

Stefania De Curtis

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 ORCID iD: 0000-0002-9676-136X

Biography

I was born in Florence, on January 29, 1959. After my undergraduate studies at the University of Florence, I moved to Trieste for my Ph.D at the International School of Advanced Studies (SISSA). I spent several periods as Visiting Scientist at the Theory Division of the Physics Department of the Geneva University, first with a “Fondazione A. Della Riccia” grant, after with the support of the Swiss National Science Foundation. I won a national secondary school professorship competition for Mathematics and Physics. I got an INFN fellowship just before the permanent position as a researcher of the INFN Florence Unit. I presently live and work in Florence as a Research Director (“Dirigente di Ricerca”) of the Florence INFN Unit. I’ve a contract of association with CERN as VISC (Visiting Scientist) and I’m Professor on contract of the Florence University from 2005. Starting from December 1st, 2019, till January 15, 2025 I’ve been the Director of the INFN National Center for Advanced Studies “The Galileo Galilei Institute for Theoretical Physics (GGI)”

I got the “**Abilitazione Scientifica Nazionale**” DD 222 20/7/2012 - sector A2/02 (Fisica Teorica delle Interazioni Fondamentali) Prima Fascia - valid from January 8, 2014 to January 8, 2025

Education

- ▶ **1972 - 1977** Liceo Scientifico “Leonardo da Vinci”, Firenze, Italy. Scientific Lyceum Diploma
- ▶ **April 1983** B.S. in Physics. Florence University, IT (110/110, summa cum laude). Thesis: Study of the Dynamical Breaking of the Chiral Symmetry with the Effective Action method. Advisor R. Casalbuoni
- ▶ **October 1987** Ph.D. in Physics (Elementary Particle), SISSA Trieste, Thesis: "Dynamical symmetry breaking in QCD and quark masses" Supervisor R. Casalbuoni

Professional Experience

- ▶ **1983 - 1985** Ph.D Fellow, SISSA Trieste
- ▶ **1984** “Fondazione A. Della Riccia” grant at the Theory Division of the Physics Dept. of Geneva University
- ▶ **1985 - 1987** Professor in the Secondary School teaching Mathematics and Physics
- ▶ **1987 - 1988** INFN grant (competition 971/86)
- ▶ **1988 - 2002** Researcher INFN Firenze (competition 973/86)
- ▶ **2000 - 2007** Professor on contract teaching “Physics Foundations” , “Physics Didactics” and “Physics Laboratory” at the Faculty of Education Science of the Florence University
- ▶ **2002 - 2018** First Researcher INFN Firenze (competition 8680/2001)
- ▶ **2005 - present** Professor on contract teaching “Quantum Field Theory” at the Physics Department of the Florence University
- ▶ **2018 - present** Research Director (Dirigente di Ricerca) INFN Firenze (competition 18012/2016)
- ▶ **2019 - present** Director of the INFN National Center for Advanced Studies “The Galileo Galilei Institute for Theoretical Physics (GGI)”

Teaching and Outreach Activities

- ▶ **1995 - 1996** Course of “Theoretical Physics“ for the XI Cycle of Physics Doctorate of the Florence University
- ▶ **1998 - 1999** Integrative Course of “Foundation of Theoretical Physics” for the “Corso di Laurea in Fisica” Florence University
- ▶ **1999 - 2000** Course of “Theory of the Fundamental Interactions“ for the XV Cycle of the Physics Doctorate of the Florence University
- ▶ **2000 - 2007** Courses of “Physics Foundations” , “Physics Didactics” and “Physics Laboratory” for the “Corso di Laurea in Scienze della Formazione Primaria” at the Faculty of Education Science of the Florence University
- ▶ **2001 - 2002** Course of “Field Theory, Functional Methods and Renormalisation” for the XVII Cycle of the Physics Doctorate of the Florence University
- ▶ **2002 - 2003** Course of “Elementary Particle Physics“ for the “Corso di Laurea in Fisica” Florence University
- ▶ **2003 - 2004** Integrative Course of “Elementary Particle Physics“ on “Recent aspects in theoretical physics of elementary particles” for the “Corso di Laurea in Fisica” Florence University
- ▶ **2003 - 2004** and **2006 - 2007** Course of “Non-abelian gauge theories, perturbative calculations”, for the XIX and XXII Cycles of the Physics Doctorate of the Florence University
- ▶ **2007 - 2008** Course of “Strong Interactions: Theory and Phenomenology”, for the XXIV Cycle of the Physics Doctorate of the Florence University
- ▶ **2005 - present** Course of “Field Theory” for the “Corso di Laurea Magistrale in Fisica e Astronomia” Florence University
- ▶ I’ve been the advisor of several thesis at the Florence University for the degree in Educational Science, and for the Master and Ph.D degrees in Physics. Here are the last ones: Andrea Tesi (Analysis of an electroweak model with composite Higgs - 2011), Daniele Barducci (Phenomenological analysis of a minimal model with composite Higgs - 2011), Juri Fiaschi (One-loop corrections to the S parameter in an electroweak theory with extended symmetry - 2012), Elena Vigiani (Non minimal terms in models with Higgs Goldstone Boson - 2013), Carlotta Sacco (Dipoles in models with Higgs Goldstone Boson- 2014) , Fabio Berti (The Higgs Boson as a partially composite particle - 2017), Francesco Ciumei (Composite Higgs Model with UV completion - 2017), Simone Blasi (Non-minimal Higgs sector beyond the Standard Model - 2017), Alessandro Agugliaro (Composite Higgs: Theory and Phenomenology - 2019), Andrea Guiggiani (CP-violation and baryogenesis from a non-minimal composite Higgs model - Master 2020) and Andrea Guiggiani (Bubble Dynamics at the Electroweak Scale - PhD 2024)
- ▶ I’ve been member of several international grant-review panels and Ph.D. juries. Here is the most recent: appointed by the Presidents of Lyon 1 University, and the University of Johannesburg as reviewer for the PhD defence of Lara Mason on March, 4, 2022;
- ▶ **2021 - present** Panelist in several round tables or discussions in outreach events. Here are some examples: [Ago Modena Fabbriche Culturali](#): Il quanto tecnologico, April 22, 2022; [Higgs 2022](#): Public Round Table: Esplorando l’Universo 10 anni con il Bosone di Higgs, Pisa Nov. 9, 2022; [Festival delle Scienze: Anatomia di una scoperta](#). Dialogo in musica dal Bosone di Higgs all’Universo Oscuro, Rome Nov. 26, 2022.
- ▶ **2022 - present** Member of “100 Esperte - Osservatorio di Pavia” <http://www.100esperte.it>. A project born in 2016 from an idea of the [Osservatorio di Pavia](#) and the association [GiULiA](#) women journalists, in collaboration with the [Fondazione Bracco](#). It is a database with more than 100

women experts in various fields, available for interviews and in-depth analysis on news events or current issues.

Professional Activities (Coordination, Organization and Leadership)

