

# Europass Curriculum Vitae

## Summary:

Orlando Luongo is currently an Assistant Professor (Ricercatore Articolo 36, III livello) in theoretical physics at the National Laboratories of Nuclear Physics (INFN) of Frascati and an Adjunct Assistant Professor (Professore a contratto) of Quantum Field Theory at the Physics Department of the University of Camerino. In particular, he is currently part of the *Satellite/lunar/GNSS laser ranging/altimetry and cube/microsat Characterization Facilities Laboratory - SCF Lab* in Frascati. He got cum laude his master degree in Physics at the University of Naples "Federico II" in 2008. He got in 2015 a second bachelor in Civil Engineering at the University of Naples "Pegaso". He gained his international PhD degree in Relativistic Astrophysics at the University of Rome "La Sapienza" in 2012. Either during his PhD or later, he has spent several time in abroad universities, among them: the UNAM university, in Mexico, the University of Cape Town, in South Africa, and others. He was part of the KM3NeT project of INFN during the period 2013-2015, attending specialist courses in the fields of Astroparticle Physics and Management at the National Laboratories of Nuclear Physics (LNS) in Catania. In 2015 he was awarded the Polvani national prize, from the Italian Society of Physics (SIF), for his high-impact researches in Astrophysics. In 2018 he received the National Scientific Qualification as Associate Professor of Theoretical Physics, FIS/02, (art.16 of the law 30 December 2010, n.240). His teaching experience is wide, spanning from courses of astroparticle physics to cosmology, both at the University of Naples "Federico II", and passing through theoretical physics (UNAM University), mathematical methods for physics and quantum field theory (University of Naples "Federico II" and University of Camerino). Moreover, he has taught General Physics and Calculus at the Department of Engineering of the University of Sannio, for the bachelors of Civil, Energetic, Electronic and Computational Engineering. He is regularly present in several local and international meetings. He was chairman for parallel sessions of the Marcel Grossmann meeting and permanent editor for: International Journal for Geometric Methods in Modern Physics and for Licosia Edizioni. He is author of about 80 scientific works, including research papers, chapters of books, proceedings, and so forth. His research activity is wide and essentially based on the study and characterization of large scale dynamics and in particular on investigating the nature of dark energy and its thermodynamic properties. To this end, he has recently proposed a novel mechanism of cancellation of quantum vacuum energy at early phases of the universe evolution. This mechanism naturally solves both fine tuning and coincidence problems plaguing the standard cosmological paradigm. The mechanism predicts a tight range of mass for dark matter candidates inside  $0.5 - 1.7 TeV$ .

## Personal information

Surname(s) / First name(s)

Gender

## Occupational field

## Work experience

Dates

Occupation or position held

Main activities and responsibilities

**Luongo, Orlando**

Male

**Assistant professor in theoretical physics**

09/10/2017 – present

Assistant Professor in theoretical physics Researcher (Ricercatore INFN, III livello - Articolo 36)

Research in gravitational theories and unified dark energy models.

Name and address of employer	National Institute of Nuclear Physics (INFN), Frascati, Italy.
Dates	01/01/2017 – present
Occupation or position held	Adjunct Assistant Professor
Main activities and responsibilities	Professor of Quantum Field Theory.
Name and address of employer	Physics Division, University of Camerino, Camerino, Italy.
Dates	01/03/2017 – 30/09/2017
Occupation or position held	Post Doc Fellowship
Title of the fellowship	Relativistic Quantum Information Theory
Main activities and responsibilities	Research in gravitational theories and quantum gravity: theory and experiments.
Name and address of employer	School of Science and Technology, University of Camerino, Camerino, Italy.
Supervisor	Prof. Stefano Mancini
Coordinator	Prof. Stefano Mancini
Dates	01/01/2016 – 28/02/2017
Occupation or position held	Post Doc Fellowship
Title of the fellowship	Cosmology in <i>non-standard</i> gravitational frameworks
Main activities and responsibilities	Research in non-homogeneous cosmology and in the late time universe dynamics.
Name and address of employer	Department of Physics "E. Pancini", University of Naples, Naples, Italy.
Coordinator	Prof. Fedele Lizzi
Dates	01/07/2015 – 31/12/2015
Occupation or position held	Post Doc Fellowship
Title of the fellowship	Cosmographic reconstructions of Dark Energy in Alternative Theories of Gravity
Main activities and responsibilities	Research in the dynamics of dark energy at late and early times.
Name and address of employer	Department of Mathematics and Applied Mathematics, University of Cape Town, Cape Town, South Africa.
Supervisor	Prof. Peter Dunsby
Co-Supervisor	Dr. Alvaro de la Cruz-Dombriz
Coordinator	Prof. Peter Dunsby
Dates	01/03/2013 – 14/04/2015
Occupation or position held	Fellowship awarded for the Km3NeT project
Title of the fellowship	Una nuova frontiera per la ricerca: <i>Gli osservatori sottomarini</i>
Main activities and responsibilities	Research in Astroparticle Physics and Cosmology with particular attention to neutrino oscillations and masses.
Name and address of employer	National Institute of Nuclear Physics (INFN) and National South Laboratories (LNS), Catania, Italy.
Supervisor	Dr. Pasquale Migliozzi
Coordinator	Dr. Rosa Coniglione
Dates	01/12/2011 – 31/10/2012
Occupation or position held	Post Doc Fellowship
Post-doc title	Dark Energy from <i>Geometrothermodynamics</i>

Main activities and responsibilities  
Name and address of employer  
  
Supervisor  
Coordinator

Research in geometrical aspects of Universe's thermodynamics.

