CURRICULUM VITÆ

* **PERSONAL INFORMATION**

Name: Ana Margarida Pereira de Melo

Birth date and place: 31/07/1986, Alenquer (Portugal)

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* **EDUCATION**

01/01/2010- 16/01/2014 PhD in Chemistry, Centro de Química-Física Molecular, Department of Chemical Engineering (DEQ), Instituto Superior Técnico, University of Lisbon (Portugal) under the supervision of Prof. Manuel Prieto and Dr. Ana Coutinho.

2007- 29/10/2009 MSc. in Biochemistry (specialization Medical Biochemistry), Faculty of Sciences, University of Lisbon, Portugal. Final grade 18 (out of 20).

2004 –31/07/2007 Graduation in Biochemistry (3 academic years), Faculty of Sciences, University of Lisbon, Portugal. Final grade 17 (out of 20).

* **PROFESSIONAL EXPERIENCE**

1/06/2021- Invited Assistant Professor at the Department of Bioengineering, Instituto Superior Técnico, University of Lisbon, Portugal.

1/06/2019- Junior Researcher under the CEEC-Individual FCT call (1st edition). Funded by Portuguese Foundation for Science and Technology (FCT).

Institute for Bioengineering and Biosciences (iBB) at Instituto Superior Técnico.

27/10/2017- 31/05/2019 Postdoctoral Researcher under the Portuguese Platform of BioImaging (PPBI) at Instituto Superior Técnico, University of Lisbon, Portugal.

01/07/2015- 15/09/2017 Postdoctoral Researcher in the Department of Chemistry, University of Pennsylvania (UPenn), Philadelphia, USA (Rhoades Lab).

*From Jan-Sept 2017 Postdoc funded by NSF Center for Engineering MechanoBiology (CEMB) at UPenn*

https://cemb.upenn.edu/about-cemb/trainees-and-alumni/alumni/

01/02/2014- 30/06/2015 Postdoctoral Associate in the Molecular Biophysics & Biochemistry Department, Yale University, New Haven, USA (Rhoades Lab).

* **PROFESSIONAL INTERESTS**

*Domain of specialization:*

* Molecular Biophysics; Biomolecular Engineering; Chemical biology; Structural Biology; Biochemistry;
* Advanced Microscopy Techniques:

Single-Molecule Level: Single-molecule Förster resonance energy transfer (smFRET); Fluorescence Correlation Spectroscopy (FCS);

Fluorescence Recovery After Photobleaching (FRAP); Fluorescence Lifetime Imaging Microscopy (FLIM); Multiphoton Microscopy.

* Intrinsically disordered proteins (IDPs) associated with neurodegeneration (including tau and huntingtin exon-1); microtubule-associated proteins (MAPs); membrane biophysics; lipid-protein interactions; amyloid fiber formation.
* **CV SYNOPSIS**

I completed my PhD in Chemistry in January 2014 at IST (Department of Chemical Engineering, ULisboa, Portugal) under the supervision of Professor Manuel Prieto and Dr. Ana Coutinho. My PhD research was focused on the elucidation of the critical factors that trigger the formation of “amyloid-like” fibers of non-amyloidogenic proteins catalyzed by anionic lipid membranes. During my PhD, I implemented several microscopy techniques (FCS, FLIM-FRET and FRAP) at IST to characterize: (i) the early steps of lysozyme-lipid interaction, and (ii) the dynamic/structure of these “amyloid-like” fibers. These results provided new insights into the interplay of lipid-protein interactions and membrane-induced surface aggregation of proteins, which resulted in 5 first author publications.

After finishing my PhD, I immediately moved to Yale University (USA). I worked as a Postdoc under the supervision of Professor Elizabeth Rhoades at 2 American Ivy League Universities, Yale and University of Pennsylvania (UPenn) (Feb 2014–Sept 2017). At Yale, I also worked on an ambitious collaborative project with Prof. Scott Holley to apply *in vivo* fluorescence cross-correlation spectroscopy (FCCS) to quantify integrin-integrin interaction in zebrafish embryos. In July 2015, I moved to UPenn with Prof. Rhoades. During this transition, I acquired experience in setting-up a new lab; specifically, I was responsible for building new home-made microscopes for single-molecule FRET (smFRET) measurements. In addition, I received a Postdoc Fellowship from the NSF Center for Engineering MechanoBiology (Jan–Sept 2017), which gave me more scientific independence. My main postdoc project at Rhoades Lab was focused on tau protein, a neuronal intrinsically disordered protein (IDP) linked to several tauopathies (as Alzheimer’s disease). My work determined the topological features of tau in complex with tubulin by single-molecule FRET. Notably, my results allowed to contrast differences between tau isoforms and a conformational ensemble distinct from its aggregation-prone structure. Moreover, this pioneer work shows that tau retains its disordered features with the formation of a “fuzzy complex” and draws attention to the role of tau’s conformational plasticity in its function. Overall, my research work in Rhoades Lab resulted in 3 publications (including a first author in a PNAS paper - recommended in F1000 Prime) and attained international recognition by being selected for several oral presentations (including 2 Biophysical Society (BPS) meetings at 2016 Los Angeles and 2017 New Orleans, and 1 Gordon Research Seminar in Switzerland). I also gave an invited talk at i3S Institute (Porto). I was awarded with a CPOW Travel Grant from American Biophysical Society (BPS) that recognizes outstanding Young Women in Biophysics (Postdocs and Young PIs) and was co-chair of 2016 IDPs Platform section at BPS Meeting (Los Angeles, USA).

