

## CURRICULUM VITAE

### Ana Zélia Miller

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**Surname(s):** Almeida de França e Miller

**Name:** Ana Zélia

**Personal data:**

Date of birth: 27<sup>th</sup> February 1981

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### Current professional situation

**Category:** Marie Curie post-doctoral researcher

**Institution:** Instituto de Recursos Naturales y Agrobiología de Sevilla – Consejo Superior de Investigaciones Científicas (IRNAS-CSIC)

**Department:** Agroquímica, microbiología ambiental y conservación de suelos

**Address:** Av. Reina Mercedes 10, 41012 Sevilla, España

**Phone:** +34 954624711

**Start date:** 01/03/2014

**Type of contract:** Marie Curie Intra European Fellowship

**Research interests:** Geomicrobiology of subterranean environments; Biomineralization; Microbe-mineral interactions; Environmental microbiology; Molecular biology; Biodeterioration of stone cultural heritage; Geochemical and geophysical characterization of rocks; Conservation of stone cultural heritage.

### Research experience

#### **Academic achievements**

Mar 2014 – Feb 2016 Marie Curie Intra-European Fellowship (IEF) at Instituto de Recursos Naturales y Agrobiología de Sevilla – Consejo Superior de Investigaciones Científicas (IRNAS-CSIC), awarded by the European Commission. Supervisor: Prof. C. Saiz-Jimenez.

Mar 2010 – Feb 2014 Post-doctoral fellowship at *Centro de Petrologia e Geoquímica – Instituto Superior Técnico* (CEPGIST), Lisbon (Portugal), awarded by *Fundação para a Ciência e a Tecnologia* – Portuguese Ministry of Science, Technology and Higher Education (FCT-MCTES). Supervisor: Prof. Amélia Dionísio.

Mar 2006 – Feb 2010 Pre-doctoral fellowship in Conservation Sciences at the Department of Conservation and Restoration - Faculty of Sciences and Technology – New University of Lisbon (DCR-FCT-UNL), Portugal, awarded by FCT-MCTES. Supervisor: Prof. M.F. Macedo. PhD thesis title: “Primary bioreceptivity of limestones from the Mediterranean Basin to phototrophic microorganisms”. European Level-A *with honours-Excellent*.

Jan 2005 – Feb 2006 Post-graduate research scholarship at DCR-FCT-UNL, awarded by *Instituto de Emprego e Formação Profissional* (Portuguese Employment Institute). Supervisor: Prof. M.F. Macedo.

Sep 1999 – Dec 2004 Five years bachelor degree in Conservation and Restoration, DCR-FCT-UNL (Lisbon, Portugal). Bachelor's thesis scholarship awarded by PRODEP III program (Portuguese Education Ministry). Supervisor: Prof. M.F. Macedo. Bachelor's thesis title: "Bioreceptivity of stone materials to phototrophic microorganisms" [in Portuguese]. *Excellent*.

### **Participation in R&D&I projects funded in competitive calls**

- 2014 – 2016 Project title: "Canary Islands volcanic caves: geochemistry, geomicrobiology and biomineralization" (VULCAN). Financial entity: Spanish Ministry of Economy and Competitiveness (ref. CGL2013-41674-P). PI: Prof. C. Saiz-Jimenez and Prof. L. Laiz (IRNAS-CSIC). In collaboration with CEPGIST (Portugal) and University of Burgos (Spain).
- Jul 2013 – Jun 2015 Project title: "The Cabeço de Vide mineral waters (Central Portugal): a natural analogue to increase understanding of the origin of life on Earth and possibly elsewhere" (ORVITER). Financial entity: Portuguese Foundation for Science and Technology (FCT-MCTES), ref. PTDC/AAG-MAA/2891/2012. Principal Investigator (PI): Prof. J.M. Marques (CEPGIST). In collaboration with NASA - Jet Propulsion Laboratory and J. Craig Venter Institute, California, U.S.A. (Dr. Shino Suzuki and Prof. Kenneth Nealson).
- Jul 2013 – Nov 2014 Project title: "Exopolysaccharide application on industrial ceramic powders used in unidirectional dry pressing process for performance optimization" (POLYCER). Financial entity: FCT-MCTES (ref. EXPL/CTM-CER/0637/2012). PI: **A.Z. Miller** (CEPGIST, IRNAS-CSIC).
- Jan 2012 – Dec 2014 Project title: "Microclimatology, Geochemistry, Mineralogy and Geomicrobiology of subterranean environments: the case of reticulated filaments". Financial entity: Spanish Ministry of Economy and Competitiveness (ref. CGL2011-2569). PI: Prof. Bernardo Hermosin (IRNAS-CSIC, Spain). In collaboration with CEPGIST and ISEP (Portugal).
- Jan 2011 – Dec 2012 Strategic Project - UI 98 - 2011-2012 (PEst-OE/CTE/UI0098/2011). Financial entity: FCT-MCTES. PI: Prof. José Manuel Marques (CEPGIST).
- Jan 2010 – Dec 2011 Luso-Spanish bilateral Project, Title: "Primary bioreceptivity of limestone and granite rocks". Financial entity: *Fundação das Universidades Portuguesas* and University of Santiago de Compostela. Portuguese PI: Prof. M.F. Macedo (DCR-FCT-UNL); Spanish PI: Prof. Beatriz Prieto (Univ. Santiago de Compostela).
- Jan 2008 – Dec 2009 Portuguese-Spanish bilateral action, Project title: "Bioreceptivity monitoring of materials used in cultural heritage". Financial entity: CSIC and FCT-MCTES. Portuguese PI: Prof. M.F. Macedo (DCR-FCT-UNL); Spanish PI: Dr. L. Laiz (IRNAS-CSIC).
- Jan 2008 – Dec 2009 Project title: "*Fortalecimiento para la consolidación del cuerpo académico de Ciencia e ingeniería de corrosión de la Universidad Autónoma de Campeche*". Financial entity: *Consejo Nacional de Ciencia y Tecnología de México*. PI: Dr. T. Pérez López (University of Campeche, Mexico).

