

Marilù Chiofalo - Biography

Personal data. Marilù Chiofalo was born in 1968 in Reggio Calabria, she is the mother of Anna and companion of Massimiliano Labardi in a lifetime.

Academic education and position. Marilù Chiofalo is a condensed-matter physicist at the University of Pisa, where she got her MD after classical high-school studies, subsequently obtaining the PhD at the Scuola Normale Superiore with Franco Bassani and Giuseppe Iadonisi. At the University of Pisa she contributes to the Interdisciplinary Center of Sciences for Peace, to the Center for Training and Education Research, and to the Research and Responsible Innovation group, and is currently part of the Physics Department executive board.



Teaching. She teaches basic physics at the BS (SPES) and MD (CTF) of Pharmacy, physics of quantum fluids for the MD and PhD in Physics, and Physics of everyday life to teach to teach physics. She is part of the CISIA National working group aimed at reviewing the syllabus and the physics access tests for Pharmacy courses. She has served as supervisor for several bachelor's and master's degree theses.

Education research. More recently, she has undertaken an intense activity in physics education research. She is in charge of the activities aimed at teachers training for the Physics Department, contributes to the G6 group on teachers training of the Piano Lauree Scientifiche coordinated by Josette Immè, and coordinates the GIREP thematic group on Games with the Purpose of Physics Education. She is part of the Scientific Advisory Board of *Imparadigitale*, chaired by Dianora Bardi. She is the author of *Street Physics Toolbox*, 60 video-pills from Galileo's physics to electromagnetism.

Research in condensed-matter physics. The research activity is characterized by broad interdisciplinary and intersectorality, a high degree of internationalization, and a constant search for methodological innovation. She has carried out research in high-temperature superconductivity, bosonic and fermionic superfluidity of confined ultracold atoms, and - for two years - in testing the equivalence principle between inertial and gravitational masses with macroscopic bodies, within Anna Nobili's group. Her current research activity is focused on conceiving, by theoretical and quantum simulation methods, of quantum technologies and analog quantum simulators for metrological and fundamental physics applications. In collaboration with the neuroscientist of the University of Pisa Concetta Morrone, she coordinates a research program aimed at developing quantum models and simulations for visual neurosciences. In collaboration with Sabrina Maniscalco (Professor of quantum information and logic, University of Helsinki) she has conceived and coordinated the proposal *IQHuMinds* - Integrating Quantum Machines and Minds for quantum technologies, to solve or optimize quantum problems within a citizen-science approach, through the development of videogames allowing you to channel the creativity and intuition of players in the training of classical or quantum computers to perform optimal solutions. She contributes to the internal review activities of the *Virgo-Ligo* collaboration and the activities of the network *Atomic Experiments for Dark Matter and Gravity Exploration in space*, whose white paper has been selected by the European Space Agency. She coordinates the follow-on of the Kavli Institute for Theoretical Physics on *Black holes as open quantum systems*. She is the author of almost one hundred articles in peer-reviewed journals also with high-impact factors, two books, and one edited book with Robert Schrieffer and Giuseppe Iadonisi. The results of her research were invited to numerous conferences and seminars at international scientific institutions. Her most cited work (more than 500 citations) in collaboration with Murray Holland (JILA, Colorado) has predicted the realization of superfluidity of ultracold fermionic atoms, afterwards observed at JILA in the group of Debbie Jin. She has coordinated or coordinates research and teaching projects funded by CINECA, SNS, ASI, INFN, MIT-UNIFI, KITP, Erasmus+, CISIA.

International collaborations. She has carried out part of her research within international scientific institutions, including: IRC Cambridge, TU-Eindhoven, Institut Poincaré (Paris), Strathclyde (UK) ICTP, ECT and CRS-BEC (Trento), Los Alamos National Labs, Aspen Center for Physics, Kavli Institute for Theoretical Physics, Stanford, Harvard, MIT, Helsinki University, and especially at JILA (Colorado, USA), that she has been visiting almost every year since 1995.

