GIANCARLO **CELLA**

POSITIONS

January 1, 2020-today	**Senior researcher (Primo Ricercatore)** Istituto Nazionale di Fisica Nucleare · Pisa Department
2008-December 31, 2019	**Permanent researcher** Istituto Nazionale di Fisica Nucleare · Pisa Department
2004-2008	**Temporary researcher** Istituto Nazionale di Fisica Nucleare · Pisa Department
2003	**Postdoc** Dipartimento di Fisica · Università di Pisa
2002	**Postdoc** Istituto Nazionale di Fisica Nucleare · Pisa Department
2001	**Postdoc** Dipartimento di Fisica · Università di Pisa
1997-1998	**Collaboration contract** California Institute of Technology · Pasadena CA – USA
1995	**Postdoc: application of parallel and distributed computing to scientific problems** Consorzio Pisa Ricerche · Pisa
1992-1994	**Postdoc** Dipartimento di Fisica · Università di Pisa
1991	**Civil service** .

EDUCATION

1995	**PH. D. THESIS** Effetti di regolarizzazione in teorie di campo su reticolo. Correzioni QCD a processi di decadimento FCNC. (Regularization effects in lattice field theories, and QCD corrections to FCNC decay processes). · Dip. di Fisica dell'Università di Pisa, Supervisor: Prof. Giuseppe Curci
July 19 1990	**MASTER THESIS** Effetti di interazione forte nel decadimento debole del mesone B. (Strong interaction effects in weak B-meson decay). · Dipartimento di Fisica dell'Università di Pisa. Supervisor: Prof. Giuseppe Curci. 110/110 cum laude.

RESPONSIBILITIES

2025-today **Virgo national responsible**
INFN national responsible for the Virgo experiment ·

2024-today **Principal contact for INFN**
European project ACME (the Astrophysics Centre for Multi-messenger studies in Europe) HORIZON-INFRA-2023-SERV-01-02 - Research infrastructure services advancing frontier knowledge · Project Id: 101131928

2024-today **Virgo ombudsperson**
The Virgo ombudspersons provide independent, impartial, confidential and informal assistance to all members of the Virgo Collaboration. ·

2019-2022 **Virgo data analysis coordinator.**
Main responsibilities: coordination of Virgo data analysis activities, of scientific subgroups, joint coordination with LIGO and KAGRA chairs of data analysis activities of LIGO/Virgo/KAGRA collaboration. ·

2016-2019 **Coordinator contact and team member**
European project NEWS H2020-MSCA-RISE-2016, NEw WindowS on the universe and technological advancements from trilateral EU-US-Japan collaboration · Project Id: 734303

2015-2024 **Virgo Steering Committee member**

2015-2024 **Virgo Pisa group coordinator**
The group has key responsibilities in the Virgo collaboration: construction, commissioning (superattenuators, controls, electronics) and data analysis (stochastic backgrounds, continuous sources, compact binary coalescences, multimessenger). ·

2019-2021 **Pisa coordinator OLAGS project.**
INFN project "Commissione Scientifica Nazionale 5": Optical Links for Atomic Gravity Sensors. Demonstrator for the possibility of gravitational gradient measurement with displaced sensors. ·

2009-today **INFN Pisa representative inside VESF Council**
The VESF is the Virgo-EGO Scientific Forum. ·

2019-today **Director of physics school of the cultural association "Scholé"**

2016-2018 **INFN Pisa coordinator European Union project GraWIToN.**
Initial Training Network, funded by European Commission under FP7-Marie Curie Actions · http://www.grawiton-gw.eu/

2015-2017 **Referee CALC_TIER1, "Commissione Scientifica Nazionale 2" INFN.**

2004-2012 **Responsible hardware e software injections stochastic background in Virgo**

2002-2012 **LIGO/Virgo stochastic background search group chair**

2011 **Writing team member "Einstein Telescope Conceptual Design Document"**

2007 **Virgo Editorial Board member**

2000 **Member Joint LIGO/Virgo data analysis preparation committee**

EVALUATOR

2023-2024 **Evaluator** Proposals for young researcher program "Rita Levi Montalcini MUR

2015-2019 **Evaluator** ANVUR VQR

OTHER RESPONSIBILITIES

2018-today **Referee** Journal of Astronomical Instrumentation

2018-today **Referee** Astronomy and Computing

2011-today **Referee** Physical Review D
2010-today **Referee** Classical and Quantum Gravity
2009-today **Referee** Astronomy & Astrophysics
2009-today **Referee** Nuovo Cimento
2011-today **Referee** European Physical Journal Plus
2009-today **Referee** Review Scientific Instruments
2016-today **Referee** General Relativity and Gravitation
2017-today **Referee** Physics Letters A

PRIZES

2017 **Albert Einstein Medal**
As a member of the LIGO/Virgo collaboration ·

2016 **Gruber Cosmology Prize**
As a member of the LIGO/Virgo collaboration · http://gruber.yale.edu/prize/2016-gruber-cosmology-prize

2016 **Breakthrough prize**
As a member of the LIGO/Virgo collaboration · https://breakthroughprize.org/News/322016

ABILITATIONS

2014 **"Abilitazione scientifica nazionale" settore 02/A1**
Habilitation to the role of associate professor · Experimental physics of fundamental interactions.

2014 **"Abilitazione scientifica nazionale" settore 02/C1**
Habilitation to the role of associate professor · Astronomy, astrophysics, Earth and planets physics.

2005 **I.N.F.N. Habilitation**
Habilitation to the role of INFN researcher · Theoretical Physics.

2005 **I.N.F.N. Habilitation**
Habilitation to the role of INFN researcher · Astroparticle Physics.

COLLABORATIONS

6/4/2015-8/5/2015 **Research program participant**
The Next Detectors for Gravitational Wave Astronomy · Kavli Institute for Theoretical Physics China, Pechino

2014-2016 **FIRB project participant**
New perspectives on the violent Universe: unveiling the physics of compact objects with joint observations of gravitational waves and electromagnetic radiation. ·

2012-2015 **Member**
GINGER (Gyroscope IN GEneral Relativity) experiment ·

2012-2015 **PRIN project participant**
"Sviluppo di interferometri ottici ultra low-loss in regime ponderomotivo per la riduzione del rumore quantistico in rivelatori di onde gravitazionali e rivelazione ultrasensibile di piccole forze in sistemi micromeccanici" (Developement of ultra-low-loss interferometers in ponderomotive regime for the reduction of quantum noise in gravitational wave detecors · High sensitivity detection of small forces in micromechanical devices.

