

# Curriculum Vitæ

Nome : **Laura Maria Andrianopoli**  
Nazionalità : Italian  
Birth date and place: 8 January 1969, Turin (Italy)  
Present position: from 01/12/2014 Associate Professor  
at DISAT, Politecnico di Torino  
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## Area of Research

Theoretical particle physics, more specifically supergravity, supersymmetry and quantum gravity.

## Academic career

- 1/11/2007 - 30/11/2014: Assistant Professor at Politecnico di Torino
- from 1/12/2014: Associate Professor at Politecnico di Torino

## Education and Qualifications

- July 1994: *Laurea* in Laurea in Fisica Teorica presso l'Università di Torino (110/110 e Lode). Supervisor: Prof. Ferdinando Gliozzi; Co-Supervisor: Prof. Riccardo D'Auria  
Title of the Thesis: "A new representation for the coupling of scalar fields to supergravity"
- 1994 - 1997: Ph.D. course in Physics at Università di Genova. Supervisor: Prof. C. Imbimbo; Co-Supervisor: Prof. R. D'Auria  
Title of Ph.D. Thesis: "U-duality in supergravity theories and extremal black holes"

## Previous employments

- 1/11/2004 - 31/10/2007: New-Talent Grant of "Museo Storico della Fisica e Centro Studi e Ricerche Enrico Fermi"
- 1/11/2002 - 31/10/2004: Fellow of Th-Division at CERN, Geneva
- 1/09/2000 - 31/10/2002: Post-Doctoral position at Politecnico di Torino
- 1/10/1998 - 31/08/2000: Post-Doctoral position at the Th-Division of "K.U.Leuven", in Belgium, under the EU project: TMR ERBFMRXCT96-0045

- 15/02/1998 - 30/09/1998: “Angelo Della Riccia” Fellowship at Th-Division of CERN, Geneva

### **Prizes and awards:**

- 2016: National Scientific Qualification as Full Professor for the S.C. 02/A2 (Theoretical Physics and Fundamental Interactions)
- 2012: National Scientific Qualification as Associate Professor for the S.C. 02/A2 (Theoretical Physics and Fundamental Interactions)
- Honored by “Le Scienze” (Italian edition of Scientific American) and Italian President 2006 medal. Motivation: “for the internationally recognized level of her researches in supergravity”.

### **Invited seminars in the last 10 years:**

- Invited speaker at XXIX International Conference on Supersymmetry and Unification of Fundamental Interactions, to be held at University of Ioannina (Greece) from 27/06 to 2/07 2022. Title of the seminar “Superspace approach to the M5-brane”
- Unconventional supersymmetry and AdS<sub>4</sub> supergravity, at the on-line conference YOUNGST@RS - Supergravity and Holography, Mainz Institute for Theoretical Physics, 13 - 15/12/2021
- “Unconventional supersymmetry at the boundary of AdS<sub>4</sub> supergravity”, at the conference “Workshop in celebration of 65 years of Toine”, at K.U.Leuven, Belgio, 17/09/2018
- “Hidden symmetries of supersymmetric Free Differential Algebras”, at the conference “Holography and Supergravity 2018”, presso Universidad A. Ibanez, Vina del Mar, Chile, 8 - 12/01/2018
- “Hidden Gauge Structure of Supersymmetric Free Differential Algebras”, at the Conference “Supergravity at 40”, at GGI, Firenze. 26 - 28/10/2016
- “Multi-field Born-Infeld and Supergravity” at the Conference “The VII Round Table Italy- Russia@Dubna”, Dubna, Russia. from 24 - 28/11/2015
- “On boundary properties of gauged supergravities”, at the conference “New Frontiers in Theoretical Physics”, Cortona, 28-31 May 2014
- “On Stationary Black Holes in Four Dimensions”, at the University A. Bello of Santiago del Chile, at the University of Concepcion, at the Pontificia Universidad Católica de Valparaso, Chile, November 2013
- “Type IIB supergravity compactification on  $K3 \times T_2/Z_2$ ”, at University Roma Tor Vergata, November 2012

## Organizational Activity:

- Colloquium by Sergio Ferrara, winner of the Special Breakthrough Prize 2020, 20/01/2020.
- International conference “A String concert in Torino - A Meeting on Supergravity and Superstrings on the Occasion of Riccardo D’Auria’s 70th Birthday, at Politecnico di Torino, 22-23/04/2010.
- Colloquium on the experiment LHC at CERN, held at Politecnico di Torino the 15/01/2009.
- Inventor of the format (in collaboration with P.A. Grassi and G. Dall’Agata) of “Avogadro Meeting on Theoretical Physics” and organizer of the first 3 editions (2005 - 2006 - 2007), at Facoltà di Scienze MM.FF.NN. dell’Università del Piemonte Orientale (the format was appreciated and the meeting continues on an annual basis).

