BIOGRAPHICAL SKETCH

NAME: Federico Forneris

POSITION TITLE: Full Professor of Molecular Biology

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Università degli Studi di Torino	M.S.	11/12/2002	Physical Chemistry (5 years); final grade: 110/110 summa cum laude with special mention and recommendation for publication
Università degli Studi di Pavia / IUSS	PhD	01/02/2007	Basic and Applied Bio-Molecular Sciences

A. Personal Statement

My research group has been active since 2014 and is currently composed of twelve young researchers and numerous undergraduates. We focus on extracellular macromolecules involved in fundamental biological processes of bio-medical relevance. We merge computational and experimental structural biology with biochemistry and biophysics to characterize large macromolecular complexes and elucidate their structure-function relationship to put the molecular insights in the proper biological context. We secured a strong reputation in the fields of recombinant protein production (using human cells) and in the development of methods for in vitro protein characterization. I started my independent research group at the University of Pavia thanks to the Armenise-Harvard Career Development Award and the Rita Levi-Montalcini Award. For more information about current research and targets, please visit the "*Research*" section of my lab website: http://fornerislab.unipv.it/.
The success in fund-raising (>1 project per year as principal investigator since 2014), as well as serving as Vice-Rector for Research of the University of Pavia, then as President of INF-ACT Foundation and as President of Centro Grandi Strumenti of the University of Pavia allowed me to further develop and extensively exploit leadership and management skills, including coordination of the whole INF-ACT network, involving >800 researchers and requiring, other than scientific coordination, networking and conference organization, stakeholder engagement, outreach and dissemination, intellectual property and innovation scouting.

B. Positions and Honors

Positions and Employment

CURRENT POSITIONS:	
Since 2023	Full Professor of Molecular and Structural Biology at the University of Pavia.
Since 2025	President of the Centro Grandi Strumenti of the University of Pavia (core facility unit offering infrastructure access to University and external researchers for mass spectrometry, NMR, biophysics, electron microscopy, light microscopy, cell biology, *in vivo* imaging). https://cgs.unipv.it
Since 2022	President of the INF-ACT Foundation (PNRR Extended Partnership Hub involving 25 public and

	private entities, 114.5M€ funding). https://www.inf-act.it
Since 2025	Vice-President of the Adriano Buzzati-Traverso Foundation and Chair of its Scientific Committee. https://www.fondazioneadrianobuzzatitraverso.it

PREVIOUS POSITIONS:	
2021-2025	Vice-rector for Research of the University of Pavia.
2017-2023	Associate Professor (tenured) of Molecular Structural Biology at the University of Pavia.
2014-2017	Assistant Professor (tenure-track) of Molecular Structural Biology at the University of Pavia.
2009-2013	NIH/ERC funded Postdoc in Structural Biology at the University of Utrecht with P. Gros. Topic: structural biology of large macromolecular complexes.
2007-2009	AIRC funded Postdoc in Structural Biology at the University of Pavia with A. Mattevi. Topic: biochemistry and structural biology of protein complexes involved in chromatin regulation.
2003-2006	PhD Student in Structural Biology at the University of Pavia with A. Mattevi (UNIPV-IUSS PhD program in "Basic and Applied Biomolecular Sciences" – XIX Cycle). Title of PhD Thesis: "Investigating the Structural and Biochemical Properties of Human Lysine-Specific Histone Demethylase LSD1".
2002	1-year internship in Trieste (Italy) in Structural Biology at CEB (Centre of Excellence in Biocrystallography) with L. Randaccio and S. Geremia.
1997-2002	Degree in Physical Chemistry at the University of Turin (vote: 110/110 *summa cum laude* with special mention and recommendation for publication), thesis title: "Crystallographic investigation of artificial metalloproteins with 4-Helix Bundle motif".
1992-1997	High School Diploma in Accounting (vote: 60/60).

Honors

2021	Silver Medal of Merit, Orders of Saints Maurice and Lazarus for COVID-19 research
2014-2017	Awarded a 3-year appointment as Assistant Professor (tenure-track) at the University of Pavia, Italy
2013-2018	Armenise-Harvard Career Development Award (as Principal Investigator)
2010	Best oral presentation at the 7th Innate Immunity Conference, Rhodes, Greece
2003-2006	3-year PhD fellowship jointly awarded from University of Pavia and Institute of Superior Studies (IUSS).