2010-2011 **European Council project n. 211743 participant**
Einstein Telescope. 1. Study of Gravity Gradient noise and of techniques for its mitigation. 2. Simulation activities for seismic attenuation systems. ·

2002-2005 **PRIN project participant**
"Sospensioni per specchi di rivelatori interferometrici di onde gravitazionali a basso rumore termico" (Mirror suspensions for intererometric detectors of gravitational waves with low thermal noise). ·

2002-today **Associate**
European Gravitational Observatory ·

1996-today **Member**
Virgo collaboration ·

2000 **Cofinanced university project participant**
"Rumore Newtoniano nei Rivelatori per Onde Gravitazionali" (Newtonian noise in gravitational waves' detectors) ·

1997-2000 **MURST project participant**
"Angiografia Digitale ad alto Rapporto Prestazioni/Costo" (Digital Angiography with high cost/performance ratio). In the framework of the National Program of Research about Tecnologies in Cardiology) · Coordinator: S.I.A.S., Modena, in collaboration with the "Istituto di Fisiologia Clinica del C.N.R". Description: Implementation of algorithms for angiography image analysis on a APE/Quadrics parallel computing architecture.

1995 **European project participant**
Georadar Embedded on Site Parallel Processing Feasibility Study-GEOSIPP/FEST (European Community program Esprit, Parallel Computing Initiative CAPRI, project n.9452/94/197/70). · Coordinator: "Ingegneria dei Sistemi" (IDS), Pisa. Description: Feasibility study for the use of a parallel computing embedded architecture in real time elaboration of IDS georadar data.

1995-1996 **European project participant**
Numerical Modelling for Electromagnetic Design and Hardening of Telecommunication Centres-ARTEMIS (European Community program Esprit, Parallel Computing Initiative CAPRI, pro- ject n.9452/94/190/70) · Coordinator: "Centro Studi e Laboratori Telecomunicazioni" (CSELT), Torino. Description: Parallelization of numerical codes for electromagnetic compatibility on APE100 and Cray T3D computing architectures.

CONFERENCES AND SEMINARS

CONFERENCES ORGANIZATION

2024 **LOC member**
QFC2024- Quantum gases, fundamental interactions, and cosmology · https://agenda.infn.it/event/38093/

2024 **SC member**
V Gravi-Gamma-Nu workshop · https://agenda.infn.it/event/38056/

2022 **LOC member**
QFC2022- Quantum gases, fundamental interactions, and cosmology · https://agenda.infn.it/event/28726/

2021 **LOC and SC member**
Gravi-Gamma workshop, Volterra, Italia. · https://agenda.infn.it/event/20758/

2019 **LOC member**
GWEOS 2019, Pisa, Italia · https://agenda.infn.it/event/17643/

2019 **LOC member**
QFC2019- Quantum gases, fundamental interactions, and cosmology · https://agenda.infn.it/event/17056/

2019 **LOC member**
GWDAW 2019, La Biodola, Isola d'Elba, Italia. Gravitational-Wave Ad- vanced Detector Workshop "From Advanced Interferometers to Third Generation Observatories · https://agenda.infn.it/event/15928/

2016 **LOC member**
SciNEGHE 2016, Pisa, Italia. (Workshop on Science with the New Generation of High Energy Gamma-ray Experiments) · https://agenda.infn.it/event/11102/

2014 **Co-chair**
XXI SIGRAV Conference, Alessandria, Italia · Workshop experimental gravitation.

2003 **LOC member**
5th Edoardo Amaldi Conference, Pisa, Italy ·

INVITED TALKS AND SEMINARS

February 9, 2022 **ICTP Colloquium**
EGO and VIRGO: The Past, Present, and Future of the Physics of Gravity Waves. ·

September 20-23, 2021 **The 7th Conference of the Polish Society on Relativity**
Recent observations of GWs by LIGO and Virgo detectors. ·

July 5-10, 2021 **MG16 - Sixteen Marcel Grossmann meeting**
The recent observations of Gravitational Waves from the two Neutron Stars-Black Holes coalescences ·

March 9-11, 2021 **La Thuile 2021 - Les Rencontres de Physique de la Vallée d'Aoste, Virtual workshop**
Five years of gravitational wave observations: where we stand? ·

July 1-7, 2018 **Fifteenth Marcel Grossmann Meeting - MG15**
Data Analysis Techniques To Search For The Stochastic Gravitational-Wave Background · Università di Roma "La Sapienza"

March 10-17, 2018 **53rd Rencontres de Moriond - EW**
Results of LIGO-Virgo · La Thuile

September 20, 2016 **Workshop "String Theory and Inflation"**
Stochastic Background of Gravitational Waves · Dipartimento di Fisica University of Roma Tor Vergata

September 12-16, 2016 **Eighth International Workshop DICE2016. Spacetime - Matter – Quantum Mechanics**
The discovery of gravitational waves: a gentle fight against noise · Castello Pasquini/Castiglioncello (LI), Italia

May 17-20, 2016 **New Frontiers in Theoretical Physics - XXXV Convegno Nazionale di Fisica Teorica and GGI 10th anniversary**
Advanced detectors of gravitational waves: status and perspectives · Galileo Galilei Institute, Firenze

June 7-12, 2015 **"General Relativity & Gravitation: A Centennial Perspective"**
Panelist Perspectives Session: Future Technologies in Gravitational Wave Science · State College, USA.

June 7-12, 2015 **"General Relativity & Gravitation: A Centennial Perspective"**
Status of Advanced Virgo. · State College, USA.

May 17-22, 2015 **GWADW 2015**
Seismic Newtonian Noise · Girdwood, Alaska, USA.

2015 **3rd Beijing Gravitational Waves Workshop**
A Bayesian approach to the problem of the locking acquisition of a suspended optical cavity. · Tsinghua University, Pechino, Cina.

May 29-30, 2014 **IEEE International Workshop on Metrology for Aerospace**
Optical Quantum Noise in High Sensitivity Measurements · Benevento, Italia.

October 14-16, 2009 **2nd Einstein Telescope Annual Workshop**
Gravity Gradient Noise: Estimates and Reduction Strategies · Erice, Italia.

