

## PERSONAL INFORMATION



## Gianfranco Diretto

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 Manrico77 (Skype)

Sex M | Date of birth 07/11/1977 | Nationality Italian

## POSITION

Biotechnology Unit, Head

Metabolomics facility, Head

Research Scientist, ENEA (Italian National Agency for New Technologies, Energy and Sustainable Development), "Casaccia" Research Centre, Via Anguillarese 301, 00123 S.M. di Galeria (Rome), Italy

## WORK EXPERIENCE

From December 2008 to Present  
From 09/2005 – to 02/2006

Research Scientist position at ENEA on "Metabolic/Genetic Engineering in Plant Field for Bio-pharmaceutical, Nutraceutical or Energetic Production";

From 2007 to 2008

Post-doc position at ENEA. Project: "Microarray and metabolic profiling of *Solanaceae* transcriptome and metabolome";

From 04/2005 – to 06/2005  
From 01/2004 – to 06/2004

BIOGEN S.r.L. Collaboration Contract, at ENEA "CASACCIA" research centre on "Expression Profiling of transgenic plants of tomato (*Solanum lycopersicum*) with altered carotenoid content" (Advisor: Prof. Giovanni Giuliano);

From 01/2003 – to 12/2003

Farmen S.r.L. Collaboration Contract, performed at ENEA "Casaccia" Research Centre on "Metabolic engineering of carotenoid in transgenic tomato plants (*Solanum lycopersicon*)" (Adviser: Prof. Giovanni Giuliano);

BIOGEN S.r.L. Collaboration Contract, at ENEA "Casaccia" Research Centre (S.M. di Galeria, Rome) on "Molecular characterization of tomato (*Solanum lycopersicon*) transgenic plants with altered carotenoid content" (Adviser: Prof. Giovanni Giuliano).

## EDUCATION AND TRAINING

- From November 14<sup>th</sup> to 30<sup>th</sup> 2008  
From May 14<sup>th</sup> to 31<sup>st</sup> 2008
- Visit to labs of Albert-Ludwigs University (Advisors: Prof. P. Beyer; Dr. S. Al-Babili), Freiburg (Germany). Project: "Biochemical characterization of transgenic *Crt* leaf and tuber samples by HPLC of total carotenoids and LC-MS of ABA content;
- From April to December 2007  
From May to December 2006
- Period of study during the PhD program, performed at BTI for Plant Research/Cornell University (Advisor: Prof. J. Giovannoni), Ithaca, NY USA. Project: "Agronomical, molecular and physiological characterization of transgenic plants and mutants of tomato altered in carotenoid contents through microarray profiling, HPLC determination of carotenoids and post-harvest analyses";
- From 2003 to 2007
- Joint PhD fellowship in Cellular and Molecular Biology, performed between ENEA Research Centre (Adviser: Prof. Giovanni Giuliano) and University of L'Aquila (Adviser: Prof. Laura Spanò); research project: "Metabolic Engineering of Xanthophyll Pathway Remodelling in *Iridaceae* and *Solanaceae*";
- From 1996 to 2002
- First Class Degree (5 years) in Plant Biotechnology with full marks (110/110), Faculty of Biotechnological Science, University of Naples "Federico II"; research project: "Somatic embryogenesis and genetic transformation of *Rosa hybrida*";
- From 1990 to 1996
- Secondary School Diploma (50/60), "Liceo Scientifico Statale F. Sbordone", Naples, Italy.

