Massimiliano Beretta

Place of Residence
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Born: December 22nd, 1985
Marital status: married
Driving license

Current position

From July 2025: R&D Manager for Horizontal Crops at Panora

from July 2025: Manager of Panora Campus at Panora

from July 2025: determinate processing tomato senior breeder at Panora

Qualifications

September 2017: Expert in matter on "Biotechnology and vegetable breeding" at Università Cattolica of Piacenza

March 2016: PhD in Science, Technology and agri-food business at University of Modena and Reggio Emilia with a thesis on "Genome wide association analysis for flowering traits in *Lactuca sativa*" (Tutors: Prof. Pecchioni, Dr. Malatrasi)

April 2011: Master's degree in industrial biotechnology at University of Parma (105/110), with a thesis on "Development of molecular markers linked to the resistance gene to *Nasonovia ribisnigri* in Lactuca sativa" (I° relator: Prof. Valè, II° relator: Prof. Visioli, correlator: Dr. Sabatini)

February 2008: Bachelor's degree in Biotecnologies University of Parma (101/110) with a thesis on "Optimization of protocols for RNA extraction on *Popolus nigra*. (relatore: Prof. Marmiroli, correlatore: Prof. Visioli)

June 2004: Degree in Agronomy (92/100) at Istituto Professionale per l'Agricoltura e l'Ambiente IPSAA Solari of Fidenza (PR, Italy)

Work experiences

April 2023 – July 2025: Head of Research at ISI Sementi

April 2018 – July 2025: Manager of ISI Academy at ISI Sementi

January 2014 – July 2025: Determinate tomato senior breeder for processing and fresh market (*Solanum lycopersicum*)

March 2019 – August 2023: Scientific director of the european EVA Lettuce Project (www.ecpgr.cgiar.org), in cooperation with ECPGR coordinators (Dr. Sandra Gorsitching and Dr. Lorenzo Maggioni) coordinating a team of 12 private seed companies and academical partners.

September 2021 – September 2023: Member of SIGA Directive Board (Italian Society of Agricultural Genetics) in the role of Marketing and Social media manager, coordinating the activities of the NGS group (Next Generation SIGA).

February 2017 – March 2023: Head of Breeding at ISI Sementi

September 2018 – April 2022: Rocket breeder (*Diplotaxis tenuifolia*) at ISI Sementi

September 2013 – March 2014: Processing tomato assistant breeder at ISI Sementi Research

June 2011 – December 2011: Lab technician (3rd level) at ISI Sementi Research on *Lactuca sativa* breeding program

May 2010 – May 2011: Scholarship at CRA-ORL of Montanaso Lombardo (LO) on the topic "Lettuce breeding and research of molecular markers linked to resistance genes" (Tutor: Dr. Emidio Sabatini)

February 2009 – January 2010: Scholarship at CRA-ORL of Montanaso Lombardo (LO) on the topic "Research of molecular markers associated to the resistance to *Nasonovia ribisnigri* in *Lactuca sativa*" (Tutor: Dr. Emidio Sabatini)

July 2008 – Jan 2009: Lab technician (4th level) at ISI Sementi on *Lactuca sativa* breeding program

April 2008 – June 2008: Summer employee at Peotec Seeds of Medesano (PR, Italy) on melon (*Cucumis melo)* breeding program

Summers from 2003 to 2007: Summer employee at ISI Sementi on *Solanum lycopersicum, Lactuca sativa* and *Allium cepa* breeding programs

Settember 2002: Mechanical temporary employee at BGS s.r.l. (Fidenza, PR, Italy)

Acquired skills

Basic breeding methods
- Pollinations (tomato, lettuce, endive, eggplant, melon, rocket, squash, onion)
- Extraction and seed disinfection
- Setup of experimental field trials
- Setup of comparative trials for abiotic stress assay (salt stress, drought stress)

Breeding and pre-breeding methods
- Parental line selection and commercial hybrid development
- Comparative evaluation of commercial and experimental varieties (PD)
- Marker assisted selection and marker assisted backcross
- Background and foreground selection
- Pre-breeding population development: RIL, BIL, NAM and MAGIC populations in tomato and lettuce.