- ▶ **1994 - 1997** INFN Florence Researchers' Representative
- ▶ **1998 - 2005** National PI (Responsabile Nazionale) of the INFN-CSN4 project “FI21- Dynamical Breaking of the Electroweak Symmetry and Physics Beyond the Standard Model”
- ▶ **2000 - 2006** INFN Coordinator of the Theory Group of the Florence Unit (Scientific and Financial coordination of more than 40 researchers)
- ▶ **2000-2006** Referee of the CSN4 (INFN Scientific Committee for Theoretical Physics) for “Elementary Particle Phenomenology”
- ▶ **2003** Member of the panel for the INFN Competition 9726/2003 (First Researcher positions)
- ▶ **2004-2010** Reviewer of the ANVUR - VQR evaluation process
- ▶ **2005 - 2019** Local PI (Responsabile Locale) of the INFN-CSN4 project “PD21 (HEPCube)- High Energy Particle Physics Phenomenology” for the Florence node
- ▶ **2005 - present** Professor on contract teaching “Quantum Field Theory II” at the Physics and Astronomy Department of the Florence University
- ▶ **2005 - 2017** Member of the Local Organizing Committee of the “Galileo Galilei Institute for Theoretical Physics” <https://www.ggi.infn.it>
- ▶ **2006 - present** Promoter of the Working Group “Phenomenology at Linear and other Future Colliders”, Organizer of several workshops and editor of the proceedings: “[ILC Physics in Florence](#)”, Florence (2007), “LC08:e+e- Physics at the TeV Scale”, Frascati (2008), “LC09: e+e- Physics at the TeV scale and the Dark Matter Connection”, Perugia, 2009; “LC10: New Physics: complementarities between direct and indirect searches”, Frascati 2010, “LC11 Workshop: Understanding QCD at linear colliders in searching for old and new physics”, ECT* Trento, 2011; “LC13:Exploring QCD from the infrared regime to heavy flavour scales at B-factories, the LHC and a Linear Collider”, ECT* Trento (2013); “Physics Prospects for Linear and other Future Colliders after the Discovery of the Higgs (LFC15)”, ECT* Trento (2015); “Old and New Strong Interactions from LHC to Future Colliders (LFC17)”, ECT* Trento (2017) ;”LFC19: Strong dynamics for physics within and beyond the Standard Model at LHC and Future Colliders”, ECT* Trento (2019), [LFC22: Strong Interactions from QCD to new strong dynamics at LHC and Future Colliders](#)”, ECT* Trento (2022)
- ▶ **2007 - present** Member of the Scientific Board for the Doctorate in Physics and Astronomy of the Florence University
- ▶ **2007 - present** Member of the International Organizing Committee of the Johns Hopkins University (JHU) Workshops. They meet annually, and rotate among participating universities. The purpose of each workshop is to discuss outstanding issues in particle theory, ranging from mathematical physics to cosmology. In 2018 the JHU workshop “Beyond Standard Model: Where do we go from here?” was organised at the Galileo Galilei Institute in Florence, while the 43rd edition was hosted by the Kavli Institute for the Physics and Mathematics of the Universe (Kavli IPMU) of the University of Tokyo
- ▶ **2010** Member of the panel for the INFN Competition 13708/2010 (Researcher positions)
- ▶ **2010 - present** INFN Delegate for the “Conferenza Regionale per la Ricerca e l’Innovazione” (Decreto del Presidente della Giunta della Regione Toscana n. 210 del 16/11/2010)

- ▶ **2012 - 2019** INFN Coordinator of the Theory Group of the Florence Unit (Scientific and Financial coordination of more than 45 researchers)
- ▶ **2012 - present** Scientific co-Director of the Journal "[Il Colle di Galileo](#)" - Firenze University Press Editor
- ▶ **2012** Member of the Scientific Organizing Committee of the GGI workshop "Understanding the TeV Scale through LHC Data, Dark Matter and other experiments".
- ▶ **2013** Member of the Scientific Organizing Committee of the GGI workshop "Beyond the Standard Model after the first run of the LHC"
- ▶ **2013 - 2019** Coordinator of the GGI Ph.D Schools <https://www.ggi.infn.it/schools.html> and Organizer of the GGI Ph.D Schools "GGI Lectures on the Theory of Fundamental Interactions"
- ▶ **2014 - 2019** Referee for the CSN4 for "Linea 2: Elementary Particle Phenomenology"
- ▶ **2014 - present** Expert for the evaluation of SIR-MUR projects (art.53 D.Lgs 165/01)
- ▶ **2015 - present** Referee for JHEP
- ▶ **2016** Member of the panel for the INFN Competition 18226/2016 (Researcher positions)
- ▶ **2017 - 2024** Italian Representative Member to the Plenary European Committee for Future Accelerators (ECFA)
- ▶ **2017 - 2025** Member of the Center Council of the National INFN Center for Advanced Studies "The Galileo Galilei Institute for Theoretical Physics"
- ▶ **2019 - present** Member of the Scientific Committee of the "Galileo Galilei Institute for Theoretical Physics"
- ▶ **Dec. 2019 - Jan. 2025** Director of the INFN National Center for Advanced Studies "The Galileo Galilei Institute for Theoretical Physics (GGI)"
- ▶ **2020 - present** President of the INFN panel for the pre-evaluation of the Cern Fellowships
- ▶ **2020 - present** Member of the International Scientific Advisory Committee (SAC) of the "Instituto de Física de Partículas y del Cosmos" ([IPARCOS-UCM](#)) of Universidad Complutense de Madrid. IPARCOS-UCM is a newly created research institute aiming at promoting the research in the areas of Particle and Nuclear Physics, Astrophysics and Cosmology, and Instrumentation. The SAC works together with the Council and the Scientific Strategy Committee in the evaluation and design of the research activity of the Institute. The duties of the SAC members include the collaboration in the elaboration of the IPARCOS-UCM annual research report.

My Research

I'm carrying out research on a wide variety of subjects in particle physics theory. The study of elementary particle physics is at an important juncture. The Standard Model (SM) has proven to be a remarkably successful description of essentially all experimental phenomena. Still, there are significant gaps in our knowledge of the universe. For example, we still do not know the origin of dark matter or dark energy, we do not know the source of the electroweak spontaneous symmetry breaking (EWSB), which is responsible for the origin of mass, and we have not found the source of CP violation that is responsible for the dominance of matter over antimatter. There are good reasons to believe that the mechanism of symmetry breaking as described by the SM is unlikely to be correct or complete. The theory has unstable high energy behaviour and such pathologies are an indication of new phenomena at larger mass scales. These open questions have been motivating the majority of my research.

The main topic which has been present in a large part of my scientific activity is the dynamical symmetry breaking phenomenon both in strong and electroweak interactions.

Concerning the former, I gave important contributions to the study, based on functional techniques, of the dynamical chiral symmetry breaking in QCD-like theories (2). The generalisation to finite temperature and chemical potential of the composite operator formalism, allowed to study the chiral phase diagram of QCD-like theories with the evidence of a tricritical point which is a signal of metastable phases (4). Further analysis carried out with different techniques confirmed the presence of this "critical end point", which we highlighted for the first time and is still of great interest both for theorists and for experimentalists. Remarkably, recent results from the NA49 experiment at CERN are in agreement with our prediction.

Concerning instead the EW interactions, the final goal is to address the open questions of the SM such as the EWSB mechanism and the related hierarchy problem. Having long worked on the construction of effective models where the EWSB is realised through a dynamical mechanism alternative to the standard Higgs one (1,6,8), I was able to give, in the last years, substantial contributions to the construction of composite Higgs models (10,12) but also to the analysis of their phenomenological implications (11).

The discovery of the Higgs particle in 2012, is not the end of the elementary particle puzzle, but, instead, it may open the way to several questions: is it a fundamental scalar? Is it the only one responsible for the EWSB and the mass generation? Is it unique, or a part of an extended Higgs sector? Is it the portal of an "hidden" dynamics? If the answer to this last question is affirmative, then one can explore the possibility of a composite Higgs particle, possibly a pseudo-Nambu Goldstone boson (pNGB) associated to the breaking of a global symmetry; a "new pion" which could offer a solution to the hierarchy problem. One of the first concrete and calculable model for a pNGB Higgs was proposed in (10).

My work is relevant for collider-based and non-accelerator searches for new physics. I have considerable intellectual overlap and interactions with my colleagues in experimental particle physics. I have been interested on the phenomenological manifestations of new physics phenomena in the high energy particle physics experiments. With an emphasis on the Higgs sector, the LHC is performing tests of the SM and of its extensions. By exploring the TeV scale, the LHC could discover any "natural" scenario of EWSB (the one of a pNGB Higgs for example, which is theoretically well motivated) or exclude it and confirm the SM. Independently of the result, clarifying this point will be a very important legacy of the LHC and will change our perspective on the physics of fundamental interactions.

Recently the study of the composite dynamics in the early universe has captured my attention, in particular the occurrence of a strong first-order EW phase transition, which can trigger baryogenesis in composite Higgs models (13,15). Another interesting aspect of this scenario is the generation of gravitational wave signatures that could be observed at future space-based interferometers.

I'm author of ~ 110 published papers, ~ 30 contributions to conferences, ~ 35 workshop contributions with h -index=39 related to the published papers.

The complete list of my publications can be found at <http://inspirehep.net> by searching in authors "de curtis,s".

