Publication List Mohamed El Hedi Bahri

Address: 17 Cherry Brook Drive, Princeton, NJ, 08540

Publications And Pre-Prints

- Bahri, M. E. H., and Y. Sinai. "Statistical Mechanics of Freely Fluctuating Two-Dimensional Elastic Crystals." *Journal of Statistical Physics* 180.1 (2020): 739-748. (In honor of Joel L. Lebowitz)
- "Emergent Reflection Symmetry In Thermally Fluctuating Monoclinic Elastic Membranes". Authors: M.E.H. Bahri, S. Sarkar, A. Košmrlj.
- "Mechanical Properties of Fluctuating Elastic Membranes Under Uni-Axial Tension". Authors: M.E.H. Bahri, S. Sarkar, A. Košmrlj. - posted to the arxiv: https://arxiv.org/abs/2209.09350
- "Statistical Mechanics of Nano-Tubes". Authors: S. Sarkar, M.E.H. Bahri, A. Košmrlj. - in preparation for publication. (ready for private communication)
- "Statistical Mechanics of Odd Elastic Membranes". Authors: M.E.H. Bahri, S. Sarkar, D.A. Matoz-Fernandez, A. Košmrlj. - in preparation for publication. (ready for private communication)
- Thesis: "Thermal Fluctuations of Active and Anisotropic Elastic Membranes". - Author: M.E.H. Bahri. Adviser: Andrej Košmrlj.

Aleksei Bykov

Elenco delle pubblicazioni e della tesi di dottorato presentate con la domanda

1. A. Bykov Ultraviolet finite non-local Hamiltonian perturbation Quantum Field Theories and their weak adiabatic limit, arXiv:2211.10349
2. E. Sysoeva, A.Bykov Recurrence relation for instanton partition function in SU(N) gauge theory, JHEP 220(2023), arXiv:2209.14949.
3. A.Bykov Adiabatic limits and renormalization in quantum spacetime, tesi di dottorato in Matematica, Università degli studi di Roma “Tor Vergata”, A.A. 2019-2020

Chiara Caracciolo

Pubblicazioni

- **"Invariant KAM tori: from theory to applications to exoplanetary systems"** U. Locatelli, C. Caracciolo, M. Sansottera, M. Volpi, In: Baù, G., Di Ruzza, S., Páez, R.I., Penati, T., Sansottera, M. (eds) New Frontiers of Celestial Mechanics: Theory and Applications. I- CELMECH 2020., Springer Proceedings in Mathematics & Statistics, vol 399. Springer, Cham., 2023
- **"A numerical criterion evaluating the robustness of planetary architectures; applications to the υ Andromedæ system"**, U. Locatelli, C. Caracciolo, M. Sansottera, M. Volpi, Volume: Multi-scale (time and mass) dynamics of space objects, Proceedings IAU Symposium No. 364, A. Celletti, C. Beaugé, C. Gales, A. Lemaître, eds., 2022
- **"Librational KAM tori in the secular dynamics of the υ Andromedæ planetary system"**, C. Caracciolo, U. Locatelli, M. Sansottera, M. Volpi, Monthly Notices of the Royal Astronomical Society, 510, 2147–2166, 2022
- **"Normal form for lower dimensional elliptic tori in Hamiltonian systems"**, C. Caracciolo, Mathematics in Engineering, 4(6), 1–40, 2022
- **"Elliptic tori in FPU non-linear chains with a small number of nodes**, C. Caracciolo, U. Locatelli, Communications in Nonlinear Science and Numerical Simulation, 97, 105759, 2021
- **"On the stability in the neighborhood of invariant elliptic tori**, C. Caracciolo, Ph.D. thesis, University of Rome “Tor Vergata", 2021
- **"Computer-assisted estimates for Birkhoff normal forms**, C. Caracciolo, U. Locatelli, Journal of Computational Dynamics, 7(2), 425–460, 2020

14/04/2023

Elenco delle pubblicazioni e della tesi di dottorato di Tiziano Gaudio.

