

# Curriculum vitae et studiorum of Alessandro Giuliani

**Place and date of birth** La Spezia, 24 Ottobre 1978  
**Citizenship** Italian  
**Professional address** Dip.to di Matematica, Università di Roma Tre,  
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## Education

9/2001 Università di Roma “La Sapienza”. *Laurea* in Physics (cum laude).  
Advisor: Prof. G. Gallavotti.  
1/2005 Università di Roma “La Sapienza”. PhD in Physics.  
Advisors: Prof. G. Gallavotti and Prof. V. Mastropietro.

## Positions

9/2004 - 8/2005 Research fellow in Mathematics, University of Roma “Tor Vergata”.  
9/2005 - 12/2006 Instructor, Department of Physics, Princeton University.  
1/2007 - 3/2013 Ricercatore, Department of Mathematics, Università Roma Tre.  
Since 4/2013 Associate professor, Department of Mathematics and Physics, Università Roma Tre.  
2013 Habilitation to Full professor in Mathematical Physics  
Since 9/2017 Full professor, Department of Mathematics and Physics, Università Roma Tre.

## Prizes, Fellowships and Honours

1999 Premio *E. Persico*, Accademia Nazionale dei Lincei.  
2004 Junior Research Fellowship, Erwing Schrodinger Institute for Mathematical Physics.  
2006 Annales Henri Poincaré prize for paper (8) in the publication list.  
2009 Winner of an ERC Starting Grant for the project  
*Collective Phenomena in Classical and Quantum Many Body Systems*.  
2009 Nominated Scientific Secretary of the Center for Mathematical and Theoretical Physics  
2011 Premio *A. Di Braccio* for physics, Accademia Nazionale dei Lincei.  
2012 IUPAP Young Scientist Prize  
2014 – Co-Editor-in-Chief of *Mathematical Physics, Analysis and Geometry*  
2014 – Associate editor of *Journal of Statistical Physics*  
2015 Executive Committee of the *International Association of Mathematical Physics*, Elected Member  
2015 Premio *B. Finzi* for Mechanics, Accademia Lombarda  
2016 Winner of an ERC Consolidator Grant for the project  
*Universality in Condensed Matter and Statistical Mechanics*.

## Selected Visits

2002, 2003, 2004, 2008, 2009 Rutgers University, by invitation of Prof. Joel L. Lebowitz.  
2007, 2008, 2009, 2015 Princeton University, by invitation of Prof. Elliott H. Lieb.  
2008, 2014 Max Plank Institute for Mathematics, Leipzig, by invitation of Prof. S. Müller and F. Otto.  
2009, 2012 Hausdorff Center for Mathematics, Bonn, by invitation of Prof. S. Müller and B. Schlein.  
2010 Institute des Hautes Etudes Scientifiques, France, by invitation of Prof. Joel L. Lebowitz.  
2011, 2013 Institute for Advanced Studies, Princeton, USA, by invitation of Prof. Thomas Spencer.  
2014 McGill University, Canada, by invitation of Prof. V. Jaksic.  
2015-2016 Univ. Lyon-1, France, sabbatical semester.

