

BETTINELLI PAOLA

PERSONAL INFORMATION

ADDRESS: Caldaro s.s.d.V., 39052 (BZ), Italy
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E-MAIL: paola.a.bettinelli@gmail.com
NATIONALITY: Italian
DATE OF BIRTH: 25/07/1987



EDUCATION AND QUALIFICATIONS:

2016 Master's degree **INDUSTRIAL BIOTECHNOLOGY**
University of Milan-Bicocca, Faculty of SMFN, Italy
Grade: 102/110

2012 Bachelor's Degree: **INDUSTRIAL AND ENVIRONMENTAL BIOTECHNOLOGY** *Specialization: Bioinformatics*
University of Milan, Faculty of SMFN, Italy
Grade: 102/110

2006 **Classical Lyceum** A. Racchetti, Crema, CR, Italy
Grade: 80/100

PROFESSIONAL EXPERIENCES:

FEBRUARY 2023/AUGUST 2025: RESEARCHER (R4)

At Fondazione Edmund Mach (FEM) (San Michele all'Adige, TN, Italy).

MAIN ACTIVITY: genetic characterization of FEM germplasm collections oriented to the identification of sustainable quality traits and to the development of FAIR databases. The assembly and exploration of the genome of an important reference variety for FEM breeding complete the objective of this project.

NOVEMBER 2019/JANUARY 2023: PHD STUDENT

At C3A, University of Trento and FEM (San Michele all'Adige, TN, Italy).

THESIS TITLE: "Dissection of black rot resistance towards marker-assisted breeding in grapevine"

PROJECT: Pedigree reconstruction and phenotyping optimization coupled with high-density linkage mapping revealed a major QTL associated with bunch resistance.

MAY 2018/SEPTEMBER 2019: LABORATORY TECHNICIAN (A4)

At FEM (San Michele all'Adige, TN, Italy). Research and Innovation Center, Genetic and Genetic Improvement of the Vine Unit.

MAIN ACTIVITY: Marker-Assisted selection for grapevine breeding.

JULY 2017 TILL NOW: PARTNER OF ELLEBI GREEN SRL

The company has as purpose the study, experimentation and scientific research for the production and sale of innovative eco-sustainable/environmentally friendly products and methods in the agriculture sector, of public, private and sports green areas, and sensitive areas.

OCTOBER 2013/JULY 2015: STAGE AND EXPERIMENTAL THESIS

(with a brake between May and December 2014)

At FEM (San Michele all'Adige, TN, Italy). Research and Innovation Center, Biotechnology of Natural Product research group.

THESIS TITLE: "Identification and characterization of putative genes responsible for Gallic Acid Biosynthesis in Strawberry (*Fragaria vesca*) and Raspberry (*Rubus idaeus*)"

PROJECT: Identification, cloning, heterologous expression, enzymatic assay and gene expression analysis, subcellular localization of the cloned enzymes.

2010 FEBRUARY TO SEPTEMBER: STAGE AND EXPERIMENTAL THESIS

At Universidad Complutense de Madrid, Spain, LL-P ERASMUS-PROJECT. Biochemistry and Molecular Biology I Department, Biofisics Group.

THESIS TITLE: "Stoichiometric analysis of alternative histidine synthesis in *Ruthia magnifica* through Metatool 4.9.2"

PROJECT: Optimization and application of the bioinformatic tools Metatool e Tools-4-Metatool for the study of metabolic networks.

TECHNICAL KNOWLEDGES:

- WORK as PhD STUDENT

PLANT PHENOTYPING: artificial inoculation of *P. ampellicida* in vivo (leaves in greenhouse, bunches in the field) and ex vivo (leaves). Microscopic inspection of disease progression (fluorescence microscope).

PLANT GENOTYPING: plant tissue sampling and DNA extraction, SNP chip data elaboration (GrapeReSeq 18K Vitis SNP chip, Illumina) with **GenomeStudio** and **Assist**, SSRs amplification (PCR simplex and multiplex) and screening with **GeneMarker**.

LINKAGE MAPPING: map optimization and poor fitting markers exclusion with **JoinMap 5**.

QTL IDENTIFICATION: Interval mapping, Kruskal-Wallis, Multiple QTL Model Mapping (MQM) with **MapQTL 6**.

DATA ANALYSIS with **R environment**.

PUTATIVE RESPONSIBLE GENES IDENTIFICATION: Blast of all SNPchip sequences on the new PN40024.v4 for their repositioning. Jbrowse and GREAT for QTL navigation and inspection of annotated genes and gene expression.

