

BIOGRAPHICAL SKETCH

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eRA COMMONS USER NAME: CENDRON.LAURA
Organization: UNIVERSITY OF PADOVA - (2943201)

POSITION TITLE: Associate Professor, Dept. of Biology, University of Padova

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE (if applicable)	Start Date MM/YYYY	Completion Date MM/YYYY	FIELD OF STUDY
University of Padova, Padova, Italy	B.A.	10/1996	07/2001	Chemistry, <i>110/110 summa cum laude</i>
University of Padova, Dept of Chemistry and Venetian Institute of Molecular Medicine, Padova, Italy	Ph.D.	10/2001	04/2005	Chemical Sciences
University of Padova, Dept. of Chemistry	Post Doc	05/2005	05/2009	Structural Biology
University of Padova, Dept. of Biological Chemistry	Post Doc	07/2009	05/2010	Biochemistry, Struct Biol.
University of Padova, Dept. of Biomedical Sciences	Post Doc	05/2011	05/2012	Biochemistry, Struct Biol.

A. Personal Statement

I am a protein biochemist and structural biologist with extensive experience in protein production, engineering, X-ray crystallography, and functional studies. Throughout my career, I have applied structure-based integrated approaches—combining *in vitro* and *in silico* methods—to understand the molecular details of disease-related processes and develop novel therapeutic strategies. My main research interests are focused on dissecting the strength and dynamicity of molecular interactions that drive cellular responses and building strategies to interfere with them.

My early work started focusing on bacterial pathogens, characterizing virulence factors and key enzymes relevant to therapeutic applications. I contributed to the design of small-molecule inhibitors by elucidating enzyme-ligand interactions and leveraging high-throughput screening, ultimately aiming to resensitize multidrug-resistant strains to existing antibiotics. In parallel, I have explored nanobodies as versatile tools for both basic research and therapeutic development, in collaboration with European core facilities in France, Belgium and Germany. This work includes engineering and validating nanobodies for diagnostic applications and as potential therapeutics against diverse targets.

As an Associate Professor in Biochemistry at the University of Padua, I lead an independent research group focused on understanding and targeting the molecular mechanisms that underlie antibiotic resistance in bacterial pathogens. My scientific background combines rigorous training in protein chemistry and structural biology, beginning with a PhD in Chemistry and structural studies of bacterial virulence factors, followed by postdoctoral research specializing in macromolecular crystallography and biophysical methods.

Over the past decade, I have established a dedicated research program that integrates molecular microbiology, protein engineering, X-ray crystallography, and biophysical assays to explore bacterial pathogenesis and to identify novel therapeutic strategies. A core focus of my work is the rational development of molecules that prevent the emergence of antibiotic resistance, with a particular interest in opportunistic infections—such as those affecting cystic fibrosis patients—where multidrug-resistant organisms pose a growing clinical challenge.

My group has contributed significantly to this field by structurally and functionally characterizing key resistance elements, including β -lactamases and components of the bacterial SOS response, a DNA repair and mutagenesis pathway that drives the evolution of resistance. We have identified and validated small-molecule inhibitors and nanobody-based binders that modulate these targets, using an integrated approach that combines structure-guided design, enzymatic and cell-based assays, and *in vitro* reconstitution of molecular mechanisms. Structural validation via X-ray crystallography and cryo-EM, together with detailed binding analyses (SPR, ITC, DSF), enables us to define how lead molecules interact with their targets and guides optimization for potency and specificity.

This interdisciplinary platform is particularly well-suited for application to Gram-negative infections, where resistance develops rapidly under therapeutic pressure. We aim to exploit bacterial stress-response pathways and resistance enzymes

as druggable vulnerabilities, providing a path to resistance-blocking adjuvants that enhance existing antibiotics or restore their efficacy in ESCAPE pathogens, such as *Pseudomonas aeruginosa* complex.

Through national and international collaborations, including leaders in peptide therapeutics, nanobody technology, and structural biology, we are well-positioned to deliver mechanistically validated leads that can advance to preclinical development. Our capacity builds on our established platform and track record to pursue a translationally relevant strategy against one of the most urgent challenges in modern infectious disease treatment.