1. S. Carpi, T. G., L. Giorgetti, R. Hillier. *Haploid algebras in C*-tensor categories and the Schellekens list*. Accepted by Communications in Mathematical Physics, 2023. arXiv.org link: https://arxiv.org/abs/2211.12790

2. T. Gaudio. *On the correspondence between graded-local conformal nets and vertex operator superalgebras with applications*. PhD Thesis, Lancaster University, pp. 129, 2021. DOI: https://doi.org/10.17635/lancaster/thesis/1369

3. S. Carpi, T. G., R. Hillier. *Classification of unitary vertex subalgebras and conformal subnets for rank-one lattice chiral CFT models*. Journal of Mathematical Physics, vol. 60, issue 9, 2019. Selected as an *Editor's Pick*. DOI: https://doi.org/10.1063/1.5094581

Data

15/04/2023

Elenco delle Pubblicazioni Presentate

[1] S. Giaccari and R. Volpato, *A fresh view on string orbifolds,* JHEP **01**, 173 (2023) doi:10.1007/JHEP01(2023)173 [arXiv:2210.10034 [hep-th]].

[2] M. Cvitan, P. Dominis Prester, S. Giaccari, M. Paulišić and I. Vuković, *Gauging the higher-spin-like symmetries by the Moyal product,* JHEP **06**, 144 (2021) doi:10.1007/JHEP06(2021)144 [arXiv:2102.09254 [hep-th]].

[3] L. Bonora, M. Cvitan, P. Dominis Prester, S. Giaccari, M. Paulišić and T. Štemberga, *Axial gravity: a non-perturbative approach to split anomalies,* Eur. Phys. J. C **78**, no.8, 652 (2018) doi:10.1140/epjc/s10052-018-6141-1 [arXiv:1807.01249 [hep-th]].

[4] L. Bonora, M. Cvitan, P. Dominis Prester, S. Giaccari, M. Paulišić and T. Štemberga, *Worldline quantization of field theory, effective actions and L_∞ structure,* JHEP **04**, 095 (2018) doi:10.1007/JHEP04(2018)095 [arXiv:1802.02968 [hep-th]].

[5] L. Bonora, M. Cvitan, P. Dominis Prester, S. Giaccari and T. Štemberga, *One-loop effective actions and higher spins. Part II,* JHEP **1801**, 080 (2018) doi:10.1007/JHEP01(2018)080 [arXiv:1709.01738 [hep-th]].

[6] L. Bonora, M. Cvitan, P. Dominis Prester, A. Duarte Pereira, S. Giaccari and T. Štemberga, *Axial gravity, massless fermions and trace anomalies,* Eur. Phys. J. C **77**, no. 8, 511 (2017) doi:10.1140/epjc/s10052-017-5071-7 [arXiv:1703.10473 [hep-th]].

[7] L. Bonora, M. Cvitan, P. Dominis Prester, S. Giaccari, B. Lima de Souza and T. Štemberga, *One-loop effective actions and higher spins,* JHEP **612**, 084 (2016) doi:10.1007/JHEP12(2016)084 [arXiv:1609.02088 [hep-th]].

[8] S. Giaccari and L. Modesto, *Nonlocal supergravity,* Phys. Rev. D **96**, no. 6, 066021 (2017) doi:10.1103/PhysRevD.96.066021 [arXiv:1605.03906 [hep-th]].

[9] S. Giaccari, L. Modesto, L. Rachwał and Y. Zhu, *Finite Entanglement Entropy of Black Holes,* Eur. Phys. J. C **78**, no.6, 459 (2018) doi:10.1140/epjc/s10052-018-5942-6 [arXiv:1512.06206 [hep-th]].

[10] P. Donà, S. Giaccari, L. Modesto, L. Rachwał and Y. Zhu, *Scattering amplitudes in super-renormalizable gravity,* JHEP **1508**, 038 (2015) doi:10.1007/JHEP08(2015)038 [arXiv:1506.04589 [hep-th]].

[11] L. Bonora, S. Giaccari and B. Lima de Souza, *Trace anomalies in chiral theories revisited,* JHEP **1407**, 117 (2014) doi:10.1007/JHEP07(2014)117 [arXiv:1403.2606 [hep-th]].

[12] L. Bonora and S. Giaccari, *Weyl transformations and trace anomalies in N=1, D=4 supergravities,* JHEP **1308**, 116 (2013) doi:10.1007/JHEP08(2013)116 [arXiv:1305.7116 [hep-th]].