## Selected Invited Talks

- 2003, *Coupled Map Lattices*, IHP, Paris.
- 2003, 2004, 2005, 2007, 2008, 2009, 2013, 2015, 2016 Math Phys Seminar, Rutgers Univ.
- 2003, 2006, 2008, 2009, 2013, 2015, 2016 Math Phys Seminar, Princeton Univ.
- 2004, Erwing Schrödinger Institute for Mathematical Physics, Vienna, Austria, Junior Fellow Seminar.
- 2005, *Dynamics and fluctuations in extended systems*, IHP, Paris.
- 2006, 2011 Workshop “The Rigorous Renormalization Group”, Oberwolfach, Germany.
- 2007, StatPhys23, Genova.
- 2008, Theoretical Physics Seminar, Washington Univ. in St. Louis.
- 2008, SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia.
- 2008, 99th Statistical Mechanics Meeting, Rutgers Univ.
- 2009, Séminaire de Physique Théorique, LPhT/ENS/Paris.
- 2009, 101st Statistical Mechanics Meeting, Rutgers Univ.
- 2009, XVI International Congress on Mathematical Physics, Prague.
- 2010, Les Houches summer school of physics.
- 2010, QMath11, Hradec Kralove, Czech Republic (Plenary Speaker).
- 2011, M<sup>3</sup>Q, Bressanone, Italy, (Plenary Speaker).
- 2011, Graphita, L’Aquila, Italy (Keynote Speaker).
- 2012, Centre de Recherches Mathématiques, Montreal CA, Workshop on Quantum Many Body Systems
- 2012, ICMP12, Aalborg, Denmark.
- 2013, CIRM Marseille, France, Conference on Equilibrium statistical mechanics
- 2013, 109th Statistical Mechanics Meeting, Rutgers Univ. (Invited Speaker).
- 2013, Analytical Aspects of Mathematical Physics, ETH Zurich.
- 2013, Utrecht, The Netherlands, Mark Kac Seminar.
- 2014, Warwick, UK, Workshop on Many-Body Quantum Systems.
- 2014, Roma, Italy, Accademia Nazionale dei Lincei, Amaldi-Levi Civita day.
- 2014, GSSI L’Aquila, Italy, Workshop on From Atomistic to Continuum Models in Materials Science
- 2014, Fields Institute, Toronto, Canada, Conference on Nonlinearity, Transport, Physics, and Patterns
- 2015, 2016 IHP Paris, France, Workshop on Inhomogeneous Random Systems
- 2016, StatPhys26, Lyon, France
- 2016, QMath13, Atlanta, Georgia USA (Plenary Speaker)
- 2017, Mathematical Congress of the Americas, Montreal, Canada
- 2017, 118th Statistical Mechanics Meeting, Rutgers Univ., USA
- 2018, International Congress on Mathematical Physics, Montreal, Canada (Plenary Speaker)

## Teaching

- Fall 2005, Fall 2006: Instructor for the course of Physics 103 (General Physics I), Princeton University.
- Spring 2006, Spring 2007: Instructor for the course of Physics 104 (General Physics II), Princeton University.
- Fall 2007: Advanced calculus (Analisi 2), Department of Physics, Università Roma Tre.
- Spring 2008: PhD Minicourse: “The Bose gas”, Università Roma Tre e Tor Vergata.
- Fall 2008, Fall 2009: Introductory Calculus (Matematica I), Department of Geology, Università Roma Tre.
- Fall 2008: Partial Differential Equations, Department of Physics, Università Roma Tre.
- Fall 2009, Spring 2011, Spring 2013, Fall 2013: Statistical Mechanics, Department of Mathematics, Università Roma Tre.
- Fall 2011, 2012, 2013: Analytical mechanics, Department of Mathematics, Università Roma Tre.
- Spring 2015, 2017, 2018: Analytical mechanics, Dept. of Mathematics and Physics, Università Roma Tre.
- Spring 2015, 2017, 2018: Advanced analytical mechanics, Dept. of Mathematics and Physics, Università Roma Tre.

• Thesis advisor for several undergraduate and PhD theses in mathematics and physics. Mentor for several postdoc within the ERC CoMBoS Project. **Master** students: S. Del Vecchio, M. Marcozzi, P. Milanese, E. Pulvirenti. **PhD** students: G. Antinucci, G. Cava, S. Cenatiempo, I. Jauslin, M. Porta. **Postdocs**: R. Greenblatt, M. Correggi, Z. Wang, N. Benedikter, S. Sotiriadis, D. Monaco.

