

Mariapina D'Onofrio

Personal details

Date of birth: 3/11/1975

Address: University of Verona, Department of Biotechnology, Strada Le Grazie 15, CV1 Verona

Phone: +39 0458027801

E-mail: mariapina.donofrio@univr.it

Career breaks

23 October 2011-23 March 2012 maternity leave

3 July-31 July 2012 maternity leave

15 September 2013-15 February 2014 maternity leave

30 June-15 July 2014 illness leave

21 July-1 August 2014 maternity leave

Present activity

Jun 2011 Permanent position as assistant professor of organic chemistry, SSD CHIM06, at the Department of Biotechnology of University of Verona

Education

2000-2003 PhD in Chemistry, University of Modena and Reggio Emilia. Dissertation title: "Spectroscopic studies of the structure and properties of antioxidant metallo-enzymes", Tutor: Prof. Marco Sola.

1993-1999 Master's Degree in Chemistry, University of Modena and Reggio Emilia. Thesis title: "Redox Thermodynamics of Low-Potential Iron-Sulfur Proteins" Supervisor: Prof. Marco Sola. Final grade 110/110.

Professional and research experiences

Jun 2013- Jul 2013 Visiting scientist in the laboratory of Prof. David Fushman, Department of Chemistry and Biochemistry, University of Maryland, USA, with a grant obtained from the University of Verona in the framework of the call Cooperint 2012.

Jan 2007-May 2011 Permanent position at the University of Verona, Department of Biotechnology as expert technician responsible for the management, maintenance, upgrade and methodologies development of the NMR instrument operating at 600 MHz with Cryoprobe.

Mar 2006- Dec 2006 Coordination of the research activity of the biotechnology department of ProtEra s.r.l., a spin-off company of the University of Florence.

Sept 2004- Feb 2006 Marie Curie fellow in the laboratory of Prof. Harald Schwalbe, Johann Wolfgang Goethe Universität, Institut für Organische Chemie und Chemische Biologie, Germany, for the transfer of knowledge from the University to the small enterprise ProtEra, in the framework of EU Marie Curie Host Fellowship for the Transfer of Knowledge (TOK).

Jul 2004- Aug 2004 Coordination of the research activity of the biotechnology department of ProtEra s.r.l., a spin-off company of the University of Florence.

Jun 2003-Jul 2004 Postdoctoral fellow in the laboratory of Prof. David Fushman, Department of Chemistry and Biochemistry, University of Maryland, USA. Project: NMR structural and

dynamic investigation of poly-ubiquitin chains in complex with exogenous ligands and physiological partners.

Feb 2000- Feb 2003 Fellowship during the PhD period in the Centro di Risonanze Magnetiche of the University of Florence for research activity on expression and NMR structural studies of copper binding proteins, under the supervision of Prof. Ivano Bertini and Lucia Banci.

Scientific and professional awards

Apr 2017 obtainment of the Abilitazione Scientifica Nazionale as Associate Professor in Organic Chemistry (SSD 03/C1, Chim/06)

May 2019 grant to participate at the Women in Science Workshop at the Instruct Biennial Structural Biology Conference, Alcalá de Henares, Madrid, Spain

Dec 2017 winner of the national fund in the framework of the Finanziamento delle Attività Base di Ricerca (amount € 3000)

Funded Research Projects as Principal Investigator

- **Alzheimer's Association Research Grant** funded by the American Alzheimer's Association (from 01/11/17 to 31/10/20) Project title: "Role of polyubiquitination in Alzheimer's disease". Amount \$ 133800
- **Progetto Ricerca di Base 2015** funded by University of Verona (from 1/10/16 to 30/09/18) Project title: "Semi-synthesis and structural studies of ubiquitinated Tau". Amount € 44000
- **Joint Project 2010** funded by University of Verona, in collaboration with Novartis Vaccines and Diagnostics srl (Siena) (from 1/09/11 to 31/12/14). Project title: "NMR structural studies on the mechanisms of pilus assembly in Gram-positive Streptococcus agalactiae (Group B streptococcus)" Role: PI starting from 1/12/12. Amount € 129350
- Principal Investigator of the Hosting Laboratory of the Umberto Veronesi post-doctoral fellow 2017 Dr. Francesca Munari