[13] S. G. Giaccari, *Conformal symmetry in String Field Theory and 4D Field Theories,* PhD thesis (Supervisor: Prof. Loriano Bonora)

Presentiamo qui di seguito l' elenco delle pubblicazioni e della tesi di dottorato presentate dal sottoscritto per la candidature ad un posto di ricercatore universitario a tempo determinato:

Tesi di Dottorato (2016) "Phase Transitions Theory and applications to Biophysics "

1. *Experimental detection of long-distance interactions between biomolecules through their diffusion behavior: Numerical study,* Ilaria Nardecchia,Lionel Spinelli, Jordane Preto, Matteo Gori, Elena Floriani,Sebastien Jaeger, Pierre Ferrier, and Marco Pettini. **Phys. Rev. E 90, 022703 (2014) .**
2. *Persistent Homology analysis of Phase Transitions*, Irene Donato,Matteo Gori, Marco Pettini, Giovanni Petri, Sarah De Nigris, Roberto Franzosi,Francesco Vaccarino. **Phys. Rev. E 93, 052138 (2016)**.
3. *Topological origin of phase transitions in the absence of critical points of the energy landscape*, Matteo Gori, Roberto Franzosi, Marco Pettini. **J. Stat. Mech.,9, 093204 (2018)**
4. *Out-of-equilibrium collective oscillation as phonon condensation in a model protein*, Ilaria Nardecchia, Mathias Lechelon, Jeremi Torres, Valeria Gilib- erti, Michele Ortolani, Philippe Nouvel, Matteo Gori, Irene Donato, Jordane Preto, Luca Varani, Marco Pettini. **Phys. Rev. X, 8(3), 031061 (2018)**
5. *Collective behavior of oscillating electric dipoles*, Simona Olmi, Matteo Gori, Irene Donato, Marco Pettini. **Sci. Rep. 8(1), 15748 (2018)**
6. *On the origin of Phase Transitions in the absence of Symmetry-Breaking*, Giulio Pettini, Matteo Gori, Roberto Franzosi, Cecilia Clementi, Marco Pettini. **Physica A, 516, 376-392 (2019)**
7. *Coherent Riemannian-geometric description of Hamiltonian order and chaos with Jacobi metric*, Loris Di Cairano, Matteo Gori, Marco Pettini. **Chaos 29, 123134 (2019)**
8. *Geometrical Aspects in the Analysis of Microcanonical Phase-Transitions,* Ghofrane Bel-Hadj-Aissa,MG, V. Penna, G. Pettini, R. Franzosi. **Entropy 2020, 22, 380 (2020)**
9. *Hamiltonian chaos and differential geometry of configuration space–time*, Loris Di Cairano, Matteo Gori, Giulio Pettini, Marco Pettini. **Physica D, 422, 132909 (2021).**
10. *Topology and phase transitions: A first analytical step towards the def inition of sufficient conditions*, Loris Di Cairano, Matteo Gori, Marco Pettini. **Entropy 23 (11), 1414 (2021)**
11. *Experimental evidence for long-distance electrodynamic intermolecular forces*, Mathias Lechelon, Yoann Meriguet, Matteo Gori, Sandra Ruffenach, Ilaria Nardecchia, Elena Floriani, Dominique Coquillat, Frédéric Teppe, Sébastien Mailfert, Didier Marguet, Pierre Ferrier, Luca Varani, James Sturgis, Jeremie Torres, Marco Pettini. **Sci. Adv. 8 (7), eabl5855 (2022)**
12. *Topological theory of phase transitions*, Matteo Gori, Roberto Franzosi, Giulio Pettini, Marco Pettini. **J. of Phys. A 55 (37), 375002 (2022)**

Luogo e Data: Arlon (Belgio) 15/04/2023

Il Dichiarante

List of publications

1) **Localization of Generalized Wannier Bases Implies Chern Triviality in Non-periodic Insulators** (with Massimo Moscolari and Gianluca Panati). *Annales Henri Poincaré* **24**, 895–930 (2023).
`https://doi.org/10.1007/s00023-022-01232-7`

2) **Purely linear response of the quantum Hall current to space-adiabatic perturbations** (with Domenico Monaco). *Lett. Math. Phys.* **112**, 91 (2022).
`https://doi.org/10.1007/s11005-022-01574-7`

3) **From charge to spin: analogies and differences in quantum transport coefficients** (with Domenico Monaco). *J. Math. Phys.* **63**, 072102 (2022).
`https://doi.org/10.1063/5.0089786`

4) **Improved energy estimates for a class of time-dependent perturbed Hamiltonians**. *Lett. Math. Phys.* **112**, 51 (2022).
`https://doi.org/10.1007/s11005-022-01543-0`

5) **A new approach to transport coefficients in the quantum spin Hall effect** (with Gianluca Panati and Stefan Teufel). *Annales Henri Poincaré* **22**, 1069–1111 (2021).
`https://doi.org/10.1007/s00023-020-00974-6`.