I came back to Portugal in Oct 2017 to pursue my scientific independence. I was awarded a CEEC-individual FCT research contract (1st edition, for 6-years). I am also Head/Scientific Coordinator of the Bioimaging Facility at IST and Invited Assistant Professor at the Department of Bioengineering at IST (Teaching Biomolecular Engineering to Master Students). My reintegration allowed me to establish a new independent research line at iBB-IST focused on characterizing the conformational plasticity of IDPs in neurodegeneration at the single-molecule level. I already successfully applied as PI to 2 FCT Portuguese Grants: 1. for Huntington’s disease (HD) with ~ 238K euros funding (2018-2022) and 2. for Tauopathies with ~50K euros (2023-2024). I was also awarded with Maria de Sousa Prize, 2nd edition with 30K euros, sponsored by Bial Foundation and “Ordem dos Médicos”. The HD FCT project allowed me to secure funding for building the first single-molecule FRET microscope in Portugal at IST. I am also Manager Committee Member of the Cost-Action“ML4NGP - Non-globular proteins in the era of Machine Learning (CA21160), European Funding. My recent work in Portugal resulted in the following publications: Front Mol Neurosci. (2020, corresponding autor), Int. J. Mol. Sci. (2021, co-author), Langmuir (2021, co-corresponding author) and Pharmaceutics (2022, co-author). My recent work also received international recognitions with several oral presentations, including 2018 Iberian Biophysics Congress (Castellon, invited), 2021 Portuguese Neuroscience Meeting (Coimbra, invited) and 2022 USA Biophysical Society (San Francisco). American Biophysical Society also supported my research by invitation for co-chairing the 2022 IDPs Platform at Biophysical Meeting (San Francisco, USA), and honored me with the 2022 BPS Travel Award for scientists within 10-years after completing the PhD.

* **PEER-REVIEWED SCIENTIFIC PUBLICATIONS**

12. Miranda, A.; Lopez-Blanco, R.; Lopes-Nunes, J.; **Melo, A.M.**; Campello, M.P.C.; Paulo, A.; Oliveira, M.C.; Mergny, J.-L.; Oliveira, P. A.; Fernandez-Megia, E.; Cruz. C. Gallic Acid–Triethylene Glycol Aptadendrimers Synthesis, Biophysical Characterization and Cellular Evaluation. *Pharmaceutics* ***2022***, 14, 11, 2456. doi: 10.3390/pharmaceutics14112456 **Impact Factor: 6.525**

11.Scanavachi, G.; Coutinho, A.; Fedorov, A.; Prieto, M.; **Melo, A.M.;\*** Itri, R.\* Lipid hydroperoxide compromises the membrane structure organization and softens bending rigidity. *Langmuir* **2021**, 37, 33, 9952–9963. doi: 10.1021/acs.langmuir.1c00830 **Impact factor: 4.331 \*co-corresponding author**

10. Eftimov, P.; Yokoi, N.; **Melo, A.M.**; Daull, P.; Georgiev, G. Interactions of meibum and tears with mucomimetic polymers: a hint towards the interplay between the layers of the tear film. *Int. J. Mol. Sci.* **2021**, 22(5), 2747. doi: 10.3390/ijms22052747 **Impact Factor: 6.208**

9.Birol, M.; **Melo, A.M.\*** Untangling the conformational polymorphism of disordered proteins associated with neurodegeneration at the single-molecule level. *Front. Mol. Neurosci.* **2020**, 12:309. doi: 10.3389/fnmol.2019.00309 **Impact factor: 6.261** **\*corresponding author**

8. **Melo, A.M.**; Elbaum-Garfinkle, S.; Rhoades, E. Insigths into tau function and dysfunction through single molecule fluorescence. *Methods in Cell Biology* **2017**, 141, 27-44. doi: 10.1016/bs.mcb.2017.06.010

7. **Melo, A.M.**; Coraor, J.; Alpha-Cobb G.; Elbaum-Garfinkle, S.; Nath, A.; Rhoades, E. A functional role for intrinsic disorder in the tau-tubulin complex. *Proc. Natl. Acad. Sci. U.S.A*. **2016**, 113(50), 14336-14341. doi: 10.1073/pnas.1610137113 **Impact Factor: 12.779.** **Recommended in F1000 Prime.**

6*.*Jülich, D.; Cobb, G.; **Melo, A.M.**; McMillen, P.; Lawton, A.; Mochrie, S.G.J.; Rhoades, E.; Holley, S. A. Cross-scale Integrin regulation organizes ECM and tissue topology. *Dev. Cell* **2015**, 34(1), 33-44. doi: 10.1016/j.devcel.2015.05.005 **Impact Factor: 13.417**

5. **Melo, A.M.**; Fedorov, A.;Prieto, M.;Coutinho, A. Exploring homo-FRET to quantify the oligomer stoichiometry of membrane-bound proteins involved in a cooperative partition equilibrium. ***Phys. Chem. Chem. Phys.*** **2014**, **16**, 18105-18117. doi: 10.1039/c4cp00060a **Impact factor: 3.945** **(Journal back cover)**

1. **Melo, A.M.**; Prieto, M.; Coutinho, A. Quantifying lipid-protein interaction by fluorescence correlation spectroscopy (FCS). *Methods Mol. Biol.***2014**, 1076,575-595. doi: 10.1007/978-1-62703-649-8\_26
2. **Melo, A.M.**; Loura, L.M.S.; Fernandes, F.; Villalaín, J.; Prieto, M.; Coutinho, A. Electrostatically driven lipid–lysozyme mixed fibers display a multilamellar structure without amyloid features.***Soft Matter* 2014**, ***10,*** 840-850. doi: 10.1039/c3sm52586d **Impact factor: 4.046 (Journal back cover)**
3. **Melo, A.M.**; Ricardo, J.C.; Fedorov, A.;Prieto, M.;Coutinho, A. Fluorescence detection of lipid-induced oligomeric intermediates involved in lysozyme “amyloid-like” fiber formation driven by anionic membranes. *J. Phys. Chem. B* **2013**, 117*,* 2906–2917. doi: 10.1021/jp310396v **Impact Factor: 3.466** **(Journal cover)**
4. **Melo, A.M.**; Prieto, M.; Coutinho, A. The effect of variable liposome brightness on quantifying lipid-protein interactions using fluorescence correlation spectroscopy. *Biochim Biophys Acta-Biomembr* **2011**, 1808, 2559-2568. doi: 10.1016/j.bbamem.2011.06.001 **Impact Factor: 4.019**