In-vitro techniques
- Media culture preparation
- Micropropagation (*Allium cepa, Lactuca sativa, S. lycopersicum, Diplotaxis tenuifolia*)
- Ginogenesys (*Allium cepa*)
- Development of tetraploid plants (*Lactuca spp.*)
- Development of salt stress tolerance assay (*Diplotaxis tenuifolia, Solanum lycopersicum, Lactuca sativa*)

Molecular biology
- Nucleic acid extraction (DNA, RNA) and cDNA synthesis
- Plasmid cloning and bacterial transformation (*E. coli*)
- PCR, iPCR e RT-PCR, real-time PCR and evaluation with Ct-method
- High Resolution Melting (HRM)
- Bulk segregant analisys (BSA)
- Research and development of molecular markers for marker assisted selection and DNA fingerprinting (CAPS, INDEL, SNP, RAPD, SSR, STR)

Phytopathology
- Preparation and evaluation resistance assays on pathogens including *Bremia lactucae, Fusarium oxysporum, Verticillium daliae, Melaidogyne spp, Clavibacter michiganensis*

Phenotyping techniques and tools
- Spectrophotometry for quantification of chlorophyll and carotenoids
- °Brix, pH, acidity, conducibility analysis
- Germinabily and seed vigour analysis with ISTA protocol
- Calibration of NIR (SCIO)
- Chlorophyll content measurement (AtLeaf+)
- Photosynthetic efficiency measurement (Fluorpen)

Bioinformatics
- GWAS with MLM and farmCPU model applying Bonferroni and FDR test
- Creator of the R packages virtualGWAS, virtualBSA and virtualQTL for GxP association
- Analysis of .vcf files from SPET, ddRAD and array of lettuce and tomato
- Development of R scripts for seed phenotyping, restriction map finding and SSR identification on genomic data
- Use fo R, RStudio, STRUCTURE, TASSEL, GAPIT, STRAT
- Molecular biology and genomics tools: CLC Main Workbench, VectorNTI, BioEdit, Rasmol, Spdv, JoinMap, MapQTL.
- Phenotyping tools: Tomato Analyzer

Statistical skills
Applied a range of methods for experimental data interpretation, including:
- ANOVA (Analysis of Variance) for multi-group comparisons
- PCA, Heatmap
- Tukey's HSD for post-hoc multiple comparison analysis
- Normality tests (e.g. Shapiro-Wilk) to assess data distribution assumptions

Seed Production skills
- Seed stock oversight: Managed inventory and availability of experimental and pre-commercial seed stocks, ensuring alignment with production and trial needs.
- Hybrid seed production: Coordinated hybrid seed multiplication activities in collaboration with internal teams and external partners.
- Seed technology implementation: Applied and monitored seed technology protocols (e.g. treatments and priming) to ensure quality and consistency.
- Genetic purity verification: Conducted hybrid and parental line purity assessments using field grow-outs and molecular markers (including markers development) to support seed quality assurance and breeding reliability.

Management skills
- Strategic planning: Defined objectives aligned with company strategy to ensure coherent execution and measurable impact.

- Budget management: Oversaw annual budgets ranging up to €2M, including forecasting and periodic reviews to ensure alignment with business goals.
- Process optimization: Conducted process reviews and implemented new workflows using SOP and RASCI methodologies.
- Portfolio rationalization: Developed and implemented the PMCxMABA framework (Product-Market Combination x Market and Business Attractiveness), integrating breeding and market data to prioritize R&D direction and focus on high-potential revenue segments.
- Tool and process creation: Designed and implemented from scratch a set of operational templates to track variety development stages, improve internal communication, and support decision-making during cross-functional meetings.
- Cross-departmental coordination: Established dedicated alignment meetings as structured touchpoints between Production, Sales, and R&D teams, fostering transparency, collaboration, and shared accountability.

Science Communication & Leadership

- Managed 4 to 7 direct reports in the company, fostering a collaborative environment and driving team performance.
- Led the creation of SIGA's digital social presence from scratch, defining content, visual identity, and platform-specific strategies across social networks.
- Coordinated the activities of the Next Generation SIGA (NGS) group, managing a team of 8-10 under-35 members and establishing roles, workflows, and communication structures.

Breeding achievements

- Developed multiple high-performing tomato and rocket varieties tailored to market demands. Several of these varieties have been, or still are, market leaders in countries such as Italy, Greece, Argentina, and North Africa.

- These breeding successes significantly enhanced the company's reputation and played a key role in entering strategic international markets.

