

# **Curriculum vitae**

**Mara G. Freire**

## Synopsis

Mara G. Freire graduated in Chemistry in 2003 by University of Aveiro, Portugal, and received the “Best Chemistry Student Award” from Dow Portugal. By the end of 2007 she completed her PhD in Chemical Engineering, with specialization in Bioengineering, by University of Aveiro, having during her PhD studies trainees at Federal University of Rio de Janeiro, Brazil, and Claude Bernard University, Lyon, France, followed by post-doctoral activities at ITQB2, New University of Lisbon, Portugal. In 2012, Freire was an invited professor at Tiradentes University, Sergipe, Brazil. From 2013 to January 2014, Freire was an Assistant Researcher at CICECO - Aveiro Institute of Materials, Chemistry Department, University of Aveiro, Portugal, and since February 2014 she is a Coordinator Researcher at the same institution. Currently, Mara Freire is the Coordinator of Group 5 of CICECO, Biomedical and Biomimetic Materials, and a member of the Cooperation and Scientific Dissemination Committee of the Chemistry Department at University of Aveiro. Since January 2017 she is a Member of the Young Scientists Seminar of the Lisbon Academy of Sciences.

Since 2005, Freire published more than 160 papers in international peer reviewed journals, 7 book chapters and edited one book, and has over 6000 citations (excluding self-citations) and an h-index of 50. The scientific network of Freire is supported by publications with more than 150 distinct authors with the most diverse affiliations. Freire recurrently acts as a referee of multidisciplinary journals, and in international programmes for independent research careers and projects. She participated in 18 R&D projects with a total budget over 17M€, being the principal investigator in 2 of these projects. Currently, Freire is the principal investigator of a Starting Grant from the European Research Council (ERC).

In addition to 11 best poster awards in scientific conferences, Freire was the advisor of the winner MSc thesis in the Industrial and Technology Category in the Future Ideas Thesis Competition 2014, the co-advisor of the Best PhD thesis - Mário Quartin Graça Award - in the Technologies and Natural Sciences Category in 2016, was recognized amongst the top 20 “Women in Science” in Portugal in 2015, received the ECTP-NETZSCH Young Scientist Award in 2014, and was considered one of the 14 emerging investigators in the green chemistry field in 2017 by the journal Green Chemistry.

The pedagogical capacity of Freire is supported by recurrent teaching activities of Physical Chemistry, Thermodynamics, and Alternative Solvents Technologies at University of Aveiro, Portugal. Moreover, she has completed the supervision of 8 post-doctoral researchers, 6 PhD students, 36 MSc students and 27 BSc students, and is currently supervising 7 post-doctoral researchers, 10 PhD students and 2 MSc students.

## 1. Personal information

### Full name

Mara Guadalupe Freire Martins

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### Birth place and date

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### Nationality

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### Institutional address

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## 2. Academic degrees

**2007:** PhD in Chemical Engineering, with specialization in Bioengineering, University of Aveiro, Portugal

**2003:** Degree in Chemistry – Analytical Chemistry, University of Aveiro, Portugal

## 3. Current scientific and academic positions

**January 2017 - present:** Member of the Young Scientists Seminar of the Lisbon Academy of Sciences, Portugal

**October 2016 - present:** External collaborator of the Bioprocesses Engineering Group at Tiradentes University, Brazil

**January 2016 - present:** Member of the Cooperation and Scientific Dissemination Committee of the Chemistry Department, University of Aveiro, Portugal

**January 2016 - present:** UATEC (Technology Transfer Unit of University of Aveiro) Pivot at the Chemistry Department, University of Aveiro, Portugal

**January 2016 - present:** External collaborator of the MSc program in Biotechnology, Federal University of Tocantins, Brazil

**January 2015 - present:** Coordinator of Group 5 (Biomedical and Biomimetic Materials) of CICECO - Aveiro Institute of Materials, University of Aveiro, Portugal

**February 2014 - present:** Coordinator Researcher at the Chemistry Department, CICECO - Aveiro Institute of Materials, University of Aveiro, Portugal

## 4. Previous scientific and/or professional activities

**11/06/2013 - 31/01/2014:** Assistant Researcher at the Chemistry Department, CICECO - Aveiro Institute of Materials, University of Aveiro, Portugal

**01/08/2012 - 31/09/2012:** Invited Professor in the Post-Graduation Program on Processes Engineering, at Tiradentes University, Brazil

**01/01/2008 - 10/06/2013:** Post-doctoral researcher at Instituto de Tecnologia Química e Biológica, ITQB2, New University of Lisbon, Portugal

**01/06/2005 - 31/08/2005:** Researcher during the PhD at the Department of Biological Engineering, Federal University of Rio de Janeiro, Brazil

**01/02/2004 - 31/05/2004:** Researcher during the PhD at the Laboratoire des Sciences Analytiques, Claude Bernard-Lyon University, France

**01/10/2003 - 24/09/2007:** PhD student in Chemical Engineering at the Chemistry Department, CICECO - Aveiro Institute of Materials, University of Aveiro, Portugal

**01/01/2003 - 30/06/2003:** Trainee Student in Chemistry at the Department of Biological Engineering, Federal University of Rio de Janeiro, Brazil

## 5. Domains of scientific specialization

Since the beginning of her research activities, Mara Freire has been working in the following scientific domains: Biotechnology, Chemical Engineering/Bioengineering, and Chemistry/Physical Chemistry.

## 6. Scientific production

Up to date Mara G. Freire, edited 1 book, co-authored 7 book chapters, co-authored more than 160 peer-reviewed scientific manuscripts, 24 papers in conference proceedings, delivered 110 oral communications in conferences, 18 of which by invitation, and presented more than 250 posters in international conferences. Table 1 summarizes Freire's overall scientific performance according to three scientific evaluation systems.

**Table 1.** Bibliometric data obtained from the Web of Science (WOS), Scopus and Google Scholar databases, at the 13<sup>rd</sup> November 2017. na: information not available.