## Editorial and organizational activities

- Principal Investigator of the ERC Consolidator Grant *Universality in Condensed Matter and Statistical Mechanics* (Funding: 1,235,000 Euros). Duration: 2017–2021.
- Member of the Executive Committee of the *International Association of Mathematical Physics*
- Scientific Secretary of the *Tullio Levi Civita International Center for Mathematics and Theoretical Physics* (CMTP)
- Scientific Director of the CIME summer school 2010 *Quantum Many Body Systems*, Cetraro, Italy.
- Member of the organizing committee of the international conference *Seminal Interactions between Mathematics and Physics*, Accademia Nazionale dei Lincei, Roma, Italy, September 22-25, 2010.
- Member of the organizing committee of the international conference *Mechanics: classical, statistical and quantum*, Università di Roma Sapienza, 2-5 Luglio 2012.
- *Mathematics and Quantum Physics*, Accademia Nazionale dei Lincei, Roma, Italy, July 8-12, 2013.
- Organizer of the Symposium on *Phase Transition*, International Conference on Applied Mathematics, Heraklion, Crete, Greece, September 16-20, 2013.
- Organizer of the international conference *Solid Math*, SISSA Trieste, Italy, June 16-18, 2014.
- Organizer of the international conference *Selected Problems in Mathematical Physics*, La Spezia, Italy, September 1-5, 2014.
- Organizer of the INdAM intensive research period: *Mathematics and Physics at the crossroads*, Roma, Italy, June 6 to September 30, 2016.
- Organizer of the EMS-IAMP Summer School in Mathematical Physics: *Universality, Scaling Limits and Effective Theories*, Roma, Italy, July 11-15, 2016.
- Organizer of the EMS-IAMP Summer School in Mathematical Physics: *Universality in Probability Theory and Statistical Mechanics*, Ischia, Italy, June 11-15, 2018.
- Associate Editor of *Journal of Statistical Physics*.
- Co-Editor-in-Chief of *Mathematical Physics, Analysis and Geometry*.
- Referee for the following journals: *Communications in Mathematical Physics*, *Communications on Pure and Applied Analysis*, *Journal of Mathematical Physics*, *Journal of Physics A*, *Journal of Statistical Physics*, *Modern Physics Letters B*, *Physical Review B*, *Physical Review E*, *Physical Review Letters*, *Reviews in Mathematical Physics*, ...

## Publications

- 1) G. Benfatto, A. Giuliani, V. Mastropietro: “Low Temperature Analysis of Two-Dimensional Fermi Systems with Symmetric Fermi Surface”, *Annales Henri Poincaré* **4**, Num. 1, 137–193 (2003).
- 2) F. Bonetto, P. Falco, A. Giuliani: “Analyticity of the SRB measure of a lattice of coupled Anosov diffeomorphisms of the torus”, *Journal of Mathematical Physics* **45**, Num. 8, 3282–3309 (2004).
- 3) A. Giuliani, V. Mastropietro: “Anomalous critical exponents in the anisotropic Ashkin–Teller model”, *Physical Review Letters* **93**, 190603 (2004).
- 4) A. Giuliani, V. Mastropietro: “Anomalous universality in the anisotropic Ashkin–Teller model”, *Communications in Mathematical Physics*, **256**, Num. 3, 681–735 (2005).
- 5) A. Giuliani, F. Zamponi, G. Gallavotti: “Fluctuation Relation beyond Linear Response Theory”, *Journal of Statistical Physics*, **119**, Num. 3–4, 909–944 (2005).
- 6) G. Gallavotti, G. Gentile, A. Giuliani: “Fractional Lindstedt series”, *Journal of Mathematical Physics* **47**, 012702 (2006).
- 7) F. Bonetto, G. Gallavotti, A. Giuliani, F. Zamponi: “Chaotic Hypothesis, Fluctuation Theorem and singularities”, *Journal of Statistical Physics*, **123**, Num. 1, 39–54 (2006).
- 8) G. Benfatto, A. Giuliani, V. Mastropietro: “Fermi liquid behavior in the 2D Hubbard model at low temperatures”, *Annales Henri Poincaré*, **7**, Num. 5, 809–898 (2006).
- 9) O. Costin, G. Gallavotti, G. Gentile, A. Giuliani: “Borel summability and Lindstedt series”, *Communications in Mathematical Physics*, **269**, Num. 1, 175–193 (2007).
- 10) F. Bonetto, G. Gallavotti, A. Giuliani, F. Zamponi: “Fluctuations relation and external thermostats: an application to granular materials”, *Journal of Statistical Mechanics: theory and experiment*, P05009 (2006).