Main Papers

1. R.Casalbuoni, S.De Curtis, D.Dominici and R.Gatto, *Physical implications of possible $J = 1$ bound states from strong Higgs*, Nucl. Phys. B282, 235 (1987)
2. A.Barducci, R.Casalbuoni, S.De Curtis, D.Dominici and R.Gatto, *Dynamical chiral symmetry breaking in QCD and determination of quark masses*, Phys. Rev. D38, 238 (1988)
3. R.Casalbuoni, S.De Curtis, D.Dominici, F.Feruglio and R.Gatto, *Non-linear Realization of Supersymmetry Algebra From Supersymmetric Constraint*, Phys. Lett. B220, 569 (1989)

4. A.Barducci, R.Casalbuoni, S.De Curtis, R.Gatto and G.Pettini, *Chiral phase transition in QCD for finite temperature and density*, Phys. Rev. D41, 1610 (1990)
5. G.Altarelli, R.Casalbuoni, S.De Curtis, N.Di Bartolomeo, F.Feruglio and R.Gatto, *Improved bounds on extended gauge models from new LEP data*, Phys. Lett. B263, 459 (1991)
6. R.Casalbuoni, A.Deandrea, S.De Curtis, D.Dominici, R.Gatto and M.Grazzini, *Low energy strong electroweak sector with decoupling*, Phys. Rev. D53, 5201 (1996)
7. R.Casalbuoni, S.De Curtis, D.Dominici and R.Gatto, *SM Kaluza-Klein Excitations and Electroweak Precision Tests*, Phys. Lett. B462, 48 (1999)
8. R.Casalbuoni, S.De Curtis and D.Dominici, *Moose models with vanishing S parameter*, Phys. Rev. D 70, (2004)
9. G.Cacciapaglia, A.Deandrea and S.De Curtis, *Nearby resonances beyond the Breit-Wigner approximation*, Phys. Lett. B682, 43 (2009)
10. S.De Curtis, M.Redi and A.Tesi, *The 4D Composite Higgs*, JHEP 1204, 042 (2012)
11. D.Barducci, S.De Curtis, S.Moretti and G.M.Pruna, *Top pair production at a future e+e- machine in a composite Higgs scenario*, JHEP 1508, 127 (2015)
12. A.Agugliaro, O.Antipin, D.Becciolini, S.De Curtis and M.Redi, *UV complete composite Higgs models*, Phys.Rev.D 95 no. 3, 035019 (2017)
13. S.De Curtis, L.Delle Rose and G.Panico, *Composite Dynamics in the Early Universe*, JHEP 1912, 149 (2019)
14. F.Bishara, S.De Curtis, L.Delle Rose, P.Englert, C.Grojean, M.Montull, G.Panico, and A.Rossia, *Precision from the diphoton Zh channel at FCC-hh*, JHEP 04, 154 (2021)
15. S.De Curtis, L.Delle Rose, A.Guiggiani, A.G.Muior and G.Panico, *Bubble Wall Dynamics at the Electroweak Phase Transition*, JHEP 2022, 163 (2022)

The Galileo Galilei Institute for Theoretical Physics (GGI)

I've been the Director of the [Galileo Galilei Institute](#) (GGI). My mandate started on December 1st, 2019 till January 15, 2025. The GGI was founded in 2005 by a partnership between the INFN and the University of Florence. The GGI has been one of the first European Institutes devoted to organizing long-term scientific programs (called GGI workshops) in theoretical physics in its broadest sense. Its goal is to attract the most active researchers from institutions worldwide to foster discussions and collaborations that may lead to new insights and significant scientific progress. Nowadays, it is one of the leading institutions organizing programs and schools in theoretical physics. On average, the GGI runs three workshops per year, of about 6-8 weeks each, with related conferences and training or focus weeks. In addition, five Ph.D. schools are organized yearly on different domains of theoretical physics: string theory, theory of fundamental interactions, statistical field theory, nuclear and hadronic physics, and astroparticle physics. Each school lasts 2-3 weeks, covering basic and advanced topics and favouring interactions between lecturers and students.

The following data can help appreciate the success of the Institute. During its almost eighteen years of activity, the GGI has run 54 programs, 77 conferences, and 44 schools with topics ranging from high-energy physics to cosmology, from condensed matter and statistical mechanics to astroparticle physics, from string theory and mathematical physics to machine learning and quantum computation. The number of participants has been around 100 per program, which results in a total of 300 researchers per year. Considering conferences and schools, the participation has reached 800 people per year. The GGI has a [YouTube channel](#) collecting videos of most activities, particularly lectures and seminars held at the Institute. This collection offers an extensive set of courses on a wide range of research topics in theoretical physics, available to researchers worldwide.

The success of the GGI in promoting interactions among scientists is also testified by the large number of publications originating from collaborations started during the programs (see the list of [preprints](#) on the GGI website). The GGI also favours the visibility of early-stage researchers by promoting short conferences and [series of lectures](#) mainly led by young scientists.

During the COVID pandemic, I had the idea to establish the [GGI Tea Breaks' seminars](#), a series of web-based colloquia covering a broad spectrum of arguments in theoretical physics. This initiative has been highly successful and much appreciated by the international physics community at large. The videos of these colloquia are getting thousands of visualizations on the YouTube channel.

Curriculum vitae

PERSONAL INFORMATION Domenico Seminara



Undergraduate Studies

1985-1989 Undergraduate studies in Physics, University of Pisa

1985-1989 Undergraduate studies in Physics, Class of Sciences, Scuola Normale Superiore, Pisa

March 2, 1990 Degree in Physics from the University of Pisa

- Thesis: Gravity in 2+1 dimensions
- Advisor: Prof. Pietro Menotti
- Grade: 110/110 with Honors

October 2, 1990 Diploma in Physics from the Class of Sciences at the Scuola Normale Superiore of Pisa

PhD program

Nov. 1990-Nov. 1993 Ph. D. Program, Scuola Normale Superiore of Pisa, Class of Sciences

September 16, 1996 Ph.D. Degree in Physics [Titolo equivalente al Dottorato di Ricerca: LEGGE 18 Giugno 1986, n. 308, Gazzetta Ufficiale Serie Generale, n. 149 30 Giugno 1986.]

- Thesis : Fermi Walker Gauge in 2+1 dimensional gravity
- Relatore: Prof. Pietro Menotti
- Votazione: 70/70 with Honors

POST-DOC AND RESEARCH ACTIVITIES ABROAD

May 1994-Aug. 1996 Post-Doc at the Center for Theoretical Physics at MIT, Cambridge (Massachusetts, USA) in Professor Roman Jackiw's group

Sept. 1996-Sept. 1998 Post-Doc at the Department of Physics at Brandeis University (Massachusetts, USA) in Professor Stanley Deser's group

Oct. 1998-Feb. 2000 Post-Doc at the Laboratoire de Physique Théorique, École Normale Supérieure, Paris (France)

FELLOWSHIPS

1998 Fellowship within the European TMR network "Quantum Aspects of Gauge Theories, Supersymmetry, and Unification"

1995 INFN Post-Doctoral Fellowship for Theoretical Physicists

1994 INFN Post-Doctoral Fellowship for Theoretical Physicists

1993 Fellowship from the Angelo della Riccia Foundation

1990 Scholarship from the Scuola Normale Superiore of Pisa to attend the Ph.D. Program

1985 Scholarship from the Scuola Normale Superiore to attend the undergraduate studies

SHORT-TERM VISITS TO RESEARCH CENTERS

Short-Term Visits Abroad of At Least One Month

2001 CERN Fellowship to spend one month conducting research within the CERN Theory Group

2002 Research activities at the Department of Physics, Brandeis University from September 1, 2002, to October 30, 2002

2003 Research activities at the Center for Theoretical Physics, MIT under the "Bruno Rossi" exchange program from September 1, 2003, to September 30, 2003

- 2004 Research activities at the Center for Theoretical Physics, MIT under the "Bruno Rossi" exchange program from September 1, 2004, to September 30, 2004
- 2005 Guest researcher on non-commutative field theories at Heriot-Watt University with Professor Richard Szabo from November 20, 2005, to December 19, 2005
- 2006 Research activities at the Department of Physics, University of Salamanca during the INFN-CICYT 2005 exchange program from February 1, 2006, to February 28, 2006
- 2011 Research activities at the CERN Theory Group from July 1, 2011, to July 30, 2011

EMPLOYMENT POSITIONS HELD

- September 1, 2021-present Full Professor in Theoretical Physics of Fundamental Interactions, Models, Mathematical Methods, and Applications (scientific area 02/PHYS-02) at the Department of Physics and Astronomy, University of Florence.
- July 1, 2015-August 31, 2021 Associate Professor with tenure in Theoretical Physics of Fundamental Interactions, Models, Mathematical Methods, and Applications (scientific area 02/A2) at the Department of Physics and Astronomy, University of Florence.
- March 1, 2000-June 30, 2015 Researcher with tenure in Theoretical Physics of Fundamental Interactions, Models, Mathematical Methods, and Applications (scientific area 02/A2) at the Department of Physics and Astronomy, University of Florence.