* **CONFERENCE PROCEEDINGS**

19.Sousa, T.; Damas, G.; Bernardes, N.; Coutinho, A.; Prieto, M.; **Melo, A.M.** The flanking polyQ regions of Huntingtin exon 1 display distinct dynamic signatures in its membrane-bound state: insights into Huntington´s disease”. *FEBS Open Bio* 2022, 12 (Suppl. S1), 262.

18. Sousa, T.; Bernardes, N.; Coutinho, A.; Prieto, M.; **Melo, A.M.** The conformational dynamics of the flanking polyQ regions in the membrane-bound state of huntingtin exon 1. *Biophys. J.* 2022, 121 (Suppl. 1), p299a.

17. Sousa, T.; Bernardes, N.; Coutinho, A.; Prieto, M.; **Melo, A.M.** Effects of the flanking polyQ regions and membrane physical properties on huntingtin binding to lipid vesicles. *Biophys. J.* 2021, 120 (Suppl. 1), p32a (2022).

16. Ricardo J.C.; Scanavachi, G.; Fernandes, F.; **Melo, A.M**.; Itri, R.; Coutinho, A.; Prieto, M. Membrane remodeling by the amyloidogenic peptide IAPP: surface crowding relevance *Eur. Biophys. J.* 2019, 48, S69.

15. **Melo, A.M.**; Coraor, J.; Alpha-Cobb G.; Elbaum-Garfinkle, S.; Rhoades, E. Exploring the conformational plasticity of tau: insights into function and dysfunction, *Eur. Biophys. J.* 2017, 46, (Suppl. 1), S350.

14. **Melo, A.M**.; Rhoades, E. Exploring the functional and structural impact of disease-associated mutants of tau. *Biophys. J.* 2017, Vol. 112, Issue 3, p316a–317a.

13. **Melo, A.M.**; Cobb, G.; Coraor, J.; Elbaum-Garfinkle, S.; Rhoades, E. Determining a topological model for tau bound to tubulin heterodimers. *Biophys. J.* 2016, 110 (Suppl. 1), p36a–37a.

12. **Melo, A.M.**; Cobb, G.; Coraor, J.; Elbaum-Garfinkle, S.; Rhoades, E. Single-molecule FRET reveals an extended structure of tau bound to tubulin heterodimers. *Biophys. J.* 2015, 108 (Suppl. 1), p448a.

11. Coraor, J.; **Melo, A.M.**; Cobb, G.; Rhoades, E. A comparison of the conformational changes of tau isoforms in the tau-tubulin complex. *Biophys. J.* 2015, 108 (Suppl. 1), p451a.

10. **Melo, A.M.**; Fedorov, A.; Prieto, M.; Coutinho, A. Oligomer stoichiometry of membrane-bound proteins involved in a cooperative partition equilibrium: a Homo-FRET study. *Biophys. J.* 2015, 108 (Suppl. 1), p94a.

9. **Melo, A.M.**; Loura, L.M.S.; Villalaín, J.; Fernandes, F.; Prieto, M.; Coutinho, A. Non-amyloidogenic lipid-protein fibers display a multilamellar structure: implications on lipid/protein dynamics and membrane surface dehydration. *Protein Sci.* 2013, 22 (Suppl. 1), 182-183.

8. **Melo, A.M.**; Loura, L.M.S.; Villalaín, J.; Fernandes, F.; Prieto, M.; Coutinho, A. Biophysical features of electrostatically-driven lipid-protein fibers. *Eur. Biophys. J.* 2013, 42 (Suppl. 1), S153.

7. **Melo, A.M.**; Fedorov, A.; Prieto, M.; Coutinho, A. Tracking membrane-driven protein oligomerization using fluorescence lifetime and homo-FRET studies. *Eur. Biophys. J.* 2013, 42 (Suppl. 1), S153.

6. **Melo, A.M.**; Fedorov, A.; Prieto, M.; Coutinho, A. “Amyloid-like” fibril formation driven by anionic lipid membranes: multiparametric fluorescence detection of lysozyme oligomeric intermediates. *FEBS J.* 2012, 279 (Suppl. 1), 454.

5. **Melo, A.M.**; Fedorov, A.; Prieto, M.; Coutinho, A. Exploring fluorescence lifetime and homo-FRET measurements to monitor lysozyme oligomerization in anionic lipid membranes: relation to “amyloid-like” fibril formation. *Biophys. J.* 2012, 102, 433a-434a.

4. **Melo, A.M.**; Prieto, M.; Coutinho, A. Lipid-protein interaction and amyloid-like fiber formation: FLIM and FCS studies. *Eur. Biophys. J.* 2011, 40 (Suppl. 1), 92.

3. **Melo, A.M.**; Prieto, M.; Coutinho, A. Quantifying protein binding to lipid vesicles using Fluorescence Correlation Spectroscopy (FCS). *Biophys. J.* 2011, 100, 509a.

2. **Melo, A.M.**; Coutinho, A.; Prieto, M. Fluorescence correlation spectroscopy studies of lysozyme partition to phospholipid vesicles. *Eur. Biophys. J.* 2009, 38 (Suppl. 1), S201.

1. Coutinho, A.; **Melo, A.M.**; Loura, L.M.S.; Prieto, M. Influence of protein surface coverage on lysozyme interaction with anionic lipid vesicles. *Eur. Biophys. J.* 2009, 38 (Suppl. 1), S205.