- 11) A. Giuliani, J. L. Lebowitz, E. H. Lieb: “Ising models with long-range dipolar and short range ferromagnetic interactions”, *Physical Review B*, **74**, 064420 (2006).
- 12) A. Giuliani: “Ground state energy of the low density Hubbard model. An upper bound”, *Journal of Mathematical Physics* **48**, 023302 (2007).
- 13) A. Giuliani and T. Rothman: “Absolute Stability Limit for Relativistic Charged Spheres”, *Gen. Relat. Grav.* **40**, 1427-1447 (2008).
- 14) A. Giuliani, J. L. Lebowitz and E. H. Lieb: “Striped phases in two dimensional dipole systems”, *Phys. Rev. B* **76**, 184426 (2007).
- 15) A. Giuliani, J. L. Lebowitz and E. H. Lieb: “Periodic minimizers in 1D local mean field theory”, *Comm. Math. Phys.* **286**, 163-177 (2009)
- 16) A. Fathi, A. Giuliani, A. Sorrentino: “Uniqueness of Invariant Lagrangian Graphs in a Homology or a Cohomology Class”, *Ann. Sc. Normale Sup. Cl. Sc.* **8**(4), 659-680 (2009).
- 17) A. Giuliani: “Long range order for lattice dipoles”, *Jour. Stat. Phys.* **134**, 1059-1070 (2009).
- 18) A. Giuliani and R. Seiringer: “The ground state energy of the weakly interacting Bose gas at high density”, *Jour. Stat. Phys.* **135**, 915-934 (2009).
- 19) A. Giuliani and V. Mastropietro: “The 2D Hubbard model on the honeycomb lattice”, *Comm. Math. Phys.* **293**, 301-346 (2010).
- 20) A. Giuliani and V. Mastropietro: “Rigorous construction of ground state correlations in graphene: renormalization of the velocities and Ward Identities”, *Phys. Rev. B* **79**, 201403(R) (2009).
- 21) A. Giuliani, J. L. Lebowitz, E. H. Lieb: “Modulated phases of a 1D sharp interface model in a magnetic field”, *Physical Review B*, **80**, 134420 (2009).
- 22) A. Giuliani, V. Mastropietro, M. Porta: “Anomalous behavior in an effective model of graphene with Coulomb interactions”, *Annales Henri Poincaré* **11**, 1409-1452 (2010).
- 23) A. Giuliani, V. Mastropietro, M. Porta: “Lattice gauge theory model for graphene”, *Phys. Rev. B* **82**, 121418(R) (2010).
- 24) A. Giuliani, V. Mastropietro, M. Porta: “Absence of interaction corrections in the optical conductivity of graphene”, *Phys. Rev. B* **83**, 195401 (2011).
- 25) A. Giuliani, S. Müller: “Striped periodic minimizers of a two-dimensional model for martensitic phase transitions”, *Comm. Math. Phys.*, **309**, 313-339 (2012).
- 26) A. Giuliani, J. L. Lebowitz and E. H. Lieb: “Checkerboards, stripes and corner energies in spin models with competing interactions”, *Phys. Rev. B* **84**, 064205 (2011).
- 27) A. Giuliani: “The ground state construction of the two-dimensional Hubbard model on the honeycomb lattice”, in *Quantum Theory from Small to Large Scales*, Lecture Notes of the Les Houches Summer School: Volume **95**, August 2010.
- 28) A. Giuliani, V. Mastropietro, M. Porta: “Universality of conductivity in interacting graphene”, *Comm. Math. Phys.* **311**, 317-355 (2012).
- 29) G. Gallavotti, G. Gentile and A. Giuliani: “Resonances within chaos”, *Chaos* **22**, 026108 (2012).
- 30) A. Giuliani, V. Mastropietro, M. Porta: “Lattice quantum electrodynamics for graphene”, *Annals of Phys.* **327**, 461-511 (2012).
- 31) A. Giuliani, V. Mastropietro: “Exact renormalization group computation of the optical conductivity of graphene”, *Phys. Rev. B* **85**, 045420 (2012).
- 32) M. Disertori, A. Giuliani: “The nematic phase of a system of long hard rods”, *Comm. Math. Phys.* **323**, 143-175 (2013).
- 33) A. Giuliani, R. L. Greenblatt, V. Mastropietro: “The scaling limit of the energy correlations in non integrable Ising models”, *Jour. Math. Phys.* **53**, 095214 (2012).
- 34) P. Buttà, R. Esposito, A. Giuliani, R. Marra: “Froth-like minimizers of a non local free energy functional with competing interactions”, *Comm. Math. Phys.* **322**, 593-632 (2013).
- 35) M. Correggi, A. Giuliani: “The Free Energy of the Quantum Heisenberg Ferromagnet at Large Spin”, *Jour. Stat. Phys.* **149**, 234-245 (2012).
- 36) A. Giuliani, V. Mastropietro: “Universal finite size corrections and the central charge in non solvable Ising models”, *Comm. Math. Phys.* **324**, 179-214 (2013).
- 37) A. Giuliani, E. H. Lieb, R. Seiringer: “Formation of stripes and slabs near the ferromagnetic transition”, *Comm. Math. Phys.* **331**, 333-350 (2014).