6) **Spin conductance and spin conductivity in topological insulators: analysis of Kubo-like terms** (with Gianluca Panati and Clément Tauber). *Annales Henri Poincaré* **20**, 2071–2099 (2019).
`https://doi.org/10.1007/s00023-019-00784-5`.

7) **The Haldane model and its localization dichotomy** (with Domenico Monaco, Massimo Moscolari and Gianluca Panati). *Rendiconti di Matematica e delle sue Applicazioni* **39**, 307–327 (2018).
`http://www1.mat.uniroma1.it/ricerca/rendiconti/ARCHIVIO/2018(2)/307-327.pdf`.

Ph.D. thesis

- **A mathematical analysis of spin and charge transport in topological insulators**, University of Rome, "La Sapienza" (2018). Click here to download my Ph.D. thesis.

Preprints

- **Adiabatic evolution of low-temperature many-body systems** (with R. L. Greenblatt, M. Lange, and M. Porta). Preprint available at `arXiv:2211.16836`. Submitted to *Communications in Mathematical Physics.*

22) R. Della Marca, N. Loy & M. Menale, Intransigent vs. volatile opinions in a kinetic epidemic model with imitation game dynamics, *Mathematical Medicine and Biology: A Journal of the IMA*, (2022), DOI: dqac018

21) T. Kentaro, M. Menale, G. Pisante & E. Di Maio, A design tool for core-back timing in foam injection molding, *Journal of Applied Polymer Science*, **139** (45) (2022), e53121

19) C. Bianca & M. Menale, A nonconservative-thermostat kinetic theory framework: density and linear-momentum evolution, *Applied Mathematics and Information Sciences*, **16** (5) (2022), 681—687

16) B. Carbonaro & M. Menale, Towards the dependence on parameters for the solution of the thermostatted kinetic framework, *Axioms*, **10** (2) (2021), 59

15) C. Bianca & M. Menale, Existence and uniqueness of the weak solution for a space-velocity thermostatted models, *European Physical Journal Plus*, **136** (2) (2021), 243

11) C. Bianca & M. Menale, A note on the nonequilibrium stationary state in continuous-activity thermostatted models, *Applied Mathematics and Information Sciences*, **4** (5) (2020), 755—759

9) C. Bianca, B. Carbonaro & M. Menale, On the Cauchy problem of vectorial thermostatted kinetic frameworks, *Symmetry*, **12** (4) (2020), 517

8) B. Carbonaro & M. Menale, The mathematical analysis towards the dependence on the initial data for a discrete thermostatted kinetic framework for biological systems composed of interacting entities, *AIMS Biophysics*, **7** (2020), 204 -- 218

7) C. Bianca & M. Menale, Mathematical Analysis of a Thermostatted Equation with a Discrete Real Activity Variable, *Mathematics*, **8** (1) (2020), 57

6) C. Bianca & M. Menale, On the convergence towards nonequilibrium stationary states in thermostatted kinetic models, *Mathematical Methods in the Applied Sciences*, (**42**) (18) (2019), 6624--6634

5) C. Bianca& M. Menale, Existence and uniqueness of nonequilibrium stationary solutions in discrete thermostatted models, *Communications in Nonlinear Science and Numerical Simulation*, (**73**) (2019), 25—34

3) C. Bianca & M. Menale, On the interaction domain reconstruction in the weighted thermostatted kinetic framework, *European Physical Journal Plus*, **134** (4) (2019), 143

