

# ALESSANDRA DEL GIUDICE

## Curriculum Vitae

Date: 2024-08-21

### Overview

Alessandra Del Giudice received her PhD in Chemical Sciences at Sapienza University of Rome where she is currently a research fellow in Physical Chemistry since 2017. Her PhD work focused on the application of scattering techniques and optical spectroscopies for the study of protein processes as unfolding and oligomerization. While continuing to work on the bio-small angle X-ray scattering (SAXS) characterization of proteins in collaboration with biochemistry research groups, her current research interests comprise the structural characterization of soft matter systems formed by the self-assembly of amphiphilic molecules. In addition, Alessandra is the main operator of the SAXSLab Sapienza facility, giving technical assistance and scientific support to users for running in-lab SAXS experiments, with a focus on projects in which the structural understanding of systems at the colloidal scale can help guiding a transition towards more sustainable ingredients and processes.

### Education

Type	Year	Institution	Notes
PhD	2016	Sapienza University of Rome	PhD in Chemical Sciences with honors Thesis: "Structural and spectroscopic studies of proteins in stress conditions" Field: Physical Chemistry, Biophysical Chemistry, Courses attended: Biopolymers and biomaterials, Structural characterization of materials
University graduation	2013	Sapienza University of Rome	Master's Degree in Chemistry (Inorganic-Physical Chemistry) 110/110 cum laude Thesis: "Denaturation and stabilization of Human Serum Albumin: combined effect of drugs"
University graduation	2011	Sapienza University of Rome	Bachelor's Degree in Chemistry Sapienza University of Rome (Italy) 110/110 cum laude Thesis: "The effect of pH on the stability of Human Serum Albumin: spectroscopic investigations"

## Scientific experience

### Academic Appointments

Start	End	Institution	Position
22/12/2021	current position	Sapienza University of Rome, Department of Chemistry	Fixed-term researcher type A (RTDa) REACT EU Research contracts on green topics: “Structural investigations on the colloidal scale for the development of alternative materials and technologies in the green transition” - Collaboration with CR Competence AB (Lund, Sweden) - Teaching activity in Physical Chemistry (sector CHEM-02/A) - Management of SAXSLab Sapienza instrumentation
01/05/2018	21/12/2021	Sapienza University of Rome, Department of Chemistry	Post-doctoral researcher: - Structural studies on soft matter systems - Management of a laboratory small angle x-ray scattering (SAXS) facility of Sapienza University (installation in October 2018) - SAXS data analysis
01/05/2017	30/04/2018	Sapienza University of Rome, Department of Chemistry/ CNIS (Interdepartmental research center on nanotechnologies applied to engineering of Sapienza)	Post-doctoral researcher: - Structural studies with X-ray scattering techniques

### Visiting periods

Start	End	Institution	Position and research topic
13/09/2023	17/09/2023	CR Competence AB / Division of Physical Chemistry of Lund University (Lund, Sweden)	Visiting researcher: “Green coacervates for pharma and food”
24/03/2023	03/04/2023		
01/09/2022	06/11/2022		
31/01/2022	31/03/2022	Division for Physical Chemistry of Lund University (Lund, Sweden)	Visiting post-doctoral researcher: “Model peptide self-assembly”
06/08/2018	26/08/2018		
14/04/2018	30/04/2018		

04/04/2016	11/07/2016	Division for Pure and Applied Biochemistry of Lund University (Lund, Sweden)	Visiting PhD student: "Molecular aspects of fiber-forming proteins"
16/03/2015	30/09/2015	Division for Pure and Applied Biochemistry of Lund University and MAXLab synchrotron (Lund, Sweden)	Visiting PhD student: "Multi-probe characterization of protein processes"

## Teaching experience

### Courses

Year	Institution	Lecture/Course
2023/2024	Sapienza University of Rome, Faculty of Mathematical Physical and Natural Sciences/Faculty of Pharmacy and Medicine	"Elements of Physical Chemistry" (Module II of the course "Analytical Chemistry and Elements of Physical Chemistry") (3 CFU – SSD CHIM/02) Bachelor's in Biotechnology (L-2)
2022/2023		
2023/2024	Sapienza University of Rome, Faculty of Mathematical Physical and Natural Sciences	"Physical Chemistry I with Laboratory" (1 CFU (12 hours) of Laboratory - SSD CHIM/02) Bachelor's in Chemical Sciences (L-27)
2022/2023	Sapienza University of Rome, Faculty of Mathematical Physical and Natural Sciences	"Biological Physical Chemistry" (Module of 3 CFU - SSD CHIM/02) Master's in Chemistry (L-54)
2021/2022		
2023/2024	Sapienza University of Rome, Department of Chemistry	"Small angle X-ray scattering, basics and applications" (6 CFU) PhD course in Chemical Sciences
2021/2022		
2020/2021		
2019/2020		

