

# CURRICULUM VITAE

Name : **Alberto Zaffaroni**

Nationality : Italian

Position : Full Professor, University of Milano-Bicocca

Address for correspondence : Dipartimento di Fisica  
Università degli Studi di Milano-Bicocca  
Piazza della Scienza 3, 20126 Milano  
tel. 02-64482511, e-mail: [alberto.zaffaroni@mib.infn.it](mailto:alberto.zaffaroni@mib.infn.it)

Homepage: [virgilio.mib.infn.it/~zaffaron](http://virgilio.mib.infn.it/~zaffaron)

## 1 Academic degrees

- Laurea magna cum laude Università di Milano, 1991.
- Ph. D in Physics, SISSA/ISAS, Trieste, 1994. Supervisors: Prof. Pietro Fre' (SISSA) and Luciano Girardello (Milano).

## 2 Academic career

- Post-doctoral fellow at Ecole Polytechnique, Palaiseau, France (1994-1995).
- Post-doctoral fellow at the Institute for Advanced Study in Princeton (1995-1997).
- Post-doctoral fellow at the Theory Division at CERN, Geneva (1997-1999).
- INFN researcher (1999-2001 - temporary position, Milano).
- Professor at the University of Milano-Bicocca (associate 2001 -, full 2016-)

## 3 Awards and honors

- SIGRAV prize 2000 (Società Italiana di Relatività Generale e Gravitazione).

## 4 Teaching:

*Bachelor and master courses:*

- Quantum Mechanics, bachelor (from 2010/11 to 2014/15 and from 2021/22 -)
- Theory of Quantum Computing and Quantum Information, master (from 2021/22 -)
- Mathematical Methods for Physics, bachelor (from 2002/03 to 2007/08 and 2015/16, 2016/17, 2019/20).
- Quantum Gravity, master (from 2015/16 to 2020/21).
- Mathematical Methods for Physics, master (from 2001/02 to 2009/10).
- Group Theory, master (from 2003/04 to 2007/08).
- Introduction to Quantum Mechanics, bachelor (from 2008/09 to 2009/10).
- Statistical Mechanics, master (from 2015/16 to 2016/17).
- Theoretical Physics (introduction to Quantum Field Theory and the Standard Model), master (2017/18, 2018/2019 and 2021/22).

*Ph. D. courses:*

- Ph. D. courses for the Ph. D school in Milano-Bicocca, 2001, 2002, 2003, 2004, 2011, 2012, 2015 and 2017.
- *Superstrings*, Scuola Normale Superiore, Pisa, anno 2000.
- *Introduction to AdS/CFT*, Ecole Polytechnique Federal de Lausanne (Troisième cycle de la physique en suisse romande), 2009.
- *Introduction to AdS/CFT*, Scuola Normale Superiore, Pisa, 2011, and from 2017 to 2022.
- *Monopoles in Three Dimensional Gauge Theories*, Ecole Normale Superieure, Parigi, 2015.

*Courses at national and international schools for Ph. D students and post-docs:*

- SIFTS, Summer Institute de Fisica teorica, Madrid 2024.
- Scuola di Dottorato LACES 2023, Galileo Galilei Institute, Firenze 2023.
- International School of Subnuclear Physics, Erice 2023
- SIGRAV International School, School of Applied Quantum Gravity, Vietri 2023

- School on Supersymmetric Localization, Holography and Related Topics, ICTP, Trieste July 2018.
- CERN Winter School on Strings and Fields 2017, February 2017.
- Parma International School of Theoretical Physics, Parma, 30/8 - 4/10 2010.
- Scuola di Dottorato LACES 2009, Galileo Galilei Institute, Firenze 2009.
- TMR European Network Graduate school on *Strings, Supergravity and Gauge Theories*, Trieste, 31/1-4/2/2005, pubblicate in PoS RTN2005:005,2005.
- Scuola Nazionale di Dottorato dell'INFN, Parma, 30/8 -3/9/2005.
- TMR European Network Graduate school on *Quantum aspects of gauge theories supersymmetry and unification*, Torino, 26/1-2/2/2000.
- Scuola Nazionale di Dottorato dell'INFN, Parma, 6-10/9/1999.