Patents
N/A

Reviewer Experience
>10-years activity as anonymous reviewer for manuscripts submitted to international scientific journals (including Science, Nature Immunology, Nature Communications, PNAS, Cell Mol Life Sci, Structure, JSB, Scientific Reports, JBC, JMB, Biochemistry, International Journal of Biological Macromolecules) and for research grants (including the European Research Council (Consolidator Grants, ad-hoc reviewer), Cancer Research UK, ANR France, FWO Belgium, Swiss National Science Foundation (SNS), ESCMID, Italian Ministry of Health (Bando Ricerca Finalizzata).

C. Contributions to Science

A. Large-scale recombinant protein production: thanks to our advanced protein production strategies, we contributed to numerous projects providing essential reagents difficult/impossible to obtain elsewhere.

B. Understanding the molecular mechanisms of collagen homeostasis: through integrative structural and biochemical studies we established a structural framework to understand the molecular mechanisms of collagen lysine post-translational modifications and to rationalize the impact of the disease-related mutations affecting genes encoding for collagen biosynthesis enzymes.

C. Elucidating molecular recognition at synapses: focusing on neuromuscular junctions, and recently also expanding to retinal synapses, we aim at understanding the architectures and functions of specific ligands, receptors and regulator molecules.

D. Characterization of host-pathogen interactions and their harnessing for innovative therapeutics: I have combined *in vitro* reconstruction of large macromolecular complexes, biochemistry and biophysics to characterize viral and bacterial proteins and their mechanisms of pathogeneicity, innate immune responses through the complement system, and fostered engineering and vaccine development.

E. Multi-disciplinary studies of molecular recognition and fundamental biological pathways in insects, with particular focus on mosquitoes and vectors of dangerous pathogens for human health.

Overall publication record

70+ peer reviewed original research articles, 8 peer reviewed review articles, 6 book chapters, 8 conference papers (h-index = 36 and 5685 citations by Google Scholar on 31/10/2025).

For a full list of citations please paste the following link into your browser:
https://pubmed.ncbi.nlm.nih.gov/?term=federico%20forneris&sort=date
https://scholar.google.com/citations?user=UA7_x98AAAAJ

Relevant Publications:

Associated to Contribution A:

[A1] Forneris et al. (2017) **Acta Cryst A** https://doi.org/10.1107/S2053273317082985
This conference abstract describes our strategies for large-scale recombinant protein production.
[A2] Faravelli et al. (2021) **Bio-protocol** https://doi.org/10.21769/BioProtoc.3998
This publication summarizes our efforts to optimize reliable recombinant protein production pipelines using HEK293 cells.
[A3] Banushi et al. (2016) **Nat Commun** https://doi.org/10.1038/ncomms12111
Our recombinant samples led to revision of paradigms in collagen homeostasis and vesicular trafficking.
[A4] Angiolini et al. (2019) **eLife** https://doi.org/10.7554/eLife.44305
In this work we used our HEK293 cells expression system to produce milligram amounts of L1Cam for a large collaborative study.

Associated to Contribution B:

[B1] Scietti et al. (2018) **Nat Commun** https://doi.org/10.1038/s41467-018-05631-5
[B2] De Marco et al., (2025) **Nat Commun** https://doi.org/10.1038/s41467-025-59017-5
Through an integrative approach, we characterize the structure and functions of human LH3 [B1] and human GLT25D1 [B2], providing new milestone for collagen biochemistry and research.
[B3] Koenig et al. (2021) **Translat Res** https://doi.org/10.1016/j.trsl.2021.08.002
This work is an example of a genotype-to-molecular phenotype characterization of pathogenic mutations using a panel of biochemical and biophysical methods.