* **MASTER AND PhD THESIS**

"Lipid-protein interaction in “Amyloid-like” fiber formation”, Instituto Superior Técnico, University of Lisbon, January 2014 (PhD thesis).

“The Role of Lipid Membranes on the Molecular Mechanism of Amyloid-like Fibril Formation”, Faculty of Sciences, University of Lisbon, October 2009 (MSc. thesis).

* **COMMUNICATIONS**

**INVITED ORAL COMMUNICATIONS**

21. “Förster Resonance Energy Transfer – FRET, Fluorescence Lifetime Imaging - FLIM and Single-molecule methods” **Melo, A.M.** 13th Course on Optical Microscopy Imaging for Biosciences, i3S-Porto, Portugal (2022).

20. “Untangling the role of disordered proteins in neurodegeneration at the single-molecule level” **Melo, A.M.** Workshop Neurodegenerative diseases RedeSAÚDE ULisboa, Lisbon, Portugal (2022).

19. “Untangling the distinct conformational dynamics of the flanking polyQ regions in the membrane-bound state of Huntingtin exon 1” Sousa, T.; Bernardes, N.; Coutinho, A.; Prieto, M.; **Melo, A.M.** XVII Meeting of the Portuguese Society for Neuroscience, Coimbra, Portugal (2021).

18. “Untangling the role of disordered proteins in neurodegeneration at the single-molecule level” **Melo, A.M.** Groningen Biomolecular Sciences and Biotechnology Institute (GBB), University of Groningen, Netherlands (2019).

17. "Membrane remodeling by the amyloidogenic peptide IAPP: surface crowing relevance" Ricardo J. C.; Scanavachi, G.; Fernandes, F.; Melo, A.M.; Itri,R.; Coutinho**,** A.; Prieto, M.; Joint 12th EBSA / 10th ICBP-IUPAP Biophysics Congress, Madrid, Spain (2019).

16.“Exploring the conformational plasticity of tau-tubulin complex by single-molecule FRET: insights into function of a dysfunctional protein” **Melo, A.M.;** Coraor, J.; Alpha-Cobb G.; Elbaum-Garfinkle, S.; Rhoades, E. 6th Iberian / 10th Iberoamerican Biophysics Congress, Castellón, Spain (2018)

15. "Proteins on membrane interfaces: Structure and dynamics of lipid-protein fibers from advanced FRET methodologies and microscopy" Melo, A.M.; Ricardo, J; Loura, L.; Fernandes, F.; Coutinho A.; Prieto, M. VII Iberian Meeting on Colloids and Interfaces (RICI-VII), Madrid, Spain (2017). (Plenary lecture)

14. “Conformational plasticity in the tau-tubulin complex: A functional role for intrinsic disorder” **Melo, A.M.** i3S - Instituto de Investigação e Inovação, University of Porto, Porto, Portugal (2016).

13. “Amyloid-like fibers and the role of lipids: Structure and dynamics from advanced FRET methodologies and microscopy” Melo, A.M.; Loura, L.; Fernandes, F.; Coutinho A.; Prieto, M. Latin American Crosstalk in Biophysics, Salto, Uruguay (2015). (Opening Plenary Lecture)

12. “Lipid-protein supramolecular complexes: structure and dynamics of “amyloid- like” fibers” Melo, A.M.; Loura, L.; Fernandes, F.; Coutinho A.; Prieto, M. WE-Heraeus Seminar: Avanced microscopy of membrane biophysics, Bad Honnef, Germany (2015).

11. “Structure and dynamics of amyloid-like protein fibers: FCS, FRET, FLIM, and FRAP” Melo, A.M.; Loura, L.; Fernandes, F.; Prieto, M.; Coutinho. XIV Iberian Peptide Meeting, Bilbao, Spain (2014).

10. “Lipid-protein interactions in "amyloid-like" fiber formation” **Melo, A.M.** Yale University, New Haven, USA (2013).

9. “Lipid-protein interactions in "amyloid-like" fiber formation” **Melo, A.M.** European Molecular Biology Laboratory (EMBL), Heidelberg, Germany (2013).

8. “Amyloid-like fibers formed upon interaction of proteins and anionic lipids: Structure and dynamics from advanced FRET methodologies and microscopy” Melo, A.M.; Coutinho, A.; Loura, L.M.S.; Fernandes, F.; Prieto, M. The Iberian Membrane Biophysics Colloquium, San Sebastian, Spain (2013).

7. “Structure and dynamics of “amyloid-like” lipid-protein fibers: FCS, FRET, FLIM and FRAP study” Melo, A.M.; Loura, L.M.S.; Coutinho, A.; Prieto, M. 245th American Chemical Society National Meeting, New Orleans, USA (2013).

6. “Amyloid-like fiber formation driven by lipid-protein interaction: Structure and dynamics from homo-FRET, FLIM and FCS” Melo, A.M.; Loura, L.M.S.; Coutinho, A.; Prieto, M. Lipid-Protein Interactions in Membranes: Implications for Health and Disease, Hyderabad, India (2012).

5. “Fluorescence and microscopy in membrane biophysics: rafts, ceramide and amyloids in lipid-protein interaction” Pinto, S.; Melo, A.M.; Fernandes, F.; Silva, L.; Loura, L.M.S.; Coutinho, A.; Prieto, M. XV International Symposium on Luminescence Spectrometry, Barcelona, Spain (2012).

4. “Gel and fluid membrane domains in interaction with proteins: membrane morphological alterations and amyloid-like fiber formation” Coutinho, A.; Melo, A.M.; Loura, L.M.S.;Prieto, M. XI Congress of the Spanish Biophysical Society, Murcia, Spain (2011).