Participation in Research Projects

- Prin 2017, national project. Title: "Integrative tools for defining the molecular basis of the diseases: computational and experimental methods for protein variant interpretation", coordinator Prof. Fariselli.
- Firb giovani 2008, national project. Title: "Dalla comprensione dell'attivazione allosterica di fatty acid binding proteins modulata dall'interazione con membrane cellulari e leganti, al disegno di nuovi inibitori della cattura di lipidi", coordinator Dr. Assfalg.
- Prin 2008, national project. Title: "Produttività e meccanismi molecolari di fotoprotezione in organismi fotosintetici ossigenici", coordinator Prof. Bassi.
- Cariverona 2007 e Joint Project 2007, biennial local projects. Title: "Progetto pilota di metabolomica tramite Risonanza Magnetica Nucleare per lo studio del cancro del pancreas", coordinator Dr. Assfalg.
- Cariverona 2007, biennial local project. Title: "Nuove applicazioni della Risonanza Magnetica Nucleare dotata di cryoprobe ad alta sensibilità per lo sviluppo di nano biotecnologie", coordinator Prof. Molinari.

Oral communications in conferences and seminars

- 6th ECBS/LS-EuChemS Meeting, Madrid, 3-5 April 2019 Title: "Introduction of post-translational modifications in vitro modulates Tau protein fibrillation"
- 6th EuChemS Chemistry Congress, Seville, 11-15 September 2016 Title: "Biomolecular recognition by nanoparticles probed by NMR"
- XLIV National Congress on Magnetic Resonance, Roma, 28-30 September 2015 Title: "Ubiquitin-nanoparticle interactions probed by NMR"
- XXXVI Convegno della Divisione di Chimica Organica, Bologna, 13-17 September 2015 Title: "Biomolecular recognition by fullerene"
- XLI National Congress on Magnetic Resonance, Pisa, 17-19 September 2012 Title: "Exploring the ligand binding capability of human liver fatty acid binding protein"
- National Congress of the Division of Chemistry of Biological Systems of the Italian Chemical Society, San Vito di Cadore (BL), 9-11 September 2010 Title: "An NMR study on human Liver FABP as carrier for MRI contrast agents"
- XXXVIII National Congress on Magnetic Resonance, Bressanone (BZ), 10-13 September 2008 Title: "Lipid Trafficking: Unfolding and Binding features of Liver Intracellular Bile Acid Binding Proteins"
- University of Verona, 22nd July 2006 Title: "From protein structure to function: correlations and ligand binding"
- II giornata della Chimica, University of Parma 4th December 2002 Title: "Struttura NMR in soluzione di rame-proteine"

Teaching activity

Bachelor's Degree in Bioinformatics

- Academic years (a.y.) 2019/2020, 2018/2019, 2017/2018, 2016/2017, 2015/2016
Teacher of the module of 'Elements of Organic Chemistry' of the course of 'Elements of Chemistry'
- A.y. 2014/2015, 2013/2014, 2012/2013
Teacher of the course of 'Elements of Organic Chemistry'

Bachelor's Degree in Biotechnology

- A.y. 2018/2019, 2017/2018, 2016/2017, 2015/2016, 2014/2015, 2013/2014, 2012/2013, 2011/2012
Teacher of the Laboratory of Organic Chemistry of the course of Organic Chemistry

Combined Bachelor's and Master's degree in Primary teacher education

- A.y. 2019/2020
Teacher of the module of Chemistry of the course of 'Foundations and Teaching of Mathematics III and Chemistry'
- A.y. 2018/2019
Teacher of the module of 'Fundamental of Chemistry' of the course of 'Fundamentals of chemistry and environment education'

PhD programs

- A.y. 2015/2016 teacher for the PhD students of the PhD program in Biotechnology of the University of Verona: "Biomolecular nuclear magnetic resonance "

- A.y. 2014/2015 teacher for the PhD students of the PhD program in Molecular, Industrial and Environmental Biotechnology of the University of Verona: "Protein chemistry under physiological conditions: in-cell NMR spectroscopy"
- A.y. 2012/2013 teacher for the PhD students of the PhD program in Molecular, Industrial and Environmental Biotechnology of the University of Verona: "Structure determination of protein complexes by NMR spectroscopy"
- A.y. 2011/2012 teacher for the PhD students of the PhD program in Molecular, Industrial and Environmental Biotechnology of the University of Verona: "An introduction to NMR-based approaches for determining protein structures"

Scuola Nazionale di Risonanza Magnetica Nucleare

- Jun 2010 Teacher at the "Scuola Nazionale di Risonanza Magnetica Nucleare, Corso specialistico: Struttura, dinamica e interazioni di proteine", Villa Gualino, Torino on methods for expression and purification of enriched protein samples.

