

BIOGRAPHICAL SKETCH

NAME: Papa, Roberto

POSITION TITLE: Full Professor of Agricultural Genetics at D3A, UNIVPM, Italy

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	Completion Date	FIELD OF STUDY
University of Perugia IT	BSc, MSc	1989	Agricultural Sciences
Agronomy Department Università degli Studi di Sassari IT	PHD	1993	Plant Genetics
UCDAVIS Department of Agronomy and Range Science US	Postdoctoral	1998	Evolutionary Genetics

A. Personal Statement

From 2016 I am Full Professor in Agricultural Genetics at D3A, UNIVPM, Italy, while from 2002 to 2016 I was Associate Professor in Agricultural Genetics at D3A, UNIVPM, Italy. My research is focused on:

1. Strategies for the conservation and sustainable use of plant genetic resources;
2. Evolutionary genomics of crops, such as legumes (e.g., *Phaseolus* spp.) and cereals (wheat and barley), with a main focus on domestication;
3. Identification of the genetic basis of phenotypic variation in crops;
4. Development of knowledge and genetic tools for plant breeding (e.g. first common bean pangenome).

In the last ten years I have held positions as Director of the Agricultural Research Council–Cereal Research Centre (CRA-CER), Foggia (IT) (2010-2014), Director of the CRA-CER Experimental Farm (2010-2014), Board of Directors of the AGRIFOOD Marche cluster as Rector Delegate (IT) (2021-current), Visiting Professor at Paris Saclay (FR) (2020), Deputy Research Director of D3A UNIVPM (IT) (2016-2021), Guest Scientist, Forschungszentrum Jülich (DE) (2014-2016), Member of the board of directors of the D.A.Re. R&D of AgriFood in Puglia Region (IT) (2012-2015).

Currently, I am the Coordinator of the European H2020 funded Project INCREASE and of the PRIN Project SIMPHONY, as well as I am involved as co-Investigator in several national and international projects. I carry out active research collaborations with European, US and Canadian research groups.

Ongoing and recently completed projects:

GENUINE Harnessing advanced genomic methods to identify future climate resilient genotypes in legumes species with large and repetitive genomes. Funding source: PRIN (Call: MIUR PRIN PNRR 2022); Role: Principal Investigator, Responsible of research unit; 30/11/2023 - 29/11/2025.

SIMPHONY Development of a syntenic pangenome of *Phaseolus vulgaris*: studying a complex evolutionary history. Funding source: PRIN (Call: MIUR PRIN 2022); Role: Project Leader and Coordination; 05/10/2023 - 04/10/2025.

inSiEME Miglioramento genetico partecipativo 5.0 per l'individuazione di materiale eterogeneo e nuovi genotipi resistenti alle malattie per lo sviluppo di sistemi agricoli sostenibili in agricoltura biologica. Funding source: MIPAAF 2021; Role: Project Leader and Coordination; 11/11/2024 - 10/11/2027.

AGRITECH Funding source: PNRR (Call: National Research Centre for Agricultural Technologies); Role: Principal Investigator; 01/08/2022 - 31/08/2025.

RADIANT Realising dynamic value chains for underutilised crops. Funding source: EU-H2020 (Call: SFS-01-2020) Grant N. 101000622; Role: Principal Investigator, Task Leader; 01/09/2021 - 31/08/2025.

INCREASE Intelligent collections of food legumes genetic resources for European agrofood systems. Funding source: EU-H2020 (Call: H2020-SFS-2018-2020) Grant N. 862862; Role: Project Leader and Coordination; 01/05/2020 - 30/04/2026.

ROOT2RESILIENCE Root phenotyping and genetic improvement for rotational crops resilient to environmental change. Funding source: EU-H2020 (Call: HORIZON-CL6-2021-BIODIV-01) Grant N. 101060124; Role: Principal Investigator, Task Leader; 01/09/2022 - 31/10/2027.

BELIS Breeding European legumes for increased sustainability. Funding source: Horizon Europe research and innovation programme (Call: HORIZON-CL6-2022-BIODIV-02-two-stage) Grant N. 101081878; Role: Principal Investigator, Crop Leader Chickpea; 01/10/2023 - 30/09/2028.