### Student supervision

Year	Institution	Thesis
2021/2022	Sapienza University of Rome, Master's Degree in Analytical Chemistry	"Structural and spectroscopic studies on the conformational changes of albumin in stress conditions and of their reversibility: recovery from the hypochlorite-induced chemical damage and refolding from acid denaturation by a time-dependent pH jump"
2017/2018	Sapienza University of Rome, Degree in Chemistry	"Response of lysozyme to hypochlorite oxidation"
2016/2017	Sapienza University of Rome, Bachelor's Degree in Industrial Chemistry	"Characterization of mixtures of cationic block-copolymers and bile salts"

2016/2017	Sapienza University of Rome, Bachelor's Degree in Chemistry	"Study of the micellar aggregation of sodium deoxycholate by light scattering measurements"
2014/2015	Sapienza University of Rome, Master's Degree in Chemistry	"Albumin and oxidative stress: spectroscopic investigations"

## Research Activities

Keywords	Brief Description
small-angle X-ray scattering	<p>The main research interest is the structural understanding of soft-matter systems, especially involving biological molecules. My research has a focus on the use of solution scattering and spectroscopy techniques, and small angle X-ray scattering in particular, as a versatile tool to "see" how the structure at the dimensional scale within 1-100 nm is changing as a function of a known perturbation, with minimum sample preparation artifacts and with an average and representative view of the system under relevant conditions. This approach, combined with other techniques and aided by modelling has been successful to help disclosing interesting phenomena.</p> <p>I have shown that the most abundant plasma protein, albumin, is highly resistant to hypochlorite chemical damage, but undergoes a reproducible structural transition above a critical level of modification, a behavior explaining why its structure is suitable to work as a scavenger in blood but might have further physiological implications. Albumin multi-domain structure is indeed prone to structural rearrangements in perturbed conditions, as those occurring as a function of pH, which have been object of my works using time-dependent acidification protocols allowing to explore the conformational transitions of the protein, disclose structural intermediates and study the effect of its physiological ligands.</p> <p>I have studied plant proteins involved in the photosynthetic metabolism which in response to fluctuating redox environment self-associate in supramolecular complexes with regulatory role, highlighting the intrinsic dynamism of the protein complexes and of the flexible scaffold protein elements.</p> <p>Besides continuing to work in the protein bio-SAXS field in collaboration with biochemistry research groups, I have embraced the interest in the intriguing self-assembly properties of peptide-based and bile-acid based amphiphiles and more recently, in coacervation phenomena involving oppositely charged surfactant and polymers.</p> <p>I have also been working as a dedicated post-doc at SAXSLab Sapienza, supporting experiments, data analysis and interpretation of several users and collaborating with many research groups. This has allowed me to contribute to different works adding the unbiased insight of the SAXS characterization to the understanding of the nanoscale structure and structural changes of self-assembling systems of surfactants and polymers, of nanoparticles, of porous materials, of thin films, of complex liquids, and of proteins of interest for human health.</p>
soft matter	
proteins	
amphiphiles	
polymers	
colloids	
nanostructure	

## Participation in research groups

Years	Title	PI(s)	Institution
2018-present	Characterization of the supramolecular structures formed by amphiphilic molecules from biological precursors	L. Galantini	Department of Chemistry, Sapienza University of Rome
		A. Scipioni	
		M. Giustini	
		D. Monti	
2022-present	Natural care products through Neutron and Synchrotron X-ray studies of sustainable polymers and surfactants	M. Gubitosi	CR Competence AB (Lund) and Division of Physical Chemistry, Lund University
		T. Halthur	
		T. Nylander	
2022-present	Combination of SAXS and Molecular-Dynamics to study proteins with flexible domains prone to conformational changes	M. D'Abramo	Department of Chemistry, Sapienza University of Rome
		in collaboration with biochemistry groups (Sapienza University of Rome, Indian Institute of Technology Madras)	
2017-present	Study of mixtures of bile salts and cationic polyelectrolytes	K. Schillén	Division of Physical Chemistry, Lund University
		L. Galantini	
2014-present	Structural and spectroscopic studies of proteins in stress conditions	L. Galantini	Department of Chemistry, Sapienza University of Rome
			Department of Chemistry, Sapienza University of Rome
2024-present	Joint lab for the structural characterization of antibodies and supramolecular complexes	B. Vallone	Rome Technopole
		Takis srl	
2014-2022	Structural studies of proteins involved in photosynthesis regulation	S. Fermani	Department of Chemistry/FaBiT, University of Bologna
		F. Sparla	
2020-2021	Structural studies on deep eutectic solvents	P. D'Angelo	Department of Chemistry, Sapienza University of Rome
2018-2020	Model peptide self-assembly	U. Olsson	Division of Physical Chemistry, Lund University