RESEARCH POSITIONS IN OTHER INSTITUTIONS

- January 1, 2001-present Research Appointment (Incarico di Ricerca) at the National Institute for Nuclear Physics (INFN)
- January 1, 2011-December 31, 2017 10 % Affiliation with CERN (Theory Group)

RESEARCH INTERESTS

Perturbative and non-perturbative feature of quantum field theories, supersymmetric and superconformal theories, quantum information in field theories and holography, string theories, topological string theory, quantum gravity, matrix models and large N theories, field theories on non-commutative spaces, dualities for higher spin theories, classical solutions and the causality problem in general relativity, N-body problem in 2+1 dimensional gravity.

TEACHING EXPERIENCE

Lectures and Recitations for Undergraduate and Graduate Courses

- A.Y. 2021-present Lectures on Field Theory I at the Department of Physics and Astronomy (1st year of the Master's Degree in Physics and Astronomy)
- A.Y. 2017-present Lectures on Quantum Mechanics at the Department of Physics and Astronomy (3rd year of the Bachelor's Degree in Physics and Astronomy)
- A.Y. 2020 Lectures on Advanced Field Theory at the Department of Physics and Astronomy (2nd year of the Master's Degree in Physics and Astronomy)
- A.Y. 2012-2020 Lectures on Relativity at the Department of Physics and Astronomy (1st year of the Master's Degree, also valid as a PhD course)
- A.Y. 2017-2018 Lectures on Elements of Quantum Gravity at the Department of Physics and Astronomy (1st year of the Master's Degree)
- A.Y. 2015-2018 Lectures on Physics I for the Bachelor's Degree in Electronic and Telecommunications Engineering (1st year)
- A.Y. 2003-2011 Lectures on Relativity at the Department of Physics (1st year of the Master's Degree)
- A.Y. 2008 Lectures on Mathematical Methods of Physics at the Department of Physics (2nd year of the Bachelor's Degree in Physics)
- A.Y. 2003-2011 Recitations in the Quantum Mechanics at the Department of Physics (3rd year)
- A.Y. 2003 Lectures on Mathematical Methods for Physics at the Department of Physics (3rd year)

- A.Y. 2002-2006 Lectures on "Teaching Science in Elementary School", Course for the Bachelor's Degree in Primary Education Sciences (4th year)
- A.Y. 2002-2003 "Laboratory for Physical Sciences", Course for the Bachelor's Degree in Primary Education Sciences (4th year)
- A.Y. 2001-2003 Recitations on Quantum Mechanics at the Department of Physics (3rd year)
- A.Y. 2001-2002 Recitations on Mathematical Methods for Physics at the Department of Physics (3rd year)
- A.Y. 2000 Recitations on Thermodynamics and Theory of Errors, Course at the Department of Computer Science (2nd year)
- A.Y. 2000 Recitations on Electricity and Magnetism, Course at the Department of Computer Science (3rd year)

Lectures in PhD Courses in Florence

- A.Y. 2005-2008 Introduction to Supersymmetry, course for the PhD in Physics
- A.Y. 2014-2016 Black Hole Dynamics and Thermodynamic, course for the PhD in Physics
- A.Y. 2020-present Black-holes, Information Paradox and Information Theory, course for the PhD in Physics and Astronomy

Lectures at International Schools

- April 2006 "The many faces of two dimensional Yang-Mills", lectures at the IV International School on Field and Gravitation, Rio de Janeiro
- Nov 2008 LACES 2008: Course on "Introduction to Rigid Supersymmetry", at the Galileo Galilei Institute, Florence
- Nov. 2010 LACES 2010: Course on "Introduction to Black Hole Physics", at the Galileo Galilei Institute, Florence (in collaboration with Prof. Sergio Ferrara)
- Feb. 2011 SNS 2011 Pisa: Course on "Introduction to Rigid Supersymmetry", Scuola Normale Superiore di Pisa, February 2011
- Feb. 2012 TORINO 2012: Course on "Localization and its applications in supersymmetric theories", Department of Physics, Turin, February 2012
- Nov 2014 LACES 2014: Course on "Introduction to Supersymmetry", at the Galileo Galilei Institute, Florence

Supervised or Currently Supervising Theses

PhD Theses:

- In progress
- In progress
- April 2020
- December 2012
- December 2011
- June 2010
- December 2007
- December 2006

Master Theses and Old System Degree:

- July 2024
- July 2023

April 2020
February 2020
October 2018
 April 2018

February 2018
October 2017
 March 2016
 July 2016
 March 2013

 April 2011

October 2010

 April 2010
December 2009

 October 2009

 April 2009

December 2005
December 2003

 April 2022
 June 2021
 April 2021
October 2020
December 2019
October 2019
December 2018
April 2016
December 2014
 October 2009
 April 2009
December 2007
 April 2007

Committee Member or Referee for PhD Final Examinations

I have served as a committee member or referee for PhD final examinations at the Universities of Florence, Cagliari, Trento, Parma, Perugia, the Scuola Normale Superiore in Pisa, and Heriot-Watt University in Edinburgh.

Committee Member in Selection Procedures for Researcher and Professorship Positions,

I have served as a committee member in selection procedures for researcher type A/B positions, as well as for associate and full professorships.

Referee for International Post-doc Fellowships

- 2018-2019 Referee for the Fellini Fellowships: (*FELLINI is an international incoming mobility fellowship programme for experienced researchers, co-financed by the European Commission through the Marie Skłodowska-Curie COFUND Action.*)
- 2018-present Referee for the network of European universities associated with the network: Joint postdoc applications related to theories on the unification of fundamental interactions. For more information see [here](#).

REFEREEING ACTIVITIES

I serve as a referee for journals such as: Nuclear Physics B, Physical Review D, JHEP, Physics Letters B, Physical Review Letters, Classical and Quantum Gravity, Communication of Mathematical Physics, International Journal of Modern Physics A, Annals of Physics, etc.

SCIENTIFIC COLLABORATIONS

During my scientific career, I have collaborated with the following Italian and international universities: Heriot-Watt University, Edinburgh (UK); Humboldt University, Berlin (DE); University of Iceland; Queen Mary College (UK); University of Surrey (UK); NORDITA (SE); Niels Bohr Institute (DK); Brandeis University (USA); Caltech (USA); MIT (USA); University of Bologna (Italy); University of Parma (Italy); University of Milan Bicocca (Italy); University of Padua (Italy); University of Perugia (Italy); University of Pisa (Italy); SISSA (Trieste, Italy), etc.

COORDINATION ACTIVITIES AND ADMINISTRATIVE/SCIENTIFIC RESPONSIBILITIES

- November 2020-present Member of "*Commissione di Indirizzo e Autovalutazione*" of the Department of Physics and Astronomy: member for the scientific area 02/PHYS-02
- July 2023 President of the Admission Committee for the PhD in Physics and Astronomy of the University of Florence
- 2020-2021 Member of the Departmental Committee for the preparation of the VQR (Evaluation of Research Quality)
- January 2021 National Manager (Responsabile Nazionale) of the INFN-CSN4 project "GAST- Gauge and String Theory: Non-perturbative Dynamics in Gauge and String Theories"
- June 2019 Member of the Joint Faculty-Student Committee of the School of Sciences
- January 2018 President of the Joint Faculty-Student Committee of the Department of Physics and Astronomy
- 2019-present Member of the Committee for the Scientific Activities of the Department
- 2017-2019 President of the Committee for the Renewal of Research Fellowships at the Department of Physics and Astronomy
- 2017 Member of the Committee for the Drafting of the Project for Departments of Excellence
- 2017-2018 Scientific Supervisor of a Research Grant within the project: Quantum transport in quantum spin chains: steady state and entanglement
- 2017-2018 Coordinator of the Project: Quantum transport in quantum spin chains: steady state and entanglement (Project funded by the CRF foundation 2017/2018)

