LAVINIA CARLINI

ACADEMIC AND SCIENTIFIC CURRICULUM VITAE

SCIENTIFIC PROFILE

Interdisciplinary researcher with experience in plant pathology, molecular and structural biology, protein biochemistry, bioinformatics and multi-omics.
Research interests include effector-host interactions, bacterial virulence mechanisms, plant-microbiome interactions and the structural characterization of disease-relevant protein complexes.
Technical expertise spans molecular cloning, PCR/qPCR, protein-protein interaction assays, recombinant protein production and purification, crystallization, X-ray crystallography, biophysical characterization and the integration of genomic, transcriptomic, proteomic and metabolomic data.

EDUCATION

2020-2024
PhD

PhD in Mountain Environment and Agriculture

Free University of Bozen-Bolzano

Thesis: "Towards the understanding of the amylovoran biosynthetic pathway in *Erwinia amylovora*". Degree awarded on 19 April 2024.

2017-2020
MSc

Master's Degree in Industrial Biotechnology, Chemistry curriculum

University of Padua

Final grade: 110/110 cum laude.

2014-2017
BSc

First-Cycle Degree in Chemistry

University of Parma

Final grade: 101/110.

RESEARCH AND PROFESSIONAL EXPERIENCE

Dec 2025-Nov 2026
Postdoctoral

Scientific Collaborator

Laimburg Research Centre, Functional Genomics Group

Investigating the molecular mechanisms underlying phytoplasma-host interactions in *Malus domestica* and in tolerant and susceptible *Malus* species, with particular emphasis on interactions between phytoplasma effector proteins and host targets.
Characterizing effector-host interactions through PCR and qPCR analyses, molecular cloning, recombinant DNA technologies and Yeast Two-Hybrid assays.
Identified interactions were further examined using heterologous protein expression, chromatographic purification, quality assessment and optimization of recombinant proteins and protein complexes, followed by crystallization screening and optimization for structural characterization.

Nov 2024-Oct 2025
Postdoctoral

Postdoctoral Researcher in Agricultural Chemistry

Laboratory of Plant and Microbe Biotechnologies, Faculty of Agricultural, Environmental and Food Sciences, Free University of Bozen-Bolzano

Investigated the ecological, agronomic and functional effects of microbiome transplantation, focusing on plant-microbe interactions and on the biochemical, molecular and physiological responses of plants under controlled and field conditions.
Applied enzymatic assays and ionomic profiling to assess microbial activity, nutrient dynamics and plant nutritional status.

Integrated metagenomics, RNA-seq transcriptomics, LC-MS/MS proteomics and metabolomics to characterize plant-microbiome-soil interactions and identify functional biomarkers associated with soil and plant health.
Computational activities included sequence assembly, genome annotation, pangenome construction and multi-omics data analysis.

Nov 2023-Oct 2024
Postdoctoral

Postdoctoral Researcher in Molecular and Structural Biology

Department CIBIO, University of Trento, Laboratory of Protein Crystallography and Structure-Based Drug Design

Contributed to structure-based research on therapeutic opportunities for Lafora disease, including fragment-based screening against Protein Targeting to Glycogen (PTG).
Investigated the architecture and regulation of the PTG/Laforin/Malin ternary complex and PP1/PTG assemblies with glycogen-modifying enzymes.
Combined molecular cloning, recombinant protein production, crystallographic characterization, structural modelling and molecular docking with proteomic and metabolomic profiling to examine disease-related mechanisms and potential intervention points.

Nov 2020-Oct 2023
PhD student

PhD Researcher

Free University of Bozen-Bolzano, Faculty of Science and Technology, Laboratory of Bioorganic Chemistry and Bio-Crystallography

Investigated microbial virulence mechanisms in *Erwinia amylovora*, focusing on the amylovoran biosynthetic pathway and its contribution to fire blight pathogenesis, host colonization and modulation of plant defence responses.
Identified and analysed genes involved in amylovoran production and regulation using nucleic-acid manipulation, qPCR, molecular cloning and site-directed mutagenesis.
Expressed, purified and crystallized pathway enzymes for structural and mechanistic studies, and used bioinformatics to model the pathway and predict regulatory elements.
Comparative analyses across bacterial, fungal, viral and oomycete pathogens were used to examine conserved and distinct virulence strategies and plant immune signalling mechanisms.

INTERNATIONAL AND EXTERNAL RESEARCH EXPERIENCE

Feb-May 2023
PhD student

Visiting Researcher

Diamond Light Source, Research Complex at Harwell, Membrane Protein Laboratory, United Kingdom

Received training in membrane-protein production and crystallization and applied nanodrop and lipidic cubic phase crystallization, cryo-EM screening, ITC, nano-DSF and SEC-MALS.

Jun-Jul 2022
PhD student

Visiting Researcher

BIOCEV, Biotechnology and Biomedicine Centre, Prague, Czech Republic

Expanded expertise in protein biophysics using nano-DLS, nano-DSF, circular dichroism and SAXS to investigate proteins studied during the PhD project.