<b>Publications</b>	<b>Web of science (WOS)</b>	<b>Scopus</b>	<b>Google scholar</b>
Total number of publications	166	166	218
Total citations	7573	7706	9338
Total citations (excluding self-citations)	6203	6326	na
Average citations <i>per</i> publication (excluding self-citations)	37.4	38.1	na
H-index	50	50	55
Specific search/indicators	ORCID: 0000-0001-8895-0614	ORCID: 0000-0001-8895-0614	Mara G. Freire

### List of publications:

#### Edited Books

Ionic-Liquid-based Aqueous Biphasic Systems: Fundamentals and Applications, Edited by Mara G. Freire, Springer (2016) (ISBN: 978-3-662-52875-4).

#### Book chapters

1. Lima, Á. S.; Placido, N. S. O. ; França, R. L. S. ; Reis, I. A. O. ; Pereira, M. M.; Freire, M. G., "Aplicação de Sistemas Aquosos Bifásicos na Purificação de Biomoléculas", in

- “Processos de Extração e Purificação de Biomoléculas”, Edited by Á. S. Lima and C. C. Santana, Edition by Universitária Tiradentes (2017).
2. Quental, M. V.; Almeida, M. R.; Gomes, J.; Resende, J.; Domingues, P.; Freire, M. G., “Imunoglobulina Y (IgY): uma Alternativa Promissora aos Anticorpos de Mamíferos”, Chapter 7 in “Bioquímica e Bem-Estar”, Edited by Manuel A. Coimbra, Edições Afrontamento (2017).
  3. Capela, E. V.; Aires-Barros, M. R.; Freire, M. G.; Azevedo, A. M., “Monoclonal Antibodies – Addressing the Challenges on the Manufacturing Processing of an Advanced Class of Therapeutic Agents”, Chapter 6 in “Frontiers in Clinical Drug Research-Anti-Infectives”, Edited by Faryal Sami, Bentham Science (2017). DOI: 10.2174/97816810848791170401
  4. Freire M. G., “Introduction to ionic-liquid-based aqueous biphasic systems (ABS)”, Chapter 1 in “Ionic-Liquid-based Aqueous Biphasic Systems: Fundamentals and Applications”, Edited by Mara G. Freire, Springer (2016) (ISBN: 978-3-662-52875-4). DOI: 10.1007/978-3-662-52875-4\_1
  5. Pereira, M. M.; Coutinho, J. A. P.; Freire, M. G., “Ionic liquids as Efficient Tools for the Purification of Biomolecules and Bioproducts from Natural Sources”, Chapter 8 in “Ionic Liquids in the Biorefinery Concept”, Edited by Rafal Lukasik, Royal Society of Chemistry (RSC) (2016) (ISBN: 978-1-84973-976-4). DOI: 10.1039/9781782622598-00227.
  6. Marrucho, I. M.; Freire, M. G., “Aqueous Biphasic Systems based on Ionic Liquids for Extraction, Concentration and Purification Approaches”, Chapter 5 in “Ionic Liquids for Better Separation Processes”, Edited by Héctor Rodríguez, Springer (2015) (ISBN: 978-3-662-48520-0). DOI: 10.1007/978-3-662-48520-0\_5.
  7. Freire, M. G.; Santos, L. M. N. B. F.; Marrucho, I. M.; Coutinho, J. A. P., “Predicting the Thermodynamic Behavior of Water & Ionic Liquids Systems Using COSMO-RS”, Chapter 8 in “Molten Salts and Ionic Liquids: Never the Twain?”, Edited by Marcelle Gaune-Escard and Kenneth R. Seddon, John Wiley & Sons, Inc. (2010) (ISBN: 978-0-471-77392-4). DOI: 10.1002/9780470947777.ch8.

### **Manuscripts in international peer-reviewed scientific journals**

1. Passos, H.; Costa, S. H.; Fernandes, A. M.; Freire, M. G.; Rogers, R. D.; Coutinho, J. A. P., “A Triple Salting-Out Effect is Required for the Formation of Ionic-Liquid-Based Aqueous Multiphase Systems”, *Angew. Chem. Int. Edit.* 56 (2017) 15058-15062.
2. Dinis, T.B.V.; Passos, H.; Lima, D. L. D.; Sousa, A. C. A.; Coutinho, J. A. P.; Esteves, V. I.; Freire, M. G., “Simultaneous Extraction and Concentration of Water Pollution Tracers using Ionic-Liquid-based Systems”, *J. Chromatogr. A.* (2017) DOI: 10.1016/j.chroma.2017.07.084.
3. Prasad, K.; Mondal, D.; Sharma, M.; Freire, M. G.; Mukesh, C.; Bhatt, J., “Stimuli responsive ion gels based on polysaccharides and other polymers prepared using ionic liquids and deep eutectic solvents”, *Carbohydr. Polym.* 180 (2018) 328-336.
4. Leite, A. C.; Ferreira A.M.; Morais, E.; Khan, I.; Freire, M. G.; Coutinho, J.A.P., “Cloud Point Extraction of Chlorophylls from Spinach Leaves using Aqueous Solutions of