- 2017 Scientific Supervisor of a Research Grant within the project: The Physics far from equilibrium and the problem of equilibration: from quantum mechanics to classical mechanics and string theory
- 2017 Responsible for an INFN fellowship for foreigners, as coordinator of the Florence unit of the INFN GAST project
- 2016-2017 Coordinator of the Project: The Physics far from equilibrium and the problem of equilibration: from quantum mechanics to classical mechanics and string theory (Project funded by the CRF foundation 2016/2017)
- 2017-2019 Coordinator of ex 60% funds: Algebraic Structures and their Applications in Physics
- September 2016 Member of the Admission Committee for the PhD in Physics and Astronomy of the University of Florence
- 2013 Scientific Supervisor and Organizer of the GGI Scientific Program: Geometry of Strings (2013)
- 2006-2012 INFN scientific and financial Coordinator of the CSN4 for the Florence Unit
- 2008-2012 Internal Scientific Referee for the Field Theory and Strings sector of the National Scientific Committee for Theoretical Physics of INFN (CSN4)
- 2006-2012 Member of the National Scientific Committee for Theoretical Physics of INFN (CSN4)
- 2003-present Member of the PhD Board in Physics of the Department of Physics and Astronomy of the University of Florence
- October 2004 Member of the Admission Committee for the PhD in Physics and Astronomy of the University of Florence
- 2006-2017 Member of the Local Organizing Committee of the "Galileo Galilei Institute for Theoretical Physics";
- 2018-2024 Member of the "Center Council" of the National INFN Center for Advanced Studies "Galileo Galilei Institute for Theoretical Physics" (see [here](#))
- In this role, I also supervised the organization and scientific activities of the following GGI programs:
- 1) AdS4/CFT3 and the holographic states of matter (2010);
 - 2) Large N Gauge Theories (2011);
 - 3) What is ν ? From new experimental neutrino results to a deeper understanding of theoretical physics and cosmology (2012);
 - 4) New Frontiers in Lattice Gauge theories (2012);
 - 5) Supergravity: what's next? (2016);
 - 6) Entanglement in quantum systems (2018);
 - 7) String theory from a world-sheet perspective (2019);

COORDINATION OR PARTICIPATION IN NATIONAL OR INTERNATIONAL PROJECTS

- 2020-2022 Research in Paris *Complexity in Quantum Field Theory and Holography* [participants: S. Chapman, A. L. Cotrone, G. Policastro, D. Seminara, E. Tonni.]
- 2019 Research Collaborator in the Le Studium Project *EDGE: Exploration of Duality, Geometry, and Entanglement* [coordinator: S. Solodukin; participants: J. de Boer, G. Gibbons, C. Herzog, M. Kulaxizi, E. Tonni, J. Erdmenger, A. O'Bannon, A. Parnachev, D. Seminara]
- 2018 FABR: Winner of the Individual Funding for Basic Research Activities
- 2017-2018 Quantum Transport in Quantum Spin Chains: Steady State and Entanglement (Project Coordinator, funded by the CRF foundation 2017/18)
- 2016-2017 The Physics Far from Equilibrium and the Problem of Equilibration: From Quantum Mechanics to Classical Mechanics and String Theory (Project Coordinator, funded by the CRF foundation 2016/2017)
- 2017-present Algebraic Structures and their Applications in Physics (ex 60% Project Coordinator for 2017)
- 2014-present Gauge and String Theories (Local Coordinator, INFN Specific Initiative)
- 2012-2017 COST Action MP1210, The String Theory Universe [Participant, Chair: Silvia Penati]
- 2011-2013 PRIN: "Symmetries of the Universe and Fundamental Interactions", Research Program Participant [Scientific Coordinator: Prof. Augusto Sagnotti]
- 2010-2013 Non-Perturbative Dynamics in Gauge Theories and String Theory (Local Coordinator, PI14 INFN Specific Initiative)
- 2005 INFN-CICYT "Quantum Field Theory on Noncommutative Spaces", Parma-Salamanca, Project Participant, Italian Coordinator: Luca Griguolo

- 2004-2007 Non-Perturbative Dynamics in Gauge Theories and String Theory (Participant, PI14 INFN Specific Initiative)
- 2004-2006 PRIN: "Singularities, Integrability, Symmetry", Research Program Participant [Scientific Coordinator: Prof. Calogero Francesco, Scientific Responsible: Prof. Riccardo Giachetti]
- 2001-2004 Perturbative and Non-Perturbative Aspects of Field Theories and Statistical Mechanics (Participant, PR11 INFN Specific Initiative)
- 2001-2002 Perturbative and Non-Perturbative Aspects of Field Theories and Statistical Mechanics (Participant, PR11 INFN Specific Initiative)
- 2000-2002 PRIN: "Accelerated Observers and their Description in Special Relativity and Tetradic Gravity", Research Program Participant [Scientific Coordinator: Prof. Remo Ruffini, Scientific Responsible: Prof. Giorgio Longhi]

CONFERENCE AND SCHOOL ORGANIZATION

- September 3-5, 2001 Member of the Organizing Committee for the 25th Johns Hopkins Workshop on Current Problems in Particle Theory: 2001: A Relativistic Spacetime Odyssey. Experiments and Theoretical Viewpoints on General Relativity and Quantum Gravity, Florence
- May 26-29, 2004 Member of the Organizing Committee for the XXVI Informal Conference on Theoretical Physics, Cortona
- May 25-28, 2005 Member of the Organizing Committee for the XXVII Informal Conference on Theoretical Physics, Cortona
- June 11-12, 2007 Member of the Organizing Committee for the Topics in Non-Perturbative Gauge Dynamics in String and Field Theories, Department of Physics, Padua
- June 24-26, 2010 Member of the Organizing Committee for the Conference, Theories of the Fundamental Interactions, TFI2010, Perugia
- August 26 - October 20, 2013 Member of the Organizing Committee for the International Program, Geometry of Strings and Fields, Galileo Galilei Institute, Arcetri, Florence (see [here](#)).
- September 8-13, 2013 Member of the Organizing Committee for the Conference, Geometry of Strings and Fields, Galileo Galilei Institute, Arcetri, Florence
- November 4-6, 2013 Member of the Organizing Committee for the Conference, Supersymmetric Theories and Localization, Parma
- November 19, 2013 Member of the Organizing Committee for the Tuscan Meetings, seminars with joint sessions from the Universities of Florence, Pisa, and Scuola Normale in the field of Field and String Theory.
- April 13-17, 2015 Member of the Organizing Committee for the Conference, Gauge/Gravity Duality 2015, at the Galileo Galilei Institute, Arcetri, Florence
- 2008-2019 Member of the Organizing Committee for the LACES School, Advanced Lectures on Fields and Strings, founded with Carlo Angelantonj, Luca Griguolo, Pietro Antonio Grassi, and Gianluca Grignani. The school has held 16 editions (2008-2023). For more information, visit: [Laces](#)
- 2016-present Permanent Member of the Organizing Committee for the Johns Hopkins Workshop on Current Problems in Particle Theory
 - 2021 Organizer of the program "Quantum Field Theory at the Boundary" at the MITP in Mainz
 - 2024 Member of the Scientific Organizing Committee of the GGI program "BPS Dynamics and Quantum Mathematics" (see [here](#))

SELECTION OF INVITED SEMINARS SINCE 2000

- Geodesic bit threads and thermal entropy, 4th Meeting on Exploration of Duality, Geometry, and Entanglement, Tours (France), January 9-13, 2024
- Line and Defects in ABJ(M) Theories, 3rd Meeting on Exploration of Duality, Geometry, and Entanglement, Tours (France), January 9-13, 2023 (held virtually due to COVID)
- $T\bar{T}$ -Deformation of Two-Dimensional Gauge Theories Revisited, 2nd Meeting on Exploration of Duality, Geometry, and Entanglement, Tours (France), December 13-17, 2021 (held virtually due to COVID)