Digital Skills & Emerging Technologies

September 2021 - Blockchain: Foundations and Use Cases

June 2004 - European Computer Driver Licence (ECDL)

- Confidence with Linux, Windows, command line, regular expression, Microsoft Office, Open Office

- Hardware knowledge and server implementation

- Implementation of electronic systems with Arduino platform for data collection

- Use of the main AI tools: ChatGPT, Gemini, GAMMA, NotebookLM, Skywork

Idioms

English, B1 (CEFR)

Spanish, A2 (CERVANTES)

French, A2 (ILA)

Traveling experience for working purposes in Portugal, Spain, Albania, Netherland, France, Greece, Israel, California, Argentina, Algeria, Belgium, Dominican Republic, India, Thailand (from few to up to 20 days)

Thesis co-supervisor

2025 – Master's Degree of Francesca Visconti, 110/110 (San Raffaele University). "Phenotypic and genetic analysis of physiological traits in a tomato RIL population"

2025 – Master's Degree of Adan Abdisamad, 110/110 (University of Florence). "Assessing Photosynthetic Efficiency in Tomato Genotypes through AtLEAF and FluorPen tools"

2025 – Bachelor's Degree of Chiara Fulgoni, 102/110 (University of Teramo). "Fenotipizzazione di caratteri rilevanti nel pomodoro, dal seme alla tavola"

2025 – Bachelor's Degree of Federico Furia, 102/110 (University of Parma). "Fenotipizzazione di tratti funzionali al cambiamento climatico in pomodoro"

2024 – Master's Degree of Marcello Galli, 110/110 (University Cattolica of Piacenza). "Studio di caratteri di interesse agronomico in una popolazione di linee di introgressione *Solanum pennellii*"

2023 – PhD of Gabriella De Angelis (University Cattolica of Piacenza)
"Development of rocket hybrids (*Eruca sativa* and *Diplotaxis tenuifolia*) resistant to *Fusarium oxysporum ff. spp.* and *Phytophthora parasitica*"

2021 – Master's Degree of Manuele Ragazzi, 110/110 (University Cattolica of Piacenza). "Fenotipizzazione of varietà commerciali of pomodoro da industria in condizioni di stress idrico"

2020 – Master's Degree of Francesco Schiattelli, 110/110 Laudae (University of Perugia) "Fenotipizzazione of una NAM population of pomodoro da industria"

2019 – Master's degree of Andrea Gonella, 110/110 Laudae (University of Bologna). "Fenotipizzazione of caratteri della pianta e della bacca in un programma commerciale of breeding of pomodoro (*Solanum lycopersicum, L.*)"

2019 – Master's degree of Ivan Lena, 106/110 (Università Cattolica del Sacro Cuore of Piancenza) "Caratterizzazione fenotipica ed evoluzione of caratteri of interesse agronomico in *Solanum lycopersicum L.*"

Other qualifications

from 2022: Member of Assosementi "Sezione costitutori" (www.sementi.it)

from 2021 - Member of SOI (Società Ortofruittcola Italiana)

2019 - 2022 - Member of World Processing Tomato Congress e ISHS Congress (San Juan, Argentina) scientific committee

2018 – 2024 - ISI Academy board member

2018 - Member of EUCARPIA (Eropean Association for Research on Plant Breeding)

2017 - Member of SIGA (Società Italiana of Genetica Agraria)