Institute for Nuclear Science (ICN), Universidad Nacional Autonoma de Mexico, (UNAM), Mexico City, Mexico.

Prof. Hernando Quevedo, Prof. Salvatore Capozziello  
Prof. Hernando Quevedo

**List of scientific interests:**

In particular, I am greatly interested in the following topics:

1. Extended theories of gravity: effective dark energy reconstruction.
2. Local and cosmological tests of general relativity.
3. Neutrino oscillations and consequences in cosmology.
4. Quantum gravity and quantum cosmology in relativistic quantum information theory.
5. Exact solutions and absolute calculus in General Relativity.
6. Cosmography of the observable universe and Monte Carlo Analysis.
7. Thermodynamics aspects of present-time cosmology and the role of dark matter.

**Summary of publications:**

1. Total number of works: > 80
2. Total number of citations: > 850
3. h-factor: 18

(data got from <https://inspirehep.net> last update: March 2019)

**Current affiliations:**

1. Affiliated to INFN (Istituto Nazionale di Fisica Nucleare), section of Frascati, Italy.
2. Affiliated to the Physics Division of the School of Science and Technology of the Camerino University.
3. Affiliated to the Physics Department, Al-Farabi Kazakh National University, Almaty, Kazakhstan.

**Past affiliations:**

1. Affiliation to INFN (Istituto Nazionale di Fisica Nucleare), section of Naples, Italy.
2. Affiliation to the Department of Mathematics and Applied Mathematics, University of Cape Town, Cape Town, South Africa.
3. Affiliation to the Institute for Nuclear Science (ICN), Universidad Nacional Autonoma de Mexico, (UNAM), Mexico City, Mexico.
4. Affiliation to INAF (Istituto Nazionale di Astrofisica), section of Naples, Italy, for the period 01/10/2014-31/03/2015.

## Memberships:

1. Member of SIF, *Società italiana di Fisica*.
2. Member of SIGRAV, *Società Italiana di Relatività Generale e Fisica della Gravitazione*.

## Scientific activity and developments:

Below, I summarize my principal goals in five different research fields. These results are the most relevant highlights of my personal research career.

- **Vacuum energy cancellation mechanism:** I propose that, during early-time transition, dark matter's pressure cancels out quantum field vacuum energy effects (Luongo, Muccino, PRD, 98, 103520, (2018)). This mechanism leads to an alternative to the standard cosmological model presuming that matter, i.e. baryons and cold dark matter, exhibits a non-vanishing pressure mimicking the cosmological constant effects. The mechanism of cancellation provides a negative and constant pressure whose magnitude is determined by baryons only at late times. To frame this process out, I presume a scalar field Lagrangian introducing a Lagrange multiplier as constraint and a symmetry breaking effective potential. The corresponding cosmological scenario is equivalent to a unified dark energy model (Dunsby, Luongo, Reverberi, PRD, 94, 083525, (2016)) with vanishing speed of sound. I thus predict possible dark matter candidates whose masses span in the range  $0.5 - 1.7$  TeV.
- **Extended theories of gravity:** I proposed a new  $f(R)$  model which fits local and large scale bounds and well approximates the universe shape, extending the standard cosmological model (Aviles, Bravetti, Capozziello, Luongo, PRD, 87, 044012, (2013)). To do so, I investigated local effects due to modified theories of gravity in the regime of the Solar System and I matched kinematics of extended theories of gravity with local scale outcomes. I thus reconstruct the functional model using auxiliary functions and I frame the shapes of  $f(R)$  in a model-independent way (Capozziello, Farooq, Luongo, Ratra, PRD, 90, 044016, (2014)). The corresponding model is an alternative to standard approaches, e.g. for example the Hu-Sawicki model, Starobinsky  $f(R)$ , and so forth.
- **Cosmography:** I proposed how to handle higher order expansions of the scale factor  $a(t)$  reducing systematics and enabling the universe kinematics to be predictive. I proposed the use of Padé and Chebyshev polynomials in two distinct seminal papers (Gruber, Luongo, PRD, 89, 103506, (2014) and Capozziello, D'Agostino, Luongo, MNRAS, 476, 3924, (2018)). I introduced a new treatment of cosmic analysis, named the Eis method, capable of removing systematics (Aviles, Klapp, Luongo, PDU, 17, 25, (2017)). To this end, I study the well-consolidate model independent technique, named cosmography, capable of discriminating among several extensions of the standard cosmological model, the ones able to reproduce current observational constraints. The use of cosmography may also reveal the correct gravitational theory and well adapts to understanding whether and how the universe expansion history is effectively modified due to possible extended theories of gravity.
- **Black holes and naked singularities:** I investigate how to handle repulsive gravity effects in several scenarios near compact objects by using an invariant method to characterize regions of repulsive gravity, associated to black holes and naked singularities. My method is based upon the behavior of the curvature tensor eigenvalues, and leads to an invariant definition of a *repulsion radius* (Luongo, Quevedo, PRD, 90, 084032, (2014)). I obtain reasonable results for the spacetime regions contained inside the repulsion sphere whose size and shape depend on the value of the mass, charge and angular momentum. Consequently, I define repulsive gravity as a classical relativistic effect by using the geometry of spacetime only.
- **Quantum cosmology:** I propose a new paradigm of quantum cosmology in which the cosmological constant is reproduced as a byproduct of entangled and statistically correlated minisuperspace cosmological states (Capozziello, Luongo, Mancini, PLA, 377, 1061, (2013)). To show that, I consider two quantum epochs corresponding to two correlated eras. Computing the density matrix with the assumption of an entangled final state leads to a non-vanishing Von Neumann entropy whose magnitude could be interpreted, in view of recent observations, as the cosmological constant, healing *de facto* the coincidence problem between matter and vacuum energy (Capozziello, Luongo, Entropy, 13, 2, 528, (2011)).