- 38) A. Giuliani, E. H. Lieb, R. Seiringer: “Realization of stripes and slabs in two and three dimensions”, *Phys. Rev. B* **88**, 064401 (2013).
- 39) M. Correggi, A. Giuliani, R. Seiringer: “Validity of the spin-wave approximation for the free energy of the Heisenberg ferromagnet”, *Comm. Math. Phys.*, to appear.
- 40) M. Correggi, A. Giuliani, R. Seiringer: “Validity of spin wave theory for the quantum Heisenberg model”, *Europhys. Lett.* **108**, 20003 (2014).
- 41) S. Cenatiempo, A. Giuliani: “Renormalization theory of a two dimensional Bose gas: quantum critical point and quasi-condensed state”, *Jour. Stat. Phys.* **157**, 755-829 (2014).
- 42) A. Giuliani, V. Mastropietro, F. L. Toninelli: “Height fluctuations in interacting dimers”, *Ann. Inst. H. Poincaré Probab. Stat.* **53**, 98-168 (2017).
- 43) A. Giuliani, V. Mastropietro, F. L. Toninelli: “Height fluctuations in non-integrable classical dimers”, *Europhys. Lett.* **109**, 60004 (2015).
- 44) A. Giuliani, E. H. Lieb: “Columnar Phase in Quantum Dimer Models”, *Jour. Phys. A: Math. Theor.* **48**, 235203 (2015).
- 45) L. De Carlo, G. Gentile, A. Giuliani: “Construction of the Lyapunov spectrum in a chaotic system displaying phase synchronization”, *Math. Phys. Anal. Geom.* **19:10** (2016).
- 46) A. Giuliani, I. Jauslin: “The ground state construction of bilayer graphene”, *Rev. Math. Phys.* **28**, 1650018 (2016).
- 47) A. Giuliani, R. Seiringer: “Periodic striped ground states in Ising models with competing interactions”, *Comm. Math. Phys.* **347**, 983-1007 (2016).
- 48) A. Giuliani, I. Jauslin, E. H. Lieb: “A Pfaffian formula for monomer-dimer partition functions”, *J. Stat. Phys.* **163**, 211-238 (2016).
- 49) A. Giuliani, V. Mastropietro, M. Porta: “Universality of the Hall conductivity in interacting electron systems”, *Comm. Math. Phys.*, online first (2016), doi:10.1007/s00220-016-2714-8
- 50) A. Giuliani, I. Jauslin, V. Mastropietro, M. Porta: “Topological phase transitions and universality in the Haldane-Hubbard model”, *Phys. Rev. B* **94**, 205139 (2016).
- 51) A. Giuliani, V. Mastropietro, F. Toninelli: “Haldane relation for interacting dimers”, *J. Stat. Mech.* 034002 (2017). arXiv:1612.01274.

## Preprints

- 52) A. Giuliani: “Order, disorder and phase transitions in quantum many body systems”, arXiv:1711.06991.

Last update: February 27, 2018