Associated to Contribution C:

[C1] Guarino et al. (2020) **Front Mol Biosci** https://doi.org/10.3389/fmolb.2019.00156
This review summarizes our molecular understanding about neuromuscular junctions.
[C2] Canciani et al. (2019) **Prot Sci** https://doi.org/10.1002/pro.3587
[C3] Canciani et al. (2022) **Mol Neurobiol** https://doi.org/10.1007/s12035-022-03056-2
[C4] Canciani et al. (2026) **J Struct Biol** http://dx.doi.org/10.1016/j.jsb.2026.108320

These publications ([C2]-[C4]) testify our ability to infer biologically-relevant insights from human protein targets localized at neuromuscular synapses.
[C5] Patil et al. (2023) **Sci Signal** https://doi.org/10.1126/scisignal.add9539
A multi-disciplinary structural characterization of a large macromolecular assembly involving an orphan receptor and a proteoglycan.

Associated to Contribution D:
[D1] Xue X., et al. (2017) **Nat Struct Mol Biol** https://doi.org/10.1038/nsmb.3427
This paper illustrates the architecture of a long-sought complement complex regulatory complex and its mechanism of action.
[D2] Brasu et al. (2022) **Nat Immunol** https://doi.org/10.1038/s41590-022-01313-z
[D3] Bernardotto et al. (2023) **Biomaterials** https://doi.org/10.1016/j.biomaterials.2023.122394
[D4] Oliviero et al. (2025) **J Med Chem** https://doi.org/10.1021/acs.jmedchem.6c00166
These three papers represent examples of our contribution to COVID-19 research. Our major contribution in these works is the generation and characterization of antigens and/or host proteins.

Associated to Contribution E:
[D1] Arnoldi et al. (2022) **Curr Biol** https://doi.org/10.1016/j.cub.2022.06.049
This publication describes our journey into the characterization of an unprecedented feedback mechanism in mosquito saliva, essential for blood feeding.
[D2] Buezo Montero et al. (2019) PLoS Neg Trop Dis https://doi.org/10.1371/journal.pntd.0007806
[D3] Arnoldi et al. (2023) **WAO J** https://doi.org/10.1016/j.waojou.2023.100836
These papers illustrate our investigations to characterize the antigenic properties of mosquito salivary proteins and the associated immune responses in humans.
[D4] Berlinguer et al. (2026) **BioRxiv** https://doi.org/10.15252/embj.201593673
A new journey into mosquito biology addresses vitellogenin interactions with its receptor. This preprint represents the first published result of this new research direction of our lab.

D. Past and Ongoing Research Support

Active Grants

Period	***Project Title***	***Funding source***	***Role of the PI***
2023-2026	Dissecting The Significance and the Impact of Missense PLOD1 Mutations Causing Kyphoscholiotic Ehlers-Danlos syndrome	The Ehlers-Danlos Society (USA)	Principal Investigator
2026-2030	Targeting pro-metastatic collagen lysine post-translational modification enzyme assemblies	AIRC, Investigator Grant (IT)	Principal Investigator
2022-2027	Structural enzymology studies of collagen prolyl-4-hydroxylases (C-P4Hs)	Jane and Aatos Erkko Foundation (FI)	Subcontractor
2023-2027	Immuno-Hub	Italian Ministry of Health, Piano Operativo Salute (POS, IT)	Co-Investigator
2025-2027	Nuovi farmaci biotecnologici combinati e intelligenza artificiale contro i batteri multi-resistenti (ARTIBAC)	Regione Lombardia, call “Collabora & Innova” (IT)	Co-Investigator
2025-2028	From trash to cash: biotechnological recycling of exhausted cell culture media and sustainable production of hydrolysates for cultivated meat using microalgae	The Good Food Institute (USA)	Co-Investigator