## Education and training

Dates	03/11/2008 – 29/03/2012
Occupation or position held	International PhD in Physics
Main activities and responsibilities	Research in General Relativity: Theory and experiments
Name and address of employer	University of Rome "La Sapienza", (Italy)
With thesis	Geometrothermodynamics in General Relativity as a tool to describe the Universe dynamics
Supervisor	Prof. Hernando Quevedo
Coordinator	Prof. Remo Ruffini
Final vote	Excellent/Excellent
Dates	01/10/2006 – 16/07/2008
Title of qualification awarded	Master Degree in Physics
Principal subjects	Theoretical Physics
Name and type of organization providing education and training	University of Naples "Federico II"
With thesis	L'approccio tomografico in Cosmologia Quantistica
Supervisors	Prof. Salvatore Capozziello, Dr. Cosimo Stornaiolo
Average grade	30/30
Final vote	110/110 cum laude
Dates	01/10/2003 – 14/09/2006
Title of qualification awarded	Bachelor's Degree in Physics
Principal subjects	Quantum Mechanics
Name and type of organization providing education and training	University of Salerno
With thesis	Fenomeni di coerenza in processi di interazione tra radiazione e materia
Supervisor	Prof. Fabrizio Illuminati
Co-Supervisor	Prof. Silvio De Siena
Average grade	30/30
Final vote	110/110 cum laude
Dates	06/12/2014 – 29/09/2015
Title of qualification awarded	Bachelor's Degree in Civil Engineering
Principal subjects	Civil Engineering
Name and type of organization providing education and training	University of Naples " <i>Pegaso</i> "
With thesis	Studio quantitativo delle facciate ventilate per il miglioramento dell'efficienza termica degli edifici
Supervisor	Prof.ssa Paola Iodice
Average grade	27/30
Final vote	105/110
Dates	15/09/98 - 07/07/2003
Title of qualification awarded	Scientific high school diploma
Name and type of organization providing education and training	Liceo Scientifico "Leonardo Da Vinci", Salerno
Final vote	100/100

## Qualification(s):

1. National Scientific Qualification (abilitazione scientifica nazionale, art.16 of the law 30 December 2010, n.240) as Associate Professor in FIS/02 - Theoretical Physics.
2. Italian qualification, "Tirocinio Formativo Attivo", TFA, at the University of Salerno, Italy, 29/07/2013, with final vote 100/100.

## Awards and achievements:

1. Awarded by "Società Italiana di Fisica" (SIF) with Giovanni Polvani Prize for scientific industriousness merits concerning young scientists for the period May 2008 - May 2015, Rome, Italy, September, (2015).
2. Awarded for *Progetto di Formazione Specialistica: Una Nuova Frontiera per la Ricerca: Gli Osservatori Sottomarini*, considered as a Master diploma in Physics, Catania, Laboratori Nazionali del Sud (INFN-LNS), Italy, (2015).
3. Awarded for best paper 2014 from "Highlights of 2014" of IJMPD gained for the work: *A unified dark energy model from a vanishing speed of sound with emergent cosmological constant*, in collaboration with prof. Hernando Quevedo, Co-Author of the work, (2014).
4. Prize for *Premio De Simone Per l'impegno sociale 2016* gained for relevant results in the field of Cosmology, Montoro, (2016).
5. Prize for *Merits in Astrophysics 2015* gained from Comune di Montoro, for high-impact researches in the field of Astrophysics and Cosmology, Montoro, Italy, (2015).
6. Prize gained for "high-impact science communication" gained from *Percorsi culturali di eccellenza: Sapere Aude*, awarded by Istituto di Istruzione Superiore "Leonardo Da Vinci", Salerno, Italy, (2013).
7. Awarded as finalist in Regional Selection for *Giochi della Chimica*, Naples, Italy, (2002).
8. Present on Wikipedia: [en.wikipedia.org/wiki/Cosmological\\_constant\\_problem](http://en.wikipedia.org/wiki/Cosmological_constant_problem) in the section dealing with the most consolidate proposed solutions of the cosmological constant problem.
9. Present on Wikipedia: [en.wikipedia.org/wiki/Kerr%E2%80%93Newman\\_metric](http://en.wikipedia.org/wiki/Kerr%E2%80%93Newman_metric) as a reference for the geodesic equations.
10. Present on Wikipedia: [en.wikipedia.org/wiki/Cosmography](http://en.wikipedia.org/wiki/Cosmography) concerning the development of new cosmographic methods with parameterized redshift variables.