- Non-Ionic Surfactants”, ACS Sustain. Chem. Eng. (2017) DOI: 10.1021/acssuschemeng.7b02931.
- de Faria, E.; do Carmo, R.; Cláudio, A. F. M.; Freire, C. S. R.; Freire, M. G.; Silvestre, A. J. D., “Deep Eutectic Solvents as Efficient Media for the Extraction and Recovery of Cynaropicrin from *Cynara cardunculus* L. Leaves”, *Int. J. Mol. Sci.* 18 (2017) 2276-2285.
  - Bisht, M.; Mondal, D.; Pereira, M. M.; Freire, M. G.; Venkatesu, P.; Coutinho, J. A. P., “Long-Term Protein Packaging in Cholinium-based Ionic Liquids: Improved Catalytic Activity and Enhanced Stability of Cytochrome c against Multiple Stresses”, *Green Chem.* 19 (2017) 4900-4911.
  - Almeida, H. F. D.; Freire, M. G.\*; Marrucho, I. M., “Improved Monitoring of Aqueous samples by the preconcentration of active pharmaceutical ingredients using ionic-liquid-based systems”, *Green Chem.* 19 (2017) 4651-4659.
  - Ferreira, A.M.; Passos, H.; Okafuji, A.; Freire, M.G.; Coutinho, J.A.P.; Ohno, H., “Designing the Thermal Behaviour of Aqueous Biphasic Systems composed of Ammonium-based Zwitterions”, *Green Chem.* 19 (2017) 4012-4016. (Included in the themed collections: “International Symposium on Green Chemistry 2017” and “2017 Green Chemistry Hot Articles”).
  - Sousa, R. d. C. S.; Pereira, M. M.; Freire, M. G.; Coutinho, J. A. P., “Evaluation of the Effect of Ionic liquids as Adjuvants in Polymer-based Aqueous Biphasic Systems using Biomolecules as Molecular Probes”, *Sep. Purif. Technol.* (2017) DOI: 10.1016/j.seppur.2017.07.018.
  - de Faria, E. L. P.; Shabudin, S. V.; Cláudio, A. F. M.; Válega, M.; Domingues, F. M. J.; Freire, C. S. R.; Silvestre, A. J. D.; Freire, M.G., “Aqueous Solutions of Surface-Active Ionic Liquids: Remarkable Alternative Solvents to Improve the Solubility of Triterpenic Acids and Their Extraction from Biomass”, *ACS Sustain. Chem. Eng.* 5 (2017) 7344-7351.
  - Teles, A. R. R.; Capela, E. V.; Carmo, R. S.; Coutinho, J. A. P.; Silvestre, A. J. D.; Freire, M. G., “Solvatochromic Parameters of Deep Eutectic Solvents formed by Ammonium-based Salts and Carboxylic Acids”. *Fluid Phase Equilib.* 448 (2017) 15-21.
  - e Silva, F. A.; Pereira, J. F. B.; Kurnia, K. A.; Ventura, S. P. M.; Silva, A. M. S.; Rogers, R. D.; Coutinho, J. A. P.; Freire, M. G., “Temperature Dependency of Aqueous Biphasic Systems: an Alternative Approach for Exploring the Differences between Coulombic-dominated Salts and Ionic Liquids”, *Chem. Commun.* 53 (2017) 7298-7301. (Included in the themed collection “2017 Emerging Investigators”).
  - Taha, M.; Quental, M. V.; Silva, F. A.; Capela, E. V.; Freire, M. G.; Ventura, S. P. M.; Coutinho, J. A. P., “Good's Buffer Ionic Liquids as Relevant Phase-Forming Components of Self-Buffered Aqueous Biphasic Systems”, *J. Chem. Technol. Biotechnol.* 92 (2017) 2287-2299.
  - Ferreira, A. M.; Cláudio, A. F. M.; Válega, M.; Domingues, F. M. J.; Silvestre, A. J. D.; Rogers, R. D.; Coutinho, J.A.P.; Freire, M. G., “Switchable (pH-driven) aqueous biphasic systems formed by ionic liquids as integrated production-separation platforms”. *Green Chem.* 19 (2017) 2768-27773. (Included in the themed collection “Green Chemistry 2017 Emerging Investigators”).

15. Ferreira, A. M.; Morais, E. S.; Leite, A. C.; Mohamadou, A.; Holmbom, B.; Holmbom, T.; Neves, B.M.; Coutinho, J.A.P.; Freire, M.G.; Silvestre, A. J. D., "Enhanced Extraction and Biological Activity of 7-hydroxymatairesinol obtained from Norway Spruce Knots using Aqueous Solutions of Ionic Liquids", *Green Chem.* 19 (2017) 2626-2635.
16. Neves, C. M. S. S.; Silva, A. M. S.; Fernandes, A. M.; Coutinho, J. A. P.; Freire, M.G., "Towards an Understanding of the Mechanisms behind the Formation of Liquid-Liquid Systems formed by Two Ionic Liquids", *J. Phys. Chem. Lett.* 8 (2017) 3015-3019.
17. Ventura, S. P. M.; Silva, F. A.; Quental, M. V.; Mondal, D.; Freire, M. G.; Coutinho, J. A. P., "Ionic-Liquid-Mediated Extraction and Separation Processes for Bioactive Compounds: Past, Present, and Future Trends", *Chem. Rev.* (2017) 6984-7052.
18. Capela, E. V.; Quental, M. V.; Domingues, P.; Coutinho, J. A. P.; Freire, M. G., "Effective Separation of Aromatic and Aliphatic Amino Acids Mixtures using Ionic-Liquid-based Aqueous Biphasic Systems", *Green Chem.* 19 (2017) 1850-1854. (Included in the themed collection "2017 Green Chemistry Hot Articles").
19. Madeira, P. P.; Passos, H.; Gomes, J.; Coutinho, J. A. P.; Freire, M. G., "Alternative probe for the determination of the hydrogen-bond acidity of ionic liquids and their aqueous solutions". *Phys. Chem. Chem. Phys.* 19 (2017) 11011-11016.
20. Almeida, H. F. D.; Marrucho, I. M.; Freire, M. G., "Removal of Non-Steroidal Anti-Inflammatory Drugs from Aqueous Environments with Reusable Ionic-Liquid-based Systems", *ACS Sustain. Chem. Eng.* 5 (2017) 2428-2436.
21. Cláudio, A. F. M.; Pereira, J. F. B.; McCrary, P. D.; Freire, M. G.; Coutinho, J. A. P.; Rogers, R. D., "A Critical Assessment of the Mechanisms Governing the Formation of Aqueous Biphasic systems Composed of Protic Ionic Liquids and Polyethylene Glycol", *Phys. Chem. Chem. Phys.* 18 (2016) 30009-30019.
22. Mondal, D.; Sharma, M.; Quental, M. V.; Tavares, A. P. M.; Prasad, K.; Freire, M. G., "Suitability of Bio-Based Ionic Liquids for the Extraction and Purification of IgG Antibodies", *Green Chem.* 18 (2016) 6071-6081. (Highlighted in Nature India)
23. Teles, A. R. R.; Correia, H.; Maximo, G.; Rebelo, L. P. N.; Freire, M. G.; Pereiro, A. B.; Coutinho, J. A. P., "Solid-Liquid Equilibria of Binary Mixtures of Fluorinated Ionic Liquids", *Phys. Chem. Chem. Phys.* 18 (2016) 25741-25750.
24. Ferreira, A. M.; Faustino, V. F. M.; Mondal, D.; Coutinho, J. A. P.; Freire, M. G., "Improving the Extraction and Purification of Immunoglobulin G by the Use of Ionic Liquids as Adjuvants in Aqueous Biphasic Systems", *J. Biotechnol.* 236 (2016) 166-175.
25. Almeida, H. F. D.; Canongia Lopes, J. N.; Rebelo, L. P. N.; Coutinho, J. A. P.; Freire, M. G.; Marrucho, I. M., "Densities and Viscosities of Mixtures of Two Ionic Liquids Containing a Common Cation", *J. Chem. Eng. Data* 61 (2016) 2828-2843.
26. Soares, B.; Passos, H.; Freire, C. S. R.; Coutinho, J. A. P.; Silvestre, A. J. D.; Freire, M. G., "Ionic Liquids in Chromatographic and Electrophoretic Techniques: Toward