- WORK as LABORATORY TECHNICIAN

MAS (Marker-Assisted Selection): plant tissue sampling and DNA extraction (96wells-CTABprotocol, QIAGEN DNeasy Plant Mini Kit), PCR (simplex and multiplex), gel electrophoresis.

BIOINFORMATIC: genotyping analysis with molecular markers using dedicated software (**GeneMapper v.5**).

GREENHOUSE CONTROLLED INFECTION IN VIVO (*P. ampellicida*, *E. ampelina*): in vitro isolation and propagation of the pathogen (pure cultures), sporulation induction, inoculum preparation, infection, and symptoms screening.

EX VIVO CONTROLLED INFECTION (detached organs for *E. necator* leaf disks for *P. viticola*): sporulation induction, inoculum preparation, infection, and symptom screening (phenotyping, OIV scale).

- MASTER'S DEGREE INTERNSHIP

Extraction of nucleic acids (DNA and RNA) from plant tissues (CTAB) and from cell cultures (MiniPrep).

Cloning systems: PCR, gel electrophoresis, synthesis of recombinant DNA molecules.

E. coli, *S. cerevisiae*, and *A. tumefaciens* transformation.

Microbiology: sterilization, preparation of selective growth media and pure cultures.

A. thaliana and *N. benthamiana* agroinfiltration.

Fluorescence microscopy analysis of transformed *N. benthamiana* (GFP fusion protein).

Protein expression and purification in *E. coli* and *S. cerevisiae*: his-tag, GST fusion protein.

Protein identification and quantification: PAGE, western blot (immunoblotting), Bradford assay.

Enzymatic activity analysis: spectrophotometry and LCMS.

Transcriptomic analysis: RNA extraction, cDNA synthesis, real time qPCR and data analysis with Bio-Rad CFX Manager 3.0.

Metabolite extraction from plant tissue for LC-MS analysis.

Bioinformatic: genomic, metabolic and protein databases (Genbank / EMBL and SwissProt, Genome Browser of the UCSC, Ensembl, GenScan and GenomeScan, PDB, CATH Kegg Genes and Kegg Pathway Maps, Metacyc and Brenda);

alignment of nucleotide and protein sequences (BLAST, FASTA, ALIGN, ClustalW); Molecular Modeling programs (PyMol, I-Tasser, Swissmodel workspace, UniprotKb, Autodoc).

- BACHELOR'S DEGREE INTERNSHIP: stoichiometric and flux balance analysis, network design (Metatool e Tools-4-Metatool).

LANGUAGES:

ITALIAN:	Mother language
ENGLISH:	Good (First Certificate in English, B2 level in 2006)
SPANISH (CASTELLANO):	Fluent

SKILLS AND PERSONAL QUALITIES:

TEAM-WORKING	Because of my personal attitude and thanks to my work experiences I have good interpersonal skills, patience, and diplomacy. I am used to collaborate with different persons on the same project and prepare progress reports.
ORGANIZATION	As a PhD student I have to plan experiments, plant material management, participation to congresses and to respect deadlines. During my academic career I was always working, learning to plan, organize, and optimize my time in order to reach my goals. I had experience in private event organization. I served as maître during summer events in Bergamo (Italy).
COMMUNICATION	I have good experience in public speaking, both during scientific congresses or for scientific dissemination.
IT SKILLS	Proficient in use Microsoft Office and web-based resources and databases. and to use cloud-based video communications online platforms (Google Meet, Microsoft Teams, Skype, Zoom).

SCIENTIFIC PUBLICATIONS:

Refereed publications with IF:

- **Bettinelli**, Nicolini, Costantini, Stefanini, Hausmann, Vezzulli (2023). Towards Marker-Assisted Breeding for Black Rot Bunch Resistance: Identification of a Major QTL in the Grapevine Cultivar 'Merzling'. *Int. J. Mol. Sci.* 24, 3568. MDPI (IF: 6.208)
- Pirrello§, Mizzotti§, Tomazetti§, Colombo, **Bettinelli**, Prodorutti, Peressotti, Zulini, Stefanini, Angeli, Masiero, Welter, Hausmann, Vezzulli (2019) Emergent Ascomycetes in viticulture: an interdisciplinary overview. *Front Plant Sci.* (IF: 4.402)
- Zini§, Dolzani§, Stefanini, Gratl, **Bettinelli**, Nicolini, Betta, Dorigatti, Velasco, Letschka, Vezzulli (2019). R-Loci Arrangement Versus Downy and Powdery Mildew Resistance Level: A Vitis Hybrid Survey. *Int. J. Mol. Sci.* 2019, Vol. 20, Page 3526 20: 3526. (IF: 4.556)