3. “Advanced FRET methodologies in membrane biophysics” Coutinho, A.; Melo, A.M.; Fernandes, F.; Loura, L.M.S.; Prieto, M.3th Iberian Photochemistry Meeting, Granada, Spain (2011).

2. “Lipid-protein interaction related to amyloid-like fibril formation” Coutinho, A.; Melo, A.M.; Loura, L.M.S.; Prieto, M. International Courses on Toxicology 2010, Coimbra, Portugal (2010).

1. “Amyloid-like fibers formation: the role of lipid-protein interaction” Coutinho, A.; Melo, A.M.; Loura, L.M.S.; Prieto, M. 4th ISN Special Neurochemistry Conference, Sicily, Italy (2010).

**SELECTED ORAL COMMUNICATIONS**

14. “The conformational dynamics of the flanking polyQ regions in the membrane-bound state of huntingtin exon 1.” Sousa, T.; Bernardes, N.; Coutinho, A.; Prieto, M.; **Melo, A.M.** Biophysical Society 66th Annual Meeting, San Francisco, USA (2022). ***Co-Chair of platform section: IDPs.***

13. “Exploring the conformational plasticity of tau at the single-molecule level” **Melo, A.M.;** Cobb, G.; Coraor, J.; Elbaum-Garfinkle, S.; Rhoades, E. Integrative Approaches to Protein Folding & Aggregation, Lisbon, Portugal (2019).

12. “Untangling the conformational plasticity of tau through single-molecule FRET” **Melo, A.M.**; Coraor, J.; Cobb, G.; Elbaum-Garfinkle, S.; Rhoades, E. Strategies and tools for modulating pathologic protein self-assembly, Porto, Portugal (2019).

11. “Determining a topological model for tau bound to tubulin heterodimers by smFRET: Insights into its function/dysfunction” **Melo, A.M.**; Coraor, J.; Cobb, G.; Elbaum-Garfinkle, S.; Rhoades, E. VIth Jornadas Ibéricas de Fotoquímica (6'JIF), Aveiro, Portugal (2018).

10. “Exploring the conformational plasticity of tau by single-molecule FRET: Insights into its biological function and dysfunction” **Melo, A.M.**; Coraor, J.; Cobb, G.; Elbaum-Garfinkle, S.; Rhoades, E. Chemistry at ULisboa (3ECQUL), Lisbon, Portugal (2018).

9. “Exploring the functional and structural impact of disease-associated mutants of tau” **Melo, A.M.**; Rhoades, E. Biophysical Society 61st Annual Meeting, New Orleans, USA (2017).

8. "Exploring the conformational plasticity of tau: insights into function and dysfunction" **Melo, A.M.** Gordon Research Seminar (GRS) in Intrinsically Disordered Proteins, Les Diablerets, Switzerland (2016).

7. “Determining a topological model for tau bound to tubulin heterodimers” **Melo, A.M.**; Cobb, G.; Coraor, J.; Elbaum-Garfinkle, S.; Rhoades, E. Biophysical Society 60th Annual Meeting, Los Angeles, USA (2016). ***Co-Chair of platform section: IDPs and aggregates.***

6. “Quantifying the membrane assembly of amphitropic proteins by homo-FRET analysis” Melo, A.M.; Fedorov, A.; Prieto, M.; Coutinho, A. Biophysics of proteins and surfaces: Assembly, Activation, Signaling, Madrid, Spain (2015).

5. “Exploring fluorescence lifetime and homo-FRET measurements to monitor lysozyme oligomerization in anionic lipid membranes: relation to “amyloid-like” fibril formation” **Melo, A.M.**; Fedorov, A.; Prieto, M.; Coutinho, A. Biophysical Society 56th Annual Meeting, San Diego, USA (2012).

4. “Coupled lysozyme partition/oligomerization triggered by anionic lipid vesicles: a time-resolved fluorescence study” **Melo, A.M.**; Fedorov, A.; Prieto, M.; Coutinho, A. XIII Iberian Peptide Meeting, Alicante, Spain (2012).

3. “FCS: Formalisms and methodologies in lipid-protein interaction studies” **Melo, A.M.**; Coutinho, A.; Prieto, M. 10th Portuguese National Meeting on Photochemistry, Porto, Portugal (2010).

2. “Lipid-protein interaction: Quantification of protein binding to lipid vesicles using single colour fluorescence correlation spectroscopy (FCS)” **Melo, A.M.**; Coutinho, A.; Prieto, M. International Courses on Toxicology 2010, Coimbra, Portugal (2010).

1. “Lysozyme binding to phosphatidylserine-containing membranes: implications in amyloid-like fiber formation” **Melo, A.M.**; Coutinho, A.; Prieto, M. XII Iberian Peptide Meeting, Lisbon, Portugal (2010).

**OTHER COMMUNICATIONS - POSTERS IN CONFERENCES**

20. “The flanking polyQ regions of Huntingtin exon 1 display distinct dynamic signatures in its membrane-bound state: insights into Huntington´s disease” Sousa, T.; Damas, G.; Bernardes, N.; Coutinho, A.; Prieto, M.; **Melo, A.M.** 25th IUBMB Congress, the 46th FEBS Congress and the 15th PABMB Congress, Lisbon, Portugal (2022).

19. “The flanking polyQ regions of Huntingtin exon 1 display distinct conformational signatures in its membrane­bound state: insights into Huntington´s disease” Sousa, T.; Damas, G.; Bernardes, N.; Coutinho, A.; Prieto, M.; **Melo, A.M.** Gordon Research Conference (GRC) in Intrinsically Disordered Proteins, Les Diablerets, Switzerland (2022).