## Professional Skills

- Agronomic techniques (fruit texture analysis; brix° determination; elasticity test of tomato cuticle; tomato crosses);
- Plant tissue culture (*in vitro* micropropagation; kanamycin test; cell cultures of rose; *in vitro* regeneration and *in vivo* (greenhouse) cultures of tobacco, potato, petunia, tomato and rose);
- Cytological techniques (determination of ploidy level in tobacco, petunia, potato and rose through direct (count of chromosomes in root apices) and indirect (count of chloroplasts in the guard cells of the stomata) methods; determination of trichome number in potato);
- Plant genetic transformation (*Agrobacterium*-mediated transformation of tobacco, potato, petunia, tomato and rose; biolistic transformation of tobacco and rose; electrophoresis-mediated transformation of *R. canina* L. seeds; *A. tumefaciens* vacuum-infiltration of pepper and tomato flowers and fruits);
- Molecular Biology (binary and shooting vectors construction; *Escherichia coli* and *Agrobacterium tumefaciens* transformation by electroporation, CaCl<sub>2</sub> and thermal shock; *Escherichia coli* and *Agrobacterium tumefaciens* transformation by electroporation, CaCl<sub>2</sub> and thermal shock; extraction of plasmidic and plant genomic DNA; oligo design; PCR analysis; radioactive Southern blot analysis; extraction of total RNA; radioactive northern blot analysis; competitive PCR; RT-PCR; Real-Time PCR; Microarray analysis of tomato and potato rna by direct and indirect labelling);
- Biochemistry (spectrophotometer analysis of carotenoids, anthocyanins and ascorbic acid; TLC of total carotenoid content; HPLC-PDA-MS (APCI) of total isoprenoids and lipids; HPLC-ESI-MS of phytohormone content (ABA, Auxins, Cytokinins, Gibberellins, Salicylic Acid, Jasmonic Acid); LC-ESI-MS of polar metabolome; GC-MS of volatiles and semi-volatiles; extraction of total proteins; western blot analysis; ethylene determination by Gas-Chromatography (GC-FID); ACO enzymatic activity assay; LOX enzymatic activity assay; osmolarity analysis).

## PERSONAL SKILLS

Mother tongue(s) Italian

Other language(s)	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2
Spanish	B1	B1	B1	B1	B1

**Communication skills** ▪ good communication skills gained through my experience as personell component.

**Organisational / managerial skills** ▪ leadership (currently responsible for a team of 3 people)

**Job-related skills** ▪ -

**Computer skills** ▪ good command of Mac OS, Windows and Microsoft Office™ tools; Statistical Programs (Systat); Graphic programs (Adobe Photoshop, Canvas); Bio-informatic programs (Blast, SwissProt, Mac-Vector, Assemblylign, Clustal W, Oligo 4.0, Primer Express 4.0, Amplify 1.2, Tmev 3.0, BioConductor, Consensus, Bioprospector, BioOptimizer, Patser, CREME, GeneOntology, Genespring 7.3, Kappa-view 4.0, Genesis 4.0, MapMan 8.0, Cytoscape 2.6.3), Excalibur 1.3, SIEVE 2.0, Mass Frontier 1.5; Robin 2.0.