### **Teaching activity**

#### **Subjects given**

2010/2011 Subject: "Conservation of stone: Biodeterioration", Bachelor in Conservation and Restoration, DCR-FCT-UNL.

- 2009/2010 Subject: "Conservation of stone: Biodeterioration", Bachelor in Conservation and Restoration, DCR-FCT-UNL.
- 2007/2008 Subject: "Biology in Conservation", Bachelor in Conservation and Restoration, DCR-FCT-UNL.
- 2007/2008 Subject: "Conservation of stone: Biodeterioration", Bachelor in Conservation and Restoration, DCR-FCT-UNL.
- 2005-2008 Block practice teaching helper of the lecture "Biology in Conservation", Bachelor in Conservation and Restoration, DCR-FCT-UNL (Lisbon, Portugal).
- 2004/2005 Subject: "Analytical methods: spectrofluorometry", Bachelor in Conservation and Restoration, DCR-FCT-UNL.

### **Supervision of dissertations and other supervisions**

- 01/2012 – 12/2015 **PhD thesis:** "Geomicrobiología de cuevas: origen y composición de los filamentos reticulados", Ms. Ángela María García Sánchez, University of Seville (Spain).
- 09/2013 – 06/2014 **PhD stay:** "Bioreceptivity of limestone treated with secondary metabolites", Mr. Sergio Sasso, University of Basilicata, Faculty of Sciences (Potenza, Italy).
- 2013 – 2015 **PhD thesis:** "Geochemical study of manganese mines: bioinduced manganese oxides" [Estudio geoquímico de minas de manganeso: óxidos de manganeso bioinducidos], Mr. Alfonso José González Muñoz, University of Seville (Spain).
- 2013 – 2015 **PhD thesis:** "Biodeterioration of tiles: study of traditional and photocatalytic biocides for elimination of microorganisms", Mrs. Mathilda Larsson Coutinho, DCR-FCT-UNL (Portugal).
- 2013/2014 **MSc thesis:** "*Aplicação de exopolissacáridos em prensados cerâmicos para optimização do seu desempenho*", Ms. Inês Caneira, IST-UTL (Portugal)
- 07/2013 – 06/2014 **Research grant** (BI) awarded through the R&D Project POLYCER. Mr. Bernardino Moreira, CEPGIST (Portugal).
- 2010/2011 **MSc thesis:** "Characterization and quantification of phototrophic biofilms on artistic tiles from Pena National Palace (Sintra, Portugal)", Ms. Sara Gutiérrez-Patricio, University of Seville (Spain).
- 2007/2008 **MSc thesis:** "Black films on granitic cultural heritage. The cases of São Francisco and Lapa churches (Porto, Portugal)", Ms. Bruna Pereira de Oliveira, DCR-FCT-UNL (Lisbon, Portugal).
- 2007/2008 **MSc thesis:** "Monitoring of photosynthetic biofilm development by image analysis", Ms. Maria Inês Sardinha Gomes, DCR-FCT-UNL (Lisbon, Portugal).
- 2005/2006 **PhD stay** at the DCR-FCT-UNL: "Fungi growing on sterilized limestone", Mr. Petr Kunes, Faculty of Chemical Technology (Prague, Czech Republic).
- 2004/2005 **Bachelor thesis:** "Development of fungi on Ançã limestone", Mrs. Maria de Jesus Salgado, DCR-FCT-UNL (Lisbon, Portugal).

### **Scientific production**

#### **List of peer reviewed publications**

1. **Miller A**, Dionísio A, Macedo MF, 2006. Primary bioreceptivity: a comparative study of different Portuguese lithotypes. *Int. Biodeterior. Biodegrad.* 57, 136-142 (JCR index IF 2006 = 1.619; Q2).
2. *Book Chapter.* **Miller A**, Macedo MF, 2006. Mapping and characterization of a green biofilm inside of Vilar de Frades Church (Portugal). In: Fort R, Alvarez de Buergo M, Gomez-Heras M, Vazquez-Calvo C (eds), *Heritage, Weathering and Conservation, Proceedings and monographs in Engineering, Water and Earth Sciences*. Balkema, Taylor & Francis, London, pp. 329-335. ISBN: 0-415-41272-2 (Conference Proceedings Citation Index – Science).
3. *Book Chapter.* Pereira A, **Miller A**, Figueiredo E, Trindade S, 2006. Materials and techniques used in the works of Art from Igreja dos Paulistas in Lisbon (Portugal). In: Fort R, Alvarez de Buergo M, Gomez-Heras