Papers and posters

- Gabelli G, Caproni L, Palumbo F, Boni AG, Ferrari F, Prazzoli L, Malatrasi M, Sestili S, dell'Acqua M, Beretta M, Barcaccia G (2026) - SABER: A Multiparental Tomato Population Leveraging Wild Relative Diversity for High-Resolution QTL Mapping (https://doi.org/10.64898/2026.03.18.712672)
- Stagnati L, Beretta M, Lezzi A., Ottaviani L., Boni AG, Malatrasi M, Lanubile A, Marocco A, Busconi M **(2025)** - *SABER: Enhancing genetic diversity in tomato breeding through a multiparental population*. Proceedings of the LXVII SIGA annual congress Viterbo, 10/13 september, 2025.
- Corradi M, Ferrari G, Boni AG, Beretta M. (2024) - Assessing drought stress tolerance in *S. pennellii* (LA0716) Introgression Lines (Atti del 67° Convegno Annuale della Società Italiana of Genetica Agraria. September 2024)
- Palermo N, Cotti G, Vurro F, Marchetti E, Beretta M, Marmiroli N, Janni M. (2024) - Accelerate phenotyping selection in tomato through in vivo phenotyping of drought response dynamics characterization. (Atti del 67° Convegno Annuale della Società Italiana of Genetica Agraria. September 2024)
- Americo S, Ferrari G, Desiderio F, Guerra D, Sicilia A, Felici B, Bulut M, Alseekh S, Fernie A, Morelli G, Lo Piero A.R, Beretta M, Cattivelli L, D'Orso F. (2024) - An "-omic" study to unveil the salt stress tolerance mechanism in S. pennellii x S. lycopersicum Introgression Lines (Ils). (Atti del 67° Convegno Annuale della Società Italiana of Genetica Agraria. September 2024)
- Stagnati L, Beretta M, Lezzi A, Boni AG, Malatrasi M, Lanubile A, Marocco A, Busconi M. (2024) - SABER: a multipareltal population to increase variability for tomorrow's tomato breeding. (Atti del 67° Convegno Annuale della Società Italiana of Genetica Agraria. September 2024)
- Furia F, Chiancone B, Ferrari G, De Angelis G, Beretta M. (2024) - Enhancing tomato photosynthesis: genetic diversity & RIL insights. (Atti del 67° Convegno Annuale della Società Italiana of Genetica Agraria. September 2024)
- Tripodi P, Beretta M, Peltier D, Kalfas I, Vasilikiotis C, Laidet A, Briand A, Aichholz C, Zollinger T, Van Treuren R, Scaglione D, Goritschnig S, 2023 - Development and application of Single Primer Enrichment Technology (SPET) SNP assay for population genomics analysis and candidate gene discovery in lettuce (Frontiers in plant science, DOI: https://doi.org/10.3389/fpls.2023.1252777)
- Ferrari G, Americo S, Prazzoli ML, Beretta M (2022) - Investigating genetic control of salt stress tolerance in tomato commercial hybrid cultivars and Solanum pennellii introgression lines (DOI: 10.17660/ActaHortic.2022.1351.27)
- De Angelis G, Franzini A, Beretta M (2021) - Explore genetic variability for tolerance to abiotic and biotic stress in Diplotaxis tenuifolia (Atti del 64° Convegno Annuale della Società Italiana of Genetica Agraria. September 2021)
- Ferrari G, Prazzoli ML, Beretta M (2021) - Exploiting salt stress resistance in Solanum pennelli (Atti del 64° Convegno Annuale della Società Italiana of Genetica Agraria. September 2021)
- Del Regno C, Beretta M, Sestili S, Palma D, Campanelli G (2021) - Exploiting phenotypic variability in a G10 MAGIC population of Solanum lycopersicum (Atti del 64° Convegno Annuale della Società Italiana of Genetica Agraria. September 2021)
- Campanelli G, Sestili S, Acciarri N, Montemurro F, Palma D, Leteo F, Beretta M (2019) - Multi-Parental Advances Generation Inter-Cross Population, to Develop Organic Tomato Genotypes by Participatory Plant Breeding (Agronomy 2019, 9(3), 119; DOI: 10.3390/agronomy9030119)
- Brunazzi A, Sestili S, Campanelli G, Leonarduzzi C, Malatrasi M, Beretta M (2018) – Development of a Multi-parent Advanced Generation Inter-Cross

(MAGIC) population in tomato (Solanum Lycopersicum): A New source for plant breeders (XVIIIth EUCARPIA Meeting of the Tomato Working Group)

- Malatrasi M, Boni AG, Orsi I, Belfanti E, Vecchio R, Beretta M (2014) - Genetic heritability studies of °Brix content in Solanum lycopersicum (13th ISHS Symposium on the Processing Tomato, Sirmione 2014)
- Beretta M, Orsi I, Boni AG, Belfanti E, Malatrasi M - Phebin Mapper (PM): a new bioinformatics tool for phenotype-genotype correlation. Tomato case study using SolCAP Tomato Infinium array (VISCEA congress, Vienna 2014)
- Beretta M, Donati F, Ciriaci T, Sabatini E – GxE interaction in lettuce bolting phenomena (ISHS, Molecular Markers in Horticulture Symposium 2013)
- Bagnaresi P, Sala T, Irdani T, Scotto C, Lamontanara A, Beretta M, Rotino GL, Sestili S, Cattivelli L, Sabatini E - Solanum torvum responses to the root-knot nematode Meloidogyne incognita. (BMC Genomics 2013, 14:540. DOI: 10.1186/1471-2164-14-540)
- Beretta M, Bagnaresi P, Donati F, Sabatini E. - Simple HIGH TROUGHPUT PHENOTYPING via "R" and DIGITAL images. (Next Generation Plant Breeding Conference. Ede-Wageningen, 2012)
- Caffagni A, Milc J, Meriggi P, Bucci V, Sabatini E, Acciarri N, Ciriaci T, Pulcini L, Felicioni N, Beretta M and Pecchioni N – Iodine uptake and distribution in fruit and crop species. (Italian Journal of Agronomy 2012; volume 7:e32, DOI: https://doi.org/10.4081/ija.2012.e32)
- Sabatini E, Beretta M, Sala T, Acciarri N, Milc J, Pecchioni N - Molecular breeding. In: Genetics, Genomics and Breeding of Tomato (Eds. B.E. Liedl et al. 2013, CRC Press, Boca Raton, FL. pp. 228-303, DOI: https://doi.org/10.1201/b14578)
- Sala T, Beretta M, Sabatini E. – Isolation and characterization of Mi-1 homologues in Solanum melongena and Solanum torvum. (Minerva Biotecnologica 2010 June - 22 166)
- Beretta M, Sala T, Sabatini E. – Nematode tolerance in lettuce and its relationship with aphid resistance. (Atti del 54° Convegno Annuale della Società Italiana of Genetica Agraria. Matera, October 2010)
- Sala T, Beretta M, Sabatini E. – Identification and characterization of markers linked to Verticillium dahliae (race 2) resistance genes in tomato. (Atti del 54° Convegno Annuale della Società Italiana of Genetica Agraria. Matera, October 2010)
- Beretta M, Bagnaresi P, Sabatini E. – A search for molecular markers linked to aphid resistance genes in lettuce based on NBS-LRR domains. (Atti del 53° Convegno Annuale della Società Italiana of Genetica Agraria. Torino, September 2009)