**Other skills** ▪ cooking; trip planner.

**Driving licence** ▪ B

#### ADDITIONAL INFORMATION

Patents	<ul style="list-style-type: none"> <li>• “Una nuova carotenoide diossigenasi e metodi per la produzione biotecnologica in microorganismi e piante di composti ad elevato valore aggiunto derivati dallo zafferano” (“A new carotenoid dioxygenase and methods for the biotechnological production in microorganisms and plants of high value compounds from saffron”). Giuliano, G., Ferrante, P., Frusciante, S., Diretto, G., Pietrella, M., Al-Babili, S. 23/0714, n. RM2014A000415;</li> </ul>
Publications	<p><a href="https://scholar.google.com/citations?user=m_FudvYAAAAAJ&amp;hl=it">https://scholar.google.com/citations?user=m_FudvYAAAAAJ&amp;hl=it</a> (97 records, Hi: 34)</p> <p><a href="https://www.scopus.com/authid/detail.uri?authorId=14628122300">https://www.scopus.com/authid/detail.uri?authorId=14628122300</a> (84 records, Hi: 30)</p> <p>For the complete list of publications, see Annex 1</p>
Oral Presentations	For the complete list of Oral Presentations at National and International conferences, see Annex 2
Scientific Services	For the complete list of Scientific services, see Annex 3
Chair	<ul style="list-style-type: none"> <li>- The 11<sup>th</sup> Solanaceae Conference, Porto Seguro, Brasil, November 2<sup>nd</sup>-6<sup>th</sup> 2014; co-chair session IV Phenotyping tools (Metabolomics);</li> <li>- PlantEngine COST ACTION FA1106 final meeting, Sorrento, Italy, April 15<sup>th</sup>-17<sup>th</sup> 2015; co-chair session I “Capturing secrets from nature”;</li> <li>- EUROCAROTEN COST ACTION CA15136 workshop, Trogir, Croatia, October 16<sup>th</sup>-18<sup>th</sup> 2017; chair session III.</li> </ul>
Honours and awards	<ul style="list-style-type: none"> <li>• “Best Oral Presentation” at the 2nd Solanaceae Genome Workshop, Ischia (Na), Italy, September 25-29<sup>th</sup>, 2005;</li> <li>• “Natale Di Fonzo” SIGA 2011 Award for Genetic Breeding, LVI Italian Society of Agricultural Genetics – SIGA Annual Congress, Assisi (PG), Italy, September 19<sup>th</sup>-22<sup>th</sup> 2011.</li> </ul>
Tutorship	<ul style="list-style-type: none"> <li>• Master degree Thesis “Local Systems biology of tomato mutants altered in genes of the carotenoid biosynthesis” (2010-2011). Candidate: Sarah Frusciante; University of Rome “La Sapienza”, Rome, Italy, Faculty of Biotechnology;</li> <li>• Master degree Thesis “Morphological, Molecular and Biochemical characterization of transgenic potato plants expressing the gene of the bacterial Phytoene desaturase (<i>CrtI</i>)” (2011-2012). Candidate: Maria Sulli; University of Rome “La Sapienza”, Rome, Italy, Faculty of Biotechnology;</li> <li>• Master degree Thesis “Molecular and Metabolic characterization of tomato fruits expressing the ZCD gene of saffron” (2011-2012). Candidate: Antonio Miguel Garcia Condoluci; University of Rome “La Sapienza”, Rome, Italy, Faculty of Biotechnology;</li> <li>• PhD Thesis “Dissection of carotenoid and apocarotenoid biosynthesis in crop plants” (2011-2013). Candidate: Sarah Frusciante; University of Rome “La Sapienza”, Rome, Italy, Faculty of Biotechnology;</li> <li>• ENEA Post-doc fellowship “Metabolic Profiling of matrices of agri-food origin” (2018-2021). Candidate: Sarah Frusciante;</li> <li>• Master degree Thesis “Molecular and biochemical characterization of tomato edited plants in <math>\beta</math>-carotene hydroxylase 1 and 2 (<math>\beta</math>-CHY1 e <math>\beta</math>-CHY2) involved in carotenoid biosynthesis” (2021-2022). Candidate: Carla Sandri; University Campus Bio-Medico, Rome, Italy;</li> <li>• PhD Thesis “Investigation of apocarotenoid biosynthesis in physiological functions in crop plants” (2021-2023). Candidate: Dorotea Ricci; University Campus Bio-Medico, Rome, Italy;</li> </ul>
PhD committee member	<ul style="list-style-type: none"> <li>• PhD Thesis “Isolation and characterization of enzymes involved in the biosynthesis of secondary metabolites with phytotherapeutic interest” (July 5<sup>th</sup>, 2013). Candidate: Almudena Traperó Mozos; University of Castilla La-Mancha, Albacete, Spain, Faculty of Pharmacy;</li> <li>• PhD Thesis “Molecular regulation of carotenoid biosynthesis in tomato fruits. New biotechnological alternatives” (July 25<sup>th</sup>, 2016). Candidate: Lucio D’andrea; Centre for Research in Agricultural Genomics (CRAG), Barcelona, Spain;</li> <li>• PhD Thesis “Genes and genomic regions related to the production of volatile compounds in the tomato fruit” (September 15<sup>th</sup>, 2016). Candidate: Jose Luis Rambla Nebot; University of Valencia, Spain, Department of Biotechnology;</li> </ul>
Teaching	Training course “Methodologies in Genomics and Metabolomics for the breeding of the horticultural crops”. February, 10 <sup>th</sup> -14 <sup>th</sup> 2014. University of Naples “Federico II”.