In the last years, I have further expanded my research to the study of albumin as a compounds carrier and delivery agent, focusing on albumin-FcRn interactions and strategies to enhance drug half-life. Building on my experience in protein-ligand complex characterization, I aim to leverage albumin's unique properties for improved drug delivery and cross-species applicability. This complements ongoing projects involving small-molecule inhibitors, macrocycles, and bicyclic peptides, all united by the goal of understanding how structural insights can advance translational medicine and foster the development of new therapies.

Recently, thanks to long-lasting collaborations with clinicians, molecular biologists and electrophysiologists, I have been actively involved in developing two new research lines at the Institute, focusing on membrane proteins. These projects are dedicated to investigating novel, uncharacterized molecular interactions that underlie the pathways triggered by these proteins in relation to critical processes, including signal transduction, transcriptional regulation, and inflammation.

B. Positions, Scientific Appointments and Honors

Positions

- 12/2021 – : Associate Professor in Biochemistry, Università di Padova (Italy)
- 2014 – : Member of the school board of PhD program in Bioscience (Univ. of Padova)
- 2016 – : Member of the Teaching Committee for the Bachelor and Master Degree Courses in Molecular Biology, Univ. of Padova.
- Supervisor (or Co-supervisor) of more than 40 Thesis students, both at the Master and Bachelor Degree levels and four PhD students (two active); member of the PhD dissertation committee of four PhD candidates, advisor/reviewer of six PhD thesis.
- 05/2012 – 11/2021 Assistant Professor in Biochemistry, Università di Padova (Italy).

Scientific Appointments and Honors

- In 2011, I've been selected first in the Young Investigator Award ("Bando Giovani Studiosi 2011", Univ. of Padova);
- In 2013, I've received "Premio Nardelli for Young Italian Crystallographers", for the achievement of excellent results in the field of Crystallography (AIC, Italian Member of IUCr);
- Member of AIC, (Italian association of Crystallography, partner of IUCr) and SIMGBM, (Italian Society of General Microbiology and Microbial Biotechnology, partner of FEMS);
- Member of BIC (Bio-based Industries) Consortium and of Centro Studi "Synthetic Biology @UNIPD";
- Member of the organization committee and session chair of the 2024 European Crystallographic meeting (Padova, Italy) and chair and organization member of the Biological Section at 50th AIC Meeting (Bologna 2023, Sept 5th-8th);
- Editorial Board Member for Antibiotics (2019 – present); Review Editor for the Editorial Board of Chemical Biology (specialty section of Frontiers in Chemistry and Frontiers in Molecular Biosciences);
- Project reviewer for the French National Research Agency (ANR), panel "CE11 - Caractérisation des structures et relations structure-fonctions des macromolécules biologiques";
- Member of the International Selection Committee, on the first call for application to the MSCA-COFUND ArchiFun International Doctoral Programme, 2024 and 2025

C. Contributions to Science

Web of Science Core Collection metrics

I'm the author of 123 scientific publications on peer-reviewed international journals, 4 book chapters and 2 patents deposited (Eu Application n.: 102022000012431 and SIB Identification n.: BI869E/RVP/rmc). I'm the author of 110 structures deposited in the Protein Data Bank archive. Academic indexes: H-index: 31 (Wos, Web of Science ResearcherID-5202-2014); citations: 2479 without self-citations (Wos).

Oral Communications in the context of bacterial resistance

- Oral communication (plenary lecture) at the "30th Croatian-Slovenian Crystallographic Meeting" held in Veli Losinj, Croatia, in June 2024, with a presentation titled: "A structural view of SOS response in bacteria: how it works and how to block it."
- Oral presentation at the Workshop "Structural biology applied to drug discovery" organized at the University of Modena and Reggio Emilia in December 2022, with an oral communication titled: "Nanobody-Based Inhibitors of the SOS Response as Potential Suppressors of Antimicrobial Resistance."
- Oral contribution at the "8th Meeting of European Microbiologists, FEMS Congress 2019," held in Glasgow, with a presentation titled: "Acyclic boronic acids mimic β -Lactamases tetrahedral intermediates leading to broad-spectrum inhibitors."