## 5 Student Supervision:

- Ph. D students:
  - 1) Riccardo Apreda, "Gravity duals of supersymmetric and non-supersymmetric gauge theories", Università di Pisa, 2004.
  - 2) Enrico Trincherini, "To AdS and back again", Università di Milano, 2004 - now researcher at Scuola Normale Superiore, Pisa.
  - 3) Agostino Butti, "Recent results in N=1 gauge/gravity correspondence", Università di Milano-Bicocca, 2006.
  - 4) Davide Forcella, "Moduli Space and Chiral Ring of D3 Branes at Singularities", SISSA, 2008.
  - 5) Claudius Klare, "Supersymmetry on Curved Space and Holography", Università di Milano-Bicocca, 2014.
  - 6) Morteza Seyed Hosseini, "Black hole microstates and supersymmetric localization", Università di Milano-Bicocca, 2018.
  - 7) Lorenzo Coccia, "On the planar limit of 3d  $T_\rho^\sigma[SU(N)]$  theories, Università di Milano-Bicocca, 2022.
  - 8) Edoardo Colombo, "Extremal functions in AdS/CFT: black hole entropy, equivariant localization", Università di Milano-Bicocca, 2024.
- I partially supervised the research of other students of the Ph. D. school in Milano (Francesco Bigazzi - now INFN researcher in Pisa -, Aldo Cotrone - associate professor in Firenze - and Roberto Casero.)
- I supervised about 20 master thesis (including Francesco Benini - associate professor SISSA - and Andrea Brini - Sheffield University) and more than 40 bachelor thesis.

## 6 Administrative and teaching activities

- Coordinator of the Master in Physics, Bicocca 2020-2024.
- President of the Teaching Committee for the degrees in Physics, Bicocca (2006-2018).
- Member of the "Comitato d'Area Fisica dell'Ateneo di Milano-Bicocca" until September 2009.
- Member of the "Commissione Paritetica della Scuola di Scienze di Milano-Bicocca" until 2014/15.
- Member of the "Commissione Paritetica del Dipartimento di Fisica dell'Università di Milano-Bicocca" from 2015/16 to 2017/18.
- Member of the "Commissione per l'Abilitazione Scientifica Nazionale nel settore 02/A2, tornata 2018-2020".

## 7 Research grant management

- PI of the project "Quantum Gravity from Strongly Coupled Dynamics" in MIUR - Prin2022.
- Scientific coordination of Milano unit "Supersymmetry Breaking with Fields, Strings and Branes" in MIUR - Prin2017.
- National coordinator of contract GSS of Istituto Nazionale di Fisica Nucleare (INFN), which includes seven units: Bicocca, Milano, Torino, Genova, Padova, Lecce, Frascati (2010 -2016).
- Scientific coordination of Milano unit "Campi di gauge, stringhe e dualità" in MIUR - Prin2007.
- Scientific coordination of Milano unit "Simmetrie dell'Universo e delle Interazioni Fondamentali" in MIUR - Prin2009.
- Participation to several italian and european grants: "Teorie di gauge e stringhe", MIUR - Prin 2003; - "Campi di gauge, stringhe e dualita", MIUR - Prin 2005 - "La teoria delle stringhe e la fisica delle interazioni fondamentali", MIUR - Furb 2010; - EC-RTN network "Constituents, Fundamental Forces and Symmetries of the Universe" (MRTN-CT-2004-005104); - TMR network "The quantum structure of spacetime and the geometric nature of fundamental interactions" (RTN HPRN-CT-2000-00131).

## 8 Other Activities

- Member of the editorial board of the international journals JHEP and SciPost.
- Panel member for ERC - Starting Grants (PE2 sector) 2022 and 2024.
- Referee for various international journals including JHEP, Nuclear Physics B, Physics Letters B, Physical Review D, Physical Review Letters.
- External Reviewer for: ERC; US National Science Foundation (NSF); Swiss National Science Fund (SNSF); UK Science and Technology Facilities Council (STFC) and Royal Society; Israel Science Foundation (ISF); Rita Levi Montalcini fellowship program (MIUR); VQR 2004-2010 e 2011-2014.
- Invited scientific visits and seminars at several international Institutions including MIT, UCLA, USC, Caltech, KITP Santa Barbara, New York University, Imperial College London, King's College London, Queen Mary College London, Cambridge, Oxford, Max Planck Munich, Desy, CERN, ICTP, Universidad Autonoma Madrid, Amsterdam University, Utrecht, Ecole Normale Supérieure Parigi, Ecole Polytechnique Parigi, Paris VI-Jussieu.

## 9 Books

- *A Guide to Mathematical Methods for Physicists With Problems and Solutions.* By Michela Petrini, Gianfranco Pradisi, Alberto Zaffaroni; World Scientific (2017).
- *A Guide to Mathematical Methods for Physicists Advanced Topics and applications.* By Michela Petrini, Gianfranco Pradisi, Alberto Zaffaroni; World Scientific (2018).