Dr. D'Onofrio supervised the research activity of 8 post-doctoral fellows, she was tutor of 1 PhD student, thesis supervisor of 5 bachelor students, and 1 master student.

PhD Programs and Committee

- Mar 2018-present Member of the Collegio Docenti, PhD Program "Nanoscience and Advanced Technologies", University of Verona
- Nov 2011- Oct 2015 Member of the Collegio Docenti, PhD Program "Molecular, Industrial and Environmental Biotechnologies", University of Verona
- Oct 2019 Invited as a member of the final exam committee, PhD in Biomolecular Sciences, University of Trento
- Mar 2018 Invited as a member of the final exam committee, PhD in Biosciences, University of Padova
- Oct 2017 Invited referee for the evaluation of the PhD students at the PhD Work in Progress, PhD in Biomolecular Sciences, University of Trento
- Jun 2015 Invited as a member of the final exam committee, PhD in Biomolecular Sciences, University of Trento
- May 2015 Invited as a member of the final exam committee, PhD Program in Molecular, Industrial and Environmental Biotechnologies, University of Verona
- Feb 2015 Invited as external referee for the PhD theses in Biomolecular Sciences of Dr. Roberta Lentini, University of Trento
- Gen 2013 Invited as external referee for the PhD theses in Biomolecular Sciences of Dr. Paola Torre, University of Trento

Institutional duties and scientific associations activity

- 2015 - present Member of the "Commissione AQ CdS Bioinformatica"
- 2013 - present Member of the "Commissione Pratiche studenti- Collegio didattico Informatica"
- 2015- 2018 Member elected as representative of Assistant professors of the "Giunta di Dipartimento"
- 2011- 2019 Member of the "Commissione Strumentazione Comune di Dipartimento"

Memberships and Associations activity

- Elected as member of the Board of Directors of the Italian Discussion Group on Magnetic Resonance, GIDRM, from 2020 to 2022 with the role of Treasurer

- Elected as member of the Board of Directors of the Italian Discussion Group on Magnetic Resonance, GIDRM, from 2017 to 2019 with the role of Treasurer
- Member of the Italian Chemical Society, Division of Organic Chemistry
- Member of the Italian Chemical Society, Division of Biological Systems Chemistry
- Member of the Committee for the GIDRM Gold Medal award, years 2017, 2018 e 2019
- Member of the Committee for the Under 35 GIDRM Medal award, year 2018

Organization of Conferences

- Member of the Organizing and Scientific Committees of the GIDRM Day “Protein Structure-Function Relationship: new challenges and advancements”, Verona, 19 October 2018
- Member of the Organizing Committee “Convegno Nazionale 2016 della Divisione di Chimica dei Sistemi Biologici - Società Chimica Italiana”, Verona, 21-23 September 2016
- Member of the Scientific Committee of the following conferences and workshop:
 - XLVIII National Congress on Magnetic Resonance, L’Aquila, 11-13 September 2019
 - XLVII National Congress on Magnetic Resonance, Torino, 19-21 September 2018
 - XLVI National Congress on Magnetic Resonance, Fisciano, 27-29 September 2017
 - GIDRM Day: “Conformational equilibria: NMR beyond structures”, Caserta, July 2019
 - Workshop “CHANCES” - Crystallography And NMR in Complementary Structural Investigations, Firenze, September 2018
 - GIDRM Day: “HR-MAS NMR, metabolomics and multivariate analysis”, Milan, June 2017
- Member of the Organizing Committee of the following conferences
 - Advances in NMR and MS based Metabolomics 2019, Lucca, 20-22 November 2019
 - Advances in NMR and MS based Metabolomics 2017, Padova, 14-16 November 2017

Summary of the research activity

- Optimization of semi-synthetic and enzymatic methods to introduce post translational modification on proteins involved in neurodegenerative diseases and the influence of the modifications on structure and aggregation properties.
- Synthesis of polyubiquitin chains and their interaction with organic nanoparticles. Optimization of enzymatic and semi-synthetic methods to ubiquitinate different substrates.
- NMR studies on liver Fatty Acid Binding Proteins and liver and ileal Bile Acid Binding Proteins. Characterization of the binding properties with physiological ligands (fatty acids and bile acids) and synthetic molecules (potential contrast agents) both in diluted solution and in crowded environment.
- Characterization of protein-nanoparticle interactions using an integrated approach (NMR, fluorescence spectroscopy, dynamic light scattering, and calorimetry)
- In collaboration with a research group in Novartis Vaccine in Siena, I have characterized by NMR the structure of the wild type and mutant enzymes and substrates involved in the molecular assembly of bacterial pili.