Eugenio Pozzoli

List of 12 scientific publications attached and Ph.D. thesis

Journal articles

1. **Quantum geometric confinement and dynamical transmission in Grushin cylinder**, *M.Gallone, A.Michelangeli, E.Pozzoli*, Reviews in Mathematical Physics, Vol. 34, No. 7 (2022) 2250018 (91 pages) arXiv DOI.
2. **Quantum confinement for the curvature Laplacian $-\Delta + cK$ on 2D-almost-Riemannian manifolds**, *I.Beschastnyi, U.Boscain, E.Pozzoli*, Potential Analysis, vol. 58, pp. 441-464, (2023) arXiv DOI.
3. **Classical and quantum controllability of a rotating symmetric molecule**, *U.Boscain, M.Sigalotti, E.Pozzoli*, SIAM Journal on Control and Optimization, 59 (2021), page 156-184. arXiv DOI.
4. **Classical and quantum controllability of a rotating asymmetric molecule**, *E.Pozzoli*, Applied Mathematics and Optimization, 85 (2022), page 1-27. arXiv DOI.
5. **Full Quantum Control of Enantiomer-Selective State Transfer in Chiral Molecules Despite Degeneracy**, *M.Leibscher, E.Pozzoli, C.Pérez, M.Schnell, M.Sigalotti, U.Boscain, and C.P.Koch*, Communications Physics 5, 110 (16 pages) (2022) arXiv DOI.
6. **Lie algebra for rotational subsystems of a driven asymmetric top**, *E.Pozzoli, M.Leibscher, M.Sigalotti, U.Boscain, C.P.Koch*, Journal of Physics A: Mathematical and Theoretical 55, 215301 (16 pages) (2022) arXiv DOI.
7. **Small-time bilinear control of Schrödinger equations with application to rotating linear molecules**, *T.Chambrion, E.Pozzoli*, Automatica (to appear), 8 pages arXiv Acceptation letter.
8. **Single-input perturbative control of a quantum symmetric rotor**, *T.Chambrion, E.Pozzoli*, IEEE Control Systems Letters, vol.6, pp. 2425-2430 (2022) arXiv DOI.
9. **On geometric quantum confinement in Grushin-type manifolds**, *M.Gallone, A.Michelangeli, E.Pozzoli*, Z. Angew. Math. Phys., 70 (17 pages) (2019). arXiv DOI.

Proceedings

10. **Reachable sets for a 3D accidentally symmetric molecule**, *U. Boscain, M. Sigalotti, E.Pozzoli*, IFAC-PapersOnLine, 53, 2, 21st IFAC World Congress (2020), page 1943-1948 hal DOI.

Book chapters

11 **Heat equation with inverse-square potential of bridging type across two half-lines**, *M.Gallone, A.Michelangeli, E.Pozzoli*, In: Georgiev, V., Michelangeli, A., Scandone, R. (eds) Qualitative Properties of Dispersive PDEs., INdAM 2021. Springer INdAM Series, vol 52. Springer, Singapore. pp 141-164 arXiv DOI.

12 **Quantum confinement in α-Grushin planes**, *E.Pozzoli*, In: Michelangeli, A. (eds) Mathematical Challenges of Zero-Range Physics, Springer-INdAM series, vol.42, page 229-238 (2020) arXiv DOI.

PhD Thesis

13 **Some problems of evolution and control in quantum mechanics**, *PhD thesis, Sorbonne University and Inria Paris. Hal: tel-03482146, version 1*.

Pubblicazioni Presentate

1. L. G. Córdova, S. Negro and F. I. Schaposnik
   "*Thermodynamic Bethe ansatz past turning points: the (elliptic) sinh-Gordon model*",
   JHEP **2201** (2022) 035; Pre-print: https://arxiv.org/abs/2110.14666.
2. G. Camilo, T. Fleury, M. Lencsés, S. Negro and A. B. Zamolodchikov
   "*On factorizable S-matrices, generalized TTbar, and the Hagedorn transition*",
   JHEP **2110** (2021) 062; Pre-print: https://arxiv.org/abs/2106.11999.
3. P. Dorey, C. Dunning, S. Negro and R. Tateo
   "*Geometric aspects of the ODE/IM correspondence*",
   J. Phys. **A53** (2020) 22, 223001; Pre-print: https://arxiv.org/abs/1911.13290.
4. G. Hernández-Chifflet, S. Negro and A. Sfondrini
   "*Flow equations for generalized $T\overline{T}$ deformations*",
   Phys. Rev. Lett. **124** (2020) 20, 200601; Pre-print: https://arxiv.org/abs/1911.12233.
5. R. Conti, S. Negro and R. Tateo
   "*Conserved currents and $T\overline{T}_s$ irrelevant deformations of 2D integrable field theories*",
   JHEP **1911** (2019) 120; Pre-print: https://arxiv.org/abs/1904.09141.
6. R. Conti, S. Negro and R. Tateo
   "*The $T\overline{T}$ perturbation and its geometric interpretation*",
   JHEP **1902** (2019) 085; Pre-print: https://arxiv.org/abs/1809.09593.
7. R. Conti, L. Iannella, S. Negro and R. Tateo
   "*Generalised Born-Infeld models, Lax operators and the $T\overline{T}$ perturbation*",
   JHEP **1811** (2018) 007; Pre-print: https://arxiv.org/abs/1806.11515.
8. N. Gromov, V. Kazakov, G. Korchemsky, S. Negro and G. Sizov
   "*Integrability of donformal fishnet theory*",
   JHEP **1801** (2018) 095; Pre-print: https://arxiv.org/abs/1706.04167.
9. A. Cavaglià, S. Negro, I.M. Szécsényi and R. Tateo
   "*$T\overline{T}$-deformed 2D quantum field theories*",
   JHEP **1610** (2016) 112; Pre-print: https://arxiv.org/abs/1608.05534.
10. S. Negro
    "*On sinh-Gordon thermodynamic Bethe ansatz and fermionic basis*",
    Int. J. Mod. Phys. **A29** (2014) 20, 1450111; Pre-print: https://arxiv.org/abs/1404.0619.
11. S. Negro and F. Smirnov
    "*On one-point functions for sinh-Gordon model at finite temperature*",
    Nucl. Phys. **B875** (2013) 166-185; Pre-print: https://arxiv.org/abs/1306.1476.
12. P. Dorey, S. Faldella, S. Negro and R. Tateo
    "*The Bethe ansatz and the Tzitzéica-Bullough-Dodd equation*",
    Phil. Trans. Roy. Soc. Lond. **A371** (2013) 20120052; Pre-print: https://arxiv.org/abs/1209.5517.