## 10 Conferences and Workshops:

*Invited plenary seminars at international conferences and workshops (2006-):*

- RattazziFest: *Modern Trends in Theoretical Physics*, EPFL October 2024.
- AMIFEST: *Supersymmetric QFT, Branes and Moduli Spaces*, September 2024.
- "Equivariant Localization and Holography", mini-workshop on *Equivariant Integrals in Geometry, Field Theory and Supergravity*, Torino February 2024.
- "Equivariant localization and holography", *Precision Holography*, CERN June 2023
- *Porratifest: A Symposium in Honor of Massimo Porrati* Novembre 2022.

- Session leader "Black holes and gravitation", PSI, Physics Sessions Initiative 2022, Crete, June 2022.
- AdS Black Holes in String Theory (review talk), *Crossing Horizons*, King's College London, May 2022.
- Progress on AdS Black Holes in String Theory (review talk)", *Strings 2019*, Bruxelles, July 2019.
- "Topologically twisted indices and holography", *Joburg Workshop on String Theory*, South Africa, September 2018.
- "AdS black hole in diverse dimensions", *ERC/Solvay workshop "Holography"*, Bruxelles, May 2018.
- "AdS black hole entropy in diverse dimensions", *Strings, Geometry and Black Holes*, King's College London, April 2018.
- "Localization and entropy counting", *Fields And Duality 2017*, Munich, October 2017.
- "Extremization principles for BPS black holes in AdS", *String Theory and Quantum Gravity*, Ascona, Switzerland July 2017.
- "Extremization principles for BPS black holes in AdS", *Supergravity 2017*, Padova May 2017.
- "Supersymmetric localization and AdS4 black holes", *Iberian Strings 2017*, Lisbon January 2017.
- "AdS4 black holes and 3d gauge theories", *Autumn Symposium in String Theory*, KIAS Corea September 2016.
- "3d supersymmetric gauge theories and AdS4 black holes", *Recent Developments in Strings and Gravity*, Corfu September 2016.
- "AdS4 black holes and 3d gauge theories", *Supersymmetric theories, dualities and deformations*, Bern July 2016.
- "Holography, localization and black holes", *Second workshop on String Theory and Gender* inside String-Math Trimester, IHP, Paris, June 2016.
- "AdS4 black holes and 3d gauge theories", *Current Themes in Holography*, Copenhagen, April 2016.
- "AdS4 black holes and 3d gauge theories", *CERN Theory Institute "Recent Developments in M-theory"*, Ginevra February 2016.
- "Recent Developments in Superconformal Field Theories", *XXVIII Workshop Beyond the Standard Model*, Bad Honnef, Bonn, February 2016.
- "Entropy of supersymmetric black holes in AdS4", *VII Round Table Italy-Russia*, Dubna, November 2016.

- "Aspects of 3d gauge theories", *Gauge theories, supergravity and superstrings*, Benasque, August 2015.
- "A topologically twisted index for 3d gauge theories", *Strings 2015*, Bangalore, June 2015.
- " Monopole operators and three dimensional SCFTs", *Exact Quantum Fields and the Structure of M-theory*, Heraklion, Crete, 2014
- "Tilings, BPS operators and moduli spaces", *Quiver Gauge Theories, Tilings and Calabi-Yau Geometry*, The Royal Society at Chicheley Hall, Chicheley, UK, 2013.
- "Quantum field theory lessons from string theory", *A Passion for Particles*, Pisa 2013.
- "Supersymmetry on curved space", *Frontiers of Mathematical Physics*, 2012 Dubna, 16-16 December 2012.
- "Backgrounds without Relativistic Invariance and Holography ", *Hatch 2012* Moscow, 11-15 June 2012.
- "Holography for 3d theories", *Holograv 2012* Swansea, 16-20 April 2012.
- "A Holographic View on Supersymmetry in Curved Space ", *Workshop on Supersymmetry, Quantum Gravity and Gauge Fields*, Scuola Normale Superiore, PISA, 12-14 Settembre 2012.
- "Supersymmetry on curved spaces and holography" , *Institute d'ete* (20 - 31 agosto 2012), Ecole Normale, Parigi.
- "Massive type IIA and strong coupling ", *Crete Conference On Gauge Theories And The Structure Of Spacetime*, 11-18 September 2010.
- "Aspects of Gauge/Gravity Dualities ", *XIX SIGRAV Conference*, Pisa, September 27-October 1, 2010.
- "Chern-Simons Theories and Their Supergravity Duals", *Miniworkshop String Theory*, Oviedo, 27th May 2009.
- "The master space of N=1 gauge theories", *Continuous Advances in QCD (CAQCD-08)*, Minneapolis, May 15-18, 2008.
- "Chiral Rings and Generating Functions for Superconformal Gauge Theories", *Solvay Workshop "Gauge Theories, Strings and Geometry"*, Brussels, 9-11 May 2007.
- "Aspects of the N=1 AdS/CFT correspondence", *QCD and String Theory*, July 2-8, 2006. Ringberg Castle, Munich .
- "Mesons and Baryons in N=1 AdS/CFT", *Interactions Fondamentales et la Structure de L'espace-temps*, Ecole Normale Superieure, Paris, 14-25 Agosto 2006.