## Honorable interviews:

1. Interview proposed by Mr. Stephen Battersby for New Scientist, awarded for the work: *Dark energy from entanglement entropy*, developed by Prof. Salvatore Capozziello, (Co-Author of the work), (2013).
2. Interview proposed for the Journal Contattolab, awarded for merits in Astrophysics, (2015). (Link: <http://www.contattolab.it/orlando-luongo-scientziato-montorese-premiato-come-miglior-ricercatore/>).
3. Interview proposed for the Journal Tuttolocal, awarded for merits in Astrophysics, (2015). (Link:<http://www.tuttolocal.it/home/astrofisica-cosmologia-relativistica-metriche-dello-spazio-tempo-premiato-le-ricerche-di-orlando-longo-straordinario-scientziato-montorese/>)

## Personal skills and competences

Mother tongue(s)

Other language(s)

*Self-assessment  
European level<sup>(\*)</sup>*

**English**  
**Spanish**  
**French**

## Language diplomas:

## Organisational skills and competences:

## Social skills and competences:

## Computer driving licences:

## Computer skills and competence in programming:

## Italian

Understanding		Speaking		Writing
Listening	Reading	Spoken interaction	Spoken production	
Excellent	Excellent	Excellent	Excellent	Excellent
Excellent	Excellent	Excellent	Excellent	Excellent
Good	Good	Good	Good	Good

<sup>(\*)</sup> Common European Framework of Reference (CEF) level

1. Trinity College Certificate (English, Level 9/Level B2.3), Salerno, (2002).
2. Aspect International Language Academies, London, (English, Level B2), (2002).
3. PET certificate, Cambridge, (English, Level B2), (2008).
4. BULATS certificate, Cambridge, (English, Level C2), (2017).
5. BULATS certificate, Cambridge, (Spanish, Level B2), (2018).

I consider myself a methodical, creative and extremely productive person. I am convinced to be able to carry out research of high quality and interest for the worldwide scientific community and to significantly contribute to the research environment of physics departments. I deliver multitasking skills to get results on various projects at the same time. I am capable to face out and analyze several situations, coming forward with logical solutions. In so doing, I have attitude to problem solving skills which enable me not to get overwhelmed and to systematically solve problems. In that, I guarantee high-impact abilities in communications and decision making. For those reasons, I consider myself a highly adaptable, positive and flexible person who really enjoys working as part of multicultural/challenging teams, since I have already had experiences in research teams in Europe, America and Africa.

I base my scientific work on the capability of being charismatic, with high-impact in communications and conveying one's thoughts and ideas. In such a way, friendliness, leadership and the ability to listen, not taking over the conversation, allow me to get included into different research groups, well interacting in scientific communities. Further, I present myself as a person able to manage disagreements in a socially acceptable manner, with a reasonable empathy and with a clever sense of humour. Open mind, politeness, assertiveness, not dominating over other people, are even my good attitudes in research groups.

1. E.C.D.L. Professional C.A.D. (European Computer Driving License), 3rd level;
2. E.C.D.L. Advanced (European Computer Driving License), 2nd level;
3. E.C.D.L. Core (European Computer Driving License), 1st level.

Excellent competences in: Windows (All versions and packages), Linux (All versions and packages), MAC-OS (All versions and packages), Web site realizations and maintenance, Numerical calculus and programming; Wolfram Mathematica (All versions), Maple, MATLAB, CosmoMC, CAMB, Iraf, Python, R, SuperMongo, C/C++, Fortran, Office (All versions), GNUPLOT, Origin, LateX, Root, BAT, AutoCAD, BIM, CodeV, Planetary Ephemeris Program-PEP.