Congresses and workshops

September 2025: SIGA Annual Congress (Viterbo, Italy)

September 2024: SIGA Annual Congress (Bologna, Italy)

June 2024: Translational Photosynthesis Roadmapping workshop (Cadarache, France)

September 2023: SIGA Annual Congress (Bari, Italy)

September 2022: SIGA Annual Congress (Piacenza, Italy)

September 2019: SOL-CODE congress (Jerusalem, Israel)

September 2018: SIGA Annual Congress (Verona, Italy)

May 2018: XIXth EUCARPIA Meeting of the Tomato Working Group at Università Federico II of Napoli (Napoli, Italy)

Februrary 2018: "Breeding with Genomics" course at Seed Biotechnology Center of UCDavis (Davis, USA)

September 2017: SIGA Annual Congress (Pisa, Italy)

June 2016: speaker al "V annual meeting PGB network – New breeding techniques: genome editing, cisgenesis and genomic selection" organized by SIGA (Piacenza, Italy)

October 2015: 12th Solanaceae Congress, SOL2015 (Bordeaux, France)

April 2014: XVIIIth EUCARPIA Meeting of the Tomato Working Group at Université d'Avignon et des Pays de Vaucluse (Avignone, France)

May 2013: "Metodi ed applicazioni of informatica per l'analisi of dati biologici" organized by SIGA (Salsomaggiore Terme, Italy)

November 2012: "Next generation plant breeding" congress (Ede-Wageningen, Netherland)

May 2012: "Metodi avanzati of miglioramento genetico dei vegetali e prospettive per la produzione of alimenti" organized by SIGA (Salsomaggiore Terme, Italy)

April 2012: "Come fare un business plan" organized by Comitato Lions per Lifebility per Innovazioni Tecnologiche rivolte al Sociale at Camera of Commercio of Milano, Italy

April 2011: "Bioinformatica applicata alla genomica agraria" organized by SIGA (Salsomaggiore Terme, Italy)

October 2010: SIGA Annual Congress (Matera, Italy)

September 2009: SIGA Annual Congress (Torino, Italy)

Other achievments

May 2012 – Prize "New authors in Rome" for the book "Il suono del silenzio" (Youcanprint Ed.)

June 2004 – Medal for commitment, participation, and excellent results at Istituto superiore IPSAA Solari of Fidenza (PR, Italy)

March 2003 – Award for the best report in the campaign promoted by AIDO

Other interests and activities

Innovation, technology, trading, playing, writing

2025 – Founder of "Max The Genetic Boy" scientific dissemination pages

2025 – Author of the book "Geni di valore" (KDP)

2024 – Author of the book "Al di là dei sogni" (KDP)

2019 – Founder of "Max Relativo" scientific YouTube channel

2015 – Author of Mistero Magazine (Italia1, italian TV)

2014 – Author of the book "Doppio gioco" (Youcanprint Ed.)

2012-2013 – Member of the Youth Policies Table of Fidenza (PR)

2012 – Author of the book "Copie imperfette" (Youcanprint Ed.)

2011-2013 – Founder and radio speaker of RS Radio Soppalco

2010 – Author of the book "Il suono del silenzio" (Youcanprint Ed.)