Sep-Oct 2021
PhD student

Visiting Researcher

International Centre for Genetic Engineering and Biotechnology, Trieste, Italy

Performed genome-wide computational and bioinformatic analyses of *Erwinia* genomes, including genome annotation, comparative genomics and gene-function prediction.
Integrated mass-spectrometry-based proteomic and metabolomic data to map functional traits in bacterial pathogens and host-pathogen interaction models.

Sep 2019-Jul 2020
MSc level

Research Intern

Department of Chemical Sciences, University of Padua

Produced and characterized recombinant proteins through construct and plasmid design, heterologous expression and chromatographic purification.

Analysed secondary and three-dimensional structure using prediction tools and X-ray crystallography, and performed biochemical and biophysical characterization by DLS, circular dichroism, Thermofluor, SDS-PAGE and mass spectrometry.

Summer 2017
MSc level

Laboratory Intern

Water Analysis and Chromatography Laboratory, Provincial Environment Agency (APPA BZ), Province of Bolzano

Performed chromatographic and spectrometric analyses of environmental and food samples, including metabolite extraction and GC-MS and LC-MS analysis.

Oct 2016-Jan 2017
Undergraduate

Laboratory Intern

Department of Chemistry, University of Parma, Laboratory of Organic Chemistry

Synthesized and functionalized calix[4]arene-based macromolecules and characterized supramolecular compounds using two-dimensional NMR, mass spectrometry and TLC.

PEER-REVIEWED PUBLICATIONS

1. Carlini, L.; Tancreda, G.; Iobbi, V.; Caicci, F.; Bruno, S.; Esposito, A.; Calzia, D.; Benini, S.; Bisio, A.; Manni, L.; Schito, A.; Traverso, C.E.; Ravera, S.; Panfoli, I. The Flavone Cirsiliol from *Salvia x jamensis* Binds the F1 Moiety of ATP Synthase, Modulating Free Radical Production. *Cells* **2022**, 11, 3169. doi:10.3390/cells11193169.
2. Carlini, L.; Esposito, A.; Ambrosino, L.; et al. The Ams proteins and the amylovoran biosynthetic pathway: an extensive bioinformatic study. *Journal of Plant Pathology* **2023**. doi:10.1007/s42161-023-01532-9.
3. Bharti, S.*; Carlini, L.*; Esposito, A.; Benini, S. Bioinformatics and modelling studies of FhuD, the periplasmic siderophore-binding protein from the plant pathogen *Erwinia amylovora*. *PLOS ONE* **2025**, 20(7), e0326667. *Equal contribution. doi:10.1371/journal.pone.0326667.
4. Panfoli, I.; Carlini, L. Resveratrol as a Potential Platelet Inhibitor in Aspirin-Resistant Diabetic Patients: A Novel Therapeutic Strategy Targeting F0F1-ATP Synthase Inhibition. *Life* **2025**, 15(11), 1718. doi:10.3390/life15111718.

MANUSCRIPTS IN PREPARATION

- Carlini, L.; Sangiorgio, D.; Insam, H.; Rinke, C.; Bertani, I.; Venturi, V.; Pii, Y. Microbiota transplantation: an emerging strategy to promote barley resilience and productivity.
- Carlini, L.; Sangiorgio, D.; Pii, Y. A multi-omics approach to investigate the effects of microbiota transplantation in barley.
- Sbardellati, V.; Carlini, L.; Janik, K. Hidden Weapons: Effector proteins of "*Candidatus* Phytoplasma mali" in South Tyrol. *Laimburg Journal*.

DOCTORAL THESIS

Carlini, L. Towards the understanding of the amylovoran biosynthetic pathway in *Erwinia amylovora*.

SELECTED CONFERENCE CONTRIBUTIONS

- 2026 | Poster, PPATH2026, British Society for Plant Pathology, Norwich, UK: "Hijacking the Host: Do SAP05-RPN10 interactions shape phytoplasma susceptibility in apple?".
- 2026 | Poster, PPATH2026, Norwich, UK: "RPN10 paralogs as potential resistance modulators in apple" (co-author).

- 2026 | Poster, PPATH2026, Norwich, UK: “Ghost in the machine? Function of the phytoplasma effector PME10 in the context of photosynthesis and proteosomal degradation” (co-author).
- 2026 | Flash oral presentation, BMM26 Structural Biology Meeting, Florence, Italy: “From Structure to Susceptibility: Phytoplasma Effector Function across different *Malus* species”.
- 2025 | Oral presentation, XLIII SICA Congress, Padua, Italy: “Root microbiota: tapping into microscopic helpers to address iron deficiency”.
- 2025 | Oral presentation, XLIII SICA Congress, Padua, Italy: “Microbiota transplantation: a novel approach to enhance barley resilience and productivity” (co-author).
- 2024 | Poster, 34th European Crystallographic Meeting, Padua, Italy: “Protein Targeting to Glycogen (PTG), a validated target in Lafora disease”.
- 2024 | Poster, SIBBM Seminar, Trento, Italy: “Searching for New Therapeutic Opportunities in Lafora Disease” (co-author).
- 2024 | Poster, Dundee, Scotland: “Development of PROTACs for BAZ2A and BAZ2B Bromodomains” (co-author).
- 2022 | Oral presentation, Third International Symposium on Fire Blight of *Rosaceous* Plants, Dresden, Germany: “The Ams proteins and the amylovoran biosynthetic pathway in the phytopathogen *Erwinia amylovora*”.
- 2022 | Poster, Third International Symposium on Fire Blight of Rosaceous Plants, Dresden, Germany: “Proteins Involved in Siderophore Mediated Iron Uptake in *Erwinia amylovora*” (co-author).