Recently funded projects

- CFF Cystic Fibrosis Foundation: Spring Pilot and Feasibility Award 2025
- National Financial support to Applied Biomedical Research projects (Italian Ministry of Health)
Title: "Bicycle peptide inhibitors of Urokinase Plasminogen Activators (uPA) for the treatment of chronic arthritis"
Role: Co-applicant
- Budget Integrato della Ricerca di Dipartimento – BIRD – 2024 – University of Padova, Dept. of Biology
Title: "Unraveling Inhibition Dynamics of NDM-1 β -Lactamase: Time-Resolved Crystallography as a Tool for Drug Optimization" Role: Main Proposer
- Cystic Fibrosis Foundation - 2025 Spring Pilot and Feasibility Award program of the Cystic Fibrosis Foundation (CFF)
Title: "Disrupting the Bacterial SOS Response to Combat Biofilm Formation and Resistance Spread in Cystic Fibrosis Infections" Role: Main Proposer
- National Financial support to Applied Biomedical Research projects (Italian Ministry of Health)- PRIN 2017
Title: "Class IIa HDACs as therapeutic targets in human diseases: new roles and new selective inhibitors"
Role: Research Unit Coordinator
- Cariparo Foundation - "Cariparo Visiting Programme, 2018"
Title: "New alliance against bacterial resistance: joining state-of-the-art technologies in the fields of Peptides Therapeutics and Structural Biology for the development of antimicrobial weapons." Role: Main Proposer

Last 5 years peer review selected publications

Vascon F, Fongaro B, Mickevičius V, Pasquato A, Grybaite B, Petraitis V, Ben Abderrazek R, Polverino de Laureto P, Tondi D, Kavaliauskas P, Cendron L. Identification and Characterization of a Small-Molecule Inhibitor of the *Pseudomonas aeruginosa* SOS Response. *ACS Infect Dis*. 2025 Dec 12;11(12):3465-3480. doi: 10.1021/acsinfecdis.5c00467. PMID: PMC12706794.

Pellattiero A, Quirin C, Magrin F, Sturlese M, Fracasso A, Biris N, Herkenne S, Cendron L, Gavathiotis E, Moro S, Mattarei A, Scorrano L. Small molecule OPA1 inhibitors amplify cytochrome c release and reverse cancer cells resistance to Bcl-2 inhibitors. *Sci Adv*. 2025 Jul 4;11(27):eadx4562. doi:10.1126/sciadv.adx4562. PMID: 40614185; PMID: PMC12227059.

Linciano S, Mazzocato Y, Romanyuk Z, Vascon F, Farrera-Soler L, Will E, Xing Y, Chen S, Kumada Y, Simeoni M, Scarso A, Cendron L, Heinis C, Angelini A Screening macrocyclic peptide libraries by yeast display allows control of selection process and affinity ranking. *Nat Commun*. 2025 Jun 25;16(1):5367. doi:10.1038/s41467-025-60907-x. PMID: 40562762; PMID: PMC12198371.

Vascon F, De Felice S, Gasparotto M, Huber ST, Catalano C, Chinellato M, Mezzetti R, Grinzato A, Filippini F, Maso L, Jakobi AJ, Cendron L. Snapshots of *Pseudomonas aeruginosa* SOS response reveal structural requisites for LexA autoproteolysis. *iScience*. 2025 Jan 2;28(2):111726. doi: 10.1016/j.isci.2024.111726. PMID: 39898034; PMID: PMC11787620.