## Master(s) and Specialisation(s):

1. Specialisation course in: *Space Optics* obtained at the European Space Research Technology Centre (ESTEC), Noordwijk, the Netherlands, (2017).
2. Specialisation course in: *Tecnico competente in Acustica Ambientale*, (Corso di formazione abilitante), 60 CFU, Beta Formazione, Ravenna, Italy, (2017).
3. Diploma *Consulente Ambientale* obtained by Eureka Formazione, Policoro, Italy, (2017).
4. Diploma *Consulente Energetico* obtained by Eureka Formazione, Policoro, Italy, (2017).
5. Specialization in: *Corso di Formazione Docenti Formatori e Responsabili Progetti Formativi* obtained by Eureka Formazione, Policoro, Italy, (2017).
6. Specialization in: *Safety Manager* obtained by Eureka Formazione, Policoro, Italy, (2017).
7. Specialisation course in: *Campi Elettromagnetici, Valutazione del Rischio e Protezione*, University of Naples "Federico II", Physics Department, Naples, (2016).
8. Diploma A.N.F.O.S. *Sicurezza nei cantieri edili*, Nocera, Italy, (2016).
9. Specialisation course in: *Geometrical Methods in Physics* obtained at the UNAM University, Mexico City, Mexico, (2011)-(2012).
10. Specialisation course in: *Numerical calculus with elements of Advanced Computing* obtained at the UNAM University, Mexico City, Mexico, (2011)-(2012).
11. Specialisation course in: *numerical analysis of wave propagations* held by M.A.E. Group, based on the software Geopsy, Frosolone, Italy, (2008).
12. Diploma *Operatore su Personal Computer* obtained by C.P.F. school, Solofra, Italy, (1996).

## Teaching experience:

Teaching basic and advanced courses represents a relevant part of my activities. I enjoy interacting with students at all levels. I also experiment different ways of monitoring students progress, interacting with them in small groups and laboratories. Students are continually assessed via a series of problem solving and multiple choice problem sheets on specific topics. I regularly use computer algebra systems, and numerical simulations in classroom demos to give different perspectives on physical problems, providing a much needed link to situations of importance in everyday life. My teaching experiences are listed below.

## List of teaching experiences in Italy:

### At the University of Sannio, Benevento, Italy:

1. Adjunct Assistant professor with Co.Co.Co. for the course of "Fisica" (Physics) at the University of Benevento, Unisannio, Italy, for the courses of Civil Engineering (Ingegneria Civile) and Energetic Engineering (Ingegneria Energetica), 1 year during 2016/2017, for a total of 40 hours.
2. Adjunct Assistant professor with Co.Co.Co. for the course of "Fisica Generale" (General Physics) at the University of Benevento, Unisannio, Italy, for the courses of Computer Engineering (Ingegneria Informatica) and T.L.C. Engineering (Ingegneria Elettronica per l'Automazione e le Telecomunicazioni), 1 year during 2016/2017, for a total of 40 hours.
3. Adjunct Assistant professor with Co.Co.Co. for the course of "Matematica 1" (Calculus) at the University of Benevento, Unisannio, Italy, for the courses of Energetic Engineering (Ingegneria Energetica), 1 year during 2016/2017, for a total of 40 hours.
4. Adjunct Assistant professor with Co.Co.Co. for the course of "Fisica" (Physics) at the University of Benevento, Unisannio, Italy, for the courses of Civil Engineering (Ingegneria Civile) and Energetic Engineering (Ingegneria Energetica), 1 year during 2015/2016, for a total of 30 hours.
5. Adjunct Assistant professor with Co.Co.Co. for the course of "Fisica Generale" (General Physics) at the University of Benevento, Unisannio, Italy, for the courses of Computer Engineering (Ingegneria Informatica) and T.L.C. Engineering (Ingegneria Elettronica per l'Automazione e le Telecomunicazioni), 1 year during 2015/2016, for a total of 60 hours.

### At the University of Naples "Federico II", Naples, Italy:

1. Teaching experience for the course of "Metodi Matematici per la Fisica" (Mathematical Methods for Physics) at the University of Naples "Federico II", Naples, Italy, 2016, for a total of 20 hours, in collaboration with Prof. F. Lizzi.
2. Teaching experience for the course of "Fisica Generale" (General Physics) at the University of Naples "Federico II", Naples, Italy, 2016, for a total of 20 hours, in collaboration with Prof. S. Capozziello.
3. Teaching experience for the course of "Cosmologia" (Cosmology) at the University of Naples "Federico II", Naples, Italy, 2016, for a total of 10 hours, in collaboration with Prof. S. Capozziello.
4. Co-Teaching experience for the PhD course of "Constraining Cosmologies using CosmoMC and CAMB" at the University of Naples "Federico II", Naples, Italy, 2016, for a total of 9 hours, (ITALY), in collaboration with Dr. Jason Dossett.
5. Teaching support for the course of "Astroparticle Physics" at the University of Naples "Federico II", Naples, Italy, 2014, for a total of 8 hours, (ITALY).

### At the University of Camerino, Camerino, Italy:

1. Adjunct Assistant Professor for the course of "Quantum Field Theory" (Teoria Quantistica dei campi) at the University of Camerino, Camerino, Italy, 2017-present, 6 CFU.
2. Teaching experience for the course of "Metodi Matematici per la Fisica" (Mathematical Methods for Physics) at the University of Camerino, Camerino, Italy, 2017, for a total of 25 hours, in collaboration with Prof. S. Mancini.
3. Teaching experience for the course of "Metodi Matematici per la Fisica" (Mathematical Methods for Physics) at the University of Camerino, Camerino, Italy, 2018, for a total of 25 hours, in collaboration with Prof. S. Mancini.