LEGUME GENERATION Boosting innovation in breeding for the next generation of legume crops for Europe. Funding source: Horizon Europe research and innovation programme (Call: HORIZON-CL6-2022-BIODIV-02-two-stage) Grant N. 101081329; Role: Principal Investigator, Task Leader; 01/09/2023 - 29/02/2028.

BEAN_ADAPT Evolution in a changing environment: the genetic architecture of adaptation outside centres of domestication of *Phaseolus vulgaris* and *P. coccineus*. Funding source: ERA-CAPS Call2014 Role: Project Leader and Coordination ; 2015-2019.

B. Positions, Scientific Appointments, and Honors

Positions

2021-Present	Board of Directors of the AGRIFOOD Marche cluster as Rector Delegate
2020-2020	Visiting Professor Paris Saclay FR
2016-Present	Full Professor in Agricultural Genetics D3A UNIVPM IT
2016-2021	Deputy Research Director of D3A UNIVPM IT
2014-2016	Guest Scientist Forschungszentrum Jülich DE
2012-2015	Member of the board of directors of the D.A.Re. R&D of AgriFood in Puglia Region IT
2010-2014	Director Agricultural Research Council–Cereal Research Centre (CRA-CER) Foggia IT
2010-2014	Director of the CRA-CER Experimental Farm IT
2007-Present	Member of the Agricultural Science PhD School Committee and Member of the Vegetable Production and Environment PhD Course, UNIVPM IT
2003-Present	Member of PhD Evaluation Committees for several Italian and International Universities
2002-2016	Associate Professor in Agricultural Genetics D3A UNIVPM IT
1994-2002	Researcher DIBIAGA UNIVPM IT

Scientific Appointments

2021-2024	Associate Editor The Crop Genome
2021-Present	Associate Editor BMC Genomics
2020-Present	Associate Editor Plants and Associate Editor Agronomy
2016-2017	ERA-CAPS panel member
2016	POLONEZ National Science Centre PL Panel Member

2015-Present	Associate Editor Frontiers in Plant Science
2015-2018	Member of Research Oversight Committee (ROC) for Genome Canada Genome Prairie project AGILE on lentil genomics
2015-2016-2017	French National Research Agency (ANR; SEC20) Panel Member
2014-2024	Associate Editor PLoS ONE
2012	Evaluation Panel Agropolis Foundation 2012 Call for Proposals Open Science
2011-2013-2015-2017	European Research Council (ERC) Advanced Grants, LS8 Panel Member
2010- 2021	Associate Editor BMC Genetics
2010-2014	Member of CRA National Committee for the evaluation of Visiting Fellowship research activities
2008-2015	Evaluation Panel FIRB, SIR, PRIN Projects of Italian Ministry of Universities MIUR
2006-2007	Scientific Board, SIGA Annual Meetings, Riva del Garda and Ischia IT
2005-2007	Member of Directory Board, Italian Society of Agricultural Genetics (SIGA)
2002-Present	Scientific Reviewer for more than 30 international peer-reviewed journals including Nature, Nat. Genetics, Nat. Biotechnology, Nat. communication, Molecular Plant, and PNAS

Memberships of scientific societies:

SIGA (Italian Society for Agricultural Genetics)

SIBE (Italian Society for Evolutionary Biology)

EPSO (European Plant Science Organisation)

Honors

2024	The European Commission has awarded INCREASE the “Grand Prize” of the EU Prize for Citizen Science 2024
2001	Awarded “Research Fellow of University of Ancona” academic year 2000-2001 UNIVPM IT

Other Scientific Commitments

Organization of Scientific Meetings:

January 2024-2025	Participatory and Citizen Science Genomics workshop at the Plant and Animal Genome 31 International Conference San Diego US
July 2020	International Program Committee for the 8th International Crop Science Congress Saskatoon CA
July 2018	Scientific Committee, Plant Genetics & Breeding Technologies IV – VISCEA Vienna AT
September 2017	Scientific Committee, EUCARPIA Breeding Grasses and Protein Crops in the Era of Genomics Vilnius LT
May 2015	Scientific Advisory Board, Plant Genomics Congress London UK
May 2015	Scientific Committee, EUCARPIA International Symposium on Protein Crops Pontevedra ES
September 2013	Chair of the Organising Committee, SIGA Annual Meeting Foggia IT
May 2013	Organising Committee of the International Symposium on Genetics and Breeding of Durum Wheat Rome IT
April 2012	Organiser and Coordinator of the International COST/CRA Course on ‘Metabolomics and Plant Breeding’ Foggia IT

Teaching and Mentoring Experience:

1998-2010; 2014-2024 Teaching for BSc, MSc and PhD courses in ‘Plant genetics’, ‘Plant Biotechnology and Biodiversity’, ‘Advanced Plant Breeding’, ‘Conservation genetics’, ‘Quantitative and Population Genetics’, ‘Statistics’, ‘Genetic analysis for biodiversity conservation’, ‘Evolution of crops and plant genetic resources’ at UNIVPM IT

Supervision of graduate students, PhD students and postdocs:

1998-2024	32 MSs students, 34 PhD students, and 27 Postdocs at the Faculty of Agriculture UNIVPM IT
2016-2024	6 Visiting Graduated Students from Brazil, Czech republic, Mexico, Tunisia, France, Turkey
2003-2005	Visiting Scientist from INRA (FR) funded by the Organization for Economic Cooperation and Development and the European Science Foundation
2003-2005	3 Visiting Students on Leonardo and Archimede Programmes and the IPGRI Award at D3A UNIVPM IT

C. Contributions to Science

My research has advanced the understanding of the genetic, genomic, and phenotypic bases of crop domestication, adaptation, and agroecological performance, with a focus food legumes (e.g., *Phaseolus* spp.) and cereals (tetraploid wheat and barley). I have elucidated the molecular and transcriptomic mechanisms underlying key agronomic traits, such as pod shattering, indehiscence, kernel composition, and nitrogen-use efficiency, revealing patterns of adaptive gene loss, altered co-expression, and convergent evolution. My work has combined high-throughput genotyping technologies, including genomics and metabolomics to dissect evolutionary processes and trait variation. Recently, I have contributed to the outline of a theoretical framework to optimize crop mixtures and enhance agricultural diversification by integrating agroecological genomics and participatory science. Within the H2020 INCREASE project, I have coordinated the development of intelligent germplasm collections and genomic resources of four key food legumes for European agrofood systems, as well as the implementation of a Citizen Science Experiment for the decentralized conservation of common bean plant genetic resources, which has involved more than 20,000 European citizens across five years. By investigating genotype × environment interactions and domestication-driven changes in plant phenotypes and root exudates, my research bridges fundamental plant biology with practical applications in sustainable crop improvement. Overall, these contributions provide a comprehensive understanding of adaptive variation, domestication trajectories, and strategies to leverage genetic diversity for resilient and diversified agroecosystems.

In the last 10 years (2015-2024), I have had 55 scientific publications in peer-reviewed indexed journals and 3 book chapters. According to Scopus, my overall total H-index is 48 with 4453 citations in the last ten years.

A list of selected articles in which I am first investigator, co-author and corresponding author is provided below:

- Santamarina, C., et al. Agroecological genomics and participatory science: optimizing crop mixtures for agricultural diversification. *Trends in Plant Science* (2025); <https://www.doi.org/10.1016/j.tplants.2025.04.008>
- Cortinovis, G., et al. Adaptive Gene Loss in the Common Bean Pan-Genome during Range Expansion and Domestication. *Nature Communications* (2024); <https://www.doi.org/10.1038/s41467-024-51032-2>
- Pieri, A., et al. Transcriptomic response to nitrogen availability reveals signatures of adaptive plasticity during tetraploid wheat domestication. *The Plant Cell* (2024); <https://www.doi.org/10.1093/plcell/koae202>
- Rossato, M., et al. CRISPR-Cas9-based repeat depletion for high-throughput genotyping of complex plant genomes. *Genome Research* (2023); <https://www.doi.org/10.1101/gr.277628.122>
- Bellucci, E., et al. Selection and adaptive introgression guided the complex evolutionary history of the European common bean. *Nature Communication* (2023); <https://www.doi.org/10.1038/s41467-023-37332-z>
- Fréville, H., et al. Shift in beneficial interactions during crop evolution. *Evolutionary Applications* (2022); <https://www.doi.org/10.1111/eva.13390>