2015-2016	Multi-probe characterization of protein processes	C. Dicko	Division of Pure and Applied Biochemistry, Lund University
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### Funding for research projects

Year	Title (PI)	Program	
2023	Design of carbon dots-bile acids bioconjugates and evaluation of their self-assembly and active surface properties for the development of innovative antifungal nanomaterials (F. Vetica)	Internal research projects Sapienza University of Rome - <i>Medium</i>	
2022	Composite Anion-exchange Membranes for water Electrolysis (CAMEL) (M. A. Navarra)	Internal research projects Sapienza University of Rome - <i>Medium</i>	
2021	Human Serum Albumin as a pH-dependent carrier: interplay between the acid conformational transitions and ligand binding/release (A. Del Giudice)	Internal research projects Sapienza University of Rome - <i>Starting</i>	
2020	Promoting functionality studies of proteins, peptides and self-assembled nanocarriers at SAXSLab Sapienza (A. Del Giudice)	Internal research projects Sapienza University of Rome - <i>Starting</i>	
2019	A physical-chemical view on the consequences of protein chemical damage induced by hypochlorite: studying model proteins to understand general phenomena (A. Del Giudice)	Internal research projects Sapienza University of Rome - <i>Starting</i>	
2018	Natural amphiphiles for nanotechnological applications (L. Galantini)	Internal research projects Sapienza University of Rome - <i>Medium</i>	
2017	Steroidal Amphiphiles Based Nanoscience (L. Galantini)	Internal research projects Sapienza University of Rome - <i>Medium</i>	
2016	Bile salts and derivatives in nanotechnological applications (L. Galantini)	Internal research projects Sapienza University of Rome - <i>Medium</i>	
2015	Human Serum Albumin under oxidative stress: structural and spectroscopic studies to characterize the oxidation process and evaluate the effect of antioxidants (A. Del Giudice)	Internal research projects Sapienza University of Rome - <i>Starting</i>	

## Society memberships

Year	Title
2023 - present	Italian Synchrotron Radiation Society (SILS)
2018 - present	Italian Society of Pure and Applied Biophysics (SIBPA)
2017 - present	Italian Chemical Society (SCI)
2016 - present	European Colloids and Interface Society (ECIS)

## Awards and Honors

Year	Title
2019/09	“Langmuir” prize for the oral presentation at the European Colloids and Interface Society conference ("Self-assembly of model amphiphilic peptides in non-aqueous solvents: changing driving forces, same structure?")
2019/07	Award for the best oral presentation by a young scientist at the national meeting of the Division of Physical Chemistry of the Italian Chemical Society ("The effect of fatty acid binding in the acid isomerizations of albumin investigated with a continuous acidification method")
2019/06	Award for the best oral presentation at the “Convegno Giovani Ricercatori” at the Department of Chemistry, Sapienza University of Rome ("The structural response of Human Serum Albumin to oxidation: a biological buffer to local formation of hypochlorite")
2018/09	Travel grant for the XXIV National Congress of the Italian Society of Pure and Applied Biophysics (SIBPA), Ancona, Italy
2017/10	Best poster prize at the "São Paulo FAPESP School on Biophysical Methods to Study Biomolecular Interactions", São Paulo, Brasil ("The structural response of Human Serum Albumin to oxidation: a biological buffer to local formation of hypochlorite")
2017/10	Travel grant for the international school "São Paulo FAPESP School on Biophysical Methods to Study Biomolecular Interactions", São Paulo, Brasil
2016	Successful candidate for the assignment of the Erasmus + Unipharma Graduates scholarship for a 3-month visiting period during PhD at Lund University, Division for Pure and Applied Biochemistry/Division of Physical Chemistry ("Molecular aspects of fiber forming proteins")
2015	Successful candidate for the assignment of the Erasmus + Unipharma Graduates scholarship for a 6-month visiting period during PhD at Lund University, Division for Pure and Applied Biochemistry/MaxLab synchrotron ("Multi-probe characterization of protein processes")
2014/09	Travel grant for the 2nd Joint Conference Associazione Italiana di Cristallografia - Società Italiana Luce di Sincrotrone, Florence, Italy
2014/02	Best poster prize at the HERCULES school, Grenoble, France within "Session B: applications to biomolecular structure and dynamics" ("Ibuprofen and propofol cobinding effect on Human Serum Albumin unfolding in urea")
2013	Acknowledged as "Excellent graduate" of the academic year 2013 by the Sapienza University of Rome.