### At the University of Rome "La Sapienza", Rome, Italy:

1. Teaching support for the course of "Theoretical physics" at the University of Rome "La Sapienza", Rome, Italy, 2009-2010, for a total of 6 hours, (ITALY).

**Examiner:**

1. Examiner for Quantum Field Theory and Theoretical Physics, University of Camerino, Camerino, Italy, 2017-present.
2. Examiner for Fisica (Physics), University of Sannio, Benevento, Italy, 2015-2017.
3. Examiner for Fisica Generale (General Physics), University of Sannio, Benevento, Italy, 2015-2017.
4. Examiner for Fisica (Physics), University of Naples "Federico II", Naples, Italy, 2013-2017.
5. Examiner for Metodi Matematici per la Fisica (Mathematical Methods for Physics), University of Naples "Federico II", Naples, Italy, 2016-2017.
6. Examiner for Cosmologia (Cosmology), University of Naples "Federico II", Naples, Italy, 2015-present.
7. Examiner for Metodi Matematici per la Fisica (Mathematical Methods for Physics), University of Camerino, Camerino, Italy, 2017-present.
8. "Cultore della materia" for the courses of "Fisica Generale" (FIS/01), at the University of Naples "Federico II", 2013-2015, (ITALY).
9. "Cultore della materia" for the courses of "Fisica Generale" (FIS/01), at the University of Naples "Federico II", 2016-2018, (ITALY).

**List of abroad teaching experiences:****At the University of Mexico UNAM, Mexico City, Mexico:**

1. Teaching experience for the PhD course of "General Relativity" at the UNAM University, Mexico City, Mexico, 1st August-28th September 2012, for a total of 65 hours, in collaboration with Prof. H. Quevedo.
2. Teaching experience for the PhD course of "Advanced Quantum field theory" at the UNAM University, Mexico City, Mexico, 1st May-30th June 2015, for a total of 62 hours, in collaboration with Prof. H. Quevedo.
3. Teaching experience for the course of "Advanced Mathematical Methods for Physical and Natural Sciences" at the Institute of Nuclear Sciences of the UNAM University, Mexico City, Mexico. The course was split into 2 parts of 36 hours each. Period: from December 1, 2011, to April 30, 2012.

**Supervisor of thesis:**

Graduated 8 students: 6 bachelor students (5 with distinction), 2 master students (1 with distinction).

**Referee for:**

1. Reports on Progress in Physics.
2. Physical Review D.
3. Physics Letter B.
4. Classical and Quantum Gravity.
5. General Relativity and Gravitation.
6. Physics Letter A.
7. International Journal of Modern Physics D.
8. International Journal of Geometric Methods in Modern Physics.
9. Physics of the Dark Universe.
10. The European Physical Journal C.
11. Astrophysics and Space Sciences.
12. Modern Physics Letter A.
13. Physica Scripta.
14. Optik.
15. Universe.
16. Entropy.
17. Galaxy.
18. Symmetry.
19. Mathematical and Computational Applications.

**Editorial and activities:**

1. Editor for the journal *International Journal of Geometrical Methods in Modern Physics*, website: [www.worldscientific.com/worldscinet/ijgmmp](http://www.worldscientific.com/worldscinet/ijgmmp)
2. Managing Editor for Publishing House: "Licosia Edizioni", Rome, Italy, website: [www.licosia.com/?page\\_id=1679](http://www.licosia.com/?page_id=1679)
3. Lead Guest Editor for the special issue: *Model-Independent Techniques of Dark Energy Scenarios in Homogeneous and Inhomogeneous Cosmologies* on Advances in High Energy Physics, Hindawi, website: [www.hindawi.com/journals/ahep/si/808350/cfp/](http://www.hindawi.com/journals/ahep/si/808350/cfp/)
4. Lead Guest Editor for the special issue: *Beyond the Standard Cosmological Model in the Multi-messenger Era* on Symmetry, MDPI.
5. Lead Guest Editor for the special issue: *Theories of Gravity: Alternatives to the Cosmological and Particle Standard Models* on Universe, MDPI.
6. Guest Editor for the special issue: *New Solutions of Einstein Equations in Spherical Symmetry* on Symmetry.