- M, Vazquez-Calvo C (eds), *Heritage, Weathering and Conservation, Proceedings and monographs in Engineering, Water and Earth Sciences*. Balkema, Taylor & Francis, London, pp. 901-907. ISBN: 0-415-41272-2 (Conference Proceedings Citation Index – Science).
4. *Book Chapter*. Gomes MI, Rogerio-Candelera MA, **Miller AZ**, Macedo MF, Dionísio A, Laiz L, Saiz-Jimenez C, 2008. Análisis de imagen para la evaluación de la bioreceptividad de materiales utilizados en el Patrimonio Cultural. In: Saiz-Jimenez C, Rogelio-Candelera MA (eds), *Avances recientes en la investigación sobre patrimonio*. Novena reunión de la Red Temática de Património Histórico y Cultural, CSIC, Sevilla, pp. 81-82. ISBN: 846909888-8.
  5. **Miller AZ**, Laiz L, Gonzalez JM, Dionísio A, Macedo MF, Saiz-Jimenez C, 2008. Reproducing stone monument photosynthetic-based colonization under laboratory conditions. *Sci. Total Environ.* 405, 278-285 (JCR index IF 2008 = 2.579; Q1).
  6. *Book Chapter*. Pereira de Oliveira B, Dionísio A, Silveira T, Sequeira Braga MA, **Miller A**, Macedo MF. 2009. Do diagnóstico à intervenção de conservação em pedra granítica – o caso da Igreja dos Terceiros da Ordem de São Francisco (Porto). In: Peixoto de Freitas V, Diz Gomez C, Helene P, Abrantes V (eds), 3º Encontro de Patologia e Reabilitação de Edifícios, Universidade do Porto, pp. 813-818. ISBN: 978-972-752-109-8.
  7. Laiz L, **Miller AZ**, Gonzalez JM, Akatova E, Jurado V, Dionísio A, Macedo MF, Saiz-Jimenez C, 2009. Isolation of five Rubrobacter strains from biodeteriorated monuments. *Naturwissenschaften* 96, 71-79 (JCR index IF 2008 = 2.126; Q1).
  8. Pereira de Oliveira B, Dionísio A, Sequeira Braga MA, **Miller A**, Macedo MF, Silveira T, 2009. A contribuição da comunidade microbiológica nos processos de decaimento do granito. O caso de estudo da Igreja dos Terceiros da Ordem de São Francisco (Porto, Portugal). *Cadernos do Laboratório Xeolóxico de Laxe* 34, 75-88 (accessed via Web of Science).
  9. **Miller AZ**, Laiz L, Dionísio A, Macedo MF, Saiz-Jimenez C, 2009. Growth of phototrophic biofilms from limestone monuments under laboratory conditions. *Int. Biodeterior. Biodegrad.* 63, 860-867 (JCR index IF 2009 = 2.252; Q2).
  10. **Miller AZ**, Dionísio A, Laiz L, Macedo MF, Saiz-Jimenez C, 2009. The influence of inherent properties of building limestones on their bioreceptivity to phototrophic microorganisms. *Annals Microbiol.* 59, 1-9 (JCR index IF 2009 = 0.358; Q4).
  11. Macedo MF, **Miller AZ**, Dionísio A, Saiz-Jimenez C, 2009. Biodiversity of cyanobacteria and green algae on monuments in the Mediterranean Basin: an overview. *Microbiol-SGM* 155, 3476-3490 (JCR index IF 2009 = 3.025; Q2).
  12. **Miller AZ**, Leal N, Laiz L, Rogerio-Candelera MA, Silva RJC, Dionísio A, Macedo MF, Saiz-Jimenez C, 2010. Primary bioreceptivity of limestones used in Southern Europe monuments. In: Smith BJ, Gomez-Heras M, Viles HA, Cassar J (Eds), *Limestone in the Built Environment: Present Day Challenges for the Preservation of the Past*. *Geological Society of London, Special Publications* 331, 79-92 (accessed via Web of Science).
  13. **Miller AZ**, Rogerio-Candelera MA, Laiz L, Wierzchos J, Ascaso C, Sequeira Braga MA, Hernández-Mariné M, Maurício A, Dionísio A, Macedo MF, Saiz-Jimenez C, 2010. Laboratory-induced endolithic growth in calcarenites: biodeteriorating potential assessment. *Microb. Ecol.* 60, 55-68 (JCR index IF 2010 = 2.875; Q1).
  14. Pereira de Oliveira B, De la Rosa JM, **Miller AZ**, Saiz-Jimenez C, Gómez-Bolea A, Sequeira Braga MA, Dionísio A, 2011. An integrated approach to assess the origins of black films on a granite monument. *Environ. Earth Sci.* 63, 1677-1690 (JCR index IF 2011 = 1.059; Q3).
  15. *Book Chapter*. **Miller AZ**, Rogerio-Candelera MA, Dionísio A, Macedo MF, Saiz-Jimenez C. 2013. Microalgae as biodeteriogens of stone cultural heritage: qualitative and quantitative research by non-contact techniques. In: Johansen MN (ed). *Microalgae: Biotechnology, Microbiology and Energy*. Nova Science Publishers, 345-358. ISBN: 978-1-61324-625-2.
  16. Sanchez-Moral S, Fernandez-Cortes A, Cuezva S, Cañaveras JC, Correcher V, **Miller AZ**, Dionísio A, Marques JM, Saiz-Jimenez C, Afonso MJ, Chamine HI, Furio M, Garcia-Guinea J. 2011. Uranyl-Evansites