- Additional Improvements on the Separation of Natural Compounds”, *Green Chem.* 18 (2016) 458- 4604.
27. Neves, C. M. S. S.; Shahriari, S.; Lemus, J.; Pereira, J. F. B.; Freire, M. G.; Coutinho, J. A. P., “Aqueous Biphasic Systems Composed of Ionic Liquids and Polypropylene Glycol: Insights Into Their Liquid-Liquid Demixing Mechanisms”, *Phys. Chem. Chem. Phys.* 18 (2016) 20571-20582.
  28. Batista, M. L. S.; Passos, H.; Henriques, B. J. M.; Maginn, E. J.; Pinho, S. P.; Freire, M. G.; Gomes, J. R. B.; Coutinho, J. A. P., “Why Are Some Cyano-based Ionic Liquids Better Glucose Solvents than Water?”, *Phys. Chem. Chem. Phys.* 18 (2016) 18958-18970.
  29. Teles, A. R. R.; Dinis, T. B. V.; Capela, E. V.; Santos, L. M. N. B. F.; Pinho, S. P.; Freire, M. G.; Coutinho, J. A. P., “Solubility and Solvation of Monosaccharides in Ionic Liquids”, *Phys. Chem. Chem. Phys.* 18 (2016) 19722-19730.
  30. Luís, A.; Shimizu, K.; Araújo, J. M. M.; Carvalho, P. J.; Lopes-da-Silva, J. A.; Canongia Lopes, J. N.; Rebelo, L. P. N.; Coutinho, J. A. P.; Freire, M. G.; Pereiro, A. B., “Influence of Nanosegregation on the Surface Tension of Fluorinated Ionic Liquids”, *Langmuir* 32 (2016) 6130-6139.
  31. Passos, H.; Tavares, D. J. P.; Ferreira, A. M.; Freire, M. G.; Coutinho, J. A. P., “Are Aqueous Biphasic Systems composed of Deep Eutectic Solvents Ternary or Quaternary Systems?”, *ACS Sustain. Chem. Eng.* 4 (2016) 2881–2886.
  32. Rodrigues, A. S. M. C.; Almeida, H. F. D.; Freire, M. G.; Lopes-da-Silva, J. A.; Coutinho, J. A. P.; Santos, L. M. N. B. F., “The Effect of n vs. iso Isomerization on the Thermophysical Properties of Aromatic and Non-Aromatic Ionic Liquids”. *Fluid Phase Equilib.* 423 (2016) 190-202.
  33. Pereira, M. M.; Cruz, R. A. P.; Almeida, M. R.; Lima, Á. S.; Coutinho, J. A. P.; Freire, M. G., “Single-Step Purification of Ovalbumin from Egg White Using Aqueous Biphasic Systems”, *Proc. Biochem.* 51 (2016) 781-791.
  34. Vieira, N. S. M.; Luís, A.; Reis, P. M.; Carvalho, P. J.; Lopes-da-Silva, J. A.; Esperança, J. M. S. S.; Araújo, J. M. M.; Rebelo, L. P. N.; Freire, M. G.; Pereiro, A. B., “Fluorination Effects on the Thermodynamic, Thermophysical and Surface Properties of Ionic Liquids”, *J. Chem. Thermodyn.* 97 (2016) 354-361.
  35. Passos, H.; Luís, A.; Coutinho, J. A. P.; Freire, M. G., “Thermoreversible (Ionic-Liquid-Based) Aqueous Biphasic Systems”, *Sci. Rep.* 6 (2016) Article number: 20276.
  36. Pereira, J. F. B.; Magri, A.; Quental, M. V.; Gonzalez-Miquel, M.; Freire, M. G.; Coutinho, J. A. P., “Alkaloids as Alternative Probes To Characterize the Relative Hydrophobicity of Aqueous Biphasic Systems”, *ACS Sustain. Chem. Eng.* 4 (2016) 1512–1520.
  37. Almeida, H. F. D.; Freire, M. G.; Marrucho, I. M., “Improved Extraction of Fluoroquinolones with Recyclable Ionic-Liquid-based Aqueous Biphasic Systems”, *Green Chem.* 18 (2016) 2717-2725.

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39. Martins, M. A. R.; Neves, C. M. S. S.; Kurnia, K. A.; Carvalho, P. J.; Rocha, M. A. A.; Santos, L. M. N. B. F.; Pinho, S. P.; Freire, M. G., "Densities, Viscosities and Derived Thermophysical Properties of Water-Saturated Imidazolium-Based Ionic Liquids", *Fluid Phase Equilibr.* 407 (2016) 188-196.
40. Ferreira, A. M.; Esteves, P.; Boal-Palheiros, I.; Pereira, A. B.; Rebelo, L. P. N.; Freire, M. G., "Enhanced Tunability Afforded by Aqueous Biphasic Systems Formed by Fluorinated Ionic Liquids And Carbohydrates", *Green Chem.* 18 (2016) 1070-1079.
41. Ferreira, A. M.; Freire, M. G., "Extração e Purificação de Produtos de Valor Acrescentado Utilizando Sistemas Aquosos Bifásicos Constituídos por Líquidos Iónicos", *Química - Boletim da SPQ* 139 (2015) 23-34.
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44. Sintra, T. E.; Luís, A.; Rocha, S. N.; Lobo Ferreira, A. I. M. C.; Gonçalves, F.; Santos, L. M. N. B. F.; Neves, B. M.; Freire, M. G.; Ventura, S. P. M.; Coutinho, J. A. P., "Enhancing the Antioxidant Characteristics of Phenolic Acids by Their Conversion into Cholinium Salts", *ACS Sustain. Chem. Eng.* 3 (2015) 2558-2565.
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## 7. Participation in R&D projects

Up to date Mara Freire participated in 18 R&D projects with a total budget over 17M€, being the principal investigator in 2 of these projects (1.4M€ and 133,000€), team coordinator of 5 projects (3 international, 2 national and 1 with industrial partners), and team member in the remaining 11 projects.

