

Professor Ana Aguiar-Ricardo

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Ana Aguiar-Ricardo is Professor of Chemical & Biochemical Engineering with expertise in the field of green chemistry and supercritical fluid technology targeting (bio)polymer synthesis, processing, and functionalization design. Her primary research focus is the development of greener chemical processing platforms for non-invasive drug delivery via dermal and pulmonary routes, and for (bio)separation processes. She graduated in Chemical Engineering from Instituto Superior Técnico (IST) and obtained a PhD from Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa (FCT-NOVA, 1994) under the supervision of Prof. M. Nunes da Ponte. She did post-doctoral work at University of Nottingham, UK (1995), in the laboratory of Prof M. Poliakoff. She held a visiting position at Massachusetts Institute of Technology (MIT, USA, July-December 2007). In 2011, she was appointed with the Habilitation in Sustainable Chemistry. Since 2012, she is Full Professor at Department of Chemistry (DQ), FCT-NOVA) and a NOVA Faculty member of Bio-Engineering Systems in the MIT-Portugal Program (MPP). She is Director of Chemistry Department since January 2018. She was appointed representative of Sociedade Portuguesa de Química in the European Association for Chemical and Molecular Sciences (EuCheMS) Working Party on Green and Sustainable Chemistry (Jan 2013) and at IUPAC Chemistry and the Environment Division (2014-2015). She has co-authored over ninety-five papers in peer review journals (h-index: 23), six book chapters, over fifty articles in conference proceedings with transfer of copyright and three articles in national magazines with peer review. Registration of two national patents.

Academic Positions

2012 – Full Professor, Department of Chemistry, Faculty of Science and Technology, New University of Lisbon. Member of REQUIMTE-LAQV.

2012/13 – Principal Investigator of REQUIMTE-LAQV research group (RL-EQB-LA06-51) Clean Chemical Processes.

2008/12 – Associate Professor, Department of Chemistry, Faculty of Science and Technology, New University of Lisbon.

2009-11 – Researcher in charge of the research group REQUIMTE (RG-LVT-Almada-750006-3287) in the area of Chemical Engineering and Biochemistry.

2007 – Visiting Professor at the Massachusetts Institute of Technology (July to December 2007) during the period of sabbatical leave. She established research collaboration with Professors Paula Hammond and Linda Griffith under the MIT Portugal Program.

2005/12 – Researcher of REQUIMTE. Coordinates the Laboratory of Synthesis and Processing of Polymers and Biomaterials Using Supercritical Fluid Technology, integrated in the Laboratory of Thermodynamics and Separation Processes.

1994/08 – Assistant Professor, Department of Chemistry, Faculty of Science and Technology, New University of Lisbon.

1995 – Postdoctoral in the group of Professor Martyn Poliakoff, in Dep.of Chemistry, Nottingham University, UK

Academic Degrees

2011 – Habilitation in Sustainable Chemistry-Chemical & Biochemical Engineering

1994 – Doctor of Philosophy in Chemistry, Physical Chemistry, Universidade NOVA de Lisboa. Advisor: Manuel Nunes da Ponte. PhD thesis: “Interaction second virial coefficients of mixtures of simple gases”. Rating: Very Good with Distinction and Commendation Unanimously.

Prizes and Awards

2011 - Prémio Hovione – Solvay Hovione Ideas Challenge 2011: “Molecularly Imprinted Devices for Purification of APIs”. Luso-German Award, Action Nº A-13/10, 2010-11”Smart particle systems for controlled drug delivery”.

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2008 - Prémio Hovione – SHIC' 2008: "Smart Porous Particles: a new route for controlled release to the lungs".

2007 – FLAD award

2001-2002_ FLAD Luso – British Awards: Action Nº B-24/2001, 2001-02, Phase-behaviour in Supercritical CO₂. New strategies towards emulsions and polymerisation; Action Nº B-39/1998, 1998-99, "Supercritical Fluids – Clean Solvents for Polymer Synthesis and Materials Processing". Luso – British Award J.N.I.C.T. - British Council 423/RU, 1995-96 "Supercritical Fluids: Clean Solvents for Clean Chemistry". 1997-1998 - Luso – Spanish Award, Action Nº E-42/1997, 1997-98 "Organometallic Chemistry in Supercritical Fluids". 1986-1987-INIC – Fellow (Introduction to Research), developing research work in the field of photochemistry under the guidance of Prof. Dr. Sílvia Brito Costa, Center for Structural Chemistry of IST.