2009 **Seminar APC**
Gravitational Waves Stochastic Background: Sources & Detectors. · Paris

May 27-28, 2009 **58th Fujihara Seminar**
Low frequency limits (Gravity Gradient Noise) · Shonan Village Center, Hayama, Japan.

May 23, 2008 **Virtual Institute of Astroparticle Physics**
Gravitational Waves Stochastic Background in Interferometric Detectors · Virtual seminar.

April 27, 2004 **Background stocastico di onde gravitazionali: sorgenti e detector**
Dipartimento di Fisica dell'Università di Napoli ·

SELECTED PRESENTATIONS AND SEMINARS

July 5-12 2017 **EPS Conference on High Energy Physics**
Stochastic GW searches and Cosmology with GWs. · Venezia, Italy

October 18-21 2016 **The search for a stochastic background of gravitational waves**
SciNeGHE 2016, High-energy gamma–ray experiments at the dawn of gravitational wave astronomy · Pisa, Italy

September 12-16 2016 **The search for a stochastic background of gravitational waves.**
TeV Particle Astrophysics 2016 · CERN

May 17-22 2015 **System ID for modern control.**
GWADW 2015 · Girdwood, Alaska, USA

May 17-22 2015 **Output "Anti-squeezing"**
GWADW 2015 · Girdwood, Alaska, USA

September 22-26 2014 **New Perspectives on the Violent Universe: toward an italian network for joint astronomical observa- tions of gravitational waves and electromagnetic radiation.**
100° SIF congress · Pisa, Italy

March 4-5 2014 **Gravitational Wave Stochastic Background.**
What Next in Gravitational Wave Research? · EGO Cascina, Italy

November 23 2010 **Some considerations about Gravity Gradient Noise.**
3rd annual ET meeting · Budapest, Hungary

2010 **Migliorare la sensibilità a basse frequenze in rivelatori interferometrici di onde gravitazionali (Improving low frequency sensitivity in interferometric detectors of gravitational waves)**
SIF congress 2010 · Bologna, Italy

October 29 2009 **La Gravitazione (Gravitation)**
1609-2009: l'Universo di Galileo, l'Universo oggi · Pisa, Italy

July 12-18 2009 **Gravity Gradient Noise**
12th Marcel Grossman Meeting · Paris, France

May 12-17 2008 **Gravity Gradient Noise: Subtraction and the Underground Option.**
GWADW 2008, La Biodola (Elba) ·

May 12-17 2008 **Detection Noise and Quantum Fluctuation Amplification.**
GWADW 2008, La Biodola (Elba) ·

March 26-28 2008 **Esperimenti per la rivelazione delle onde gravitazionali (Experiments for gravitational wave detection)**
Incontri di Fisica delle Alte Energie, Bologna ·

October 10 2007 **Stochastic Background Search (from a data analysis perspective).**
2nd ENTApP-GWA joint meeting on gravitational waves sources and observation, Tuebingen ·

October 8-9 2007 **Stochastic Background Search with VIRGO and GEO.**
4th ILIAS-GW annual general meeting, Tuebingen ·

September 24 2007 **Una applicazione dello squeezing al miglioramento della sensibilità dei rivelatori interferometrici di onde gravitazionali (An application of squeezing to the improvement of the sensitivity in interferometric detectors of gravitational waves).**
XCIII Congresso Nazionale SIF, Pisa · Special mention for best talk.

May 11-13 2007 **Studio delle onde gravitazionali**
Incontri di Fisica delle Alte Energie, Napoli ·

2006 **Underground reduction of gravity gradient noise.**
GWADW, La Biodola (Elba) ·

April 27 2006 **Interferometers without optical coatings.**
ILIAS meting, Firenze ·

28 March 2006 **Newtonian noise under the ground.**
3rd ILIAS annual meeting, Laboratorio nazionale Gran Sasso ·

23-24 January 2006 **Stochastic Background: data analysis.**
First ENTApP - GWA joint meeting, Paris ·

March 18,2005 **Il principio di inteterminazione di Heisenberg e la rivelazione delle onde gravitazionali (Heisenberg indetermination principle and gravitational waves detection)**
Workshop "Le onde gravitazionali, una nuova finestra sull'Universo", Domus Galilaeana Pisa. ·

December 15 2004 **Simulation of gravitational wave stochastic background**
GWDAW-9 workshop, Annecy ·

December 15 2004 **A couple of techniques to improve sensibility preserving robustness in gravitational waves burst detection**
GWDAW-9 workshop, Annecy ·

November 26 2004 **Virgo: il detector e le sorgenti (Virgo: sources and detector)**
Meeting "Astrofisica in Toscana 2", Pisa ·

October 21 2004 **Beyond the standard quantum limit.**
2004 IEEE Nuclear Science Symposium, Roma ·

September 16 2004 **Beyond the standard quantum limit.**
16th SIGRAV conference on General Relativity and Gravitational Physics, Vietri sul Mare (SA) ·

December 20 2003 **Optimal vetoes and best matching for coalescing binaries events.**
GWDAW-8 workshop, Milwaukee ·

February 7 2003 **Dealing with Newtonian noise above and below the ground: a review.**
Aspen 2003 GWADW winter conference ·

May 22 2002 **A case study in binary coalescing detection: optimal matching with amplitude corrections.**
Elba 2002 GWADW ·

December 15, 2001 **GWIC working group report.**
GWDAW 2001, Trento ·

2001 **Status of Virgo.**
Aspen Winter conference ·

February 16, 2000 **End to end simulation**
Stanford University seminar ·

October 13 2000 **Tools for freezing optics**
GREX Workshop 2000 ·

November 23, 1999 **MSE. A mechanical simulation engine for the LIGO E2E model**
California Institute of Technology Seminar ·

23-30 January 1999 **Off line subtraction of Seismic Newtonian noise.**
XXXIVth Rencontres de Moriond, Gravitational Waves and Experimental Gravity, Les Arcs, Savoie, France ·

1998 **Off-line Subtraction of Seismic Newtonian Noise.**
13th Italian Conference on General Relativity and Gravitational Physics, Monopoli ·

May 20-24 1996 **Triggering and Data Analysis for the VIRGO experiment on the APEmille parallel computer.** 6th topical seminar Experimental apparatus for particle physics and astrophysics, S. Miniato (PI) ·