- from Porto (NW Portugal) and Galicia (NW Spain): Structure, and assignment of Spectra Catholuminescence and Raman bands. *Spectrosc. Lett.* 44, 511-515 (JCR index IF 2011 = 0.719; Q4).
17. **Miller AZ**, Rogerio-Candelera MA, Dionísio A, Macedo MF, Saiz-Jimenez C, 2012. Assessing the influence of surface roughness on the epilithic colonisation of limestones by non-contact techniques. *Mater. Construcc.* 62, 307, 411-424 (JCR index IF 2012 = 0.788; Q2).
  18. **Miller AZ**, Sanmartín P, Pereira-Pardo L, Dionísio A, Macedo MF, Prieto B, 2012. Bioreceptivity of building stones: a review. *Sci. Total Environ.* 426, 1-12 (JCR index IF 2012 = 3.258; Q1).
  19. Jurado V, **Miller AZ**, Laiz L, Pereira MF, Dionísio A, Saiz-Jimenez C, 2012. *Rubrobacter bracaraensis* sp. nov., a novel member of the genus *Rubrobacter* isolated from a biodeteriorated monument. *Syst. Appl. Microbiol.* 35, 306-309 (JCR index IF 2012 = 3.288; Q2).
  20. **Miller AZ**, Dionísio A, Sequeira Braga MA, Hernández-Mariné M, Afonso MJ, Muralha VSF, Herrera LK, Raabe J, Fernandez-Cortes A, Cuezva S, Hermosin B, Sanchez-Moral S, Chaminé H, Saiz-Jimenez C, 2012. Biogenic Mn oxide minerals coating in a subsurface granite environment. *Chem. Geol.* 322-323, 181-191 (JCR index IF 2012 = 3.154; Q1).
  21. **Miller AZ**, Hernández-Mariné M, Jurado V, Dionísio A, Barquinha P, Fortunato E, Afonso MJ, Chaminé HI, Saiz-Jimenez C. 2012. Enigmatic reticulated filaments in subsurface granite. *Environ. Microbiol. Rep.* 4, 596-603 (JCR index IF 2012 = 2.708; Q2).
  22. Rogerio-Candelera MA, **Miller AZ**, Dionísio A, Macedo MF, Saiz-Jimenez C. 2012. Técnicas no destructivas para la monitorización cuantitativa y cualitativa de procesos de biodeterioro en materiales pétreos. *Estudios Arqueológicos de Oeiras* 19, 287-294.
  23. Saiz-Jimenez C, **Miller AZ**, Martin-Sanchez PM, Hernandez-Marine M, 2012. Uncovering the origin of the black stains in Lascaux Cave in France. *Environ. Microbiol.* 14, 3220-3231 (JCR index IF 2012 = 5.756; Q1).
  24. *Book Chapter*. **Miller AZ**, Dionísio A, Saiz-Jimenez C, 2012. Microorganisms in caves: unusual morphologies [Microorganismos en cuevas: morfologías inusuales]. In: Durán JJ, Robledo PA (eds), *Las cuevas turísticas como activos económicos: conservación e innovación*, Madrid: Asociación de Cuevas Turísticas Españolas (ACTE), pp. 309-319. ISBN: 978-84-616-1140-9.
  25. *Book Chapter*. Martin-Sanchez PM, **Miller AZ**, Saiz-Jimenez C. 2012. Las manchas negras de la cueva de Lascaux, Francia. Revisión del estado actual de conocimientos. In: Durán JJ, Robledo PA (eds), *Las cuevas turísticas como activos económicos: conservación e innovación*, Madrid: Asociación de Cuevas Turísticas Españolas (ACTE), pp. 321-333. ISBN: 978-84-616-1140-9.
  26. *Book Chapter*. **Miller AZ**, Dionísio A, Jurado V, Cuezva S, Sanchez-Moral S, Cañaveras JC, Saiz-Jimenez C, 2013. Biomineralization by cave dwelling microorganisms. In: Sanjurjo Sánchez J (ed.). *Advances in Geochemistry Research*. Nova Science Publishers, pp. 77-105. ISBN: 978-1-62618-245-5.
  27. Alias-Villegas C, Jurado V, Laiz L, **Miller AZ**, Saiz-Jimenez C, 2012. *Nocardioides albertani*, sp. nov., isolated from Roman catacombs. *Int. J. Syst. Evol. Microbiol.* 63, 1280-1284 (JCR index IF 2012 = 2.112; Q3).
  28. Rogerio-Candelera MA, Herrera LK, **Miller AZ**, García Sanjuán L, Mora Molina C, Wheatley DW, Justo A, Saiz-Jimenez C, 2013. Allochthonous red pigments used in burial practices at the Copper Age site of Valencina de la Concepción (Sevilla, Spain): Characterisation and social dimension. *J. Archaeol. Sci.* 40, 279-290 (JCR index IF 2012 = 1.889; Q2).
  29. Coutinho ML, **Miller AZ**, Gutiérrez-Patricio S, Hernandez-Marine M, Bolea AG, Rogerio-Candelera MA, Philips A, Saiz-Jimenez C, Macedo MF, 2013. Microbial communities on deteriorated artistic tiles from Pena National Palace (Sintra, Portugal), *Int. Biodeterior. Biodegr.* 84, 322-332 (JCR index IF 2012 = 2.059; Q2).
  30. *Book Chapter*. Martin-Sanchez PM, **Miller AZ**, Pereira MFC, Hermosin B, Saiz-Jimenez C, 2013. The Seville Cathedral altarpiece: a microbiological and chemical survey. In: Rogerio-Candelera MA, Lazzari M, Cano E (eds), *Science and technology for the conservation of cultural heritage*, Taylor & Francis Group, London, pp. 67-70. ISBN: 978-1-138-00009-4.
  31. *Book Chapter*. Benavente D, Elez J, Fernandez-Cortes A, Cuezva S, Jurado V, **Miller AZ**, Rogerio-Candelera MA, Hernandez-Marine M, Cañaveras JC, Saiz-Jimenez C, Sanchez-Moral S, 2013. Decay of