- Analytic Bootstrap and Witten Diagrams for (ABJM) Wilson Line as Defect CFT_1 , 1st Meeting on Exploration of Duality, Geometry, and Entanglement, Tours (France), June 2-5, 2020 (held virtually due to COVID)
- ABJM Matrix Model Reloaded, Conference on Supersymmetric Quantum Field Theories in the Non-Perturbative Regime, GGI Florence, May 7-11, 2018
- Corner Function Contributions to Holographic Entanglement Entropy in AdS₄/BCFT₃, 6th International Conference on New Frontiers in Physics (ICNFP 2017): Workshop on Supergravity and Related Matters, Crete, August 27-29, 2017
- Wilson Lines as Superconformal Defects in ABJM Theory: A Formula for the Emitted Radiation, Conference on Topological Solitons, Non-Perturbative Gauge Dynamics, and Confinement, Pisa, July 20-21, 2017
- Status Report on 3D Supersymmetric Wilson Loops: Facts and Surprises, Talk at the Department of Physics, Turin, April 2017
- Status Report on 3D Supersymmetric Wilson Loops: Facts and Surprises, Talk at Scuola Normale Superiore, April 2017
- Supersymmetric Wilson Loops and Bremsstrahlung Function in ABJ(M) Theories, Talk at the Department of Sciences, University of Eastern Piedmont, February 2015
- BPS Wilson Loops and Bremsstrahlung Function in ABJ(M), European String Meeting, Mainz, September 2014
- The Generalized Quark-Antiquark Potential in ABJM Theories, Research Seminar, EMPG, Edinburgh, February 2014
- The Generalized Quark-Antiquark Potential in ABJM Theories, Meeting on Symmetries of the Universe and Fundamental Interactions, Pisa, May 2013
- Exact Results on Wilson Loops in Supersymmetric Gauge Theories, Talk at the Department of Physics, Genoa, April 2013
- Localization and Correlators of Wilson Loops in N=4 SYM, Talk at the Department of Physics, University of Pisa, January 2011
- More News on Supersymmetric Wilson Loops, Talk at Scuola Normale Superiore Pisa, April 2010
- Supersymmetric Wilson Loops and Their Correlators, Talk at the Department of Physics, Bologna, May 2009
- Supersymmetric Wilson Loops in N=4 and Their Correlators, Plenary Talk at the Opening Conference of the GGI Program, New Perspectives in String Theory, Arcetri, April 2008
- Supersymmetric Wilson Loop in N=4 SYM, Talk at the Physics Department, Humboldt University, Berlin, July 2008
- Exactly Solvable Supersymmetric Wilson Loops, Talk at the Department of Physics, Padua, June 2008
- Thermodynamics of Supersymmetric Gauge Theories, Talk at the Department of Physics, Naples, May 2008
- Thermodynamics of Supersymmetric Gauge Theories, Talk at the Department of Physics, Turin, November 2007
- Critical Behaviors in Topological Strings and Matrix Models, Talk at the Department of Physics, Pisa, April 2007
- BPS Black Holes and Topological Strings, Plenary Talk at the SIGRAV Conference, Turin, September 2006
- Black Holes, Topological Strings, and Large N Phase Transitions, Talk at the V Northwest Superstring Meeting, Salamanca, February 2006
- Black Holes, Topological Strings, and Large N Phase Transitions, Talk at the Department of Physics, University of Tor Vergata, Rome, October 2005
- Black Holes, Topological Strings, and Large N Phase Transitions, Talk at QG05 (Plenary Session), Cala Gonone, September 2005
- Non-Commutative Topologically Massive Gauge Theory, Physics Department, Ann Arbor, Michigan, USA, April 2004
- Towards the Solution of Non-Commutative Gauge Theories in Two Dimensions, Talk at the Center for Theoretical Physics, MIT, September 2003
- Non-Commutative Gauge Theories in Two Dimensions, Talk at SISSA, January 2002
- Non-Commutative Gauge Theories in Two Dimensions, Talk at the Department of Physics, University of Tor Vergata, Rome, October 2002

–Divergences and Counterterms in N=1 and N=2 Supergravities in D=11 and D=10 Dimensions, International Meeting on Quantum Gravity and Spectral Geometry, Naples, July 2001

LIST OF PUBLICATIONS

- [1] Stefania Caggioli, Francesco Gentile, Domenico Seminara, and Erik Tonni. “Holographic thermal entropy from geodesic bit threads”. In: *JHEP* 07 (2024), p. 088. DOI: [10.1007/JHEP07\(2024\)088](https://doi.org/10.1007/JHEP07(2024)088). arXiv: [2403.03930](https://arxiv.org/abs/2403.03930) [hep-th].
- [2] Luca Griguolo, Rodolfo Panerai, Jacopo Papalini, Domenico Seminara, and Itamar Yaakov. “Localization and resummation of unstable instantons in 2d Yang-Mills”. In: *JHEP* 06 (2024), p. 188. DOI: [10.1007/JHEP06\(2024\)188](https://doi.org/10.1007/JHEP06(2024)188). arXiv: [2403.00053](https://arxiv.org/abs/2403.00053) [hep-th].
- [3] Luca Griguolo, Jacopo Papalini, Lorenzo Russo, and Domenico Seminara. “Asymptotics of Weil-Petersson volumes and two-dimensional quantum gravities”. In: (Feb. 2024). arXiv: [2402.07276](https://arxiv.org/abs/2402.07276) [hep-th].
- [4] Luca Griguolo, Jacopo Papalini, Lorenzo Russo, and Domenico Seminara. “The resurgence of the plateau in supersymmetric $\mathcal{N} = 1$ Jackiw-Teitelboim gravity”. In: *JHEP* 06 (2024), p. 168. DOI: [10.1007/JHEP06\(2024\)168](https://doi.org/10.1007/JHEP06(2024)168). arXiv: [2310.06768](https://arxiv.org/abs/2310.06768) [hep-th].
- [5] Luca Griguolo, Luigi Guerrini, Rodolfo Panerai, Jacopo Papalini, and Domenico Seminara. “Supersymmetric localization of (higher-spin) JT gravity: a bulk perspective”. In: *JHEP* 12 (2023), p. 124. DOI: [10.1007/JHEP12\(2023\)124](https://doi.org/10.1007/JHEP12(2023)124). arXiv: [2307.01274](https://arxiv.org/abs/2307.01274) [hep-th].
- [6] Nicola Gorini, Luca Griguolo, Luigi Guerrini, Silvia Penati, Domenico Seminara, and Paolo Soresina. “Constant primary operators and where to find them: the strange case of BPS defects in ABJ(M) theory”. In: *JHEP* 02 (2023), p. 013. DOI: [10.1007/JHEP02\(2023\)013](https://doi.org/10.1007/JHEP02(2023)013). arXiv: [2209.11269](https://arxiv.org/abs/2209.11269) [hep-th].
- [7] Luca Griguolo, Rodolfo Panerai, Jacopo Papalini, and Domenico Seminara. “The phase diagram of $T\bar{T}$ -deformed Yang-Mills theory on the sphere”. In: *JHEP* 11 (2022), p. 078. DOI: [10.1007/JHEP11\(2022\)078](https://doi.org/10.1007/JHEP11(2022)078). arXiv: [2209.06222](https://arxiv.org/abs/2209.06222) [hep-th].
- [8] Luca Griguolo, Rodolfo Panerai, Jacopo Papalini, and Domenico Seminara. “Exact $T\bar{T}$ deformation of two-dimensional Yang-Mills theory on the sphere”. In: *JHEP* 10 (2022), p. 134. DOI: [10.1007/JHEP10\(2022\)134](https://doi.org/10.1007/JHEP10(2022)134). arXiv: [2207.05095](https://arxiv.org/abs/2207.05095) [hep-th].
- [9] Luca Griguolo, Rodolfo Panerai, Jacopo Papalini, and Domenico Seminara. “Exact TT^- Deformation of Two-Dimensional Maxwell Theory”. In: *Phys. Rev. Lett.* 128.22 (2022), p. 221601. DOI: [10.1103/PhysRevLett.128.221601](https://doi.org/10.1103/PhysRevLett.128.221601). arXiv: [2203.09683](https://arxiv.org/abs/2203.09683) [hep-th].
- [10] Luca Griguolo, Rodolfo Panerai, Jacopo Papalini, and Domenico Seminara. “Non-perturbative effects and resurgence in Jackiw-Teitelboim gravity at finite cutoff”. In: *Phys. Rev. D* 105.4 (2022), p. 046015. DOI: [10.1103/PhysRevD.105.046015](https://doi.org/10.1103/PhysRevD.105.046015). arXiv: [2106.01375](https://arxiv.org/abs/2106.01375) [hep-th].
- [11] Luca Griguolo, Jacopo Papalini, and Domenico Seminara. “On the perturbative expansion of exact bi-local correlators in JT gravity”. In: *JHEP* 05 (2021), p. 140. DOI: [10.1007/JHEP05\(2021\)140](https://doi.org/10.1007/JHEP05(2021)140). arXiv: [2101.06252](https://arxiv.org/abs/2101.06252) [hep-th].
- [12] Nicola Gorini, Luca Griguolo, Luigi Guerrini, Silvia Penati, Domenico Seminara, and Paolo Soresina. “The topological line of ABJ(M) theory”. In: *JHEP* 06 (2021), p. 091. DOI: [10.1007/JHEP06\(2021\)091](https://doi.org/10.1007/JHEP06(2021)091). arXiv: [2012.11613](https://arxiv.org/abs/2012.11613) [hep-th].
- [13] Lorenzo Bianchi, Gabriel Bliard, Valentina Forini, Luca Griguolo, and Domenico Seminara. “Analytic bootstrap and Witten diagrams for the ABJM Wilson line as defect CFT_1 ”. In: *JHEP* 08 (2020), p. 143. DOI: [10.1007/JHEP08\(2020\)143](https://doi.org/10.1007/JHEP08(2020)143). arXiv: [2004.07849](https://arxiv.org/abs/2004.07849) [hep-th].