TEACHING EXPERIENCE

UNIVERSITY

2016-today **Astroparticle**
Physics department · Pisa University

2013-2020 **Physics 1**
Physics department · Pisa University

2015-2016 **Gravitational waves**
Physics department · Pisa University

2009 **General relativity**
Mathematics department · Pisa University

2003-2012 **Physics 1**
Physics department · Pisa University

2004-2007 **Physics 2**
Physics department · Pisa University

2004 **Complements of physics**
Mathematics department · Pisa University

2001 **Thermodynamics**
Mathematics department · Pisa University

TEACHING IN GRADUATE SCHOOLS

4-8 July 2022 **1st MaNiTou Summer School on Gravitational Waves**
Latest News from LIGO/Virgo ·

15-24 June 2022 **International School of Subnuclear Physics Erice: 58th Course: Gravity and Matter in the Subnuclear world.**
Observing the universe through gravitational waves: what we are learning? ·

16-20 July 2018 **International Alpine School of Mathematics and Physics, Domodossola**
The physics of LIGO and Virgo ·

May 7-11 2018 **XIX Frascati Spring School Bruno Touschek in Nuclear, Subnuclear and Astroparticle Physics.**
Gravitational Waves: Detectors and Data Analysis. · Laboratori Nazionali di Frascati. https://agenda.infn.it/event/14992/

2015 **2015 International School on Numerical Relativity and Gravitational Waves**
Gravity Gradient Noise ·

2011 **Spring VESF data analysis school 2011**
Stochastic background data analysis ·

2010 **5th VESF school on gravitational waves**
Continuous Sources and Stochastic Background · Sesto di Pusteria 2010

2002-2008 **VIRGO-SIGRAV school on gravitational waves**
Techniques of quantum non demolition ·

1994 **International School of Advanced Studies (ISAS) di Trieste**
Scientific application of parallel calculations. ·

THESIS SUPERVISION

PH. D. THESIS SUPERVISION

Tutoring

MASTER THESIS SUPERVISION

June 6, 2024

December 14, 2023

February 27, 2023

December 14, 2022

October 27, 2022

July 22, 2022

December 13, 2021

2019

2019

2018

2018

2017

2017

2017

2016

2016

2016

2015

2014

OUTREACH

HIGH SCHOOL SEMINARS

2021 **La realtà e i modelli della fisica: termodinamica, meccanica statistica e strutture emergenti (Reality and physical models: thermodynamics, statistical mechanics and emergent structures)**
Liceo Scientifico "A. Volta" · Reggio Calabria

2020 **La descrizione geometrica dell'Universo. Einstein e oltre. (The geometrical description of the Universe: Einstein and beyond)**
Scuola estiva Filosofia Roccella Scholé · Roccella Jonica

2019 **La scoperta delle onde gravitazionali. (The discovery of gravitational waves)**
ITIS Marconi · Pontedera

2019 **Lo spaziotempo curvo. (Curved spacetime)**
Liceo Scientifico "P. Mazzone" · Roccella Jonica

2013-2016 **Einstein a flatlandia: dalla geometria alla cosmologia (Einstein in flatland: from geometry to cosmology)**
Pianeta Galileo ·

2012 **Fisica moderna e descrizione del mondo: Microcosmo (Modern physics and description of the World: microcosm)**
Several High Schools ·

2012 **Fisica moderna e descrizione del mondo: Macrocosmo (Modern physics and description of the World: macrocosm)**
Several High Schools ·

PUBLIC SEMINARS

2024 **Buchi neri: un viaggio tra la conoscenza e l'ignoto**
Fisica al Pub · Pisa January 15, 2024

2023 **Buchi neri: un viaggio tra la conoscenza e l'ignoto**
Lucca Comics · Lucca November 4, 2023 https://www.ego-gw.it/blog/2023/10/24/ego-e-virgo-a-lucca-al-comicsscience-palace/

2020 **Capire una epidemia con la matematica (Understand mathematically a pandemic)**
Filosofia Roccella Scholé, Roccella Jonica ·

2019 **Meccanica quantistica e senso comune (Quantum mechanics and common sense)**
Seminario pubblico, Filosofia Roccella Scholé, Roccella Jonica ·

2018 **Einstein a Flatlandia (Einstein in flatland)**
Incontro pubblico, Cittadella Galileiana, Pisa ·

2018 **Colloqui sull'Universo: Dall'infinitamente piccolo all'infinitamente grande. (Speaking about the Uni- verse: from the infinitely small to the infinitely large)**
Incontro pubblico, Domoschool - International Alpine School of Mathematics and Physics, Domodossola ·

2018 **Sulla cresta dell'onda gravitazionale (Diving gravitational waves)**
Seminario pubblico, Pint of Science Siena, Siena ·

2018 **La rivelazione delle onde gravitazionali: una nuova prospettiva sull'Universo (Gravitational wave detection: a new perspective on the Universe)**
Seminario pubblico, Filosofia Roccella Scholé, Roccella Jonica ·

2017 **Un cambio di paradigma in due mosse: Dalla meccanica di Newton alla relatività speciale (A two step change of paradigm: from Newton mechanics to special relativity)**
Fondazione Dino Guerra - La dove il pensiero incontra l'esperienza: invito alla lettura dei classici della scienza ·

2016 **Un cambio di paradigma in due mosse: Dalla relatività speciale alla relatività generale (A two step change of paradigm: from special relativity to general relativity)**
Fondazione Dino Guerra - La dove il pensiero incontra l'esperienza: invito alla lettura dei classici della scienza ·

OTHER

2004–today **Introductive seminars for visitors at European Gravitational Observatory**
European Gravitational Observatory · Cascina, Italy

PROFESSIONAL ABILITIES

- Excellent knowledge of programming languages and techniques (C, C ++, python, fortran) in traditional and parallel environments (pvm, mpi, multithreading).
- Excellent knowledge of techniques and languages of symbolic manipulation (Mathematica, Maple)

COURSES

2011 **Le azioni PEOPLE del VII Programma Quadro dell'Unione Europea**
INFN training · Roma

2011 **Quantum mechanics meets gravity**
INFN training · Roma

2008 **GRID users' school**
INFN training · CNAF Bologna

CONSULTINGS

Tecnobiomedica S.p.A, Pomezia Implementation of a ventricular position sensor
European Community Neural Network applications
Ingegneria Dei Sistemi S.p.A., Pisa Parallel computing applications

LANGUAGES

English: Good knowledge
French: Scholastic knowledge

AFFILIATIONS

2004-today **SIF, Società Italiana di Fisica**
2016-today **EPS, European Physics Society**
1996-today **SIGRAV, Società Italiana di Relatività Generale e Fisica della Gravitazione**
2024-today **SISTEQ, Società Italiana di Scienze e Tecnologie Quantistiche**