Peer-review activity. She carries out peer-review activity for Physical Review Letters and Physical Review (A, B, E, X), Nature, New Journal of Physics, European Phys. Journal, Europhysics Letters, Universe, Photonics, and served as referee for VQR, ERC starting grant, and for prestigious USA and European scientific institutions.

Outreach. She is author of radio/video formats for science outreach, and has co-created and conducted with Sara Maggi the 5-minutes radio-broadcast program *Hallo, Science!* with the special series Nobel, why? Nobel Women, and Galileo (36 episodes). She collaborates with major National newspapers and magazines about culture, science, and society topics. In the last decade she has almost yearly contributed to *Bright!* – the European Researchers Night and to the initiative *Pianeta Galileo* of the Tuscany Region, bridging academia and high-schools. She has conceived and directed the music and science festival *Musical...mente*, the conversation-show *The physics of Harry Potter for muggles* and, with the cartoonist Giovanni Timpano (cartoonist of Batman for Marvel USA), the format *Physics meets cartoons*. She is part of the jury of the *Cosmos* award for popular science, chaired by Gianfranco Bertone. She is director of the *Discover* section of the platform *QPlayLearn* (www.qplaylearn.com) created by Sabrina Maniscalco and aimed at quantum science and technologies education. For QPlayLearn, she has co-created the quantum pills, 5-minutes animations on basic quantum physics concepts, organized the first two Italian editions of the *Quantum Game Jams* within Internet Festival and, with Sabrina Maniscalco, she is scientific chair of the project *progetto Quantum Jungle* funded by Fondazione di Pisa and Palazzo Blu, 6 sq installation bridging arts and science to visualize the time evolution of a quantum state. Within the *Quantum Flagship*, she co-coordinates the pilot project *Quantum Technologies Education for Everyone* (QUTE4E) of the Quantum Technology Education coordination and support action initiative.

Awards. Award for junior scientists of the Italian Physical Society (1997). Selected as a leading scientist by the project 100Experts. Award Culture of Solidarity (Pistoia, 2014) and Women award (Pavia, 2016).

Active citizenship and institutional and political activities. In a parallel lifetime, she is active in politics and associations, in particular women movements to start with. She has been co-founder in Pisa of Movimento Allattamento Materno Italiano (Italian association form of the ONU-World Alliance for Breastfeeding Actions). She contributes to the Women and Science Association, the network 500WomenScientists, the Board of the Scuola Normale Alumni Association, the Guarantor Committee of the National Association Italian Partisans (ANPI), the Italian Union of Scientists for Disarmament (USPID), the 24Marzo onlus Association promoted by the abuelas and madres de Plaza de Mayo. She is among the Founders of the Italian Democratic Party, serving in its board bodies. She has been elected President of the Equal Opportunities Council (2003-2008) and appointed for ten years (2008-2013, 2013-2018) as Deputy mayor of the Pisa Municipality for educational policies, science education and realization of the scientific hub Cittadella Galileiana, equal opportunities policies, Legacy, and anti-corruption planning. In these functions, she has coordinated the educational policies of the six Municipalities composing the Pisa area, and represented the National Association of Italian Municipalities (ANCI) in the Observatory for Childhood and Adolescence and the Prime-ministry board against gender violence (Ministry appointments), and in the Tuscany Observatory against gambling. She currently serves in the administrative board of the Tuscany Regional Orchestra (ORT).

Free time. She plays tenor sax in the Orchestra of the University of Pisa and in the Pisa Philharmonic Ensemble. She plays any kind of sport, and in particular has learned from volleyball how to score points in team with three touches (as setter), from table-tennis to never leave the ball hitting the ground, and from soccer how

to score with bicycle kicks. She loves role-playing games, cartoons, and fantasy. She attends the *Labodif* training with Gianna Mazzini and Giovanna Galletti.