Mazzocato Y, Frasson N, Sample M, Fregonese C, Pavan A, Caregnato A, Simeoni M, Scarso A, Cendron L, Šulc P, Angelini A. Combination of Coevolutionary Information and Supervised Learning Enables Generation of Cyclic Peptide Inhibitors with Enhanced Potency from a Small Data Set. *ACS Cent Sci*. 2024 Nov 20;10(12):2242-2252. doi: 10.1021/acscentsci.4c01428. PMID: 39735311; PMID: PMC11672547.

Gherardi G, Weiser A, Bermont F, Migliavacca E, Brinon B, Jacot GE, Hermant A, Sturlese M, Nogara L, Vascon F, De Mario A, Mattarei A, Garratt E, Burton M, Lillycrop K, Godfrey KM, Cendron L, Barron D, Moro S, Blaauw B, Rizzuto R, Feige JN, Mammucari C, De Marchi U. Mitochondrial calcium uptake declines during aging and is directly activated by oleuropein to boost energy metabolism and skeletal muscle performance. *Cell Metab*. 2025 Feb 4;37(2):477-495.e11. doi: 10.1016/j.cmet.2024.10.021. Epub 2024 Nov 26. PMID: 39603237.

Prosdociimi E, Carpanese V, Todesca LM, Varanita T, Bachmann M, Festa M, Bonesso D, Perez-Verdaguer M, Carrer A, Velle A, Peruzzo R, Muccioli S, Doni D, Leanza L, Costantini P, Stein F, Rettel M, Felipe A, Edwards MJ, Gulbins E, Cendron L, Romualdi C, Checchetto V, Szabo I. BioID-based intact cell interactome of the Kv1.3 potassium channel identifies a Kv1.3-STAT3-p53 cellular signaling pathway. *Sci Adv*. 2024 Sep 6;10(36):eadn9361. doi:10.1126/sciadv.adn9361. Epub 2024 Sep 4. PMID: 39231216; PMID: PMC11373599.

Nielsen AL, Bognar Z, Mothukuri GK, Zarda A, Schuttel M, Merz ML, Ji X, Will E, Chinellato M, Bartling CRO, Stromgaard K, Cendron L, Angelini A, Heinis C. Large Libraries of Structurally Diverse Macrocycles Suitable for

Membrane Permeation. *Angew Chem Int Ed Engl.* 2024 Apr 11:e202400350. doi: 10.1002/anie.202400350. Epub ahead of print. PMID: 38602024.

Chinellato M, Perin S, Carli A, Lastella L, Biondi B, Borsato G, Di Giorgio E, Brancolini C, Cendron L, Angelini A. Folding of Class IIa HDAC Derived Peptides into α -helices Upon Binding to Myocyte Enhancer Factor-2 in Complex with DNA. *J Mol Biol.* 2024 May 1;436(9):168541. doi: 10.1016/j.jmb.2024.168541. Epub 2024 Mar 16. PMID: 38492719.

Villano G, Novo E, Turato C, Quarta S, Ruvoletto M, Biasiolo A, Protopapa F, Chinellato M, Martini A, Trevellin E, Granzotto M, Cannito S, Cendron L, De Siervi S, Guido M, Parola M, Vettor R, Pontisso P. The protease activated receptor 2 - CCAAT/enhancer-binding protein beta - SerpinB3 axis inhibition as a novel strategy for the treatment of non-alcoholic steatohepatitis. *Mol Metab.* 2024 Mar;81:101889. doi: 10.1016/j.molmet.2024.101889. Epub 2024 Feb 1. PMID:38307387; PMCID: PMC10864841.

Marchesan E, Nardin A, Mauri S, Bernardo G, Chander V, Di Paola S, Chinellato M, von Stockum S, Chakraborty J, Herkenne S, Basso V, Schrepfer E, Marin O, Cendron L, Medina DL, Scorrano L, Ziviani E. Activation of Ca²⁺ phosphatase Calcineurin regulates Parkin translocation to mitochondria and mitophagy in flies. *Cell Death Differ.* 2024 Feb;31(2):217-238. doi: 10.1038/s41418-023-01251-9. Epub 2024 Jan 18. PMID: 38238520; PMCID: PMC10850161.