## International Collaborations and Affiliations:

1. 2009 – now, Collaboration with Prof. Hernando Quevedo, Department of Nuclear Sciences, University of Mexico City, Mexico.
2. 2009 – 2012, Collaboration with Prof. Patrick Roy Kerr, Mathematic Department, Canterbury University, New Zealand,
3. 2009 – now, Collaboration with Dr. Damiano Tommasini, Physics Department, University of Athens, Athens, Greece.
4. 2010 – now, Collaboration with Dr. Alessandro Bravetti, Instituto de Investigaciones en Matematicas Aplicadas y en Sistemas, Mexico, Mexico.
5. 2010 – now, Collaboration with Dr. Christine Gruber, Department of Physics, University of Berlin, Berlin, (Germany).
6. 2010 – now, Collaboration with Dr. Alejandro Aviles, Department of Astronomy, University of California, Berkeley, USA.
7. 2013 – now, Collaboration with Prof. Bharat Ratra, Physics Department, Kansas University, Cardwell Hall, Manhattan, USA.
8. 2013 – now, Collaboration with Dr. Omer Farooq, Physics Department, Kansas University, Cardwell Hall, Manhattan, USA.
9. 2014 – now, Collaboration with Prof. Marek Biesiada, Physics Department, University of Silesia, Katowice, Poland.
10. 2014 – now, Collaboration with Prof. Jaime Klapp, Mathematic Department, IPN Institute, Mexico City, Mexico.
11. 2014 – now, Collaboration with Prof. Norman Cruz, Physics Department, Universidad de Santiago de Chile, Santiago, Chile.
12. 2014 – now, Collaboration with Prof. Emmanuel N. Saridakis, Institut d'Astrophysique de Paris, Paris, France.
13. 2015 – now, Collaboration with Prof. Predrag Jovanovic, Astronomical Observatory, Volgina, Belgrade, Serbia.
14. 2015 – now, Collaboration with Prof. Vesna Borka Jovanovic, Vinca Institute of Nuclear Sciences, Belgrade, Serbia.
15. 2015 – now, Collaboration with Prof. Dusko Borka, Vinca Institute of Nuclear Sciences, Belgrade, Serbia.
16. 2015 – now, Collaboration with Dr. Alvaro de la Cruz, Department of Mathematics, University of Cape Town, South Africa.
17. 2015 – now, Collaboration with Prof. Peter Dunsby, Department of Mathematics, University of Cape Town, South Africa.
18. 2016 – now, Collaboration with Prof. Winfried Zimdahl, Department of Physics, University of Espirito Santo, Brazil.
19. 2016 – now, Collaboration with Prof. Julio C. Fabris, Department of Physics, University of Espirito Santo, Brazil.
20. 2016 – now, Collaboration with Prof. Oliver F. Piattella, Department of Physics, University of Espirito Santo, Brazil.
21. 2016 – now, Collaboration with Prof. Somayyeh Shoorvazi, Research Institute for Astronomy and Astrophysics, Maragha, Iran.
22. 2018 - now, Collaboration with Prof. Daniele Malafarina, Nazarbayev University, Astana, Kazakhstan.
23. 2018 - now, Collaboration with Prof. Kuantay Boshkayev, Al-Farabi Kazakh National University, Almaty, Kazakhstan.

## National Collaborations and Affiliations:

1. 2008 - now, Collaboration with Prof. Salvatore Capozziello, Physics Department, University of Naples, Naples, Italy.
2. 2009 - now, Collaboration with Prof. Gerardo Cristofano, Physics Department, University of Naples, Naples, Italy.
3. 2009 - now, Collaboration with Prof. Mariafelicia De Laurentis, Physics Department, University of Naples, Naples, Italy.
4. 2009 - now, Collaboration with Dr. Andrea Geralico, International Center for Relativistic Astrophysics, Pescara, Italy.
5. 2010 - 2016, Collaboration with Dr. Giovanni Battista Pisani, Physics Department, University of Rome "La Sapienza", Rome, Italy.
6. 2012 - 2014, Collaboration with Prof. Giancarlo Barbarino, Physics Department, University of Naples, Naples, Italy.
7. 2013 - 2014, Collaboration with Dr. Manuel Scinta, Physics Department, University of Catania, Catania, Italy.
8. 2013 - now, Collaboration with Prof. Stefano Mancini, School of Science and Technology, University of Camerino, Camerino, Italy.
9. 2015 - now, Collaboration with Prof. Fedele Lizzi, Physics Department, University of Napoli, Napoli, Italy.
10. 2015 - now, Collaboration with Prof. Patrizia Vitale, Physics Department, University of Napoli, Napoli, Italy.
11. 2016 - now, Collaboration with Dr. Raffaele Marotta, Physics Department, University of Napoli, Napoli, Italy.
12. 2016 - now, Collaboration with Dr. Stefano Morisi, Physics Department, University of Napoli, Napoli, Italy.
13. 2017 - now, Collaboration with Dr. Simone Dell'Agnello, INFN, Frascati, Italy.
14. 2018 - now, Collaboration with Dr. Stefano Bellucci, INFN, Frascati, Italy.
15. 2018 - now, Collaboration with Dr. Danilo Babusci, INFN, Frascati, Italy.
16. 2018 - now, Collaboration with Dr. Antonio Capolupo, Physics Department, University of Salerno, Salerno, Italy.
17. 2018 - now, Collaboration with Dr. Lorenzo Sebastiani, Physics Department, University of Trento, Povo, Italy.
18. 2018 - now, Collaboration with Prof. Roberto Giambò, School of Science and Technology, University of Camerino, Camerino, Italy.