Viviana Fafone – Curriculum Vitae

Physics Department, University of Rome Tor Vergata, V. della Ricerca Scientifica 1, 00133 Rome,

Positions

- 1994-2005 Researcher at the Frascati National Laboratories of the National Institute of Nuclear Physics (INFN)
- 2005-2017 Associate Professor of Astronomy and Astrophysics at the University of Rome Tor Vergata
- 2017-now Full Professor of Physics at the University of Rome Tor Vergata

Research

Main research interests: gravitation and gravitational wave (GW) physics, with a focus on Instrument Science developments.
Major involvements:

- cryogenic GW detectors **Explorer** (CERN), **Nautilus** (INFN Frascati Labs) and **MiniGRAIL** (Leiden University) (1992-2016). Development of quantum technologies (3He-4He dilution refrigerators and superconducting electronics - dc SQUID); acoustic and seismic noise reduction (the technology developed has also been applied in bolometers for γ- and α-ray spectroscopy at INFN Gran Sasso National Laboratories (LNGS) to reduce vibration and thermal noise); study of the properties of new generation spherical GW detectors; study of signals from astrophysical sources of GWs in different theories of gravitation (e.g. scalar-tensor theories); study of correlations of GW data with gamma-ray burst; study of the effects of cosmic rays and charged particle beams in acoustic detectors. Many technologies developed in this framework have been synergistic for the success of present GW detectors and are contributing to the development of future GW observatories.
- Interferometric GW detector **Virgo** (European Gravitational Observatory - Cascina - Pisa) since 2006. Development of adaptive optics systems for the Virgo and Advanced Virgo projects, aimed at mitigating optical defects in the interferometer mirrors (essential to allow high power operation – 1.5 MW planned for Virgo future upgrades); studies on quantum noise reduction through the injection of squeezed vacuum states and investigation of new materials for mirrors' coatings. Contributions in multimessenger (MM) astrophysics (GWs-Low Energy Neutrinos, more recently GWs-GRBs). Studies on possible future upgrades (Virgo_nEXT).
- Next generation GW detector **Einstein Telescope (ET)** since 2008: among the authors of the first ET Design Study. Development of new strategies to reach the goal of 3 MW circulating power in the interferometer arm cavities; study of new materials for ET mirrors. These are crucial ingredients for reaching the planned factor of 10 improvement in the sensitivity of next-generation observatories that will have a transformative impact on the nascent field of GW physics and astronomy by leading us into the era of precision GW and MM astrophysics.

- Participation in the **Large-Scale Polarization Explorer** project for the detection of B-modes in CMB, a signature of primordial GW background (2015-2024).
- Collaborations with research groups in many international institutions (e.g. CERN, Leiden University - The Netherlands, California Institute of Technology - USA, Adelaide University - Australia, Max Planck Institute Hannover - Germany, INFN Gran Sasso National Laboratories - Italy, NIKHEF - The Netherlands, Laboratoire des Matériaux Avancés Lyon - France).

Institutional Offices in Universities and Research Institutions

- 2008-2012: Member of the Teaching Board of the Ph.D. course in Astronomy at the University of Rome Tor Vergata
- 2008-2011: National contact person of INFN for the ET Design Study, European Commission FP7 (Grant Agreement 211743) and member of the ET Governing Council. Member of the writing team of the ET Design Study
- 2012: referee for the ETRUSCO-GMES experiment based on satellite laser ranging funded by INFN Scientific Committee V (for technological and interdisciplinary research)
- 2013 - now: Member of the Teaching Board of the joint Ph.D. in Astronomy, Astrophysics and Space Science of the Universities of Rome Tor Vergata, Sapienza, and INAF
- 2011-2019: Local coordinator, Academic Advisor, and member of the Selection Committee of the Erasmus Mundus Master Program "AstroMundus, International Master's Degree in Astronomy and Astrophysics" funded by the European Union
- 2013-2021: Delegate of the Faculty of Science in the Tor Vergata University Board for Learning, Orientation and Tutoring
- 2015-2017: Invited member of the Tor Vergata University Board for the International Relations and Cooperation
- 2015-2018: Member of the Tor Vergata Physics Department Executive Board
- 2021 - now: Member of the Board of Directors of the Tor Vergata Foundation
- 2022 - now: Chair of the Quality Evaluation Committee of the Erasmus Mundus joint Master degree MASS (Master in Astrophysics and Space Science)
- 2022 - now: Member of the Evaluation Committee of the Gran Sasso Science Institute (GSSI)
- 2023 - now: INFN representative in the INFN-INGV (National Institute of Geophysics and Volcanology) Joint Committee
- 2025: Delegate of the Faculty of Science in the Tor Vergata Univ Board for Learning, Orientation and Tutoring for the Project Disco Lazio
- 2025: Member of the LIGO Program Advisory Committee (PAC)

Institutional Offices in Research Collaborations

- 1997-2006: Scientific Coordinator of the Gravitational Wave detector Nautilus at the INFN Frascati National Laboratories
- 2004-2006: Coordinator of the Gravitational Wave research group at INFN Frascati National Laboratories
- 2006 - now: Leader of the Virgo Tor Vergata group and member of the Virgo Steering Committee
- 2008-2016: Manager of the Advanced Virgo Thermal Compensation System for the mitigation of optical defects in the interferometer mirrors, a key component that allowed Virgo to reach its planned sensitivity for the observational runs O2 and O3
- 2016-2019: Manager of the Thermal Compensation System group for the Advanced Virgo commissioning
- 2017-2023: Co-chair of the Virgo Collaboration Editorial Board
- 2018 - now: National Representative of the Virgo experiment
- 2019-2022: Manager of the Advanced Virgo+ Thermal Compensation System
- 2019-2022: Member of the Einstein Telescope Steering Committee
- 2019-now: Member of the "Einstein Telescope Pathfinder" Scientific and Technical Advisory Committee
- 2020-2023: Member of the Virgo Organization Committee for the definition of the new Virgo bylaws
- 2021-2022: Chair of the Virgo Committee appointed to draw the roadmap for the future of Virgo in the 2030-2040 decade
- 2022 - now: Coordinator of Virgo_nEXT Project, the proposed Virgo upgrade in the 2030-2040 decade
- 2022 - now: Leader of the ET Tor Vergata group and member of the ET Collaboration Board
- 2023 - 2025: Member of the Joint EGO-Virgo Committee charged with managing issues on financial matters
- 2024 - now: Member of the ET Collaboration Bylaws Updating Committee (8 members out of about 1600 members of the ET Collaboration)
- 2024 - now: Member of the IGWN (International Gravitational Wave Network) Design Committee. IGWN is a proposed single organization to coordinate the development, commissioning, and operations of the international network of ground-based GW detectors and to carry out the scientific mission of that network. The Committee is charged with developing a Charter and Bylaws for the organization (about 9 members from each of the LIGO, Virgo and KAGRA Collaborations)