Professional Societies

Member of the International Society for Advancement of Supercritical Fluids (ISASF), the American Chemical Society (ACS), the Royal Society of Chemistry (RSC) and the Portuguese Chemical Society (SPQ).

Professional Services

Head of Chemistry Department of Faculty of Sciences and Technology (since January 2018).

Member of Scientific Committee of Doctoral Program on Green and Sustainable Chemistry.

Member of Steering Committee of EuCheMS Green and Sustainable Chemistry Division.

Member of the Supervisory Board of Faculdade de Ciências e Tecnologia (2013-2017).

National representative at IUPAC – Chemistry and the Environment Division (2014-2015).

Representative of Sociedade Portuguesa de Química in the EuCheMS WP on Green and Sustainable Chemistry (since Jan 2013).

Advisor of 13 PhD theses (two were recipients of ISASF Best Thesis Award) and master theses (9). Participation in Doctoral examinations (20; as External Examiner (6)).

Principal investigator of six research projects and team member of other 12 projects.

Evaluator of projects H2020; Evaluator of projects of QREN SI I&DT programme (National Strategic Reference Framework - NSRF/QREN); External evaluator of research projects of Université de Liège in 2009 (Actions de Recherche Concerté 2009); Evaluator of research projects (Luso-German, Luso-Brazilian) since 2002.

Chair of 2nd EuCheMS Congress on Green and Sustainable Chemistry, October 4-7, 2015, Lisbon, Portugal.

Organizing Committee, PROSCIBA 2010 – II Iberoamerican Conference on Supercritical Fluids, April 5-9, Natal, Brasil; Coordinator of the Materials session. Organizing Committee, 3^o Nat Meeting of Physical Chemistry of the Sociedade Portuguesa de Química, FCT/UNL, 1997 and of SUPERGREENCHEM Workshop, FCT/UNL, 2005. Participation in the "Programa Ciência Viva" offering summer internships about Intelligent Polymers, since 2010. Coordinator of the Organizing Committee, Chemistry Day 2005 "Who wants to be a chemist?" and Chemistry Day 2006 - "CSI Caparica". Organizer, 35 Conference cycle of the Chemistry Department, FCT/UNL, dedicated to "Chemistry put in use to...", January to March 2009.

Discussion Leader at Gordon Research Conference (GRC) on Green Chemistry, Bates College, Lewiston, Maine, 2008; at Gordon Research Seminars on Green Chemistry, Il Ciocco, Barga, Italy, 2012 and GRC on Green Chemistry, Il Ciocco, Barga, Italy, 2012.

Referee of articles (over 75) in scientific publications of ACS, Wiley, Elsevier and Taylor & Francis (e.g. ACS Appl. Mater. & Interfaces; Acta Biomaterialia; Anal. Chem.; Biomacromolecules; Carbohydrate Polym.; Desalination and Water Treatment; Fluid Phase Equilibria; Int. J. Pharmaceut.; J. Chem. Education; J. Chem. Eng. Data; J. Chem. Thermodyn.; J. Membrane Sci.; J. Supercrit. Fluids; Langmuir; Macromolecular Bioscience; Macromol. Symposia; Macromol. Reaction Eng.; Phys. Chem. Chem. Phys.; Polym. Chem.; Rev. Sci. Instrum.)

Selected Publications (out of 95)

Silva, A.S.; Sousa A.M.; Cabral, R.P.; Silva, M.C.; Costa, C.; Miguel, S.P.; Bonifácio, V.D.B.; Casimiro, T.; J. Correia, I.J.; Aguiar-Ricardo, A. "Aerosolizable gold nano-in-micro dry powder formulations for theragnosis and lung delivery", Int. J. Pharm. 2017, 519, 240–249. DOI: 10.1016/j.ijpharm.2017.01.032

Morgado, P.I.; Lisboa, P.F.; Ribeiro, M.P.; Miguel, S.P.; Simões, P.C.; Correia, I.J.; Aguiar-Ricardo, A. "Poly(vinyl alcohol)/chitosan asymmetrical membranes: Highly controlled morphology toward the ideal wound dressing", J. Membrane Sci. 2014, 469, 262-271. Doi:10.1016/j.memsci.2014.06.035

Barroso, T.; Casimiro, T.; Ferraria, A.M.; Mattioli, F.; Aguiar-Ricardo, A.; Roque A.C.A. "Hybrid Monoliths for Magnetically-Driven Protein Separations", *Adv. Funct. Mater.* 2014, 24, 4528-4541. DOI: 10.1002/adfm.201400022.