## Summary of other accomplishments

Years	Content
2014-present	Participation in experiments with <b>large scale facilities</b> (20 beamtime sessions for synchrotron SAXS, 1 neutron reflectometry experiment)
2019-2024	Participation in <b>outreach</b> activities at the Department of Chemistry of Sapienza University of Rome (laboratory activities for children, guided tours and dissemination of SAXSLab Sapienza during outreach events)
2022-2024	Member of the local <b>organizing committee</b> (Symposium for Young Chemists 2022 and 2024, Annual meeting of the Italian Society of Synchrotron Radiation 2023)
2014-2024	Presenting author of <b>oral communications</b> (18) and posters (10) at international conferences and scientific meetings. I have also delivered invited guest seminars regarding my research during interviews abroad and about the principles and applications of SAXS.
2017-present	<b>Peer-reviewer</b> for the following journals: Journal of Colloids and Interface Science, RSC Advances, Biomacromolecules, Langmuir, Colloids and Surfaces B, Physical Chemistry Chemical Physics, Optics and Laser Technology, Materials Today Communications
2014-2019	Attendance to international <b>scientific schools</b> and workshops
2018-2021	Post-doc elected <b>representative</b> in the Department Council (Department of Chemistry, Sapienza University of Rome)
2022	Winner of the national selection (4th position – regione Lazio) for the recruitment of high school teachers in Natural, Chemical and Biological Sciences (A050) – Public call DD 499/2020 – Decree 0001277 2022/08/17

## Summary of Scientific Achievements

Product type	Number	Reference Data Base	Start	End
Papers [international]	58	SCOPUS (60 including 1 response letter and 1 erratum)	2014	2024
Books [scientific]	1	<a href="https://link.springer.com/chapter/10.1007/978-3-030-81827-2_8">https://link.springer.com/chapter/10.1007/978-3-030-81827-2_8</a>	2014	2024
Oral contributions	18	Self-certified	2014	2024

Total Impact factor	345
Total Citations	585
Average Citations per Product	10.1
Hirsch (H) index	15
Normalized H index*	1.5

\*H index divided by the academic seniority (10 years from first publication).

## Selected Publications

List of the 12 publications selected for the evaluation.

Notes: corresponding authors are indicated with an asterisk (\*), co-first authorships are indicated by superscript hashtags (#). For 2024 publications, the journal IF values of year 2023 (from Journal Citation Report) are reported. The number of citations is from SCOPUS, the journal quartile is the best from SCOPUS/WoS.