Competitive Projects

- 2008-2010 Coordinator of the Tor Vergata University research unit for the project "Study of experimental issues in cryogenic and underground GW interferometers" funded by the Italian Ministry for Education, University and Research (MIUR - PRIN Research Program 2007)
- 2019-2024 PI of the project "ENIGMA: ENabling technologies for the upgrades of second generation and for third generation ground-based Interferometric Gravitational wave detectors in the medium- and high-frequency range: the keystone to foster Multimessenger Astronomy", funded by MIUR - PRIN Research Program 2017
- 2020-2024 Coordinator of the Tor Vergata University research unit for the project AHEAD2020 (Integrated Activities for the High Energy Astrophysics Domain) - H2020-INFRAIA-2019-1
- 2022 - now: Partner Investigator of the ARC Centre of Excellence for GW Discovery (OzGrav) (PI Prof M. Bailes) funded by the Australian Research Council
- 2023 - now: PI for the Tor Vergata unit of the project ETIC (Einstein Telescope Infrastructure Consortium) funded by in the framework of the National Recovery and Resilience Plan (PNRR - Research Infrastructures)

Awards

- 1993: Winner of the Italian Physical Society Prize for young researchers
- 2002: Winner of the Italian Society of General Relativity and Gravitational Physics prize "for the contribution given to the field of Relativity and Gravitation on the experiments with resonant detectors and to the studies, both experimental and theoretical, on new generation gravitational waves detectors". Selection Committee: C. Bachas (Ecole Normale Superieure, Paris), M. Cerdonio (Università di Padova), G. Ellis (Cape Town, South Africa), B. Schutz (Albert Einstein Institute, Potsdam), G. Veneziano (CERN)
- 2016: Special Breakthrough Prize in Fundamental Physics, shared with the authors of the GW discovery paper
- 2016: Gruber Cosmology Prize, with the LIGO Scientific Collaboration and the Virgo Collaboration
- 2017: Albert Einstein Medal with the LIGO Scientific Collaboration and the Virgo Collaboration

Commissions of Trust

- 2010: Chair of the Selection Committee for the GWIC (Gravitational Wave International Committee) - Braccini Thesis Prize, the main recognition for Ph.D. theses in the field of GWs
- 2019 - now: Member of the GWIC - Braccini Ph.D. Thesis Prize Board
- 2019: Member of the Selection Committee for the INFN "Bruno Rossi" Ph.D. Thesis Prize
- 2021 Member of the Selection Committee for the Guido Horn D'Arturo Prize of the Italian Astronomical Society
- Referee for international journals

Teaching activity

At the Physics Department of the University of Rome Tor Vergata

- AY 2006/2007 - AY 2016/2017: General Physics – Electromagnetism and Optics (Bachelor's in science and technology for Media)
- AY 2007/2008 - now: Gravitational Waves (Master's degree in physics) the first master course specific on GWs in Italy
- AY 2016/2017 - now: General Physics – Mechanics and Thermodynamics (Bachelor's in physics)
- Lectures on General Relativity and Gravitational Waves for Ph.D. programs in Physics and in Astronomy and Astrophysics.

At the Gran Sasso Science Institute

- Lectures on Gravitational Wave sources and experiments from 2013 to 2021 for the Ph.D. in Astroparticle Physics

Tutor for 10 Bachelor, 23 Master and 12 Ph.D. theses. Advisor for several post-doc researchers (12).

Conferences

- Member of the LOC of EWASS 2012 (European Week of Astronomy and Space Science), July 1-6, 2012 (Rome)
- Convener of the session "Q&A: Everything you wanted to know about GWs but were afraid to ask" at the 20th International Conference on General Relativity and Gravitation and 10th Amaldi Conference on Gravitational Waves, July 7-13, 2013 (Warsaw)
- Member of the Scientific Advisory Committee of GWADW 2015 (Gravitational Wave Advanced Detectors Workshop), May 17-22, 2015 (Girdwood, Alaska)
- Convener of the session on Gravitational Waves of TAUP 2015 (Topics in Astroparticle and Underground Physics), September 7-11, 2015 (Turin)
- Convener of the session on Gravitational Waves at RICAP-16 (6th Roma International Conference on Astroparticle Physics) June 21-24, 2016
- Member of the SOC of the LXII Italian Astronomical Society Conference, May 2-5, 2018 (Teramo, Italy).
- Convener of the session "Second Generation Interferometer Commissioning", GWADW 2019, May 19-25, 2019 (Isola d'Elba, Italy)
- Member of the SOC of the 2nd GRAvitational – wave Science&technology Symposium (GRASS 2019), October 17-18, 2019 (Padova, Italy)
- Convener of the session "Beyond Second Generation" at the GWADW 2021, May 17-21, 2021, remote
- Member of the International Advisory Committee at GWADW 2023, May 21-27, 2023 (Isola d'Elba, Italy)
- Member of the SOC of COSPAR-2024-E1.6 "Explosive Phenomena in Transient and Multimessenger Sources and Their Observational Manifestations", July 13-21, 2024 (Busan, Korea)
- Convener of the session on Gravitational Waves Detection at RICAP-2024, September 23-27, 2024

Delivered invited talks at numerous international conferences, with an average rate of a maximum of a couple per year (a fraction of invitations received, to prioritize opportunities for younger researchers).