Araújo M.; Viveiros, R.; Correia, T. R.; Correia, I. J.; Bonifácio, V.D.B.; Casimiro, T.; Aguiar-Ricardo, A. "Natural melanin: A potential pH-responsive drug release device", *Int. J. Pharm.* 2014, 469, 140–145. DOI: 10.1016/j.ijpharm.2014. 04.051.

Raje, V.P.; Morgado, P.I.; Ribeiro, M.P.; Correia, I.J.; Bonifácio, V.D.B.; Branco, P.S.; Aguiar-Ricardo, A. "Dual On-Off and Off-On Switchable Oligoaziridine Biosensor", *Biosens. Bioelectron.*, 2013, 39, 64-69. DOI:10.1016/j.bios.2012.06.047

Restani, R. B.; Morgado, P.I.; Ribeiro, M.P.; Correia, I.J.; Aguiar-Ricardo, A.; Bonifácio, V. D. B. "Biocompatible Polyurea Dendrimers with pH-Dependent Fluorescence", *Angew. Chem. Int. Ed.*, 2012, 51, 5162-5165. DOI: 10.1002/anie.201200362

Barroso, T.; Viveiros, R.; Temtem, M.; Casimiro, T.; Bothelho do Rego, A.; Aguiar-Ricardo, A. "A combined strategy to surface-graft stimuli-responsive hydrogels using plasma activation and supercritical carbon dioxide", *ACS Macro Letters*, 2012, 1,356-360. DOI: 10.1021/mz200145w

Correia, V.G.; Bonifácio, V.D.; Moutinho-Fragoso, G.; Casimiro, T.; Lobato da Silva, C.; Pinho, M.G.; Aguiar-Ricardo, A. "Oxazoline-Based Antimicrobial Oligomers: Synthesis by CROP Using Supercritical CO₂ ", *Macromolecular Biosci.* 2011, 11(8), 1128-1137. Highlighted in back-cover. DOI: 10.1002/mabi.201100126

Temtem, M.; Silva, L.M.C.; Andrade, P.Z.; Santos, F.; Lobato da Silva, C.; Cabral, J.M.S.; Abecasis, M.M.; Aguiar-Ricardo, A. "Supercritical CO₂ Generating Chitosan Devices with Controlled Morphology. Potential Application for Drug Delivery and Mesenchymal Stem Cell Culture", *J. Supercrit. Fluids* 2009, 48, 269-277. DOI:10.1016/j.supflu.2008.10.020

Temtem, M.; Casimiro, T.; Mano, J.F.; Aguiar-Ricardo, A. "Green Synthesis of a Temperature Sensitive Hydrogel", *Green Chem.* 2007, 9, 75-79. DOI: 10.1039/B603930H Professor Ana Aguiar-Ricardo, Universidade Nova de Lisboa

Selected Invited Communications

Aguiar-Ricardo A, Supercritical-Assisted POxylation: Designing new materials using carbon dioxide, symposium on "Poly(2oxazoline)s and related polypeptoids", 252nd American Chemical Society (ACS) Fall National Meeting in Philadelphia, August 21-25, 2016. (Keynote lecture)

Aguiar-Ricardo A, POxylated surfaces: How to design a "green" soft killer, High Polymer Research Group, 56th Conference 2016, Shrigley Hall, Pott Shrigley, Cheshire, 24-28 April, 2016. (Plenary lecture)

Aguiar-Ricardo A. Better ways to deliver medications using supercritical fluids. The Royal Society, Scientific meeting: Supercritical Fluids – Green Solvents for green Chemistry, 13-14 April 2015, London, UK.

Aguiar-Ricardo A. Greening the manufacture of (bio)materials for new therapies, 5th International IUPAC Conference on Green Chemistry, 17- 21 August 2014, Durban, South Africa. (Keynote lecture)

Aguiar-Ricardo A. Supercritical fluid technology for the development of aerosol drug delivery formulations, 27th European Symposium on Applied Thermodynamics, (ESAT 2014): Experiments meet Theory and Simulation, 6-9 July 2014, Eindhoven - The Netherlands. (Keynote lecture)

Aguiar-Ricardo A. Manufacturing nanomedicines for pulmonary delivery, 1 st International Symposium on Nanoparticles/Nanomaterials and Applications, 20-22 January 2014, Caparica, Portugal. (Keynote lecture)

Aguiar-Ricardo A. "Supercritical CO₂ in the Building-Up of New Strategies to Polymer Synthesis, Membrane Production and Preparation of Smart Devices", Chemical Engineering Department Seminar Series- Fall 2007, MIT.