- building materials in the Circular Mausoleum, Necropolis of Carmona, Spain. In: Rogerio-Candelera MA, Lazzari M, Cano E (eds), Science and technology for the conservation of cultural heritage, Taylor & Francis Group, London, pp. 117-120. ISBN: 978-1-138-00009-4.
32. *Book Chapter*. Sanz-Rubio A, Sanchez-Malo A, Fernandez-Cortes A, García-Antón E, Sanchez-Moral S, Cuezva S, **Miller AZ**, Dionísio A, Afonso MJ, Chaminé HI, Hermosin B, Saiz-Jimenez C, 2013. Microclimatic studies in Paranhos water galleries, Porto (Portugal). In: Rogerio-Candelera MA, Lazzari M, Cano E (eds), Science and technology for the conservation of cultural heritage, Taylor & Francis Group, London, pp. 25-28. ISBN: 978-1-138-00009-4.
  33. Jurado V, **Miller AZ**, Cuezva S, Fernandez-Cortes A, Benavente D, Rogerio-Candelera MA, Reyes J, Cañaveras JC, Sanchez-Moral S, Saiz-Jimenez C, 2014. Recolonization of mortars by endolithic organisms on the walls of San Roque church in Campeche (Mexico): A case of tertiary bioreceptivity. *Constr. Build. Mater.* 53, 348–359 (JCR index IF 2012 = 2.293; Q1).
  34. Garcia-Anton E, Cuezva S, Jurado V, Porca E, **Miller AZ**, Fernandez-Cortes A, Saiz-Jimenez C, Sanchez-Moral S. 2014. Combining stable-isotope ( $\delta^{13}C$ ) of trace gases and aerobiological data to monitor the entry and dispersion of microorganisms in caves. *Environ. Sci. Pollut. Res.* 21, 473-484 (JCR index IF 2012 = 2.618; Q2).
  35. **Miller AZ**, Pereira MFC, Calaforra JM, Forti P, Dionísio A, Saiz-Jimenez C, 2014. Siliceous speleothems and associated microbe-mineral interactions from Ana Heva lava tube in Easter Island (Chile). *Geomicrobiol. J.* 31, 1-10 (JCR index IF 2013 = 1.804; Q2).
  36. Rodrigues A, Gutierrez-Patricio S, **Miller AZ**, Saiz-Jimenez C, Wiley R, Nunes D, Vilarigues M, Macedo MF, 2014. Fungal biodeterioration of stained glass windows. *Int. Biodeterior. Biodegr.* 90, 152-160 (JCR index IF 2013 = 2.235; Q2).
  37. Ettenauer JD, Jurado V, Piñar G, **Miller AZ**, Santner M, Saiz-Jimenez C, Sterflinger K., 2014. Halophilic microorganisms are responsible for the rosy discolouration of mural paintings. *PLOS ONE* 9, e103844 (JCR index IF 2013 = 3.534; Q1).
  38. De la Rosa JM, Paneque M, **Miller AZ**, Knicker H, 2014. Relating physical and chemical properties of four different biochars and their application rate to biomass production of *Lolium perenne* on a Calcic Cambisol during a pot experiment of 79 days. *Science of the Total Environment*, 499c, 175-184 (JCR index IF 2013 = 3.163; Q1).
  39. *Book Chapter*. **Miller AZ**, Dionísio A, Lopes ME, Afonso MJ, Chaminé HI, 2014. Microbe-mineral interactions in a Portuguese geo-archaeological site. In: C. Saiz-Jimenez (ed), The conservation of the subterranean cultural heritage, CRC Press - Taylor & Francis group, London. pp. 103-111. ISBN: 978-1-138-02694-0.
  40. *Book Chapter*. Garcia-Sanchez AM, **Miller AZ**, Jurado V, Dionísio A, Muralha VSF, Afonso MJ, Chaminé HI, 2014. Is the presence of bacterial communities related to the urban contamination sources of the 16th century Paranhos spring water galleries? In: C. Saiz-Jimenez (ed), The conservation of the subterranean cultural heritage, CRC Press - Taylor & Francis group, London. pp. 95-102. ISBN: 978-1-138-02694-0.
  41. *Book Chapter*. Sasso S, **Miller AZ**, Rogerio-Candelera MA, Laiz L, Scrano L, Bufo SA, Saiz-Jimenez C, 2014. Tertiary bioreceptivity of Hontoria limestone: assessment of secondary metabolites as natural biocides. In: M.A. Rogerio-Candelera (ed.), Science, Technology, and Cultural Heritage. Londres: CRC Press. pp. 185-190. ISBN: 978-1-138-02744-2.
  42. Cennamo P, Caputo P, Marzano C, **Miller AZ**, Saiz-Jimenez C, Moretti A. 2014. Diversity of phototrophic components in biofilms from Piperno historical stoneworks. *Plant Biosystems*, DOI:10.1080/11263504.2014.990538 (JCR index IF 2012 = 1.912; Q2).
  43. **Miller AZ**, Pereira MFC, Calaforra JM, Forti P, Dionísio A, Saiz-Jimenez C. Ana Heva lava tube (Easter Island, Chile): Preliminary characterization of the internal layers of coralloid-type speleothems. *Microsc. Microanal.* Accepted (JCR index IF 2013 = 2.161; Q2).
  44. Coutinho ML, **Miller AZ**, Macedo MF. Biodiversity and biodeterioration of architectural ceramic materials: an overview. *Journal of Cultural Heritage*, Accepted (JCR index IF 2013 = 1.111; Q3).

## Electronic publications

1. **Miller A**, Alarcão C, Salgado MJ, Macedo MF, 2005. Biodeterioração da pedra por microrganismos. *Actas do 4º Encontro do IPCR*, IPCR, Lisboa, 24-25 Novembro 2005.
2. Pina FJ, Melo MJ, **Miller AZ**, 2008. Conservation sciences and conservation-restoration area in Portugal: a new department. *COALITION Newsletter* 16, 7–11.
3. Rogerio-Candelera MA, **Miller AZ**, Saiz-Jimenez C, 2009. Contribution of image analysis to the detection of endolithic microbial community in limestones used in cultural heritage. *COALITION Newsletter* 17, 12–14.