## Teaching Activity

- Teaching in Graduate Courses of Italian Universities:
  - Physics 2 at Politecnico di Torino, A.A. 2007-08, 2020-21, 2021-22
  - Physics 1 at Politecnico di Torino, A.A. 2008-09, 2011-12, 2012-13, 2013-14, 2014-15, 2015-16, 2016-17, 2017-18, 2018-19.
  - Exercises and laboratory sessions at course Physics 1 at Politecnico di Torino, A.A. 1996-97 and 2010-11
- Teaching in Ph.D. Courses:
  - “Elements of Field Theory” at Politecnico di Torino A.A. 2018-19, 2020-21
  - “Elements of Quantum Electrodynamics” at Politecnico di Torino A.A. 2014-15
  - “Introduction to supersymmetry”, at Politecnico di Torino, on a bi-annual basis until 2013.
  - “Minicourse On Black Holes and Supergravity”, at the University A. Bello of Santiago del Chile, at the University of Concepcion and at the Pontificia Universidad Católica de Valparaiso, in Chile, November 2013
  - Minicourse on “Supergravity in 4 dimensions” at the Ph.D. course in Physics at the University of Milano, A.A. 2002-2003;
  - Course on “Electric-magnetic duality in supersymmetric theories” at the Ph.D. course in Physics at the University of Torino, A.A. 2000-01;
  - Course of “Constrained Dynamics” at the Ph.D. course in Theoretical Physics at the University K.U.Leuven (Belgium), A.A. 1999-2000.

- Supervisor Activity:
  - Presently I am (external) tutor of the Master student at University of Torino Giuseppe Casale
  - I was tutor of the Ph.D. students Evelyn Rodriguez, Diego Molina Penafiel, Lucrezia Ravera, Riccardo Matrecano.
  - I was supervisor for the Laurea theses of the students Floriana Gargiulo and Paolo Angelino at University of Torino, A.A. 1999-2000.
  - I was (external) supervisor of the Master thesis (Laurea Magistrale) of Alessandro Milanese, at University of Torino, A.A. 2015-2016
  - I was supervisor of a two months traineeship on supergravity and supersymmetric black holes(2021), financed within Erasmus Traineeship Programme, of the Master student Oscar Arandes from Uppsala University
  - I was supervisor of the Degree thesis on quantum field theory of the Erasmus student Dana Karout at Politecnico di Torino (2015)

### **Services and charges in Italian and Foreign Universities:**

- I proposed and I was then president of the evaluation committee for the attribution of a post-doctoral position (assegno di ricerca) at Politecnico di Torino for the A.Y. 2020, then renewed for 2021 and 2022.
- I was part of the evaluation committee for the attribution of n. 8 postdoctoral positions cofinanced by Università del Piemonte orientale, Italy and CRT Foundation - (Id. 406), January 2020
- I was part of the evaluation committee of the tenure-track activity (RTDB) of Dr. Stefania Bufalino, October 2018.
- I was part of the evaluation committee for the attribution of a post-doctoral position at INFN-Torino in the INFN Fellowship Program 2012/2013 (Bando id1009).
- I was part of the evaluation committee for the Ph.D. thesis/final exam of the following students:
  - Osmin Lacombe, Université La Sorbonne, Paris, November 2021 (I was also one of the external referees for PhD his thesis). Title of the thesis: “Champs, particules, cordes et applications ‘a la cosmologie”.
  - Ruggero Noris, Politecnico di Torino, January 2021. Title of the thesis: “Aspects of Supergravity and String theory”
  - Matteo Azzola, Milan University, I was one of the external referees for the PhD thesis, November 2019. Title of the thesis: “Aspects on (super)gravity in various dimensions”
  - Lucrezia Ravera, Politecnico di Torino, February 2018, Title of the thesis: “Group Theoretical Hidden Structure of Supergravity Theories in Higher Dimensions”