- Bellucci, E., et al. The INCREASE project: Intelligent Collections of food-legume genetic resources for European agrofood systems. *The Plant Journal* (2021); <https://www.doi.org/10.1111/tpj.15472>
- Di Vittori, V., et al. Pod indehiscence in common bean is associated with the fine regulation of PvMYB26. *Journal of Experimental Botany* (2021); <https://www.doi.org/10.1093/jxb/eraa553>
- Rau, D., et al. Genomic dissection of pod shattering in common bean: mutations at non-orthologous loci at the basis of convergent phenotypic evolution under domestication of leguminous species. *The Plant Journal* (2019); <https://www.doi.org/10.1111/tpj.14155>
- Iannucci, A., et al. Evolution of the Crop Rhizosphere: Impact of Domestication on Root Exudates in Tetraploid Wheat (*Triticum turgidum* L.). *Frontiers in Plant Science* (2017); <https://www.doi.org/10.3389/fpls.2017.02124>
- Beleggia, R., et al. Evolutionary Metabolomics Reveals Domestication-Associated Changes in Tetraploid Wheat Kernels. *Molecular Biology and Evolution* (2016); <https://www.doi.org/10.1093/molbev/msw050>
- Gioia, T., et al. Impact of domestication on the phenotypic architecture of durum wheat under contrasting nitrogen fertilization. *Journal of Experimental Botany* (2015); <https://www.doi.org/10.1093/jxb/erv289>
- Bellucci, E., et al. Decreased nucleotide and expression diversity and modified coexpression patterns characterize domestication in the common bean. *The Plant Cell* (2014); <https://www.doi.org/10.1105/tpc.114.124040>
- Laidò, G., et al. Genetic Diversity and Population Structure of Tetraploid Wheats (*Triticum turgidum* L.) Estimated by SSR, DArT and Pedigree Data. *PlosOne* (2013); <https://www.doi.org/10.1371/journal.pone.0067280>
- Bitocchi, E., et al. Molecular analysis of the parallel domestication of the common bean (*Phaseolus vulgaris*) in Mesoamerica and the Andes. *New Phytologist* (2013); <https://www.doi.org/10.1111/j.1469-8137.2012.04377.x>
- Bitocchi, E., et al. Mesoamerican origin of the common bean (*Phaseolus vulgaris* L.) is revealed by sequence data. *Proceedings of the National Academy of Sciences* (2012); <https://www.doi.org/10.1073/pnas.1108973109>
- Rodriguez, M., et al. Genotype by environment interactions in barley (*Hordeum vulgare* L.): different responses of landraces, recombinant inbred lines and varieties to Mediterranean environment. *Euphytica* (2007); <https://www.doi.org/10.1007/s10681-007-9635-8>
- Papa, R. & Gepts, P. Asymmetry of gene flow and differential geographical structure of molecular diversity in wild and domesticated common bean (*Phaseolus vulgaris* L.) from Mesoamerica. *Theoretical and Applied Genetics* (2003); <https://www.doi.org/10.1007/s00122-002-1085-z>
- Gepts, P. & Papa, R. Possible effects of (trans) gene flow from crops on the genetic diversity from landraces and wild relatives. *Environmental Biosafety Research* (2003); <https://www.doi.org/10.1051/ebr:2003009>
- Papa, R., et al. Genetic diversity in landrace populations of *Hordeum vulgare* L. from Sardinia, Italy, as revealed by RAPDs, isozymes and morphophenological traits. *Plant Breeding* (1998); <https://www.doi.org/10.1111/j.1439-0523.1998.tb02201.x>

(for the complete list visit: [Roberto Papa | ScienceDirect](#))