## 8. Scientific team/supervising experience

Mara Freire research team includes 7 post-doctoral researchers, 10 PhD students and 2 MSc students. Up to date, she supervised 8 post-doctoral researchers, 6 PhD students, 36 MSc students and 27 BSc students. Her research team also accounts with 1 lab technician. A list of these researchers and students is described below. The description of the institutions involved is also provided.

### Post-doctoral researchers

1. Sousa A. C. A., “MultiRespira - Multidisciplinary approach to understand the role of environmental contaminants in respiratory diseases in Estarreja Region”. Grant from CNRS-Labex DRIIHM (France). University of Aix-Marseille, France; Public-Health Institute from University of Porto (ISPUP), Portugal; University of Beira

- Interior, Portugal; University of Aveiro, Portugal. Co-Supervisor. Started in October 2017.
2. Santos, E. S., "Cultivation of Mediterranean Plants in Technosols from Mining Areas and their Exploration as Sources of Natural Value-Added Compounds". University of Aveiro, Portugal; Instituto Superior de Agronomia, Portugal; Santiago de Compostela University, Spain. Fundação para a Ciência e a Tecnologia (FCT) Grant. Supervisor. Started in September 2017.
  3. Sharma, M., "Synthesis and use of bio-based ionic liquids for the selective extraction and purification of antibodies". University of Aveiro, Portugal; CSIR-Central Salt & Marine Chemicals Research Institute, India. European Research Council (ERC) Grant. Supervisor. Started in October 2016.
  4. Pedro, A. Q. H., "Recombinant expression of different *Campylobacter jejuni* colonization-associated proteins and their purification for hen immunization". University of Aveiro, Portugal; University of Beira Interior, Portugal. European Research Council (ERC) Grant. Supervisor. Started in April 2016.
  5. Neves, M. C., "Supported Ionic Liquids for the Purification of Immunoglobulin Y (IgY)". University of Aveiro, Portugal. Fundação para a Ciência e a Tecnologia (FCT) Grant. Supervisor. Started in February 2014.
  6. Neves, C. M. S. S., "Characterization of Novel Reversible Ionic-Liquid-based Aqueous Biphasic Systems and their Use for Fractionation of Complex Mixtures". University of Aveiro, Portugal. Fundação para a Ciência e a Tecnologia (FCT) Grant. Co-supervisor. Started in October 2015.
  7. Madeira, P. P., "Development of a Cost-Effective kit for the Extraction and Preservation of RNA using Ionic Liquids". University of Aveiro, Portugal. Fundação para a Ciência e a Tecnologia (FCT) Grant. Co-supervisor. Started in January 2016.

## Concluded

1. Tavares, A. P. M., "Purification of Antibodies (Immunoglobulin Y, IgY) using Aqueous Biphasic Systems Composed of Novel Ionic Liquids with Buffering Characteristics". University of Aveiro, Portugal. Fundação para a Ciência e a Tecnologia (FCT) Grant. Supervisor. July 2014 - June 2017.
2. Mondal, D., "Study of antibodies stability in the presence of ionic liquids", University of Aveiro, Portugal. European Research Council (ERC) Grant. Supervisor. December 2015 - August 2017.
3. Sousa, R. C. S., "Extraction of Egg White Proteins using Ionic-Liquid-based Aqueous Biphasic Systems". University of Aveiro, Portugal. Ciência sem Fronteiras Grant. Co-Supervisor. January 2016-January 2017.
4. Lima, Á. S., "Purification of Anthocyanins from Grape Pomace". Technical University Wien, Austria; University of Aveiro, Portugal. CNPq grant. Co-Supervisor. June 2015-June 2016.
5. Pankaj, B., "Purification of Antibodies using Aqueous Biphasic Systems", University of Aveiro, Portugal. European Research Council (ERC) Grant. Supervisor. December 2015-June 2016.

6. Cláudio, A. F. M., “Extraction and Purification of High-Value Bioactive Compounds from Agroforestry Biomass Residues using Aqueous Solutions of Ionic Liquids”. University of Aveiro, Portugal. Fundação para a Ciência e a Tecnologia (FCT) Grant. Co-Supervisor. October 2014-May 2016.
7. Kurnia, K. A., “Comprehensive Study on Ionic-Liquids-Water Interactions”. University of Aveiro, Portugal. Fundação para a Ciência e a Tecnologia (FCT) Grant Co-Supervisor. January 2012-May 2015.
8. Taha, M., “Biomimetic CO<sub>2</sub> Sequestration Using Carbonic Anhydrase, Amine-Based Buffers, and Ionic Liquids”. University of Aveiro, Portugal. Fundação para a Ciência e a Tecnologia (FCT) Grant. Co-Supervisor. January 2012-December 2014.

