

Giovanna Felis is Associate Professor in Microbiology at the Dept. of Biotechnology, University of Verona, Italy.

In 2011 she co-funded, the start-up Microbion (www.microbion.it), former spin off of the University of Verona, Italy.

Member of the *Subcommittee on the Taxonomy of Bifidobacterium, Lactobacillus and related genera*, of the *International Committee on Systematics of Prokaryotes*, ICSP (since 2008).

Member (*socio corrispondente*) of the Academy of Agriculture, Science and Letters of the city of Verona (<http://www.aaslvr.it>), found. 1768, (since 2015).

Member of the Italian Society of Agro-Food-Environmental Microbiology (SIMTREA, <http://www.simtrea.org>) (since 2006), and of BISMIS - Bergey's International Society for Microbial Systematics (<http://www.bismis.org>), (since 2014).

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Brief overview of roles related to research

GF obtained her PhD in 2004 in Agro-Industrial Biotechnology defending a thesis, under the supervision of Prof. Franco Dellaglio, focused on genetic biodiversity of food-related bacteria with interesting taxonomic insights such as descriptions and reclassification of novel taxa, at the species and subspecies level, as well as investigation of phylogenetic relatedness at genus-level for different taxa. During this period she was awarded with “young researcher award” from the University of Verona, 2002 and spent three months in the Bioinformatics Lab of University College Cork, Ireland (supervisor Prof. D. Higgins).

In the years 2004-2007 she was post-doctoral fellow at the IZCS, now AGRIS Sardegna (2004), and at the Dept. of Biomedical Sciences, University of Sassari (Italy) (2004-2006), working on genetic characterization of food and clinical isolates of different Gram-positive bacteria. Between 2006 and 2007 she was visiting scientist of The Kluyver center for genomics of industrial fermentation at NIZO (Ede, the Netherlands) to work on genetic diversity of *Lactococcus lactis* analysed by means of microarray technology. Since 2008 she works at the Dept. of Biotechnology, University of Verona, first as a post-doctoral fellow (2008-2011), then as assistant professor (2011-2014) and finally as associate professor (2014-present).

Research activity of the last ten years has been focused on several aspects related to agro-food microbiology, with particular reference to the analysis of biodiversity investigated with genetic and genomic techniques to characterise microbial strains or consortia relevant for production of food and beverages as well as for health (probiotics and human microbiota) (see below for details).

In this timeframe, she was also:

- visiting scholar at the Health and Nutrition Sciences Department at Montclair State University (USA) (Feb 2014, 2 weeks), financially supported by the Global Education Center of MSU.

- visiting scientist at the CSIC-IPLA, Villaviciosa, Spain as part of the Integrated Action Italy-Spain 2010 - MIUR Prot. IT10MD12L (November 2012, one week).

At present, GF has published more than 50 papers on international peer-reviewed journal papers, 5 technical papers on Italian journals, 10 contributions in scientific books and 1 patent (see below). She also co-authored over 80 contributions (posters and talks) to national and international conferences.

She is associate editor of *Frontiers in Microbiology* and *Frontiers in Nutrition*, for the former journal she co-edited two Research Topics.

Other editorial activities include role of reviewer for several journals (*Int J Syst Evol Microbiol*, *J Appl Microbiol*, *Int J Food Microbiol*, *Ann Microbiol*, *FEMS Microbiol Lett*, *Syst Appl Microbiol*, *Appl Microbiol Biotechnol*, *Anaerobe*, *Food Microbiol*, *Front Microbiol*).

She has been member of the local organizing committee of:

- 38th SOMED Congress, International Society for Microbial Ecology and Disease: Human Microbiome: from the bench to health benefits, Verona 11-13 Oct 2015;

- Winter School in Applied Bioinformatics, Univ. Verona, Canazei (TN) 21-25 Jan 2018 (<https://www.winterschoolbiotech2018.com/>).

Research interests

Research activity on **bacterial systematics** started during the PhD has continued throughout the years and has been focused mainly on lactic acid bacteria (LAB) and genus *Lactobacillus*, also with description of novel species and subspecies and insights into the evolution of the genus, based on analysis of pathways for carbohydrate metabolism, and on comparative genomics. Taxonomic expertise has been applied also to other genera, again with description of novel taxa, and more speculative contributions have also been published.

It has to be mentioned that even though systematics is considered a basic research area, taxonomic issues in LAB can have impact on applied research and industrial exploitation, as they include many important food bacteria and probiotics.

Taxonomic expertise has also constituted the framework for more **applied studies**:

1. diagnostic tools: accurate choice of strains and sequences to be compared, considering the results of application of techniques used for taxonomic studies, has led to the design of robust assays for species differentiation as prototypes for more general applications (PATENT WO2018015572 (A1), Priority n. WO2016EP67597 20160722).
2. characterization of microorganisms in food products to allow determination of their stress response, technological potential and/or safety characteristics; to a minor extent, this approach has been applied to strains relevant in clinical settings.
3. analyses of microbial consortia relevant in the production process of food productions (e.g., withered grape for Amarone wine) or health (human microbiome).

In particular, whole genome and metagenome sequencing as well as microarray analyses have been the key to unveil genome-wide functional potential of strains belonging to different species and genera, including yeasts and bacteria, mainly lactic acid bacteria (e.g., *Lactococcus lactis*, *Leuconostoc mesenteroides*, and *Oenococcus oeni*).

Current research line is directed towards the investigation of the biotechnological potential of microbial strains, with a main focus on, but not limited to, lactic acid bacteria, through multidisciplinary omics-based approaches. Interest is twofold, for improved applications in the production of food and beverages of improved (sensory and/or nutritional) quality as well as for the development of industrial applications exploiting microbial biodiversity.

Grants as principal investigator

GF is/has been Principal Investigator (PI) or Scientific Advisor of 5 grants for a total budget of 535.412,00 euro. More in detail, she has been PI for 4 Joint projects funded by University of Verona for cooperation with companies in applied research projects:

1. Joint Project 2012 – MicroPhyto - Development of novel procedures to obtain innovative supplements based on phytochemicals and microorganisms. with WIZ Chemicals s.r.l.
2. Joint Project 2014 - FORTIS-Klu - For optimized resistance of fragilis *Kluyveromyces*, with Laboratori Turval s.r.l.
3. Joint Project 2015 – PROUD-STICKS - Innovation for breadsticks production: a focus on probiotics and sourdough composition, with Panificio Zorzi s.r.l.
4. Joint Project 2016 LAB-Go - Isolation and characterization of lactic acid bacteria for the valorization of goat cheese local production in the Lessinia area (Verona province, Veneto region, Italy).

GF has also been the scientific advisor for a research fellow funded in the framework of European Social Fund (2012) through Veneto Region – ID strain – development and application of novel highly discriminative genetic methods for tracking microbial strains associated to the production of food and beverages.

Finally, two national research grants (FIRB) have been positively evaluated but not funded: the former in the FIRB Call 2010, project code RBFR10A2MA (*Oenococcus oeni*: a new model for studying microbial evolution), which received positive evaluation, but was not funded; the latter in FIRB Call 2012, project code RBFR122RDP (Co-evolution of yeast and bacteria during wine-making: interactions of *Saccharomyces cerevisiae* e *Oenococcus oeni* revealed with omic techniques) which passed first evaluation step.