Refereed publications with IF in progress:

- **Bettinelli**, Nicolini, Giovannini, Prodorutti, Stefanini, Hausmann, Vezzulli. Breeding for black rot resistance in grapevine: advanced approaches for germplasm screening. **Submitted.**
- **Bettinelli**§, Tomazetti§, Zulini, Nicolini, Stefanini, Vezzulli. A refined marker-assisted selection strategy for stacking mildew resistance loci in grapevine. **In preparation.**
- Migliaro, Peressotti, Dolzani, **Bettinelli**, Banchi, Riaz, Cappellin, Zini, Walker, Reischl, et al. Unravelling the knot of grapevine hybrid kinship: A 50 SSR- and 12 R-loci-based genetic diversity analysis. **In preparation.**

Refereed publications without IF:

- Vezzulli, Gramaje, Tello, et al (2022) Genomic Designing for Biotic Stress Resistant Grapevine. *Genomic Des Biot Stress Resist Fruit Crop* 87–255. https://doi.org/10.1007/978-3-030-91802-6_4
- Stefanini, Gratl, **Bettinelli**, Zini, Letschka, Sturm, Velasco, Stuppner, Khomenko, Eisenstecken, Robatscher, Chitarrini, Pedri, Vezzulli (2022). Studi sui tratti di qualità negativa nelle nuove viti mediamente resistenti alle malattie fungine. CO.NA.VI. 2020 – 8° Convegno Nazionale di Viticoltura. BIO Web Conferences 44:04003. <https://doi.org/10.1051/bioconf/20224404003>
- Vezzulli, Dolzani, Nicolini, **Bettinelli**, Migliaro, Gratl, Stedile, Zatelli, Dallserra, Clementi, Dorigatti, Velasco, Zulini, Stefanini (2019). Miglioramento genetico assistito per la resistenza a peronospora, oidio e fillossera presso FEM. CO.NA.VI. 2018 - 7° Convegno Nazionale di Viticoltura. BIO Web Conferences 13: 01002. <https://doi.org/10.1051/bioconf/20191301002>

§ These authors contributed equally to this work

PRESENTATIONS TO NATIONAL AND INTERNATIONAL MEETINGS (POSTER):

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| 2022-09 | Bettinelli , Nicolini, Giovannini, Costantini, Stefanini, Hausmann, Vezzulli. Highly dense linkage mapping and identification of a major QTL associated with black rot resistance in the grapevine cultivar 'Merzling'. In: SIGA 2022 – LXV Annual Congress, 6-9 September, Piacenza, Italy. |
| 2022-06 | Bettinelli , Tomazetti, Zulini, Nicolini, Zatelli, Dallserra, Dorigatti, Stefanini, Vezzulli. Piramidazione di loci di resistenza a peronospora e oidio mediante un processo ottimizzato di selezione assistita da marcatori molecolari. In: CO.NA.VI. 2022 – 9° Convegno Nazionale di Viticoltura, 13-15 June, Conegliano, Italy. |
| 2021-10 | Bettinelli , Nicolini, Stefanini, Hausmann, Vezzulli. High-density linkage mapping and QTL identification of black rot resistance towards marker-assisted breeding in grapevine. ISHS Grapevine Physiology and Biotechnology congress, 31-October/5-November, Stellenbosch, South Africa. |
| 2021-08 | Bettinelli , Nicolini, Giovannini, Visentin, Betta, Prodorutti, Cainelli, Clementi, Dorigatti, Stefanini, Hausmann, Vezzulli. DAMAGE: Dissection of black rot resistance towards Marker-Assisted breeding in Grapevine. EUCARPIA 21st general congress, 23-26 August 2021, Rotterdam, Netherlands. |
| 2020-11 | Tomazetti, Rossarolla, Stefanini, Bettinelli , Welter, Silva. Área foliar da videira piwi variedade Aromera estimada utilizando rede neural artificial. 14° SENAFRUT, 12, 17, 19, 24 e 26 November 2020, Universidade Federal De Santa Catarina, Florianópolis, Brasil. https://senafut.com.br/assets/uploads/5ca0f-anais_2020.pdf handle: http://hdl.handle.net/10449/65913 |
| 2010-10 | Morán, Vázquez, Xavier, Gamba, Bettinelli , Montero. Comparison and graph representation of metabolic networks using Tools-4-Metatool. 11th International Conference on Systems Biology, 11-24 October 2010 Workshop, Edinburgh. |
| 2010-07 | Morán, Montero, Vázquez, Xavier, Gamba, Bettinelli . Tools-4-Metatool. Online suite of web-tools to process stoichiometric network analysis data from METATOOL. IV Spanish Portuguese Biophysical Congress, 7-10 July, Zaragoza, Spain. |