Projects	<p>-2005-2011: Italian Ministry of Education and Research, Special Fund for Basic Research: "Parallelomics: massively parallel transcriptional and metabolic profiling approaches for plant improvement" (Personell);</p> <p>-2006-2009: Italian Ministry of Education and Research, Special Fund for Industrial Research: "ITALYCO: Advanced biology for the improvement of Italian processing tomatoes" (Personell);</p> <p>-2006-2011: EC 6th FP: "High Quality Solanaceous Crops for Consumers, Processors and Producers by Exploration of Natural Biodiversity (EU-SOL)" (Personell);</p> <p>-2007-2010: EC 6th FP: "Development of High Throughput Approaches to Optimise the Nutritional Value of Crops and Crop-Based Foods (DEVELONUTRI)" (Personell);</p> <p>-2009-2013: EC 7° FP: "Development of tools and effective strategies for the optimisation of useful secondary METAbolite PROduction in planta (METAPRO)" (Personell);</p> <p>-2010-2012: "Improvement of nutritional and phytosanitary properties of commodities for human and animal nutrition (ALISAL)" (Personell);</p> <p>-2011-2014: AGER private consortium. "Durum wheat adaptation to global change: effect of elevated CO2 on yield and quality traits - DUCO" (Personell);</p> <p>-2011-2014: Italian Ministry of Agriculture. "Improvement of the utilization and digestibility of agricultural residues for biofuel production - BIOMASSVAL" (Personell);</p> <p>-2012-2015: Italian Ministry of Agriculture. "Italian-Israeli Initiative for the nutritional improvement of Solanaceous crops (IT-IL-NUTRI-SOL)" (Personell);</p> <p>-2013-2017: EC 7° FP "From DISCOvery to products: A next generation pipeline for the sustainable generation of high-value plant products (DISCO)" (Personell);</p> <p>-2015-2018: H2020 "Traditional tomato varieties and cultural practices: a case for agricultural diversification with impact on food security and health of European population (TRADITOM)" (Personell);</p> <p>-2018-2019 POR "Quality testing of organoleptic properties of COffee blends via genetic and METAbolic fingerprinting (COMETA)" (Team leader);</p> <p>-2018-2023: H2020 "Sustainable innovation of microbiome applications in food system (SIMBA)" (Personell);</p> <p>-2019-2021: PON "Colture autoctone mediterranee e loro valorizzazione con tecnologie avanzate di chimica verde (COMETA)".</p> <p>-2020-2024: H2020 "Innovative high-value cosmetic products from plants and plant cells" (INNCOCELLS)" (Team leader).</p> <p>- 2022-2024: PRIMA "Novel food products for the PROMotion of MEDiterranean LIFEstyle and healthy diet (PROMEDLIFE)" (Team leader).</p>
Project evaluator	<p>Evaluator for the PRIN (Progetti di Ricerca di Interesse Nazionale) 2021 edition; COST (European Union Europea), 2017; FONDECYT (Chilean Research Program), 2019; Spanish State Research Agency (AEI), 2019-2023</p>
National scientific qualification as Full Professor (ASN)	<p>Botany (05/A1), Level I (12/11/20 – 12/11/29); Plant Chemistry, Genetics and Pedology (07/E1), Level I (12/11/20 – 12/11/29).</p>
Editor di riviste e membro di Società Scientifiche	<p>- Member of the Italian Society of Plant Genetics (SIGA);</p> <p>- Guest Editor for the Special Issue on "Metabolic Engineering of Plants" for the journal "International Journal of Molecular Sciences (IJMS)", 2020";</p> <p>- Topical Advisory Panel Member of the journal International Journal of Molecular Sciences (IJMS).</p>