*Invited participation to long international scientific programs, 2006- (and corresponding seminars):*

- "Twisted compactifications, holography and localisation", Mainz Institute for Theoretical Physics, nel contesto del programma "Holography, Generalized Geometry and Duality", 6-17 May 2019.
- "Entropy counting for AdS4 black holes", Galileo Galilei Institute in Florence, nel contesto del programma: "Supergravity: What next?", 05/16 - 28/10/16.
- "Entropy of AdS4 black-holes in M-theory from 3d gauge theories", CERN nel contesto del TH Institute, "Recent Developments in M-theory" 8-18 Febbraio 2016.
- "M theory black holes and 3d gauge theories", Mainz Institute for Theoretical Physics, nel contesto del programma "Stringy Geometry", 14-25 Settembre 2015.
- "Twisted index of 3d gauge theories", entro la Conferenza "Gauge/Gravity duality 2015" nel contesto del programma "Holographic Methods for Strongly Coupled Systems", 09/03 - 30/04/2015 Galileo Galilei Institute in Firenze.
- "Massive type IIA and strong coupling", Galileo Galilei Institute in Florence, nel contesto del programma: AdS4/CFT3 and the Holographic States of Matter, 30/08 - 05/11/2010.
- "Chern-Simons theories and the AdS4/CFT3 correspondence", Galileo Galilei Institute in Florence, nel contesto del programma: New Perspectives in String Theory, 06/04 - 19/06/2009.
- "Counting BPS states in conformal gauge theories", Isaac Newton Institute for Mathematical Sciences, Cambridge, ottobre 2007 nel contesto del programma: Strong Fields, Integrability and Strings 23/7 - 21/12/2007.
- "Sasaki-Einstein manifold and AdS/CFT", Galileo Galilei Institute in Florence, nel contesto del programma: String and M theory approaches to particle physics and cosmology, 19/03 - 22/06/2007.
- "Branes at singularities", Galileo Galilei Institute in Florence, nel contesto del programma: New Directions Beyond the Standard Model in Field and String Theory, 02/05 - 30/06/2006.

*Organizations of conferences:*

- Member of the advisory board for the INFN string conferences: TFI 2010 Perugia, TFI 2012 Trieste e TFI 2015 Napoli.
- Member of the advisory board for Eurostrings 2022, 2023 and 2024.



- Convener in HEP2005, Lisbona; co-organizer Frontier Science 2005, Milano-Bicocca; member of the scientific board for Solvay workshop "Gauge Theories, Strings and Geometry" 2007; member of the scientific board for the conference "Exact Quantum Fields and the Structure of M-theory", Heraklion, Crete, 2014;
- Co-organizer of the workshop "Large-N Gauge Theories", Galileo Galilei Institute, Firenze, 04/04 - 17/06/2011.
- Co-organizer of the workshop and school "Supersymmetric Localization, Holography and Related Topics", ICTP, Trieste Luglio 2018.
- Co-organizer of the Zoom Fall Seminar Series: Supersymmetric Black Holes, Holography and Microstate Counting, Simons Center, Stonybrook, october and november 2020.
- Co-organizer of the Workshop "Quiver, Calabi-Yau three-folds and DT invariants", Sorbonne U, Parigi Aprile 2022.
- Co-organizer of the conference "Supersymmetric Black Holes, Holography and Microstate Counting", Simons Center, Stonybrook, novembre 2022.
- Co-organizer of the PRIN 2022 workshop in Trieste, september 2022

## 11 Research interests

- Quantum Field Theories.
- Quantum Gravity.
- Gauge Theories and String Theories, in particular their non-perturbative properties.

## 12 Bibliometry:

- INSPIRE database (standard database for high energy physics): h index = 60, about 9300 citations, average 84, with 2 papers with more than 500 citations, 3 papers with more than 250, 22 papers with more than 100 and 42 papers with more than 50

<https://inspirehep.net/literature?sort=mostrecent&size=25&page=1&q=f%20a%20zaffaroni%2Ca&ui-citation-summary=true>

- Google Scholar: 10800 citations, h index = 63

<https://scholar.google.com/citations?user=GpxCB-UAAAAJ&hl=en>

Updated December 2024.

## 13 Lista delle Pubblicazioni:

List of papers and preprints with original material. The complete and updated list with citations from the databases Inspire e Google Scholar can be always found on:

[virgilio.mib.infn.it/~zaffaron](http://virgilio.mib.infn.it/~zaffaron)

## References

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