Keywords

- Chemistry, structural and functional properties of biomolecules
- NMR spectroscopy
- Biomacromolecules-ligand interactions
- Nanoparticles: characterization and interactions

- Chemical and biochemical modification of biomacromolecules
- Protein aggregation

Bibliometric indexes

- N. total publications: 46
- H index: 16
- N. total citations: 817 (source Scopus)
- Orcid iD: 0000-0002-8699-0847

Selected Publications (* corresponding author)

1. Munari F, Bortot A, Assfalg M, **D'Onofrio M***. Alzheimer's disease-associated ubiquitin mutant Ubb⁺¹: Properties of the carboxy-terminal domain and its influence on biomolecular interactions. *Int J Biol Macromol.* 2018 Mar;108:24-31. doi: 10.1016/j.ijbiomac.2017.11.121.
2. **D'Onofrio M**, Zanzoni S, Munari F, Monaco HL, Assfalg M, Capaldi S. The long variant of human ileal bile acid-binding protein associated with colorectal cancer exhibits sub-cellular localization and lipid binding behaviour distinct from those of the common isoform. *Biochim Biophys Acta Gen Subj.* 2017 Sep;1861(9):2315-2324. doi: 10.1016/j.bbagen.2017.07.004.
3. **D'Onofrio M**, Barracchia CG, Bortot A, Munari F, Zanzoni S, Assfalg M. Molecular differences between human liver fatty acid binding protein and its T94A variant in their unbound and lipid-bound states. *Biochim Biophys Acta Proteins Proteom.* 2017 Sep;1865(9):1152-1159. doi: 10.1016/j.bbapap.2017.06.025.
4. Pérez Santero S, Favretto F, Zanzoni S, Chignola R, Assfalg M, **D'Onofrio M***. Effects of macromolecular crowding on a small lipid binding protein probed at the single-amino acid level. *Arch Biochem Biophys.* 2016 Sep 15;606:99-110. doi: 10.1016/j.abb.2016.07.017.
5. Zanzoni S, Pedroni M, **D'Onofrio M**, Speghini A, Assfalg M. Paramagnetic Nanoparticles Leave Their Mark on Nuclear Spins of Transiently Adsorbed Proteins. *J Am Chem Soc.* 2016 Jan 13;138(1):72-5. doi: 10.1021/jacs.5b11582.
6. Lazzarin M, Cozzi R, Malito E, Martinelli M, **D'Onofrio M**, Maione D, Margarit I, Rinaudo CD. Noncanonical sortase-mediated assembly of pilus type 2b in group B Streptococcus. *FASEB J.* 2015 Nov; 29(11):4629-40. doi: 10.1096/fj.15-272500.
7. Assfalg M, Ragona L, Pagano K, **D'Onofrio M**, Zanzoni S, Tomaselli S, Molinari H. The study of transient protein-nanoparticle interactions by solution NMR spectroscopy. *Biochim Biophys Acta.* 2015 Apr 30 pii: S1570-9639(15)00133-8 doi: 10.1016/j.bbapap.2015.04.024.
8. Zanzoni S, Ceccon A, Assfalg M, Singh RK, Fushman D, **D'Onofrio M***. Polyhydroxylated [60]fullerene binds specifically to functional recognition sites on a monomeric and a dimeric ubiquitin. *Nanoscale.* 2015 Apr 9; 7(16):7197-205. doi: 10.1039/c5nr00539f.
9. Ceccon A, Lelli M, **D'Onofrio M**, Molinari H, Assfalg M. Dynamics of a globular protein adsorbed to liposomal nanoparticles. *J Am Chem Soc.* 2014 Sep 24; 136(38):13158-61. doi: 10.1021/ja507310m.
10. Favretto F, Assfalg M, Gallo M, Cicero DO, **D'Onofrio M***, Molinari H. Ligand binding promiscuity of human liver fatty acid binding protein: structural and dynamic insights from an interaction study with glycocholate and oleate. *Chembiochem.* 2013 Sep 23; 14(14):1807-19. doi: 10.1002/cbic.201300156.