De Felice S, Romanyuk Z, Chinellato M, Zoia G, Linciano S, Kumada Y, Pardon E, Steyaert J, Angelini A, Cendron L. Crystal structure of human serum albumin in complex with megabody reveals unique human and murine cross-reactive binding site. *Protein Sci.* 2024 Feb;33(2):e4887. doi: 10.1002/pro.4887. PMID: 38152025; PMCID: PMC10804666.

Bersani M, Failla M, Vascon F, Gianquinto E, Bertarini L, Baroni M, Cruciani G, Verdirosa F, Sannio F, Docquier JD, Cendron L, Spyraakis F, Lazzarato L, Tondi D. Structure-Based Optimization of 1,2,4-Triazole-3-Thione Derivatives: Improving Inhibition of NDM-/VIM-Type Metallo- β -Lactamases and Synergistic Activity on Resistant Bacteria. *Pharmaceuticals (Basel).* 2023 Dec 2;16(12):1682. doi: 10.3390/ph16121682. PMID: 38139809; PMCID: PMC10747250.

Pavan A, Cendron L, Di Nisio A, Pedrucci F, Sabovic I, Scarso A, Ferlin A, Angelini A, Foresta C, De Toni L. In vitro binding analysis of legacy-linear and new generation-cyclic perfluoro-alkyl substances on sex hormone binding globulin and albumin, suggests low impact on serum hormone kinetics of testosterone. *Toxicology.* 2023 Dec;500:153664. doi: 10.1016/j.tox.2023.153664. Epub 2023 Nov 4. PMID: 37931871.

Zorzan M, Castellan M, Gasparotto M, Dias de Melo G, Zecchin B, Leopardi S, Chen A, Rosato A, Angelini A, Bourhy H, Corti D, Cendron L, De Benedictis P. Antiviral mechanisms of two broad-spectrum monoclonal antibodies for rabies prophylaxis and therapy. *Front Immunol.* 2023 Aug 10;14:1186063. doi: 10.3389/fimmu.2023.1186063. PMID: 37638057; PMCID: PMC10449259.

Chinellato M, Gasparotto M, Quarta S, Ruvoletto M, Biasiolo A, Filippini F, Spiezia L, Cendron L, Pontisso P. 1-Piperidine Propionic Acid as an Allosteric Inhibitor of Protease Activated Receptor-2. *Pharmaceuticals (Basel).* 2023 Oct 18;16(10):1486. doi: 10.3390/ph16101486. PMID: 37895957; PMCID: PMC10610151.

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Legru A, Verdirosa F, Vo-Hoang Y,....., Licznar-Fajardo P, Crowder MW, Cendron L, Pozzi C, Mangani S, Docquier JD, Hernandez JF, Gavara L. Optimization of 1,2,4-Triazole-3-thiones toward Broad-Spectrum Metallo- β -lactamase Inhibitors Showing Potent Synergistic Activity on VIM- and NDM-1-Producing Clinical Isolates. *J Med Chem.* 2022 Dec 22;65(24):16392-16419. doi: 10.1021/acs.jmedchem.2c01257. Epub 2022 Nov 30. PMID: 36450011.

Habeshian S, Merz ML, Sangouard G, Mothukuri GK, Schüttel M, Bognár Z, Díaz-Perlas C, Vesin J, Bortoli Chapalay J, Turcatti G, Cendron L, Angelini A, Heinis C. Synthesis and direct assay of large macrocycle diversities by combinatorial late-stage modification at picomole scale. *Nat Commun.* 2022 Jul 2;13(1):3823. doi: 10.1038/s41467-022-31428-8. PMID: 35780129; PMCID: PMC9250534.

Moro G, Liberi S, Vascon F, Linciano S, De Felice S, Fasolato S, Foresta C, De Toni L, Di Nisio A, Cendron L, Angelini A. Investigation of the Interaction between Human Serum Albumin and Branched Short-Chain Perfluoroalkyl Compounds. *Chem Res Toxicol.* 2022 Nov 21;35(11):2049-2058. doi: 10.1021/acs.chemrestox.2c00211. Epub 2022 Sep 23. PMID: 36148994; PMCID: PMC9682524.