### PhD students

1. Capela, E. V., “Purification of Monoclonal Antibodies (Immunoglobulin G, IgG) using Aqueous Biphasic Systems composed of Bio-based Ionic Liquids”. University of Aveiro, Portugal; Instituto Superior Técnico, Portugal. Fundação para a Ciência e a Tecnologia (FCT) Grant. Supervisor. Started in May 2017.
2. Dinis, T. V., “Development of Ionic-Liquid-based Supported Materials for the Purification of Ribonucleic Acid (RNA)”. University of Aveiro; Beira Interior University, Portugal. Fundação para a Ciência e a Tecnologia (FCT) Grant. Supervisor. Started in October 2015.
3. Morais, E, “Deep Eutectic Solvents as Efficient Media for the Extraction of Polysaccharides in Biorefinery Processes”, University of Aveiro, Portugal. Fundação para a Ciência e a Tecnologia (FCT) Grant. Co-Supervisor. Started in September 2017.
4. Pedro, S.I.N., “Deep Eutectic Solvents as Active Pharmaceutical Ingredients in Biopolymer-based Drug Delivery Systems”, University of Aveiro, Portugal. Fundação para a Ciência e a Tecnologia (FCT) Grant. Co-Supervisor. Started in September 2017.
5. Belchior, D. C. V., “Development of new platforms for the concentration of cancer biomarkers”. University of Aveiro, Portugal. Ciência sem Fronteiras Grant. Supervisor. Started in November 2015.
6. Quental, M. V., “Purification of antibodies (Immunoglobulin Y, IgY) using aqueous biphasic systems composed of novel ionic liquids with buffering characteristics”. University of Aveiro, Portugal. Fundação para a Ciência e a Tecnologia (FCT) Grant. Supervisor. Started in October 2015.
7. Faria, E. L. P., “Extraction of Value-Added Compounds from *Eucalyptus spp.* with Ionic Liquids and their Solutions”. University of Aveiro, Portugal. Ciência sem Fronteiras Grant. Supervisor. Started in December 2014.
8. Almeida, A. M. R., “Development of a Purification Platform for IgY using Ionic-Liquid-Based Systems”. University of Aveiro, Portugal. European Research Council (ERC) Grant. Supervisor. Started in February 2014.

9. Ferreira, A. M., "Purification of Monoclonal Antibodies using Ionic-Liquid-Based Aqueous Biphasic Systems". University of Aveiro, Portugal. Fundação para a Ciência e a Tecnologia (FCT) Grant. Supervisor. Started in March 2014.
10. Bernardo, S. C. S., "Development of Purification Strategies for Polyclonal Antibodies". University of Aveiro, Portugal. European Research Council (ERC) Grant. Supervisor. Started in March 2014.

### **Concluded**

1. Pereira, M. M., "Application of Ionic Liquids for the Concentration of Cancer Biomarkers from Biological Fluids". University of Aveiro, Portugal; Tiradentes University, Brazil. Supervisor. 2017.
2. Almeida, H. F. D., "Treatment of Aqueous Effluents Contaminated with Pharmaceutically Active Compounds (PhACs)". ITQB, New University of Lisboa, Portugal; University of Aveiro, Portugal. Co-supervisor. 2017.
3. Passos, H. I. S., "IgY Technology: A Purification Platform using Ionic-Liquid-Based Aqueous Biphasic Systems". University of Aveiro, Portugal. Co-supervisor. 2017.
4. Cláudio, A. F. M., "Extraction of Added-Value Products from Biomass using Ionic Liquids". University of Aveiro, Portugal. Co-supervisor. 2014.
5. Neves, C. M. S. S., "Evaluation of Environmental Impact and Treatment of Aqueous Effluents Contaminated with Ionic Liquids". University of Aveiro, Portugal. Co-supervisor. 2014.
6. Pereira, J. F. B., "A Tail of Two Bioprocesses". University of Aveiro, Portugal. Co-supervisor. 2013.

### **MSc students**

1. Rufino, A., "Formation of Protein Aggregates in Presence of Ionic Liquids". MSc in Biochemistry. University of Aveiro, Portugal. Co-supervisor. Started in September 2016.
2. Rocha, B., "Removal of Cytostatic Drugs From Urine using Ionic-Liquid-based Materials". MSc in Chemical Engineering. University of Aveiro, Portugal. Supervisor. Started in September 2017.

### **Concluded**

1. Martins, J. C., "Purification of miRNA using Ionic-Liquid-based Strategies". MSc in Biotechnology. University of Beira Interior, Portugal; University of Aveiro, Portugal. Co-supervisor. 2017.
2. Antunes, J. R. M., "Extraction and Purification of Immunoglobulin Y with silica-modified materials". MSc in Biotechnology. University of Aveiro, Portugal; University of Beira Interior, Portugal. Supervisor. 2017.



3. Rosa, M. E. "Production and Purification of IgY Antibodies with Antimicrobial Properties". MSc in Biotechnology. University of Aveiro, Portugal; Biocant, Portugal. Supervisor. 2017.
4. Ferreira, F., "Purification of Antibodies using Centrifugal Partition Chromatography". MSc in Biochemistry. University of Aveiro, Portugal. Supervisor. 2017.
5. Amorim, A. P. D., "Production and Purification of Immunoglobulin G using Aqueous Biphasic Systems composed of Biocompatible Ionic Liquids". MSc in Biochemistry. University of Aveiro, Portugal; Instituto Superior Técnico, Portugal. Supervisor. 2017.
6. Costa, S. H. S., "Development of aqueous micellar two-phase systems for the selective extraction and purification of IgG from real matrices". University of Aveiro, Portugal. Supervisor. 2016.
7. Azevedo, S. C. S., "Removal of Persistent Pollutants using Silica Modified with Ionic Liquids", University of Aveiro, Portugal; ITQB/New University of Lisbon, Portugal. Supervisor. 2016.
8. Carmo, R. S., "Cynaropicrin Extraction from Cultivated Cardoon using Deep Eutectic Solvents ". University of Aveiro, Portugal. Co-supervisor. 2016.
9. Gomes, M. V., "Extraction and Recovery of Cynaropicrin from *Cynara cardunculus* L. using Ionic Liquids Aqueous Solutions". University of Aveiro, Portugal. Supervisor. 2016.
10. Calheiros, J., "Purification of IgY and Evaluation of its Activity/Stability in aqueous Solutions of Polymers, Salts and Ionic Liquids". University of Aveiro, Portugal. Supervisor. 2016.
11. Morais, E. S., "Development of Novel Biomaterials Incorporating Antioxidant and Anti-Inflammatory Ionic Liquids for Topic Applications". University of Aveiro, Portugal. Supervisor. 2016.
12. Castro, L. S. O., "Purification of Antibodies using Aqueous Biphasic Systems". University of Aveiro, Portugal. Supervisor. 2016.
13. Pedro, S. N., "Concentration of Cancer Biomarkers using Ionic Liquids". University of Aveiro, Portugal. Supervisor. 2016.
14. Capela, E. V., "Purification of Immunoglobulin G using Aqueous Biphasic Systems formed by Ionic Liquids". University of Aveiro, Portugal; Instituto Superior Técnico, Portugal. Supervisor. 2016.
15. Esteves, P. D. O., "Extraction and Purification of Theobromine using Ionic Liquids". University of Aveiro, Portugal; ITQB/New University of Lisbon, Portugal. Supervisor. 2015.
16. Correia, H. V. T., "Characterization of Mixtures of Fluorinated Ionic Liquids". University of Aveiro, Portugal; ITQB/New University of Lisbon, Portugal. Supervisor. 2015.
17. Shabudin, S., "Isolation of Triterpenic Acids from *Eucalyptus globulus* (bark) using Ionic Liquids". University of Aveiro, Portugal. Co-supervisor. 2015.
18. Gomes, H., "Extraction of Caffeine from Spent Coffee using Aqueous Solutions of Ionic Liquids". University of Aveiro, Portugal. Co-supervisor. 2015.