**Research periods in  
foreign institutions and  
abroad experiences:**

1. December 2009 - January 2010, visiting PhD student at the University of Canterbury, Christchurch, New Zealand
2. February 2010 - August 2010, visiting PhD student at the University of Cote Azur, Nice, France.
3. January 2011 - April 2011, ICN, visiting research associate, University of Mexico (UNAM), Mexico City, Mexico.
4. December 2011 - October 2012, Postdoctoral fellowship at ICN, University of Mexico (UNAM), Mexico City, Mexico.
5. July 2015 – December 2015, Postdoctoral fellowship at the Department of Mathematics, University of Cape Town, South Africa.
6. December 2018, Visiting Professor, at the Physics Department, Nazarbayev University, Astana, Kazakhstan.

**Research stages in  
National institutions:**

1. September 2010, visiting PhD student at the Physics Department of the Ferrara University, Ferrara, Italy.

## School(s) and conference(s):

1. Scuola Nazionale di Astrofisica, *Oggetti compatti e pulsar - Scienza con ALMA*, maggio 20-26, Maracalagonis (CA), (2007), Italy.
2. SIGRAV School (INFN cosmological school): *Coarsened grained cosmology*, held at the Institute of Theoretical Physics Galileo Galilei, January 26-29, Firenze, 2009, Italy.
3. 6th Italian-Sino Workshop, Relativistic Astrophysics, June 29 - July 1, Pescara, 2009, Italy.
4. 2nd Italian-Pakistani Workshop, Relativistic Astrophysics, July 8 - 10, Pescara, 2009, Italy.
5. Weekly seminars, Università "La Sapienza" Roma, Prof. Fred Jegerlehner, November 2009, Rome, Italy.
6. 5th Australasian Conference - Christchurch Meeting December 16-18, Christchurch, 2009, New Zealand.
7. The 12th Marcel Grossmann Meeting, in Paris, France, hosted jointly by ICRANet, UNESCO and ICTP, July 13th-18th, Paris, 2010, France.
8. Conference Cosmology on the beach, Puerto Vallarta, January 10-14, 2011, Mexico.
9. 12th Italian-Korean Symposium, July 4-8, 2011, Pescara, Italy.
10. From May 2012 to October 2012 main organizer of "Monthly Seminars of General Relativity and Gravitation" at the Institute of Nuclear Science, Mexico City, Mexico.
11. The 13th Marcel Grossmann Meeting, Stockholm University, July 1 - 7, Stockholm, 2012, Sweden.
12. Conference Lampi su Napoli, Osservatorio Astronomico di Capodimonte, September 20-22, 2012, Napoli.
13. Conference *Current Problems in Theoretical Physics*, March 28 - 31, Lloyd's Baia Hotel, Vietri sul Mare, 2015, Italy.
14. Fourteenth Marcel Grossmann Meeting - MG14, University of Rome "La Sapienza", July 12-18, 2015, Rome, Italy.
15. The South African Gravity Society Meeting, 2015, Port Elizabeth, 6031, Rhodes University, 31/08/2015-02/09/2015, South Africa.
16. Majorana lectures, February 9-13, 2015, Naples, Italy.
17. Majorana lectures, March 14-16, 2016, Naples, Italy.
18. Conference *Current Problems in Theoretical Physics*, March 18-23, Lloyd's Baia Hotel, Vietri sul Mare, 2016, Italy.
19. Conference *Current Problems in Theoretical Physics*, March 24-28, Lloyd's Baia Hotel, Vietri sul Mare, 2018, Italy.
20. International School on *Space Optics*, October 2-6, ESA-ESTEC, 2017, The Netherlands.
21. Conference *Lunar Science for Landed Missions Workshop*, January 10-12, NASA Ames Campus, Mountain View, 2018, USA.
22. Conference *Fifteenth Marcel Grossmann Meeting - MG15*, University of Rome "La Sapienza", July 1-7, 2018, Rome, Italy.



**Chairman for  
conference(s)/Invited  
conference(s):**

1. Chairman for the fifteenth Marcel Grossmann Meeting - MG14, University of Rome "La Sapienza", July 1-7, 2018, Rome, Italy, website: [http : //www.icra.it/mg/mg15/par\\_sessions\\_chairs\\_details.htm#luongo](http://www.icra.it/mg/mg15/par_sessions_chairs_details.htm#luongo)
2. Invited talk at the Physics Department of Nazarbayev University, Astana, Kazakhstan, December 1-8, 2018, Astana, Kazakhstan, title: *Accelerating the universe with matter with pressure*
3. Invited talk at Spontaneous Workshop XIII, *Hot topics in Modern Cosmology*, 5-11 May 2019 — IESC, Cargèse, France, website: [http : //www.cpt.univ – mrs.fr/ cosmo/SW2019/SW13.html](http://www.cpt.univ-mrs.fr/cosmo/SW2019/SW13.html)
4. Invited talk at the Astronomical Observatory of Capodimonte, Naples, 12 June 2019, Naples, Italy.
5. Invited talk at the University of Naples "Federico II", Physics Dept., July 2019, Naples, Italy.

**Additional information:**

1. During 2007 students' representative at the Physics Department of the University of Salerno.
2. Driving licence: Patente B.

**Personal interests**

Play violin and piano. Movie maker. Bike riding. Poetry.