18. "The conformational dynamics of the flanking polyQ regions in the membrane-bound state of huntingtin exon 1" Sousa, T.; Bernardes, N.; Coutinho, A.; Prieto, M.; **Melo, A.M.** 20th International Union for Pure and Applied Biophysics (IUPAB) (2021, Virtual Meeting).

17. "Effects of the flanking polyQ regions and membrane physical properties on huntingtin binding to lipid vesicles" Sousa, T.; Bernardes, N.; Coutinho, A.; Prieto, M.; **Melo, A.M.** 65th Biophysical Society Annual Meeting (2021, Virtual Annual Meeting).

16. “The impact of oxidized POPC derivatives on lipid bilayer hydration and fluidity: insights from steady-state and time-resolved fluorescence methodologies**”** Scanavachi, G.; Melo, A.M.; Coutinho, A.; Fedorov, A.; Prieto, M.; Itri R. Biophysical Society Thematic Meeting: Revisiting the Central Dogma of Molecular Biology at the Single-Molecule Level Lima, Peru (2019).

15. “Exploring the conformational plasticity of tau: insights into function and dysfunction” **Melo, A.M.**; Coraor, J.; Alpha-Cobb, G.; Elbaum-Garfinkle, S.; Rhoades, E. 11th European Biophysics Congress, Edinburgh, Scotland (2017).

14. “Amyloid-like fibers and the role of lipids: multibilayer structure and protein oligomerization from FLIM-FRET and homo-FRET methodologies” Melo, A.M.; Coutinho, A.; Loura, L.; Fernandes, F.; Prieto, M.FRET 2, International Discussion Meeting, Gottingen, Germany (2016).

13. “Single-molecule FRET reveals an extended structure of tau bound to tubulin heterodimers**” Melo, A.M.**; Cobb, G.; Coraor, J.; Elbaum-Garfinkle, S.; Rhoades, E. Biophysical Society 59th Annual Meeting, Baltimore, USA (2015).

12. “A comparison of the conformational changes of tau isoforms in the tau-tubulin complex” Coraor, J.; Melo, A.M.; Cobb, G.; Rhoades, E. Biophysical Society 59th Annual Meeting, Baltimore, USA (2015).

11. “Oligomer stoichiometry of membrane-bound proteins involved in a cooperative partition equilibrium: a Homo-FRET study”. Melo, A.M.; Fedorov, A.; Prieto, M.; Coutinho, A. Biophysical Society 59th Annual Meeting, Baltimore, USA (2015).

10. “A Homo-FRET-based method for quantifying the oligomer stoichiometry of membrane-bound proteins involved in a cooperative partition equilibrium” Melo, A.M**.**; Fedorov, A.; Prieto, M.; Coutinho, A. XIVth Congress of the Spanish Biophysical Society, Alcalá de Henares, Spain (2014).

9. “Non-amyloidogenic lipid-protein fibers display a multilamellar structure: implications on lipid/protein dynamics and membrane surface dehydration” **Melo, A.M.**; Loura, L.M.S.; Villalaín, J.; Fernandes, F.; Prieto, M.; Coutinho, A. 27th Annual Symposium of the Protein Society, Boston, USA (2013).

8. “Biophysical features of electrostatically-driven lipid-protein fibers” **Melo, A.M.**; Loura, L.M.S.; Villalaín, J.; Fernandes, F.; Prieto, M.; Coutinho, A. 9th European Biophysics Congress, Lisbon, Portugal (2013). Student Poster Award

7. “Tracking membrane-driven protein oligomerization using fluorescence lifetime and homo-FRET studies” Melo, A.M.; Fedorov, A.; Prieto, M.; Coutinho, A. 9th European Biophysics Congress, Lisbon, Portugal (2013).

6. “Amyloid-like fibril formation driven by anionic lipid membranes: multiparametric fluorescence detection of lysozyme oligomeric intermediates” **Melo, A.M.**; Fedorov, A.; Prieto, M.; Coutinho, A. 22nd IUBMB & 37th FEBS Congress, Sevilla, Spain (2012).

5. “Lipid-protein interaction and amyloid-like fiber formation: FLIM and FCS studies” **Melo, A.M.**; Prieto, M.; Coutinho, A. 8th European Biophysics Congress, Budapest, Hungary (2011).

4. “Quantifying protein binding to lipid vesicles using fluorescence correlation spectroscopy (FCS)” **Melo, A.M.**; Coutinho, A.; Prieto, M. Biophysical Society 55th Annual Meeting, Baltimore, USA (2011).

3. “Lipid-protein interaction: quantifying protein binding to lipid vesicles using single colour fluorescence correlation spectroscopy (FCS)” Coutinho, A.; Melo, A.M.; Prieto, M. IV Spanish Portuguese Biophysical Congress, Zaragoza, Spain (2010).

2. “Fluorescence correlation spectroscopy studies of lysozyme partition to phospholipid vesicles” **Melo, A.M.**; Coutinho, A.; Prieto, M. 7th European Biophysics Congress, Genoa, Italy (2009).

1. “Influence of protein surface coverage on lysozyme interaction with anionic lipid vesicles” Coutinho, A.; Melo, A.M.; Loura, L.M.S.; Prieto, M. 7th European Biophysics Congress, Genoa, Italy (2009).

* **ORGANISATION OF INTERNATIONAL CONFERENCES**

# 4. Co-Chair of the Platform: Intrinsically Disordered Proteins (IDP) at Biophysical Society 66th Annual Meeting, San Francisco, USA, 2022.

# 3. Organizer of Lisbon Biophysics Networking Meeting: From Protein Dynamics to Membrane Biophysics, Lisbon, October 2018, Portugal (sponsor by American Biophysical Society).

# 2. Co-Chair of the Platform: Intrinsically Disordered Proteins (IDP) and Aggregates I at Biophysical Society 60th Annual Meeting,Los Angeles, USA, 2016.