## Invited participation in conferences

1. **Miller A**, 2006. Será a biologia molecular importante para conservação e restauro? Seminar: *Biology in Conservation*, FCT-UNL, Lisbon, Portugal.
2. **Miller A**. 2007. Conservation Sciences in Portugal. *Second course on Conservation of Cultural Heritage, Marie Curie Research Training*, IRNAS-CSIC, Seville, Spain.
3. **Miller AZ**, 2008. Estudos em biodeterioração do património cultural. Seminar: *Conservation and Sciences of Conservation*. FCT-UNL, Lisbon, Portugal.
4. **Miller AZ**, 2010. Stone dwelling microorganisms: introduction to taxonomy and physiology. *9th Workshop: Monitoring and Treatment of biological colonization*. World Monuments Fund – Portugal, Queluz National Palace, 7-8 June 2010, Sintra, Portugal.
5. **Miller AZ**, 2011. Biodeterioração e bioreceptividade de calcários: casos de estudo. Conference: *Entre a Teoria e a Prática da Conservação de Superfícies Pétreas: o caso da colonização biológica*. FCT-UNL, Lisbon, Portugal.
6. **Miller AZ**, 2013. “Biomineralization by cave dwelling microorganisms”. Workshop: *Taphonomy of rock art walls and biomineralization*, 22-23 October 2013, Les Eyzies-de-Tayac-Sireuil, France.
7. **Miller AZ**, 2014. “Secondary mineral deposits and associated microbe-mineral interactions in subsurface rock environments”. International conference: *22nd International Karstological School “Classical Karst”*, June 16-20, 2014, Postojna, Slovenia.
8. **Miller AZ**, 2015. “Introduction to SEM-EDS: application to biochar characterization”. 3rd European Biochar Summer School - Chemical and physical characterization of bio- and hydrochars and their application in the field. 1-6 March 2015, Seville (Spain).

## Other communications in national or international conferences

9. **Miller A**. 2004. Arco da Rua Augusta – the unique Portuguese Triumphal Arch. Diagnosis and mapping of lithotypes and weathering forms. *6th International Symposium on the Conservation of Monuments in the Mediterranean Basin*, April 7-10, 2004, Lisbon, Portugal.
10. **Miller A**, Alarcão C, Salgado MJ, Macedo MF. 2005. Biodeterioração da pedra por microrganismos, *4º Encontro do Instituto Português de Conservação e Restauro*, 2005, Lisbon, Portugal.
11. Pereira A, **Miller A**, Figueiredo E, Trindade S. 2006. Materials and techniques used in the works of Art from Igreja dos Paulistas in Lisbon (Portugal). *Heritage, Weathering and Conservation International Conference*, June 21-24, 2006, Madrid, Spain.
12. **Miller A**, Macedo MF. 2006. Mapping and characterization of a green biofilm inside of Vilar de Frades Church (Portugal). *Heritage, Weathering and Conservation International Conference*, June 21-24, 2006, Madrid, Spain.
13. Laiz L, **Miller AZ**, Gonzalez JM, Akatova E, Jurado V, Dionísio A, Macedo MF, Saiz-Jimenez C. 2007. *Rubrobacter* strains isolated from efflorescences in monuments. *II International Conference on Environmental, Industrial and Applied Microbiology (BioMicroWorld2007)*, November 28 – December 1 2007, Seville, Spain.
14. Gomes MI, Rogerio-Candelera MA, **Miller AZ**, Macedo MF, Dionísio A, Laiz L, Saiz-Jimenez C. 2008. Análisis de imagen para la evaluación de la bioreceptividad de materiales utilizados en el Patrimonio