Maso L, Vascon F, Chinellato M, Goormaghtigh F, Bellio P, Campagnaro E, Van Melderen L, Ruzzene M, Pardon E, Angelini A, Celenza G, Steyaert J, Tondi D, Cendron L. Nanobodies targeting LexA autocleavage disclose a novel suppression strategy of SOS-response pathway. *Structure*. 2022 Nov 3;30(11):1479-1493.e9. doi: 10.1016/j.str.2022.09.004. Epub 2022 Oct 13. PMID: 36240773.

Minisini M, Di Giorgio E, Kerschbamer E, Dalla E, Faggiani M, Franforte E, Meyer-Almes FJ, Ragno R, Antonini L, Mai A, Fiorentino F, Rotili D, Chinellato M, Perin S, Cendron L, Weichenberger CX, Angelini A, Brancolini C. Transcriptomic and genomic studies classify NKL54 as a histone deacetylase inhibitor with indirect influence on MEF2-dependent transcription. *Nucleic Acids Res*. 2022 Mar 21;50(5):2566-2586. doi: 10.1093/nar/gkac081. PMID: 35150567; PMCID: PMC8934631.

Maso L, Trande M, Liberi S, Moro G, Daems E, Linciano S, Sobott F, Covaceuszach S, Cassetta A, Fasolato S, Moretto LM, De Wael K, Cendron L, Angelini A. Unveiling the binding mode of perfluorooctanoic acid to human serum albumin. *Protein Sci*. 2021 Apr;30(4):830-841. doi: 10.1002/pro.4036. Epub 2021 Mar 5. PMID: 33550662; PMCID: PMC7980502.

Vascon F, Gasparotto M, Giacomello M, Cendron L, Bergantino E, Filippini F, Righetto I. Protein electrostatics: From computational and structural analysis to discovery of functional fingerprints and biotechnological design. *Comput Struct Biotechnol J*. 2020 Jun 30;18:1774-1789. doi:10.1016/j.csbj.2020.06.029. PMID: 32695270; PMCID: PMC7355722.

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Linciano P, Gianquinto E, Montanari M, Maso L, Bellio P, Cebrián-Sastre E, Celenza G, Blázquez J, Cendron L, Spyraakis F, Tondi D. 4-Amino-1,2,4-triazole-3-thione as a Promising Scaffold for the Inhibition of Serine and Metallo- β -Lactamases. *Pharmaceuticals (Basel)*. 2020 Mar 24;13(3):52. doi: 10.3390/ph13030052. PMID: 32213902; PMCID: PMC7151704.

Klein R, Cendron L, Montanari M, Bellio P, Celenza G, Maso L, Tondi D, Brenk. Targeting the Class A Carbapenemase GES-5 via Virtual Screening. *Biomolecules*. 2020 Feb 14;10(2):304. doi: 10.3390/biom10020304. PMID: 32075131; PMCID: PMC7072645.

Robescu MS, Niero M, Hall M, Cendron L, Bergantino E. Two new ene-reductases from photosynthetic extremophiles enlarge the panel of old yellow enzymes: CtOYE and GsOYE. *Appl Microbiol Biotechnol*. 2020 Mar;104(5):2051-2066. doi: 10.1007/s00253-019-10287-2. Epub 2020 Jan 13. PMID: 31930452.

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Kale SS, Bergeron-Brele M, Wu Y, Kumar MG, Pham MV, Bortoli J, Vesin J, Kong XD, Machado JF, Deyle K, Gonschorek P, Turcatti G, Cendron L, Angelini A, Heinis C. Thiol-to-amine cyclization reaction enables screening of large libraries of macrocyclic compounds and the generation of sub-kilodalton ligands. *Sci Adv*. 2019 Aug 21;5(8):eaaw2851. doi: 10.1126/sciadv.aaw2851. PMID: 31457083; PMCID: PMC6703864.

Padova, January 21th, 2026