- Pier Vittorio Larocca, Turin University, June 2017. Title of the thesis: “D-brane Aspects in String Field Theory and String Theory”
  - Daniele Ruggeri, University of Torino, May 2017 (I was also one of the external referees for PhD his thesis). Title of the thesis: “Supergravity black holes: an algebraic perspective”
  - Evelyn Rodriguez, University of Concepcion, Chile, September 2015, title of the thesis ‘Geometric Pure and Matter Coupled Supergravity Theories”
  - Pietro Galli, University of Valencia (Spain), September 2013, title of the Ph.D. thesis: “Non supersymmetric black-hole solutions of N=2, D=4 Supergravity” .
  - Nelson Merino Moncada, University of Concepcion (Chile), March 2012, title of the Ph.D. thesis: “Non-trivial Relations Between Lie Algebras and Its Physical Applications” .
  - Felip Nadal, University of Valencia, (Spain), september 2012
  - Riccardo Nicoletti, University of Torino, November 2011, title of the Ph.D. thesis: “A Geometric Approach to Supergravity Theories”
- I was one member of the Soft-skill committee of Politecnico di Torino, to evaluate the soft-skill activities offered to PhD students in the PhD program at Politecnico di Torino, from 2016 to 2021.
  - I was a member of the Scientific Board (Collegio dei Docenti) of the PhD School in Physics at Politecnico di Torino, from 2015 to 2021.
  - I spent 2 weeks in Chile as invited Visiting Professor at CeCs Valdivia, in March 2022
  - I participated as invited scientist to the extended Workshop “Supergravity: what next?” held at GGI, Firenze, from 5/9/2016 to 28/10/2016 (3 week participation)
  - I spent 3 weeks in Chile as invited Visiting Professor at Pontificia Universidad de Valparaiso for 3 weeks, in November 2013
  - I am member of the Editorial board of the international journal “Symmetry”
  - I am referee for various scientific journals among which, recently: International Journal of High Energy Physics, Physics Reports, Nuclear Physics B, Physics Letters B, Letters in Mathematical Physics, Classical and Quantum Gravity, International Journal of Theoretical Physics.
  - I am in the register REPRISE of MIUR, as referee for Italian scientific projects FIRB and for the Rita Levi Montalcini Young Researchers Program.
  - I am referee of the National Chilean Committee for Science and Technology (CONICYT - Chile) to evaluate research projects submitted to the grant FONDECYT.

## Scientific Research Activity:

My research activity is framed in the physics of the fundamental interactions and of quantum gravity, and in particular on supergravity and superstring/M theories.

My research over the years has developed in various interrelated strands, mainly focused on the role of dualities in supersymmetric theories and in supergravity and their implications in the context of non-perturbative string theory and M-theory. I will briefly list in the following the most relevant themes and products of my research.

- A. A. The explicit construction of supersymmetric models, where, using the geometric superspace approach, I focussed on the building of new supersymmetric theories and on the analysis of gaugings of extended supergravities corresponding to new, phenomenologically interesting, vacua.
- B. The analysis of geometric and algebraic patterns underlying supergravity theories, with the aim of making manifest relationships between different theories (dualities) and investigating the global structure of superspace:
  - i) U-duality covariant formulation of extended (at least 8 supercharges) supergravities, their relations with string/M-theory compactifications and their algebraic characterization in terms of solvable Lie algebras.
  - ii) AdS/CFT correspondence
  - iii) Necessary conditions for supersymmetry breakings in supersymmetric theories and in supergravity and their dynamical realizations
  - iv) Hidden symmetries of supergravity theories in various dimensions and the global structure of superspace
  - v) Unconventional supersymmetry and the AdS<sub>4</sub> supergravity description of electronic properties of graphene-like systems.
- C. The study of black-hole solutions, where
  - i) we used the algebraic relations cited at the point B.i) below to determine the Bekenstein-Hawking entropy of extremal black holes in various models of extended supergravity;
  - ii) we understood the first-order formalism for static extremal solutions in a Hamiltonian formulation, that allowed us to clarify many properties of the fake superpotential and to find its generalization to non-extremal solutions;
  - iii) we extended the analysis to stationary black holes, finding the general solution in a large class of non-extremal black holes with the corresponding extremal limits.

According to INSPIRE-HEP, I have 82 scientific publications (65 published on international journals with referee). The total number of citations of my papers is 3,189 (2,996 referring to the published papers only), and my Hirsh factor is  $h=30$ .

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