19. Francisco, R., "Solubilization of Membrane Proteins using Ionic Liquids". University of Aveiro, Portugal; Biocant, Portugal. Supervisor. 2015.
20. Silva, D. P. G., "Production of Hyperimmune Egg Samples followed by Fractionation". University of Aveiro, Portugal; Biocant, Portugal. Supervisor. 2015.
21. Gomes, J. M. M., "Purification of IgY using Aqueous Biphasic Systems Composed of Good's Buffers Ionic Liquids". University of Aveiro, Portugal. Supervisor. 2015.
22. Resende, J. S. S., "Impacto do pH na Purificação de IgY com Sistemas Aquosos Bifásicos". University of Aveiro, Portugal. Supervisor. 2015.
23. Faustino, V. F. M., "Extraction and Purification of Immunoglobulin G with Aqueous Biphasic Systems". University of Aveiro, Portugal. Supervisor. 2015.
24. Dinis, T. B. V., "Concentration of Human Pollution Tracers with Ionic Liquids". University of Aveiro, Portugal. Supervisor. 2015.
25. Calixto, J. P. D., "Concentration of tumor biomarkers using aqueous biphasic systems". University of Aveiro, Portugal. Supervisor. 2015.
26. Hübner, M., "Extraction of Proteins using IL-containing Aqueous Biphasic Systems (ABS)". Dortmund Technical University, Germany; University of Aveiro. Co-supervisor. 2015.
27. Quental, M. J. V., "Application of Ionic Liquids in the Concentration of Cancer Biomarkers". University of Aveiro, Portugal. Supervisor. 2014.
28. Vaz, T. S. M., "Extraction of Antioxidants with Aqueous Biphasic Systems". University of Aveiro, Portugal. Supervisor. 2014.
29. Santos, R. J. B. N., "Identification and Characterization of Eutetic Mixtures Composed of Ionic Liquids". University of Aveiro, Portugal. Co-supervisor. 2014.
30. Ferreira, A. M., "Separation of Dyes with Reversible Aqueous Biphasic Systems". University of Aveiro, Portugal. Supervisor. 2013.
31. Carvalho, S. F., "Aqueous Biphasic Systems Composed of Ionic Liquids and Polysaccharides". University of Aveiro, Portugal. Supervisor. 2013.
32. Almeida, A. M. R., "Purification of antibodies using aqueous two-phase systems". University of Aveiro, Portugal. Supervisor. 2013.
33. Passos, H. I. S., "Extraction of bioactive compounds with aqueous solutions of ionic liquids". University of Aveiro, Portugal. Co-supervisor. 2012.
34. Marques, C. F. C., "Treatment of Aqueous Effluents Contaminated with Ionic Liquids". University of Aveiro, Portugal. Co-supervisor. 2012.
35. Cláudio, A. F. M., "Extraction of Phenolic Compounds with Aqueous Two Phase Systems", M University of Aveiro, Portugal. Co-supervisor. 2010.
36. Louros, C. S., "Extraction of Biomolecules with Aqueous Two Phases Systems". University of Aveiro, Portugal. Co-supervisor. 2009.

## **Concluded**

1. Machado, A. R. P., "Purification and Stabilization of DNA using Ionic-Liquid-based Aqueous Biphasic Systems". BSc final project in Biotechnology. University of Aveiro, Portugal. Supervisor. 2017.

2. Magalhães, F., "Purification of Antibodies (Imunoglobulina G, IgG) using Hybrid Biopolymer-based Nanomaterials ( $\text{Fe}_3\text{O}_4@\text{SiO}_2/\text{SiCRG}$ )". BSc final project in Biotechnology, Universidade de Aveiro, Portugal. Supervisor. 2017.
3. Mendes, C. S. M., "Concentration of cortisol from biological fluids applying aqueous biphasic systems". BSc final project in Biochemistry, University of Aveiro, Portugal. Supervisor. 2017.
4. Barros, J. C. B., "Purification of Immunoglobulin G from Human Plasma using Aqueous Micellar Two-Phase Systems". BSc final project in Biochemistry, University of Aveiro, Portugal. Supervisor. 2017.
5. Santos, R. F., "Development of Biocompatible Aqueous Biphasic Systems for the Purification of Biopharmaceuticals". BSc final project in Biotechnology, University of Aveiro, Portugal. Supervisor. 2017.
6. de Sá, I. M. "Solubility of Proteins in Aqueous Solutions of Ionic Liquids". BSc final project in Biotechnology. University of Aveiro, Portugal. Supervisor. 2016.
7. Ramalho, A. C. C., "Development of Biocompatible Aqueous Biphasic Systems for the Purification of Biopharmaceuticals". BSc final project in Biotechnology. University of Aveiro, Portugal. Supervisor. 2016.
8. Marques, A. M. F., "Purification of Antibodies using Carbon-based Nanomaterials". BSc final project in Biochemistry. University of Aveiro, Portugal. Supervisor. 2016.
9. Ribeiro, D. R. P., "Purification of Antibodies (Immunoglobulin Y, IgY) using Carbon Nanomaterials". BSc final project in Chemistry. University of Aveiro, Portugal. Supervisor. 2016.
10. Santos, J. P. F., "Purification of Oxidative Enzymes using Aqueous Biphasic Systems". BSc final project in Biotechnology. University of Aveiro, Portugal. Supervisor. 2016.
11. Barbosa, L. M. M., "New Aqueous Biphasic Systems for Biomolecules Fractionation/Purification". BSc final project in Biochemistry. University of Aveiro, Portugal. Supervisor. 2015.
12. Ferreira, F. M., "Extraction and Stability of Egg Yolk Antibodies (IgY) using Aqueous Biphasic Systems". BSc Final Project in Biochemistry. University of Aveiro, Portugal. Supervisor. 2015.
13. Lameirinhas, N., "Purification of Antibodies (Immunoglobulin Y, IgY) using Carbon Nanotubes". BSc final project in Biochemistry. University of Aveiro, Portugal. Supervisor. 2015.
14. Tavares, D. J. P., "Characterization of Aqueous Two-Phase Systems using Deep-Eutectic Solvents". BSc final project in Biotechnology. University of Aveiro, Portugal. Co-supervisor. 2014.
15. Costa, S. H. S., "Extraction and Selective Separation of Dyes with Aqueous Multiphasic Systems". BSc final project in Biotechnology. University of Aveiro, Portugal. Co-supervisor. 2014.
16. Capela, E. A. V., "Purification of Antibodies using Aqueous Biphasic Systems". BSc final project in Biochemistry. University of Aveiro, Portugal. Supervisor. 2014.
17. Esteves, P. D. O., "Aqueous Biphasic Systems composed of Ionic Liquids and Carbohydrates". BSc final project in Biochemistry. University of Aveiro, Portugal. Supervisor. 2014.

