Evaluator for the 2015 proposal from the Chilean Comisión Nacional de Investigación Científica y Tecnológica.
- **Jury of PhD thesis: 4**
    - Andreia Cristina Jóia Araújo Cardoso – Universidade Nova de Lisboa, 2018
    - António Miguel Teixeira Vicente – Universidade Nova de Lisboa, 2017
    - Mário Lima – Universidade de Aveiro, 2017
    - Samaneh Ranjbar – Universidade de Aveiro, 2017
- **Jury of Master thesis: 3**
    - Rafael Sousa – Universidade de Aveiro, 2013
    - Nuno Peixoto – ISEP, 2015
    - João Baptista Bourgard – Universidade de Aveiro, 2015
- Member of the scientific referee panel for Area 2.1 of the IEEE Photovoltaic Specialist Conference in 2015.
- Member of the scientific referee panel for the ES14 of the MRS 2017 Spring meeting.

ORGANISATION OF SCIENTIFIC MEETINGS

- 2014 – 42nd IEEE Photovoltaics Specialists Conference, 200 attendees, Scientific Content Committee of Area 2.1, U.S.A.
- 2014 – National Meeting on Research and Development of Photovoltaics – 45 attendees - Portugal
- 2014 – First gathering of the Physics Department Alumni of the University of Aveiro Workshop – Main organizer, 60 attendees, Portugal
- 2014 - International Workshop on Nanostructures for Photovoltaics – Main organizer, 52 attendees, Portugal
- 2017 – Materials Research Society Conference, Scientific Content Committee of Symposium ES14—Thin-Film Chalcogenide Semiconductor Photovoltaics.

PATENTS AND INDUSTRIAL KNOWLEDGE

Submitted:

- SALOMÉ Pedro, SADEWASSER Sascha, MONTELIUS Lars, Submitted on 10 April 2015 to the European Patent office, EP15163195.9.
- SALOMÉ Pedro, SADEWASSER Sascha, Submitted on 26 June 2015 to the European Patent Office, **EP 3 109 905 A1** and **WO 2016/206989 A1**.
- SALOMÉ Pedro, Sadewasser Sascha, Borme Jerome Gilles Ollivier, Machado Junior George Luiz, Alpuim Joao Pedro dos Santos Hall de Agorreta de, submitted to the European Patent office on 23 September 2016, EP16190415.6.

POLICY BRIEFS

- Co-author of the document “Forum das Energias Renováveis: Energia Solar. Contribuição para a transição energética” to be delivered to the Portuguese Goverment in the Summer 2019 to be a guide to the Energy transition of the Portuguese electrical grid.
- Co-author of the CIGS Whiter Paper 2019 – The most important policy brief in thin film solar cells.

SCIENCE PROMOTION AND INDUSTRIAL COLLABORATIONS

- Scientific Coordinator of the Summer Intership of INL in 2016, 2017 and 2018 with interviews in Publico, RTP, Jornal de Noticias, Diário do Minho, Correio do Minho, TSF, RUM, etc.
- Project Manager of an industrial Technological transfer program (1M USD/year) between University of Uppsala and Corning INC, USA between 2011 and 2012. The project dealt with the development of novel glass substrates for thin film solar cells.
- Prototype development of a self-cleaning glass substrate to use in Dubai's Desert for Premier Compositie Technologies, Dubai, UAE.
- Within projects H2020 ARCIGS-M and RE: NORTE-01-0145-FEDER-000019, exploring my patent EP15163195.9 by developing novel self-alignment nano-imprint tool.