1. Member of the organizing committee of "XII Iberian Peptide Meeting", Lisbon, Portugal, 2010.

* **PARTIPATION IN SCIENTIFIC MEETINGS AND COURSES**

1. 25th IUBMB Congress, the 46th FEBS Congress and the 15th PABMB Congress, Lisbon, Portugal (2022).
2. Gordon Research Conference (GRC) Intrinsically Disordered Proteins, Les Diablerets, Switzerland (2022).
3. Biophysical Society 66th Annual Meeting, San Francisco, USA (2022).
4. 13th Course on Optical Microscopy Imaging for Biosciences, i3S-Porto, Portugal (2022).
5. XVII Meeting of the Portuguese Society for Neuroscience, Coimbra, Portugal (2021).
6. 20th International Union for Pure and Applied Biophysics (IUPAB), Virtual Meeting Brazil (2021).
7. 65th Biophysical Society Annual Meeting, Virtual Meeting USA (2021).
8. Integrative Approaches to Protein Folding & Aggregation, Lisbon, Portugal (2019).
9. Strategies and tools for modulating pathologic protein self-assembly, Porto, Portugal (2019).
10. 6th Iberian / 10th Iberoamerican Biophysics Congress, Castellón, Spain (2018)
11. VIth Jornadas Ibéricas de Fotoquímica (6'JIF), Aveiro, Portugal (2018).
12. 11th European Biophysics Congress, Edinburgh, Scotland (2017).

# Biophysical Society 61st Annual Meeting,New Orleans, USA (2017).

1. Gordon Research conference and seminar (GRC and GRS) Intrinsically Disordered Proteins, Les Diablerets, Switzerland (2016).

# Biophysical Society 60th Annual Meeting,Los Angeles, USA (2016).

# Biophysical Society 59th Annual Meeting,Baltimore, USA (2015).

1. 27th Annual Symposium of the Protein Society, Boston, USA (2013).
2. **9th European Biophysics Congress,** Lisbon, Portugal (2013).
3. 22nd IUBMB & 37th FEBS Congress, Sevilla, Spain (2012).
4. Biophysical Society 56th Annual Meeting, San Diego, USA (2012).
5. XIII Iberian Peptide Meeting, Alicante, Spain (2012).
6. 8th European Biophysics Congres”, Budapest, Hungary (2011).
7. Biophysical Society 55th Annual Meeting, Baltimore, USA (2011).
8. Microspectroscopy: Probing Protein Dynamics and Interactions in Living Cells, Wageningen and Nijmegen, the Netherlands (2010).
9. EBSA Biophysics Course on: Membrane Biophysics & Lipid/Protein Interaction, Arcachon, France (2010).
10. 10th Portuguese National Meeting on Photochemistry, Porto, Portugal (2010).
11. International Courses on Toxicology 2010, Coimbra, Portugal (2010).
12. XII Iberian Peptide Meeting, Lisbon, Portugal (2010).
13. 7th European Biophysics Congress, Genoa, Italy (2009).

* **PRIZES AND AWARDS**

2022: Maria de Sousa Prize- 2nd Edition, sponsored by Bial Foundation and Portuguese Medical Association. <https://www.youtube.com/watch?v=efAyN-F2020>

*2022:* FEBS Letters Poster Prize (day #3) at Biochemistry Global Summit/ IUBMB-FEBS-PABMB.

*2022:* Travel BPS Award for scientists within 10-years after completing the PhD from Biophysical Society (USA)

*2019:* Junior Research Contract under CEEC-individual 2017 from FCT (CEECIND/00884/2017). 6-years contract.

*01-09/2017:* Postdoc Fellowship from NSF Center for Engineering MechanoBiology (CEMB), University of Pennsylvania.

### 2016: Honorary Mention to promote PhD thesis from Portuguese Chemical Society.

### 2016: CPOW travel award to support Outstanding Women Young Biophysicists from Biophysical Society (USA).

### 2010-2013: PhD Research Fellowship (SFRH/BD/61723/2009) from FCT, Portugal.

*2013:* Biophysical Society (USA) Student Poster Award at the 2013 EBSA Conference.

*2013:* Fellowship from Portuguese Biochemistry Society to participate in the “27th Annual Symposium of The Protein Society”.

*2012:* IUBMB/FEBS/SEBBM bursary for attendance at “22nd IUBMB & 37th FEBS Congress”.

*2012:* EBSA bursary for attendance at “XIII Iberian Peptide Meeting”.

*2011:* International Travel Award from Biophysical Society (USA) for participation in the “Biophysical Society 55th Annual Meeting”.

*2010:* FEBS Youth Travel Fund (YTF) to participate in a FEBS Advanced Course in Wageningen and Nijmegen (the Netherlands).

*2009:* Fellowship from Portuguese Biophysical Society to participate in the “7th European Biophysics Congress”.

* **PARTICPATION IN PROJECTS**

1. **PI of Maria de Sousa Grant- 2nd edition** “Tracking the unconventionally secreted tau species: insights into the progression of tauopathies”, supported by Bial Foundation and Portuguese Medical Association**.**

**01/2023-12/2024.** Funding of 30k euros.

<https://www.fundacaobial.com/premios/premio-maria-de-sousa/premio-maria-de-sousa-2022/>

1. **PI of the FCT Exploratory Grant** “The role of the plasma membrane in the unconventional secretion of tau: insights into the progression of tauopathies” (2022.01454.PTDC), supported by FCT (Portugal). **03/2023-08/2024.** Funding of ~50K euros.
2. **Management Committee Member** of the Cost-Action “ML4NGP - Non-globular proteins in the era of Machine Learning (CA21160). European Funding. **10/2022-10/2026.**