Publications

- Author of more than 320 peer-reviewed publications in international journals. h-index: 96 (Scopus)
- Books:
  - "Gravitational Physics: from Quantum to Waves" in Multiple Messengers and Challenges in Astroparticle Physics, 357-488, Springer International Publishing Switzerland, 2018, ISBN: 978-3-319-65423-2, 978-3-030-09739-4, 978-3-319-65425-6
  - "Thermal Adaptive Optics" in Advanced Interferometric Gravitational Wave Detectors, World Scientific, 2019, ISBN: 978-981-314-607-5
  - "Optical aberrations in gravitational wave detectors and a look at the future" in Gravitational Waves and Cosmology, Proceedings of the International School of Physics Enrico Fermi 200, 69-86, IOS Press, 2020, ISBN: 978-1-64368-094-1

Public Lectures, outreach, etc:

- Contributions to public-facing science magazines (Le Scienze)
- Participation in national and international outreach activities, with public talks, theater events, TV broadcasts, interviews for newspapers, social media to spread STEM disciplines through new generations, with a special focus on women in science (e.g.: Genoa Science Festival, European Researchers' Night, National Geographic Festival of Rome, Galassica - Astronomy Festival, St. Petersburg Science Festival, TEDx, RaiPlay - Discovering the Secrets of Space, Rai Scuola –Science Stories, Rai Cultura, Focus TV, Rai3-TG Leonardo, Rai1 – UnoMattina)
- Dissemination and training activities for students of primary and secondary schools, with seminars at schools and social events (e.g.: Campus Party - Fiera Milano, Student Fair in Rome, International Day of Women and Girls in Science, INFN International School on Modern Physics)
- Training courses for secondary school teachers on Modern Physics topics (e.g.: "Incontri di Fisica" – INFN Frascati National Laboratories)
- Author of the section "Gravitational Waves" of the X Appendix of the Italian Encyclopedia of Science, Literature and Arts, Treccani, 2020
- Author of the section "Multimessenger Astronomy" of the XI Appendix of the Italian Encyclopedia of Science, Literature and Arts, to be published in 2025 to celebrate the centenary of the founding of the Treccani Institute, and scientific coordinator of the Astronomy and Astrophysics lemmas.
- 2023 - now: Member of the scientific committee of "Asimmetrie" the INFN scientific popularization magazine.

CURRICULUM VITAE
GIANLUCA MARIA GUIDI

1. Metrics

* 98 Scopus h-index;

* 376 peer reviewed publications,

* 79952 citations by 25595 documents

2. Qualifications

* National Scientific Qualification for University Full Professor position:

* 2016/2017: “Experimental Physics of Fundamental Interactions”

* National Scientific Qualification for University Professor position

* 2013/2014: “Experimental Physics of Fundamental Interactions”

* 2013/2014: “Astronomy, Astrophysics, Earth and Planetary Physics”

3. Education

* 1998: Ph.D degree in Sciences, Université Libre de Bruxelles, Belgium ("avec la plus grande distinction")

* 1989-1990: Specialization Course in Physics, University of Bologna

* 1989: Degree in Physics, University of Bologna

4. Employment

* 01/08/2021-present: Full Professor in Physics (FIS01)

* 01/05/2016- 30/07/2021: Associate Professor in Physics (FIS01)

* 01/11/2000-2016: “Ricercatore confermato” in Physics (FIS01)

5. Roles and responsibilities

* Scientific Roles and responsabilities:

** past member of the Virgo Core Program Committee

** chair of Urbino-Firenze group for Virgo INFN experiment (10/2017-present)

** member of Virgo Steering Committee (10/2017-present)

** co-chair of the LIGO-Virgo CBC science group (05/2014- 2016)

** co-chair of the LIGO-Virgo CBC review committee (2010-2013)

** Data Analysis Coordination (06/2008-06/2010) (Virgo co-chair of the Joint LIGO Scientific

** Collaboration and Virgo Collaboration Data Analysis Committee)

** Convener of the Data Analysis LIGO-Virgo Joint Group (2005-2006)

** PI for the University of Urbino of Numerical-Relativity and Analytical-Relativity collaboration.

** member of the Science Team of the project "Einstein Telescope", in the framework of FP7 European program

** cochair of Division 10 of Observational Science Board of Einstein Telescope collaboration.

** Participation at the Large Volume Detector experiment

* University roles and responsabilities

** member of 4 examination boards for "assegno di ricerca": SSD FIS/01, SSD FIS/06, SSD FIS/01, SSD FIS/01

** member of VPI organization committee (SCIENZE MOTORIE, SPORTIVE E DELLA SALUTE)

** member of Commissione Didattica per il Corso di laurea Triennale SCIENZE MOTORIE, SPORTIVE E DELLA SALUTE

** Coordinator of "Committee for Qualità del Dipartimento di Scienze di Base e Fondamenti, coordinatore, 2013-2015

** referente di area per VQR.

** member del Research Committee del dipartimento DiSPeA

6. Prizes

* SPECIAL BREAKTHROUGH PRIZE IN FUNDAMENTAL PHYSICS AWARDED FOR DETECTION OF GRAVITATIONAL WAVES 100 YEARS AFTER ALBERT EINSTEIN PREDICTED THEIR EXISTENCE.

* 2016 Gruber Cosmology Prize.

7. Organization of workshops and schools:

* During his appointment as Virgo Data Analysis coordinator (2008-2010) GMG has worked at the organization of the LSC-Virgo collaborations meetings (4 per year) and has organized the Data Analysis section of the Virgo internal meetings (Virgo Weeks).

* Working Package 2 of the N2-GWA ILIASGWA European FP6 project (01/2006-2008):

** WG2 meeting, Florence (Italy) - April 27-28, 2006; WG2 workshop, Cardiff September 14-15 2006; WG2 Meeting, London October 25 2006; 2nd ENTApP-GWA joint meeting - Tubingen (D), October 10, 2007; GRB-GW workshop – Rome, February 26, 2008; Workshop:"Supernovae,neutrinos and gravitational waves" - Cascina (IT) November 26, 2008

* member of SOC of Gravitational Wave Physics and Astronomy Workshop, GWPAW, 2017, Annecy, France; 2016, , Boston, USA; 2015, Osaka , Japan; 2013, IUCAA, Pune , India.

* member of the SOC: 14th Gravitational Wave Data Analysis Workshop, Rome 2010.

* "Urbino 2008: High Energy Astrophysics Summer School": member of the oLOC and lecturer.