11. Santambrogio C, Favretto F, **D'Onofrio M**, Assfalg M, Grandori R, Molinari H. Mass spectrometry and NMR analysis of ligand binding by human liver fatty acid binding protein. *J Mass Spectrom.* 2013 Aug; 48(8):895-903. doi: 10.1002/jms.3237
12. Favretto F, Assfalg M, Molinari H, **D'Onofrio M***. Evidence from NMR interaction studies challenges the hypothesis of direct lipid transfer from L-FABP to malaria sporozoite protein UIS3. *Protein Sci.* 2013 Feb; 22(2):133-8. doi: 10.1002/pro.2194.
13. **D'Onofrio M**, Gianolio E, Ceccon A, Arena F, Zanzoni S, Fushman D, Aime S, Molinari H, Assfalg M. High relaxivity supramolecular adducts between human-liver fatty-acid-binding protein and amphiphilic Gd(III) complexes: structural basis for the design of intracellular targeting MRI probes. *Chem Eur J.* 2012 Aug 6; 18(32):9919-28 doi: 10.1002/chem.201103778.
14. Assfalg M, Bortoletti E, **D'Onofrio M**, Pigozzi R, Molinari H, Boner AL, Peroni DG, Piacentini GL. An exploratory (1) H-nuclear magnetic resonance metabolomics study reveals altered urine spectral profiles in infants with atopic dermatitis. *Br J Dermatol.* 2012 May; 166(5):1123-5. doi: 10.1111/j.1365-2133.2011.10711.
15. Cozzi R, Malito E, Nuccitelli A, **D'Onofrio M**, Martinelli M, Ferlenghi I, Grandi G, Telford JL, Maione D, Rinaudo CD. Structure analysis and site-directed mutagenesis of defined key residues and motives for pilus-related sortase C1 in group B Streptococcus. *FASEB J.* 2011 Jun; 25(6):1874-86. doi: 10.1096/fj.10-174797.
16. **D'Onofrio M**, Ragona L, Fessas D, Signorelli M, Ugolini R, Pedò M, Assfalg M, Molinari H. NMR unfolding studies on a liver bile acid binding protein reveal a global two-state unfolding and localized singular behaviors. *Arch Biochem Biophys.* 2009 Jan 1; 481(1):21-9. doi: 10.1016/j.abb.2008.10.017.
17. Haririnia A, **D'Onofrio M**, Fushman D. Mapping the interactions between Lys48 and Lys63-linked di-ubiquitins and a ubiquitin-interacting motif of S5a. *J Mol Biol.* 2007 May 4; 368(3):753-66.
18. Verma R, Peters NR, **D'Onofrio M**, Tochtrop GP, Sakamoto KM, Varadan R, Zhang M, Coffino P, Fushman D, Deshaies RJ, King RW Ubistatins inhibit proteasome-dependent degradation by binding the ubiquitin chain. *Science* 2004 Oct 1; 306(5693): 117-20.
19. Banci L, Bertini I, Ciofi-Baffoni S, **D'Onofrio M**, Gonnelli L, Marhuenda-Egea FC, Ruiz-Dueñas FJ. Solution structure of the N-terminal domain of a potential copper-translocating P-type ATPase from *Bacillus subtilis* in the apo and Cu(I) loaded states. *J Mol Biol.* 2002 Mar 29; 317(3):415-29.
20. Battistuzzi G, **D'Onofrio M**, Borsari M, Sola M, Macedo AL, Moura JJ, Rodrigues P. Redox thermodynamics of low-potential iron-sulfur proteins. *J Biol Inorg Chem.* 2000 Dec; 5(6):748-60.

Autorizzo il trattamento dei dati personali contenuti nel curriculum vitae in base all'art. 13 del D. Lgs. 196/2003 e dell'art. 13 GDPR 679/2016. Consapevole che le dichiarazioni false comportano l'applicazione delle sanzioni penali previste dall'art. 76 del D.P.R. 445/2000, dichiaro che le informazioni riportate nel presente curriculum vitae corrispondono a verità.

Data, Verona 7/12/2019

Firma