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  17. Gomes MI, Rogerio-Candelera MA, **Miller AZ**, Macedo MF, Dionísio A. 2008. Image analysis as a tool for monitoring a biofilm growth on stone materials used in Cultural Heritage. *14<sup>a</sup> Conferência Portuguesa de Reconhecimento de Padrões (RecPad2008)*, October 2008, Coimbra, Portugal.
  18. Pereira de Oliveira B, Dionísio A, Sequeira Braga MA, **Miller A**, Macedo MF, Silveira T. 2008. A biogeoquímica na protecção e uso sustentáveis do património cultural construído: o caso da Igreja dos Terceiros da Ordem de São Francisco (Porto). *11<sup>o</sup> Encontro Nacional de Ecologia*, November 2008, Vila Real, Portugal.
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  26. **Miller AZ**, Saiz-Jimenez C, 2012. Microorganisms in caves: Unusual morphologies. *IV Congreso español sobre cuevas turísticas (Cuevatur2012)*, October 18-20, 2012, Palencia, Spain.
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30. De la Rosa JM, Paneque-Carmona M, **Miller AZ**, Clemente R, Knicker H. 2013. Carbon sequestration potential by carbonized biomass in Mediterranean agricultural soils. *26<sup>th</sup> International Meeting on Organic Geochemistry (26thIMOG)*, September 16-20, Tenerife, Spain.
31. **Miller AZ**, Pereira MFC, Calaforra JM, Forti P, Dionísio A, Saiz-Jimenez C. 2013 Internal structure and compositional evolution of speleothems from Ana Heva lava tube in Easter Island (Chile): FESEM-EDS and Micro-CT characterization study. *Microscopy in research 2013*, December 9-10, Monte da Caparica, Portugal.
32. J.M. De la Rosa, I. Hilber, M. Paneque, F. Blum, T.D. Bucheli, **A.Z. Miller**, H. Knicker, 2014. Analytical characterisation and PAH assessment of four contrasting biochars and biochar amended soils from Southern Spain. *2nd Mediterranean Biochar Symposium*, 16 -17 January 2014, Palermo, Sicily, Italy.
33. Calaforra JM, Forti F, Gázquez F, Rull F, Martínez-Frías J, **Miller AZ**, Saiz-Jiménez C, Manrique JA, Medina J. Siliceous speleothems in Ana Heva lava tube (Easter Island, Chile). *16th International symposium on Vulcanospeleology*, March 16-22, 2014, Galápagos Islands, Ecuador.
34. **Miller AZ**, Dionísio A, Lopes ME, Afonso MJ, Chaminé HI, 2014. Microbe-mineral interactions in a Portuguese geo-archaeological site. *Workshop on the conservation of the subterranean cultural heritage*, March 25-27, 2014, Seville, Spain.
35. Garcia-Sanchez AM, **Miller AZ**, Jurado V, Dionísio A, Muralha VSF, Afonso MJ, Chaminé HI, 2014. Is the presence of bacterial communities related to the urban contamination sources of the 16th century Paranhos spring water galleries? *Workshop on the conservation of the subterranean cultural heritage*, March 25-27, 2014, Seville, Spain.
36. Moreira B, **Miller AZ**, Santos R, Monteiro S, Dias D, Neves O, Dionísio A, Saiz-Jimenez C, 2014. Potential contribution of microbial communities in technical ceramics for the improvement of rheological properties. European Geosciences Union General Assembly 2014 (EGU2014), 27 April - 02 May 2014, Vienna, Austria.
37. De la Rosa JM, Pereira de Oliveira B, **Miller AZ**, González-Pérez JA, Dionísio A, Sequeira Braga MA. Assessing the origin of black films on a granite historical building by analytical pyrolysis. *20<sup>th</sup> International Symposium on Analytical and Applied Pyrolysis*, May 19-23, 2014, Birmingham, UK.
38. Sasso S, **Miller AZ**, Rogerio-Candelera MA, Laiz L, Scranò L, Bufo SA, Saiz-Jimenez C. Bioreceptivity of limestone treated with secondary metabolites. *International Congress on Science and Technology for the Conservation of Cultural Heritage II (Technoheritage II)*, June 24-27, 2014, Seville, Spain.
39. Marques JM, Neves MO, **Miller AZ**, Rocha C, Etepe G, Vance S, Christensen L, Suzuki S, Carreira PM, André D, Ribeiro da Costa I, Carvalho MR, 2014. A conceptual model for Cabeço de Vide mineral waters (Portugal): abiotic methane from low temperature serpentinization as a potential analog for planetary water-rock interaction. *International Multidisciplinary Conference on Mineral Waters*, September 08-11, 2014, Karlovy Vary, Czech Republic.
40. De la Rosa J.M., Paneque M., **Miller A.Z.**, Knicker H. 2014. Biochar induced alterations of soil properties and its organic matter; discerning how it improves crop production. *17th Meeting of the International Humic Substances Society (IHSS-17)*, September 01-05, 2014, Ioannina, Greece.
41. **Miller AZ**, Suzuki S, Marques JM, Rocha C, Etiopé G, Vance S, Christensen L. 2014. Morphological features of microorganisms dwelling in an active low-temperature serpentinization site, Cabeço de Vide, Portugal: a possible analogue to early Mars. *The 14<sup>th</sup> European Workshop on Astrobiology (EANA 2014)*, October 13-16, 2014, Edinburgh, UK.
42. **Miller AZ**, Hernández-Mariné M, Jurado V, Calaforra JM, Forti P, Toulkeridis T, Pereira MFC, Dionísio A, Saiz-Jimenez C, 2014. Biosignatures valuable for Astrobiology: the case of reticulated filaments. *The 14<sup>th</sup> European Workshop on Astrobiology (EANA 2014)*, October 13-16, 2014, Edinburgh, UK.

43. Sasso S, **Miller AZ**, Rogerio-Candelera MA, Cubero B, Scrano L, Bufo SA, Saiz-Jimenez C. 2015. Non-destructive testing of stone biodeterioration and biocleaning effectiveness. *International conference TECHNART 2015*, April 27-30, 2015, Catania, Italy.
44. De la Rosa JM, Paneque M, De Celis R, **Miller AZ**, Knicker H. 2015. Contrasting agronomic response of biochar amendment at a Mediterranean Cambisol: Incubation vs. field study. *European Geosciences Union General Assembly 2015 (EGU2015)*, 12 – 17 April 2015, Vienna, Austria.
45. Caneira I, Machado-Moreira B, Dionísio A, Godinho V, Neves O, Dias D, Saiz-Jimenez C, **Miller AZ**. 2015. Application of exopolysaccharides to optimize the performance of ceramic bodies in the unidirectional dry pressing process. *European Geosciences Union General Assembly 2015 (EGU2015)*, 12 – 17 April 2015, Vienna, Austria.
46. **Miller AZ**, Jurado V, Pereira MFC, Fernández O, Calaforra JM, Dionísio A, Saiz-Jimenez C. 2015. Cave speleothems as repositories of microbial biosignatures. *European Geosciences Union General Assembly 2015 (EGU2015)*, 12 – 17 April 2015, Vienna, Austria.
47. Ferrier C, Ammari F, Bassel B, Bousquet L, Chapoulie R, Konik S, Lacanette D, Lefrais Y, Malaurent P, **Miller AZ**, Mauran G, Naessens F, Saiz-Jimenez C. Biomineralisation and coralloides: two calcitic facies involved in the conservation of paleolithic cave/rock art. *XIX International rock art conference IFRAO 2015*, 31 August – 4 September 2015, Caceres, Spain.
48. Fernández O, Gómez D, Naranjo M, Jurado V, **Miller AZ**, 2015. Nuevas galerías en la Cueva de Los Caños (Mazo, La Palma, islas Canarias): Notas sobre espeleometría, biocenosis y microbiología. *1st International Convention of Speleology*, 1 - 3 May 2015, Barcelona, Spain.