* International School on Gravity from Earth to Space", Urbino 21-23 May 2019, SOC and LOC

* SIGRAV conference, Urbino 7-9 September 2021, SOC and LOC

8. Memberships

* 2019-present: INFN associate - Einstein Telescope experiment

* 2018-present: INFN charged of research

* 1999-2017: INFN associate - Virgo experiment

* 1994-1996: INFN associate - Large Volume Detector experiment

* 2001-present: European Gravitational Observatories (EGO) 01/2001

* 2006-present: The Virgo-EGO Scientific Forum (VESF) 01/2006

* 2015-2016: Istituto Nazionale di Astrofisica, INAF

* 2015-present: International Astronomical Union, IAU

9. Teaching

* University of Urbino:

** 2022-present: "Elaborazione dei dati sperimentali" 9 CFU (Scuola di Informatica)

** 2016-present: "Fisica" 6 CFU (Scuola di Scienze Motorie)

** 2010-2021: "Fisica con Elementi di Matematica" 15 , (later 12) CFU (Corso di Laurea CTF).

** 2008-2010; 2005-2007: "Fisica" 10 CFU (Corso di Laurea CTF)

** 2001-2005; 2007-2010: "Abilità Informatiche II" 6 CFU (Corso di Laurea CTF)

** 2000-2001: "Elementi di Fisica" (Corso di Laurea in tecniche Erboristiche e Scienze della Nutrizione)

** 1998-1999: "Mathematics" (exercises) (Facoltà di Scienze)

** 1991-1992: "Fisica I" (Corso di Laurea in Geologia)

*PhD courses:

** 2012-2014: Dynamical Systems Theory (6 hours) - University of Urbino

** 2015: Gran Sasso Science Institute: GraWiTon Data Analysis school - 9-13 Novembre 2015.

** 2016: Data Analysis of Compact Binary Coalescences; GW150914 and GW151226: Detection of Gravitational Waves from Binary Black Hole Mergers (4 hours) – Università di Bologna

** 2017: Data Analysis of Compact Binary Coalescences; Detection of Gravitational Waves from Binary Black Hole Mergers (4 hours) – Università di Bologna.

** 2017: La rilevazione delle onde gravitazionali, Dottorato in Scienze della Complessità, (4 hours) – Università di Urbino

** 2018: Data Analysis of Compact Binary Coalescences; Detection of Gravitational Waves from Compact Binary Coalescence sources (4 hours) – Università di Bologna

** 2019, 2020, 2021: Detection of Gravitational Waves from Compact Binary Coalescence sources (6 hours) – Università di Florence

* Membro del Collegio di Dottorato (PhD): "Scienze della Complessità", Università di Urbino, 2011-2019

* Member of PhD final examination committee:

** Fakultat fur Mathematik und Physik der Gottfried Wilhelm Leibniz Universitat, Hannover, Luglio 2015

** IN2P3, Annecy, Ottobre 2017

** Dottorato internazionale XXX ciclo « Physics, Astrophysics and Space Science » - INAF-La Sapienza, Tor Vergata 01/2018

** GSSI in Astroparticle Physics, XXX ciclo, Giugno 2018

** LAL, Orsay, Settembre 2018

10. International Schools

* Virgo and EGO Scientific Forum: Data Analysis School 2007 05/2007-06/2007

* GSSI (AQ): GraWIToN Data Analysis School 11/2015

* 2017: Data Analysis of Compact Binary Coalescences, Detection of Gravitational Waves from Binary Black Hole Mergers (4 hours) - Course 200: Gravitational Waves and Cosmology International School of Physics "Enrico Fermi: Gravitational Waves and Cosmology- Varenna, Como (IT)

* Virgo and EGO Scientific Forum: Data Analysis School 2007 05/2007-06/2007

11. Student supervision

*Supervisor of 12 bachelor thesis and 7 master degree thesis

* Tutoring:

* PhD students supervised

12. National and international projects

* Responsible of Projects and Conventions with INFN and EGO for a total amount of € 323.417,97

* Responsible of University of Urbino Projects for a total amount of € 32.049,00

* FIRB 2013-2016: New perspectives on the violent Universe: unveiling the physics of compact objects with joint observations of gravitational waves and electromagnetic radiation. Participant

* PRIN 2007: Modellizzazione di processi dissipativi in complessi "substrato-film sottile" usati in rivelatori di onde gravitazionali.24 months. Participant

* PRIN 2010: Sviluppo di interferometri ottici ultra low-loss in regime ponderomotivo per la riduzione del rumore quantistico in rivelatori di onde gravitazionali e rivelazione ultrasensibile di piccole forze in sistemi micromeccanici.36 months Participant

* PRIN 2017: Prompt multi-messenger search for high-energy sources in gravitational wave astronomy. Progetto valutato positivamente (84) ma non ammesso al finanziamento. Chair of Urbino University group

* PRIN 2022: "BIGA: Boosting Inference for Gravitational-wave Astrophysics", responsabile locale

* PNNR: Bando a cascato SPOKE 2 - "Fundamental Research & Space Economy"
- "SVILUPPO DI UN ALGORITMO PER IL RICOPRIMENTO DELLO SPAZIO DEI PARAMETRI DI SORGENTI DI OGGETTI COMPATTI IN COALESCENZA – PARSPOC", responsabile scientifico

* ILIAS-GWA Gravitational Wave Antenna (N5/GWA) of EU FP6 - WP2: Joint operation of antennas and network data analysis 36 months Co-chair of WP2

* ASI: Studi cosmologia e fisica fondamentale -Studio di sorgenti, metodi di analisi e modelli di rumore per LISA 36 months Chair of OWP4340

* Referee of "FIRB - Futuro in Ricerca 2013" projects; 01/01/2013-31/12/2013

13. Fellowships

* California Institute of Technology-USA 07/2003 12/2003

* Visiting professor, Max Planck Institute for Gravitational Physics–Hannover (GE) 06/2014-08/2014

* IN2P3–Annecy (FR) 29/06/2015-24/07/2015

14. Outreach

* "Un nuovo sguardo all'Universo: sorgenti e rivelazione di onde gravitazionali", Liceo Scientifico, Urbino,(2015)

* "Ascoltare l'Universo con le onde gravitazionali",Liceo Classico,Urbino,(2016)

* "Le onde gravitazionali: una nuova finestra sull'universo", Urbino, (2016,panel)

* "Gianluca vi parla di ..La gravità e le onde gravitazionali!"Scuola elementare(2017)

* Alternanza Scuola-Lavoro:"FISICA: le onde gravitazionali",Liceo Scientifico Laurana, Urbino, (2018).

* Rai Scuola:Memex-I luoghi della Scienza (pt.9):Marche(2017)

Urbino, 28/11/2024 Gianluca M Guidi