PRESENTATIONS TO NATIONAL AND INTERNATIONAL MEETINGS (ORAL):

- 2022-07-12** Towards marker-assisted breeding for black rot resistance: high-density linkage mapping and identification of a major QTL in the cultivar 'Merzling' (*V. rupestris* × *V. aestivalis* var. *linccumii*). XIII International Symposium on Grapevine Breeding and Genetics 10-17 July 2022, Landau/Pfalz, Germany. Submitted
- 2021-07-24** Forward marker-assisted selection for mildew resistance in grapevine: an optimized applied process. EUCARPIA 21st general congress, 23-26 August 2021, Rotterdam, Netherlands.
- 2020-03-04** An optimization of the marker-assisted breeding process for downy and powdery mildew resistance in grapevine. The Second Annual Meeting of INTEGRATE COST Action CA17111, 3-5 March 2020, Ljubljana, Slovenia.
- 2019-12-05** Genotype-Phenotype Association Analysis: GWAS" The Final Meeting of VITISANA Euregio project: Dissecting the genetic basis of negative quality traits in new disease resistant grapevines. Tenuta viticola Plonerhof, Marleno, BZ, Italy.

OTHER SCIENTIFIC ACTIVITIES:

SEMINAR:

- 2019-02-08** "Grapevine Marker-Assisted Selection: Update & New Perspectives" CRI Seminar Series, FMACH, San Michele all'Adige, TN, Italy.

SCIENTIFIC DISSEMINATION:

- 2022-02/22-03** Three lectures for the Associazione Italiana Professionisti del Verde (AIPV). "Fisiologia Vegetale".
- 2021-12/22-01** Four Openday, Ellebigreen-AIPV. "Gestione Ecosostenibile delle Aree Verdi".
- 2020-02-06** "Metodo Ecoprato: gestione ecocompatibile certificata delle aree verdi" Fachtagung Grünflächenpflege - giornata sulla cura delle aree Verdi 2020. Sala civica di Merano il 06.02.2020
- 2010-04** Publication of three scientific dissemination articles on the blog creamoselfuturo.com. Topics: Sequencing in the post-genomic era, NGS and Third generation sequencing.

COLLABORATION:

AT FEM

@ CRI: Luisa Palmieri, Stefan Martens and Panagiotis Arapitsas (transcriptomics and metabolomics), Iuliia Khomenko (sensory quality, VOCs analysis), Luca Zulini and Oscar Giovannini (phenotyping and screening for resistance to vine pathogens).
@ CTT: Daniele Prodorutti and Christian Cainelli (Pathogen isolation and diagnostic tests).

NATIONAL

Marina Collina, Department of Agro-Food Sciences and Technologies (Distal), University of Bologna, IT
Laimburg Experimental Center, BZ, IT - Euregio Vitisana Project: Thomas Letschka, Elena Zini, Daniela Eisenstecken, Giulia Chitarrini, Ulrich Pedri.

INTERNAZIONALE

University of Innsbruck, AT, Euregio Vitisana Project: Hermann Stuppner, Sonja Sturm, Verena Gratl.
Julius Kühn Institute (JKI), Institute for Grapevine Breeding Geilweilerhof, Siebeldingen, DE: Ludger Hausmann.
Center for Plant Molecular Biology - ZMBP, Developmental Genetics, University of Tübingen, DE: Antje Feller.
University of California Davis, Viticulture and Enology, USA: Prof. Dario Cantù.
CREA Conegliano, IT: Daniele Migliaro.
CREA Fiorenzuola, IT: Monica Colombo.
Università degli Studi di Milano, Dipartimento di Scienze Agrarie e Ambientali, IT: Simona Masiero, Silvia Toffolatti.

EDUCATION, TRAINING AND OTHERS:

COURSES:

- **OIV international course in Ampelography** at OIV-IMIDRA, Spain, Alcalá de Henares, 05-11 September 2021
- Exploring Biodiversity using DNA-barcoding and molecular clocks, Lecturer Rota Stabelli, FEM, 17,18,20 February 2020, 12 hours.
- Exploring gene evolution using phylogenetic and phylogenomic (EPP1), Lecturer Rota Stabelli, online 27,28,30 April 2020, 12 hours.
- Introduction to Nonparametric Analysis (INA1), Lecturer Mazzoni, FEM 18,20 February 2020, online 31 April and 2 May 2020, 16 hours.
- Molecular Plant Breeding, Lecturers Costa and Costantini, FEM 2 March, online from 19 March to 4 May 2020, 32 hours.
- Plant Physiology and Genetics of Fruit Ripening (PFR1), Lecturers Costa, Perazzolli, Busatto, Farneti, online from 6 May to 29 June 2020, 24 hours.