### **Stays in research institutions abroad**

|                            |   |
|----------------------------|---|
| 10 – 21 Nov 2014           | John Craig Venter Institute (JCVI), La Jolla, California (USA). Supervisor: Dr. Shino Suzuki.   |
| 15 Sep – 31 Oct 2014       | Department 4 – Materials and the Environment, Federal Institute for Materials Research and Testing (BAM), Berlin, Germany. Supervisor: Prof. Anna Gorbushina. |
| 4 Oct – 17 Dec 2010        | Department of Microbiological, Genetic and Molecular Sciences, University of Messina (Sicily, Italy). Supervisor: Prof. Clara Urzi.                           |
| 20 – 30 Oct 2008           | Department of Botany, Faculty of Pharmacy, University of Barcelona (Barcelona, Spain). Supervisor: Prof. M. Hernández-Mariné.                                 |
| 9 – 13 Jun 2008            | Centro de Ciencias Medioambientales – CSIC (Madrid, Spain). Supervisor: Prof. Carmen Ascaso.  |
| 1 May 2006 – 30 April 2007 | IRNAS-CSIC (Seville, Spain). Supervisor: Prof. C. Saiz-Jimenez.   |

### **Experience organizing R&D&I activities**

- 1<sup>st</sup> International Congress Glass Science in Art and Conservation held at the FCT-UNL (Lisbon, Portugal), Sept. 2005.
- Organizer and keynote lecturer of the Workshop “Treatment and monitoring of biological colonization” held at the Queluz National Palace (Portugal), World Monuments Fund-Portugal, Nov.-Dec. 2007.
- Organizer and keynote lecturer of the Workshop “Treatment and monitoring of biological colonization” held at the Queluz National Palace (Portugal), World Monuments Fund-Portugal, April 2008.
- Organizer and keynote lecturer of the Workshop “Treatment and monitoring of biological colonization” held at the Queluz National Palace (Portugal), World Monuments Fund-Portugal, June 2010.
- 15<sup>th</sup> Meeting of the International Humic Substances Society held in Tenerife (Spain). 27 June -02 July 2010.
- 26<sup>th</sup> International Meeting on Organic Geochemistry (26thIMOG), September 16-20, 2013, Tenerife, Spain (Award: IMOG travel grant).
- European Science Foundation Exploratory Workshop “Impact of natural and anthropogenic pyrogenic Carbon in Mediterranean ecosystems”, Seville-Spain, November 5 - 7, 2013.

- *International Congress on Science and Technology for the Conservation of Cultural Heritage II* (Technoheritage II), Seville (Spain), June 24-27, 2014.

### **Experience in assessment and review of R&D&I projects and articles**

1. **Activity:** Reviewer  
**Organizing Institution:** Water Research journal  
**Responsibility held:** Anonymous Reviewer  
**Start date:** 2013
2. **Activity:** Reviewer of Pegasus Marie Curie Fellowship  
**Organizing Institution:** Research Foundation – Flandres (FWO)  
**Responsibility held:** Anonymous Reviewer  
**Start date:** 2013
3. **Activity:** PhD thesis committee. Title: “A framework for assessing the vulnerability of exposed schist surfaces to lichen-induced weathering in the Upper Douro region (NE Portugal)”, Joana Maria Mendonça Marques.  
**Institution:** University of Porto, Faculty of Sciences, Department of Biology  
**Date:** December 2013
4. **Activity:** PhD thesis committee. Title: “Color quantification in the study of biofilm formation on granite stone in historical and artistic heritage”  
**Institution:** University of Santiago de Compostela, Faculty of Pharmacy, Department of Soil Science and Agricultural Chemistry  
**Date:** July 2012
5. **Activity:** Reviewer  
**Journal:** Biofouling journal  
**Responsibility held:** Anonymous Reviewer  
**Start date:** 2012
6. **Activity:** Reviewer  
**Journal:** Indoor and Built Environment  
**Responsibility held:** Anonymous Reviewer  
**Start date:** 2012
7. **Activity:** Reviewer  
**Journal:** International Journal of Environmental and Analytical Chemistry  
**Responsibility held:** Anonymous Reviewer  
**Start date:** 2012
8. **Activity:** Reviewer  
**Journal:** Science of the Total Environment  
**Responsibility held:** Anonymous Reviewer  
**Start date:** 2011
9. **Activity:** Reviewer  
**Journal:** World Journal of Microbiology and Biotechnology  
**Responsibility held:** Anonymous Reviewer  
**Start date:** 2010
10. **Activity:** Reviewer  
**Journal:** Journal of Applied Phycology  
**Responsibility held:** Anonymous Reviewer  
**Start date:** 2009

**Language skills**

| <i>Language</i>   | <i>Speaking</i>  | <i>Reading</i>   | <i>Writing</i>   |
|-------------------|------------------|------------------|------------------|
| <i>English</i>    | <i>Very good</i> | <i>Very good</i> | <i>Very good</i> |
| <i>Spanish</i>    | <i>Very good</i> | <i>Very good</i> | <i>Very good</i> |
| <i>Portuguese</i> | <i>Native</i>    | <i>Native</i>    | <i>Native</i>    |