- [14] Sara Bonansea, Silvia Davoli, Luca Griguolo, and Domenico Seminara. “Circular Wilson loops in defect $\mathcal{N} = 4$ SYM: phase transitions, double-scaling limits and OPE expansions”. In: *JHEP* 03 (2020), p. 084. DOI: [10.1007/JHEP03\(2020\)084](https://doi.org/10.1007/JHEP03(2020)084). arXiv: [1911.07792](https://arxiv.org/abs/1911.07792) [hep-th].
- [15] Nadav Drukker et al. “Roadmap on Wilson loops in 3d Chern–Simons-matter theories”. In: *J. Phys. A* 53.17 (2020), p. 173001. DOI: [10.1088/1751-8121/ab5d50](https://doi.org/10.1088/1751-8121/ab5d50). arXiv: [1910.00588](https://arxiv.org/abs/1910.00588) [hep-th].
- [16] Giacomo Cavini, Domenico Seminara, Jacopo Sisti, and Erik Tonni. “On shape dependence of holographic entanglement entropy in $\text{AdS}_4/\text{CFT}_3$ with Lifshitz scaling and hyperscaling violation”. In: *JHEP* 02 (2020), p. 172. DOI: [10.1007/JHEP02\(2020\)172](https://doi.org/10.1007/JHEP02(2020)172). arXiv: [1907.10030](https://arxiv.org/abs/1907.10030) [hep-th].
- [17] Rodolfo Panerai, Matteo Poggi, and Domenico Seminara. “Supersymmetric Wilson loops in two dimensions and duality”. In: *Phys. Rev. D* 100.2 (2019), p. 025011. DOI: [10.1103/PhysRevD.100.025011](https://doi.org/10.1103/PhysRevD.100.025011). arXiv: [1812.01315](https://arxiv.org/abs/1812.01315) [hep-th].
- [18] Domenico Seminara, Jacopo Sisti, and Erik Tonni. “Holographic entanglement entropy in $\text{AdS}_4/\text{BCFT}_3$ and the Willmore functional”. In: *JHEP* 08 (2018), p. 164. DOI: [10.1007/JHEP08\(2018\)164](https://doi.org/10.1007/JHEP08(2018)164). arXiv: [1805.11551](https://arxiv.org/abs/1805.11551) [hep-th].
- [19] Marco S. Bianchi, Luca Griguolo, Andrea Mauri, Silvia Penati, and Domenico Seminara. “A matrix model for the latitude Wilson loop in ABJM theory”. In: *JHEP* 08 (2018), p. 060. DOI: [10.1007/JHEP08\(2018\)060](https://doi.org/10.1007/JHEP08(2018)060). arXiv: [1802.07742](https://arxiv.org/abs/1802.07742) [hep-th].
- [20] Domenico Seminara, Jacopo Sisti, and Erik Tonni. “Corner contributions to holographic entanglement entropy in $\text{AdS}_4/\text{BCFT}_3$ ”. In: *JHEP* 11 (2017), p. 076. DOI: [10.1007/JHEP11\(2017\)076](https://doi.org/10.1007/JHEP11(2017)076). arXiv: [1708.05080](https://arxiv.org/abs/1708.05080) [hep-th].
- [21] Lorenzo Bianchi, Luca Griguolo, Michelangelo Preti, and Domenico Seminara. “Wilson lines as superconformal defects in ABJM theory: a formula for the emitted radiation”. In: *JHEP* 10 (2017), p. 050. DOI: [10.1007/JHEP10\(2017\)050](https://doi.org/10.1007/JHEP10(2017)050). arXiv: [1706.06590](https://arxiv.org/abs/1706.06590) [hep-th].
- [22] Marco S. Bianchi, Luca Griguolo, Andrea Mauri, Silvia Penati, Michelangelo Preti, and Domenico Seminara. “Towards the exact Bremsstrahlung function of ABJM theory”. In: *JHEP* 08 (2017), p. 022. DOI: [10.1007/JHEP08\(2017\)022](https://doi.org/10.1007/JHEP08(2017)022). arXiv: [1705.10780](https://arxiv.org/abs/1705.10780) [hep-th].
- [23] Marco S. Bianchi, Luca Griguolo, Matias Leoni, Andrea Mauri, Silvia Penati, and Domenico Seminara. “The quantum $1/2$ BPS Wilson loop in $\mathcal{N} = 4$ Chern-Simons-matter theories”. In: *JHEP* 09 (2016), p. 009. DOI: [10.1007/JHEP09\(2016\)009](https://doi.org/10.1007/JHEP09(2016)009). arXiv: [1606.07058](https://arxiv.org/abs/1606.07058) [hep-th].
- [24] Marco S. Bianchi, Luca Griguolo, Matias Leoni, Andrea Mauri, Silvia Penati, and Domenico Seminara. “Framing and localization in Chern-Simons theories with matter”. In: *JHEP* 06 (2016), p. 133. DOI: [10.1007/JHEP06\(2016\)133](https://doi.org/10.1007/JHEP06(2016)133). arXiv: [1604.00383](https://arxiv.org/abs/1604.00383) [hep-th].
- [25] Marisa Bonini, Luca Griguolo, Michelangelo Preti, and Domenico Seminara. “Surprises from the resummation of ladders in the ABJ(M) cusp anomalous dimension”. In: *JHEP* 05 (2016), p. 180. DOI: [10.1007/JHEP05\(2016\)180](https://doi.org/10.1007/JHEP05(2016)180). arXiv: [1603.00541](https://arxiv.org/abs/1603.00541) [hep-th].
- [26] V. Forini, V. Giangreco M. Puletti, L. Griguolo, D. Seminara, and E. Vescovi. “Precision calculation of $1/4$ -BPS Wilson loops in $\text{AdS}_5 \times S^5$ ”. In: *JHEP* 02 (2016), p. 105. DOI: [10.1007/JHEP02\(2016\)105](https://doi.org/10.1007/JHEP02(2016)105). arXiv: [1512.00841](https://arxiv.org/abs/1512.00841) [hep-th].
- [27] Marisa Bonini, Luca Griguolo, Michelangelo Preti, and Domenico Seminara. “Bremsstrahlung function, leading Lüscher correction at weak coupling and localization”. In: *JHEP* 02 (2016), p. 172. DOI: [10.1007/JHEP02\(2016\)172](https://doi.org/10.1007/JHEP02(2016)172). arXiv: [1511.05016](https://arxiv.org/abs/1511.05016) [hep-th].
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- [29] Piermarco Fonda, Domenico Seminara, and Erik Tonni. “On shape dependence of holographic entanglement entropy in AdS_4/CFT_3 ”. In: *JHEP* 12 (2015), p. 037. DOI: [10.1007/JHEP12\(2015\)037](https://doi.org/10.1007/JHEP12(2015)037). arXiv: [1510.03664](https://arxiv.org/abs/1510.03664) [hep-th].
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- [32] Marco S. Bianchi, Luca Griguolo, Matias Leoni, Silvia Penati, and Domenico Seminara. “BPS Wilson loops and Bremsstrahlung function in ABJ(M): a two loop analysis”. In: *JHEP* 06 (2014), p. 123. DOI: [10.1007/JHEP06\(2014\)123](https://doi.org/10.1007/JHEP06(2014)123). arXiv: [1402.4128](https://arxiv.org/abs/1402.4128) [hep-th].
- [33] Francesco Bigazzi, Aldo L. Cotrone, Luca Griguolo, and Domenico Seminara. “A novel cross-check of localization and non conformal holography”. In: *JHEP* 03 (2014), p. 072. DOI: [10.1007/JHEP03\(2014\)072](https://doi.org/10.1007/JHEP03(2014)072). arXiv: [1312.4561](https://arxiv.org/abs/1312.4561) [hep-th].
- [34] Luca Griguolo, Gabriele Martelloni, Matteo Poggi, and Domenico Seminara. “Perturbative evaluation of circular 1/2 BPS Wilson loops in $N = 6$ Super Chern-Simons theories”. In: *JHEP* 09 (2013), p. 157. DOI: [10.1007/JHEP09\(2013\)157](https://doi.org/10.1007/JHEP09(2013)157). arXiv: [1307.0787](https://arxiv.org/abs/1307.0787) [hep-th].
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Domenico Seminara