- Getting started with R, Lecturer Franceschi, UniTN-CIBIO, 10,12,14,17 February 2020, 12 hours.
- Data exploration (DEX1), Lecturer Franceschi, UniTN-CIBIO 19,21 February 2020, online 8,9 June 2020, 12 hours.
- Innovative methods in crop protection (ICD1), Lecturers Anfora, Pertot, Perazzolli, Puopolo, Mazzoni, Bozzini, online 6-7 April 2020, 16 hours.
- Scientific Illustrations, making scientific figures better and faster, Lecturer Rocuzzo, UniTN-CIBIO, online from 20,23 July 2020, 6 hours.
- Genetics applied to foods (44709 · AGR/07), Lecturer Costa, UniBZ, November 2019- January 2020, 28 hours.

WORKSHOPS:

- Annot'Training – Hybrid Training School in Gene Annotation & Manual Curation of the PN40024 Grape Reference Genome, organized by INTEGRAPE COST ACTION, from June 30th to July 1st 2022 (8 hours).
- R2B research to business, Coordinator: Bigatto, HIT Hub Innovation Trentino, online from 6th to 10th July 2020 (20 hours).
- Training school METHADA 2020 eHandsOn, organized by INTEGRAPE COST ACTION, from October 30th to November 4th 2020 (19 hours).

SEMINARS:

- Justin Lashbrooke "The Molecular Mechanisms Underpinning an Absence of Anthocyanin Trait in Apple". FEM, 9-06-2021, 11-12
- Neal Carter "Journey from Browning to Non-Browning Apple Research and Commercialization for Arctic Apple at Okanagan Specialty Fruits." FEM, 10-05-2022, 10.30-12.

WEBINARS:

- Generazione resistente, VCR research center, 10-12-2020, 9.30-12.
- La difesa delle varietà di vite resistenti ai patogeni, VCR research center, 6-11-2020, 9.30-11.
- "Interdisciplinary research to address complex scenarios - SARS-CoV-2 research as a case of study. 9.12.2020. PhD day.
- VEVIR Meeting finale del progetto, FMACH, 5-03-2021, 16-18
- VitisGen2: A low-cost core genome marker platform that works well across the diverse Vitis genus, 14-04-2020
- Portinnesti M, una scelta radicale, VCR; 12-03-2021
- Verso una nuova viticoltura: il ruolo della genetica e del vivaismo, VCR; 01-10-2021, 9.30-12.30

OTHER CONGRESSES AND CONFERENCES:

- COST Action CA17111 INTEGRAPE 3rd annual meeting 20h
- The Frontiers of Science and Technology in Crop Breeding 12h

AWARDS:

- **First Prize poster award** CO.NA.VI 2022: 9° Convegno Nazionale di Viticoltura, 13-15 June, Conegliano, Italy. Piramidazione di loci di resistenza a peronospora e oidio mediante un processo ottimizzato di selezione assistita da marcatori molecolari
- **Second Prize poster award** Eucarpia general congress 2021: Breeding the key to innovative solutions, Rotterdam, NL. Online. "DAMAGE: Dissection of bLack rot resistance towards Marker-Assisted breeding in Grapevine"

OTHER WORK EXPERIENCES:

From May 2017 to May 2018: front office employee at Bimobil Spa, Avis-Budget-MAGGIORE rental cars company (full time).

From April 2016 to May 2017: shop assistant and cashier, CARPISA company (full time).

From July to December 2014: shop assistant and cashier, brand Zara, Inditex company (full time).

From September 2013 to June 2014: shop assistant and cashier, brand Tezenis, Calzedonia company (weekends and holidays).

September 2013: grape harvest.

During 2011/2012 Hostesses: promotion of products and services during events related to the world of golf.

From 2007 to 2011 I always worked part time during the academic year, full time during holidays:

- waitress, maître, bar-lady, cashier, hostess and promoter
- private teacher
- receptionist and secretary in a Veterinary Hospital
- event organization, art events presenter, public reading

DRIVING LICENSE	B, own car
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I have read and understood the information about the management of my personal data in accordance with the provisions of EU General Data Protection Regulation 2016-679.

Signature