2026-2028	Potenziamento delle Grandi Infrastrutture di Ricerca a supporto dell'Industria della Salute presso il Centro Grandi Strumenti dell'Università di Pavia	Regione Lombardia, Call FESR-Resarch Infrastructures for Universities (IT)	Principal Investigator (as CGS President)
2026-2028	Innovative diagnostic technologies for the implementation of 4p medicine (predictive, preventive, personalized, participatory) for communicable and non-communicable diseases (ACT4HEALTH)	Italian Ministry of University and Research – PN RIC 2021-2027 (IT)	Principal Investigator (as INF-ACT President)
2026-2028	Widespread technological innovation hub for the diagnosis of transmissible and non-transmissible diseases (ACT4TECH)	Italian Ministry of University and Research – PN RIC 2021-2027 (IT)	Principal Investigator (as INF-ACT President)
2026-2028	Advanced training program in health technologies and innovative diagnostics (ACT4TRAIN)	Italian Ministry of University and Research – PN RIC 2021-2027 (IT)	Co-Principal Investigator (as INF-ACT President)
2026-2028	Development of Monitoring and Analysis Research Ecosystem (DoMARE)	Italian Ministry of University and Research – PN RIC 2021-2027 (IT)	Principal Investigator (as INF-ACT President)
2026-2028	Platforms for a Monitoring and Analysis Research Ecosystem (PlasMARE)	Italian Ministry of University and Research – PN RIC 2021-2027 (IT)	Principal Investigator (as INF-ACT President)

Completed Grants

Period	***Project Title***	***Funding source***	***Role of the PI***
2022-2025	One Health Basic and translational Actions Addressing Unmet Needs on Emerging Infectious Diseases (INF-ACT)	Italian Ministry for University and Research (MUR), through NextGenerationEU PNRR (IT)	Co-Investigator, President of the coordinating Hub Institution
2023-2026	SMACK:the Saliva-Mediated feedbaCK signal affecting mosquito biting	Italian Ministry for University and Research (MUR), PRIN 2022 (IT)	Co-Investigator
2023-2026	Deciphering the molecular basis of insect vitellogenin recognition by its receptor(s): new integrative approaches to investigate low-density lipoprotein receptor (LDLR) complexity across species	Italian Ministry for University and Research (MUR), PRIN PNRR 2022 (IT)	Co-Investigator
2022	Unraveling the molecular complexity of pro-metastatic human collagen lysyl hydroxylasesglycosyltransferases	AIRC, Bridge Grant (IT)	Principal Investigator (2022-2023)
2020	Risoluzione Infrastrutture 3776	Regione Lombardia (IT)	Participant to the UNIPV Unit (2020-2024)
2020	Novel compounds to limit mosquito-borne	NATO Science for Peace	Principal

	pathogens and associated infections	and Security Program (BE)	Investigator (2020-2024)
2020	Unraveling the Molecular Mechanisms of Collagen Glycosyltransferases	Mizutani Foundation for Glycoscience (JP)	Principal Investigator (2020-2021)
2020	Molecular Characterization of Rod Vision Circuits in Health and Disease	Velux Stiftung Ophtalmology Grant (CH)	Principal Investigator (2020-2024)
2019	Identification of small molecule inhibitors of PLOD3	Atomwise AIMS Grant (USA)	Co-Investigator (2019-2020)
2019	Stopping mosquito bites through targeting of novel secondary messengers in the insects saliva	Italian Ministry for University and Research (MUR), PRIN 2017 (IT)	Principal Investigator (2019-2022)
2018	Investigating LH2 as biomarker and drug target in cancer proliferation and metastasis	AIRC, My First AIRC Grant (IT)	Principal Investigator (2018-2022)
2016	CONSOLIDAMENTO DI METODOLOGIE TECNICHE E RISORSE UNICHE PER CALLS ERC	Fondazione Cariplo (IT)	Principal Investigator (2016-2018)
2015	EXPLORING THE REGULATORY ROLES OF PROTEOLYSIS AND INTRA-MEMBRANE PROTEIN CLUSTERING IN FORMATION AND DISSOCIATION OF NEUROMUSCULAR SYNAPSES	Fondazione Cariplo (IT)	Principal Investigator (2015-2018)
2014	Untangling the molecular complexity of neuromuscular junctions	Italian Ministry for University and Research (MUR), Rita Levi-Montalcini Grant (IT)	Principal Investigator (2014-2017)
2014	Molecular Recognition at the Neuromuscular Synapse	Fondazione Giovanni Armenise-Harvard Career Development Award (USA)	Principal Investigator (2014-2019)

E. Experience as a research supervisor

>15 postdocs

18 PhD students

>50 undergraduates