Curriculum Vitae of Filippo Colomo

October 2, 2025

Personal data

Institution: Istituto Nazionale di Fisica Nucleare (INFN)

Address: INFN, Sezione di Firenze, Via G. Sansone 1, I-50019 Sesto F.no (FI), Italy

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Education

Master Degree (Laurea) in Physics, with Honours, from University of Florence, Italy, October 14, 1986.

PhD in Physics from University of Florence, Italy, October 1990.

Employment

First Researcher (Primo Ricercatore) at Istituto Nazionale di Fisica Nucleare, Sezione di Firenze, 2020-present;

Permanent Researcher (Ricercatore) at Istituto Nazionale di Fisica Nucleare, Sezione di Firenze, 1993-2019;

Post-Doctoral fellow at the Department of Physics of University of Florence, 1992-1993;

Post-Doctoral fellow at Niels Bohr Institute and Nordita, Copenhagen, 1990-1992.

Post-Doctoral fellow at INFN, Sezione di Firenze, 1990.

Research

Area of research: Mathematical Physics, and more specifically: exact results in statistical mechanics, quantum integrable and exactly solvable systems, with applications to combinatorics and particular interest to the 'limit shape' phenomena.

Other research interests: History and Philosophy of Physics, resulting, among others, in the book: *The Birth of String Theory*, A. Cappelli, E. Castellani, F. Colomo, P. Di Vecchia (eds.), Cambridge University Press (2012).

Author of over 40 papers in international scientific journals and of three edited volumes. Complete list of publications is available at: <https://filippo-colomo.github.io/papers.html> and <https://filippo-colomo.github.io/others.html>

Academic visits

Filippo Colomo has visited several university or international scientific institutions, such as: ECM at University of Barcelona; Niels Bohr Institute in Copenhagen; ICTP and SISSA in Trieste; Euler International Mathematical Institute in Saint Petersburg; PDMI-Steklov in Saint Petersburg; CRM in Montreal; Courant Institute at NYU; Schrödinger Institute in Wien, Institut Poincaré in Paris, MSRI in Berkeley, LPTHE at Université Pierre et Marie Curie in Paris; Institute of Applied Mathematics in Bonn, Simons Center for Geometry and Physics in Stony Brook; LIPN at Université Paris Nord; ICERM at Brown University in Providence; LPTM at Cergy Paris Université; IPAM at UCLA, Los Angeles.

Seminars and conferences

Filippo Colomo has attended over 150 international conferences or workshops, most of times also contributing with a talk. He has given over 60 invited talks at international conferences or workshops, or at international scientific institutions and universities. Videos or slides of some recent selected invited talks are available at <https://filippo-colomo.github.io/talks.html>

Teaching

As an INFN Researcher, Filippo Colomo has no teaching duties. Nevertheless, upon request, he has given several courses, both at undergraduate and graduate levels:

General Physics I (Mechanics and thermodynamics), Faculty of Engineering, University of Florence (1996-97 and 1997-98);

Advanced Quantum Field Theory, PhD in Physics, University of Florence (2001, 2004, 2005);

Integrable and Exactly Solvable Models PhD in Physics, University of Florence (since 2007);

Random Matrix Models PhD in Physics, University of Florence (since 2007);

Mathematical Methods for Theoretical Physics Master in Physics, University of Florence (2014-2022).

Filippo Colomo has also given sets of lectures for graduate students at the SFT-2021 school on *Statistical Field Theories* (Feb 2021, GGI Florence) and at the School *The multiple facets of the six-vertex model* (Nov 2022, ENS Lyon).

Other activities

Member of the Organizing Committees for

- 13 international scientific conferences and workshops;
- a semester program on ‘*Statistical Mechanics, Integrability and Combinatorics*’, held at Galileo Galilei Institute for Theoretical Physics (GGI), in Florence, on Spring 2015. Web: <https://www.ggi.infn.it/showevent.pl?id=139>;
- a semester program on ‘*Randomness, Integrability and Universality*’, held at Galileo Galilei Institute for Theoretical Physics (GGI), in Florence, on Spring 2022. Web: <https://www.ggi.infn.it/showevent.pl?id=366>;
- the graduate school on ‘*Statistical Field Theories*’, held yearly at Galileo Galilei Institute for Theoretical Physics (GGI), since 2014. Web: <https://www.ggi.infn.it/showevent.pl?id=551>.

Local Coordinator of INFN research grant (*Iniziativa Specifica*) SFT on ‘*Statistical Field Theories*’, INFN commission for Theoretical Physics (2023-present).

Organizer and coordinator of the *Interdisciplinary Seminar on Philosophy and Physics*, of the University of Florence (2004-present). Web page: <https://filippo-colomo.github.io/philosophy/>.

Organizer of the Mathematics and Physics joint seminar *Days in Probability and Statistical Physics* of the University of Florence (2017-present).

Member of the Center Council of the Galileo Galilei Institute for Theoretical Physics (since March 2021).

Evaluator for research grants referrals and other scientific evaluations for the Science and Education Department of the Italian Government; the National Council for Scientific Research of Romania; the Narodowe Centrum Nauki (National Science Center) of Poland; the Paris Region Fellowship Programme; the *Actions de Recherche Concertées* (ARC, Collective Research Initiatives) del Belgio.

Fellowships and grants

National Research Grant E44HRF ‘*Low-dimensional quantum systems: theory, experiments and simulations*’, PRIN 2017, coordinator: P Calabrese (2019-2022).

European Network QICFT: ‘*Quantum Integrability, Conformal Field Theory and Topological Quantum Computation*’, Marie Curie Actions IRSES (2011-2015).

INFN research grant SFT on ‘*Statistical Field Theories*’, INFN commission for Theoretical Physics (2010-present).

National Research Grant JHLPEZ ‘*Fisica Statistica dei Sistemi Fortemente Correlati all’Equilibrio e Fuori Equilibrio: Risultati Esatti e Metodi di Teoria dei Campi*’, PRIN 2007, coordinator: G. Mussardo (2008-2010).

European Network INSTANS: ‘*Interdisciplinary Statistical and Field Theory Approaches to Nanophysics and Low Dimensional Systems*’, European Science Foundation (2006-2010).

National Research Grant SINTESI ‘*Singularità, Integrabilità, Simmetrie*’, PRIN 2004, coordinator: F. Calogero (2004-2006).

European Network EUCLID: ‘*European Collaboration Linking Integrability with other Disciplines*’, EC program for Training and Mobility of Researchers (2002-2006).

European Network ‘*Integrability, Non-perturbative Effects, and Symmetry in Quantum Field Theory*’, EC program for Training and Mobility of Researchers (1997-2000).

INFN research grant FI11 on ‘*Statistical Mechanics and Quantum Field Theory*’, INFN commission for Theoretical Physics (1996-2010).

European Network ‘*New Methods in Quantum Field Theory: Infinite Symmetries in Statistical Mechanics and String Theory*’, EC program for Human Capital and Mobility (1993-1996).

Florence University Post-Doctoral Fellowship (1992-1993)

‘Angelo Della Riccia’ Post-Doctoral Fellowship, Niels Bohr Institute, (1991-1992)
INFN Post-Doctoral Fellowship in Theoretical Physics(1990-1992).
Graduate Student Fellowship, PhD in Physics, University of Florence (1987-1990).

Florence, October 2, 2025

Filippo Colomo