ID	Reference	Year	Citations	IF	Quartile
1	A. Del Giudice <sup>#</sup> , M. Gubitosi <sup>#*</sup> , A. Sthoer, S. Köhler, S. Ayscough, M.W.A. Skoda, T. Nylander, T. Halthur, Towards natural care products: structural and deposition studies of bio-based polymer and surfactant mixtures, <i>Colloids Surfaces A Physicochem. Eng. Asp.</i> (2024) 134365. <a href="https://doi.org/10.1016/J.COLSURFA.2024.134365">https://doi.org/10.1016/J.COLSURFA.2024.134365</a> .	2024	0	4.9	Q1
2	L. Natarajan, M.L. De Sciscio, A.N. Nardi, A. Sekhar*, A. Del Giudice*, M. D'Abramo*, A.N. Naganathan*, A finely balanced order-disorder equilibrium sculpts the folding-binding landscape of an antibiotic sequestering protein, <i>Proc. Natl. Acad. Sci. U. S. A.</i> 121 (2024) e2318855121. <a href="https://doi.org/10.1073/pnas.2318855121">https://doi.org/10.1073/pnas.2318855121</a> .	2024	0	9.4	Q1
3	A. Del Giudice, L. Gurrieri, L. Galantini, S. Fanti, P. Trost, F. Sparla*, S. Fermani, Conformational Disorder Analysis of the Conditionally Disordered Protein CP12 from <i>Arabidopsis thaliana</i> in Its Different Redox States, <i>Int. J. Mol. Sci.</i> 24 (2023) 9308. <a href="https://doi.org/10.3390/ijms24119308">https://doi.org/10.3390/ijms24119308</a> .	2023	1	4.9	Q1
4	G. Du, D. Belić, A. Del Giudice, V. Alfredsson, A.M. Carnerup, K. Zhu, B. Nyström, Y. Wang, L. Galantini*, K. Schillén*, Condensed Supramolecular Helices: The Twisted Sisters of DNA, <i>Angew. Chemie.</i> 134 (2022) e202113279. <a href="https://doi.org/10.1002/ange.202113279">https://doi.org/10.1002/ange.202113279</a> .	2022	26	16.6	Q1
5	R. Marotta <sup>#</sup> , A. Del Giudice <sup>#</sup> , L. Gurrieri, S. Fanti, P. Swuec, L. Galantini, G. Falini, P. Trost, S. Fermani*, F. Sparla*, Unravelling the regulation pathway of photosynthetic AB-GAPDH, <i>Acta Crystallogr. Sect. D Struct. Biol.</i> 78 (2022) 1399–1411. <a href="https://doi.org/10.1107/s2059798322010014">https://doi.org/10.1107/s2059798322010014</a> .	2022	2	2.2	Q1
6	N. Contreras-Pereda, D. Rodríguez-San-Miguel, C. Franco, S. Sevim, J.P. Vale, E. Solano, W.K. Fong, A. Del Giudice, L. Galantini, R. Pfattner*, S. Pané, T.S. Mayor*, D. Ruiz-Molina*, J. Puigmartí-Luis*, Synthesis of 2D Porous Crystalline Materials in Simulated Microgravity, <i>Adv. Mater.</i> 33 (2021) 2101777. <a href="https://doi.org/10.1002/adma.202101777">https://doi.org/10.1002/adma.202101777</a> .	2021	16	30.849	Q1
7	A. Del Giudice*, A. Rüter*, N.V. Pavel, L. Galantini, U. Olsson, Self-Assembly of Model Amphiphilic Peptides in Nonaqueous Solvents: Changing the Driving Force for Aggregation Does Not Change the Fibril Structure, <i>Langmuir.</i> 36 (2020) 8451–8460. <a href="https://doi.org/10.1021/acs.langmuir.0c00876">https://doi.org/10.1021/acs.langmuir.0c00876</a> .	2020	8	3.882	Q1
8	A. Del Giudice*, L. Galantini, C. Dicko, N. V. Pavel*, The effect of fatty acid binding in the acid isomerizations of albumin investigated with a continuous acidification	2018	3	3.973	Q1

	method, Colloids Surfaces B Biointerfaces. 168 (2018) 109–116.				
	<a href="https://doi.org/10.1016/j.colsurfb.2018.03.038">https://doi.org/10.1016/j.colsurfb.2018.03.038</a> .				
9	A. Del Giudice*, C. Dicko, L. Galantini, N.V. Pavel*, Time-dependent pH Scanning of the Acid-Induced Unfolding of Human Serum Albumin Reveals Stabilization of the Native Form by Palmitic Acid Binding, J. Phys. Chem. B. 121 (2017) 4388–4399.	2017	20	3.146	Q1
	<a href="https://doi.org/10.1021/acs.jpccb.7b01342">https://doi.org/10.1021/acs.jpccb.7b01342</a> .				
10	A. Del Giudice*, C. Dicko, L. Galantini, N. V. Pavel*, Structural Response of Human Serum Albumin to Oxidation: Biological Buffer to Local Formation of Hypochlorite, J. Phys. Chem. B. 120 (2016) 12261–12271.	2016	12	3.177	Q1
	<a href="https://doi.org/10.1021/acs.jpccb.6b08601">https://doi.org/10.1021/acs.jpccb.6b08601</a> .				
11	A. Del Giudice, N.V. Pavel, L. Galantini, G. Falini, P. Trost, S. Fermani*, F. Sparla*, Unravelling the shape and structural assembly of the photosynthetic GAPDH–CP12–PRK complex from Arabidopsis thaliana by small-angle X-ray scattering analysis, Acta Crystallogr. Sect. D Biol. Crystallogr. 71 (2015) 2372–2385.	2015	13	2.512	Q1
	<a href="https://doi.org/10.1107/S1399004715018520">https://doi.org/10.1107/S1399004715018520</a> .				
12	A. Del Giudice*, C. Leggio, N. Balasco, L. Galantini, N. V. Pavel*, Ibuprofen and propofol cobinding effect on human serum albumin unfolding in urea, J. Phys. Chem. B. 118 (2014) 10043–10051.	2014	9	3.302	Q1
	<a href="https://doi.org/10.1021/jp504280n">https://doi.org/10.1021/jp504280n</a> .				