<https://www.cost.eu/actions/CA21160/>

1. **PI of the project** “The aggregation-prone structures of Huntingtin exon 1 at the single-molecule level: Influence of membranes and implications in Huntington disease” (PTDC/BIA-BFS/30959/2017), supported by FCT (Portugal). **10/2018-09/2022.** Funding of 238K euros.
2. Researcher in the Project POCI-01-0145-FEDER-022122. Head of the Advanced Fluorescence Microscopy Facility at iBB. Node of PPBI - Portuguese Platform of BioImaging.
3. Researcher in the project “Molecular mechanisms and cellular implications of tau dysfunction", PIs Prof. E. Rhoades and Prof. D. Odde (NIH 1RF1AG053951-01), supported by R01 NIH (USA).
4. Researcher in the project “Modulation of calcitonin amyloid formation by lipid membranes and extracellular matrix: implications for the mechanism of cytotoxicity of amyloidogenic polypeptides” (PTDC/BBB-BQB/2661/2012), supported by FCT (Portugal).
5. Researcher in the project “Multifunctional Nanomaterials for Fluorescence Microscopy and Sensors” (RECI/CTM- POL/0342/2012), supported by FCT (Portugal).
6. Researcher in the project "Amyloidogenic proteins: role of lipid-protein interaction in amyloid-like fibril formation" (PTDC/QUI-BIQ/099947/2008), supported by FCT (Portugal).

* **SUPERVISION AND MENTORING FELLOWS**

Mentor of undergraduate research students at Yale and University of Pennsylvania (USA):

1. Juliana Coraor at Yale University. Currently MD-PhD student at Harvard University.

2. Richard Potter at University of Pennsylvania.

Mentor of first year graduate students during research rotations at University of Pennsylvania (USA):

1. Buyan Pan, Chemistry PhD Student (Rhoades Lab) and now Postdoc at Rapoport lab at Harvard University.

2. Sanju Wickramasinghe, PhD Student in Biochemistry & Molecular Biophysics (Rhoades Lab).

3. Sunbin Deng, Chemistry PhD Student.

Supervision of Undergraduate students in Portugal:

1. Rafaela Cruz, Undergraduate student at FCUL, ULisboa.
2. Miguel Mira, Undergraduate student at FCUL, ULisboa.
3. Miguel Ferreira, Undergraduate student at FCUL, ULisboa.

Supervision of Master students in Portugal:

1. Andreia Pereira, Biotechnology at IST, ULisboa.
2. Adriana Inácio, Biotechnology at IST, ULisboa.
3. Vanessa Ramos, Biochemistry at FCUL, ULisboa.
4. Daniela Muntean, Biotechnology at IST, ULisboa.
5. Gonçalo Damas, Biotechnology at IST, ULisboa **(ongoing).**
6. Carlota de Galrinho e Silva, Pharmaceutical Engineering at IST, ULisboa **(ongoing).**
7. Catarina Pimenta, Biological Engineering at IST¸ ULisboa **(ongoing).**

Supervision of Posdoc in Portugal:

1. Tânia Sousa, IST, ULisboa (from April 2019 to May 2021).
2. Claúdia Alves, IST, ULisboa (from November 2021 to March 2022).

* **TEACHING ACTIVITIES**

**Teaching Theoretical and Practical Classes in Biomolecular Engineering at IST:**

* **2022/2023- 2nd Trimester**, Teaching Theoretical Classes of “Protein structure and folding” and “Protein Engineering”.

Responsible for 40% of all Theoretical and Practical Classes

40 Master Students from:

Biological Engineering;

Biomedical Engineering;

Biotechnology;

Bioengineering in Regenerative and Precision Medicine;

Bioengineering and Nanosystems

<https://fenix.tecnico.ulisboa.pt/disciplinas/EBio-3/2022-2023/1-semestre>

* **2021/2022- 2nd Trimester**, Teaching Theoretical Classes of “Protein structure and folding” and “Protein Engineering”.

Responsible for 40% of all Theoretical and Practical Classes

41 Master Students from:

Biological Engineering;

Biomedical Engineering;

Biotechnology;

Bioengineering in Regenerative and Precision Medicine;

Bioengineering and Nanosystems

<https://fenix.tecnico.ulisboa.pt/disciplinas/EBio-3/2021-2022/1-semestre>

* **2020/2021- 2nd Semester**, Teaching Theoretical Classes of “Protein structure and folding”

Responsible for 25 % of all Theoretical and Practical Classes

27 Master students from:

Bioengineering and Nanosystems

Electrical and Computer Engineering (MEEC),

Engineering Physics (MEFT)

Biotechnology (MBiotec).

<https://fenix.tecnico.ulisboa.pt/disciplinas/EBio511132646/2020-2021/2-semestre>

**Invited teaching seminars of single-molecule techniques or neurodegenerative diseases in post-graduation courses at:**

* IST (ULisboa): Structural Biology (2018, 2019, 2020, 2021 and 2022); Genetic Engineering (2019) and Molecular Biotechnology (2019).
* FCUL (ULisboa) MSc in Biochemistry: Biochemistry of Neurodegeneration (2017) and Complements of Analytical Biochemistry (2017, 2018, 2019 and 2020).
* Faculty of Pharmacy (ULisboa): FCT PhD program of Medicines and Pharmaceutical Innovation (i3DU)- Pharmaceutical Biophysics (2019).
* **OUTREACH ACTIVITIES**

2018, 2019 and 2021:European Researchers’ Night at National Museum of Natural History and Science in Lisbon.

2019:MICRODia @ IST- The microscopy open day for high school students.

* **SCIENTIFIC SOCIETIES**

Member of the Portuguese Biochemistry Society, Portuguese Biophysical Society, Portuguese Chemical Society, Biophysical Society (USA) and Protein Society (USA).

Lisbon, 13 March 2023

Ana Margarida Pereira de Melo