TEACHING AND SUPERVISION

- Jun-Oct 2026 | Supervisor, Master’s thesis in molecular biology, Laimburg Research Centre. Mentored research planning, experimental troubleshooting, molecular biology and functional genomics workflows, data interpretation and scientific writing.
- Nov 2024-May 2025 | Supervisor, Bachelor’s thesis in Plant and Microbe Biotechnologies, Free University of Bozen-Bolzano. Supported experimental design, laboratory work, data analysis and scientific reporting.
- Jan 2025 | Teaching Assistant, Fundamentals of Chemistry, Free University of Bozen-Bolzano, 8 hours.
- Oct-Dec 2024 | Teaching support, Chemistry and Biochemistry, University of Trento, 15 hours.
- Nov 2023-Oct 2024 | Co-supervisor of two PhD students in molecular biology and crystallography, University of Trento.
- Apr-Oct 2024 | Supervisor of two Bachelor’s experimental thesis projects in molecular biology and protein crystallography, University of Trento.
- Jan 2023 | Teaching Assistant, Fundamentals of Chemistry, Free University of Bozen-Bolzano, 34 hours.
- Feb 2023 | Tutor, Bioorganic Chemistry and Crystallography, Free University of Bozen-Bolzano.
- Oct 2022 | Lecturer, OFA Chemistry, Free University of Bozen-Bolzano, 6 hours.
- Mar 2022 | Teaching Assistant, Entomology and Phytopathology, Free University of Bozen-Bolzano, 8 hours.
- Oct-Dec 2021 | Teaching Assistant, Fundamentals of Chemistry, Free University of Bozen-Bolzano, 24 hours.
- Oct 2021 | Lecturer, OFA Chemistry, Free University of Bozen-Bolzano, 6 hours.

RESEARCH FELLOWSHIPS AND INFRASTRUCTURE ACCESS

- 12-month postdoctoral fellowship, CEDRIC, Interreg Italy-Austria 2021-2027, Laboratory of Plant and Microbe Biotechnologies, Free University of Bozen-Bolzano.
- 12-month postdoctoral fellowship, PNRR project “Therapeutic opportunities in Lafora disease, a rare juvenile neurodegenerative epilepsy with no treatment”, Department CIBIO, University of Trento.

- Three-year PhD programme, Free University of Bozen-Bolzano: “Towards the understanding of the amylovoran biosynthetic pathway in *Erwinia amylovora*”.
- iNEXT-Discovery programme, PID 27061 and 35085: fragment screening for PTG, a target in Lafora disease.
- 11th Instruct-ERIC internship, PID 2557: structural biology of Ams proteins, including complexes and membrane proteins.
- Instruct-ERIC access, PID 26571: structural and functional characterization of proteins involved in siderophore-mediated iron uptake in *Erwinia amylovora*.
- Instruct-ERIC access, Application ID 1711: structural characterization of the siderophore biosynthesis pathway in *Aspergillus fumigatus*.

TECHNICAL EXPERTISE

Molecular biology: DNA and RNA manipulation; PCR and qPCR; molecular cloning; recombinant DNA; site-directed mutagenesis; gene-expression analysis; Yeast Two-Hybrid assays.

Protein science: Heterologous expression; recombinant protein and protein-complex production; affinity, ion-exchange and size-exclusion chromatography; SDS-PAGE; Western blotting; enzymatic assays.

Structural and biophysical biology: Protein crystallization; X-ray crystallography; LCP crystallization; cryo-EM screening; DLS; nano-DSF; circular dichroism; ITC; SEC-MALS; SAXS; Thermofluor.

Bioinformatics and multi-omics: Genome annotation; comparative genomics; pangenome construction; sequence and structural analysis; molecular modelling and docking; RNA-seq; proteomics; metabolomics; multi-omics integration.

Analytical methods: HPLC/FPLC; GC-MS; LC-MS/MS; mass spectrometry; two-dimensional NMR; UV/Vis spectroscopy; TLC.

LANGUAGE COMPETENCE

Language	Level	Certification
Italian	Native	Mother tongue
German	C1	Goethe-Zertifikat C1; bilingualism certificate A
English	C1	Cambridge English First, B2; Free University of Bozen-Bolzano Language Centre, C1

PROFESSIONAL MEMBERSHIPS

- Italian Crystallographic Association (AIC).
- European Crystallographic Association (ECA).