18. Pedro, S. I. N., "Concentration of Prostate Cancer Biomarkers using Aqueous Biphasic Systems". BSc final project in Biochemistry. University of Aveiro, Portugal. Supervisor. 2014.
19. Dinis, T. B. V., "Aqueous Biphasic Systems with Ionic Liquids: Characterization and Application in the Concentration of Synthetic Hormones". BSc final project in Biotechnology. University of Aveiro, Portugal. Supervisor. 2013.
20. Henriques, B. J. M., "Solubility of Carbohydrates in Ionic Liquids". BSc final project in Biotechnology. University of Aveiro, Portugal. Co-supervisor. (2012).
21. Vicente, F. A., "Extraction and Purification of Antibiotics using Aqueous Two-Phase Systems". BSc final project in Biochemistry. University of Aveiro, Portugal. Co-supervisor. 2012.
22. Trindade, M. J. de M. S. P., "Application of Aqueous Two-Phase Systems for the Analysis of Doping Substances". BSc final project in Chemistry. University of Aveiro, Portugal. Supervisor. 2012.
23. Vaz, T. S. M., "Application of Aqueous Two-Phase Systems for the Analysis of Doping Substances". BSc final project in Biochemistry. University of Aveiro, Portugal. Supervisor. 2012.
24. Rodrigues, A. R. G., "Antioxidant Activity and Solubility of Ionic Liquids in Water". BSc final project in Biotechnology. University of Aveiro, Portugal. Supervisor. 2012.
25. Pereira, L. S. O., "Evaluation of the Ionic Liquids Antioxidant Activity and Solubility in Water". BSc final project in Biochemistry. University of Aveiro, Portugal. Supervisor. 2012.
26. Sardo, N. M. G., "Production of Polymeric Fibers through Electrospinning using Ionic Liquids". BSc final project in Biotechnology. University of Aveiro, Portugal. Co-supervisor. 2011.
27. Neves, C. M. S. S., "Mutual Solubilities between Water and Ionic Liquids". BSc final project in Chemistry. University of Aveiro, Portugal. Co-supervisor. 2007.

## 9. Prizes and awards

1. Recognition by the journal "Green Chemistry" in the "Emerging Investigators" themed issue as amongst the top 14 Rising Stars in the Green Chemistry field in 2017.
2. Best Poster Award in the Biopartitioning and Purification (BPP) Conference in 2017.
3. Best Poster Award in the III Encontro Nacional de Estudantes de Biotecnologia in 2017.
4. Elected member of the Young Scientists Seminar of the Lisbon Academy of Sciences in 2017.
5. Co-advisor of the Best PhD thesis (Jorge F. B. Pereira) - Mário Quartin Graça Award - in the Technologies and Natural Sciences Category in 2016.
6. Best Poster Award in the 1<sup>st</sup> International Biomedical Engineering Meeting – iBEM in 2016.
7. Best Poster Award in the 8<sup>th</sup> Green Solvents Conference in 2016.

8. Best Poster Award Honorable Mention in Jornadas CICECO 2016, Energy-Trends and Future Applications in 2016.
9. Best Poster Award in the IV ENEQUI (IV Encontro Nacional de Estudantes de Química (ENEQUI)) in 2016.
10. Recognition amongst the top 20 “Women in Science” in Portugal by “Pavilhão do Conhecimento” in 2015.
11. Best Poster Award in the 2<sup>nd</sup> EuCheMS Congress on Green and Sustainable Chemistry in 2015.
12. ECTP-NETZSCH Young Scientist Award received in the 20<sup>th</sup> European Congress on Thermophysical Properties in 2014.
13. Advisor of the winner MSc thesis (Sara F. Carvalho) in the Industrial and Technology Category in the Future Ideas Thesis Competition in 2014.
14. European Research Council (ERC) Starting Grant in the Physical and Engineering Sciences (PE) Panel, in 2013.
15. Best Poster Award in the International Workshop on Ionic Liquids - Seeds for New Engineering Applications in 2012.
16. Best Poster Award in the 10<sup>th</sup> International Chemical and Biological Engineering Conference in 2008.
17. Best Poster Award in the 2<sup>nd</sup> National Conference of Thermodynamics of Chemical and Biological Systems in 2006.
18. Best Poster Award in the 11<sup>th</sup> International Symposium on Solubility Phenomena by IUPAC in 2004.
19. Best Chemistry degree student in Aveiro University in 2002-2003 by Dow Chemical in 2003.