Giuseppe Scola

List of publications

G. Scola	Local moderate and precise large deviations via cluster expansions. Journal of Statistical Physics, 2021, 183: 1-25. https://link.springer.com/article/10.1007/s10955-021-02740-2
G. Scola	Cluster expansion for the Ising model in the canonical ensemble. Mathematical Physics, Analysis and Geometry, 2021, 24: 1-33. https://link.springer.com/article/10.1007/s11040-021-09377-3
G. Scola	PhD Thesis: Applications of Cluster Expansion. https://iris.gssi.it/handle/20.500.12571/21994
M. Gianfelice, G. Scola	The consensus problem for opinion dynamics withlocal average random interactions Submitted for publication Preprint: https://arxiv.org/pdf/2204.05689.pdf
T. X. Nguyen, G. Scola, D. Tsagkarogiannis	Free energy expansions for renormalized systems with applications to colloids In preparation.
A. Giuliani, V. Mastropietro, S. Rychkov, G. Scola	Non-trivial fixed point of a ϕ_d^4 fermionic theory: critical exponents In preparation.

Luca Suriano

Elenco delle pubblicazioni

2010:

Tesi di Dottorato: L. Suriano (candidato), D. Guido (supervisore). *A quantum distance for noncommutative measure spaces and an application to quantum field theory*.

2017:

Articolo su rivista: D. Guido, N. Marotta, G. Morsella, L. Suriano. *A Gromov-Hausdorff distance between von Neumann algebras and an application to free quantum fields*, Journal of Functional Analysis v.272 n.8 (2017), pp.3238-3258 [D.O.I.: 10.1016/j.jfa.2016.12.029].

2017:

Articolo in atti di convegno: D. Guido, N. Marotta, G. Morsella, L. Suriano. *A quantum distance between von Neumann algebras and applications to quantum field theory*, Proceedings of the MG14 Meeting on General Relativity, University of Rome "La Sapienza", Italy, 12 - 18 July 2015 (2017), pp.3870-3875 [D.O.I.: 10.1142/9789813226609_0513].

2018:

Articolo su rivista: F. Fidaleo, L. Suriano. *Type III representations and modular spectral triples for the noncommutative torus*, Journal of Functional Analysis v.275 n.6, pp.1321-1602 [D.O.I.: 10.1016/j.jfa.2018.06.009].

Ekaterina Sysoeva

Inspirehep: E.Sysoeva.1 | arxiv.org: sysoeva_e_1

Elenco delle pubblicazioni

1. E. Sysoeva & A. Bykov. (2023) *Recurrence relation for instanton partition function in SU(N) gauge theory*. J. High Energ. Phys., 220
   https://doi.org/10.1007/JHEP03(2023)220

2. G. Bonelli, F. Fucito, J. F. Morales, M. Ronzani, E. Sysoeva, A. Tanzini. (2021). *Gauge theories on compact toric manifolds*. Letters in Mathematical Physics. 111.
   https://doi.org/10.1007/s11005-021-01419-9

3. E. Sysoeva. (2018). *Wilson Loop and Its Correlators in the Limit of Large Coupling Constant.* Nuclear Physics B 936, 383–99.
   https://doi.org/10.1016/j.nuclphysb.2018.09.015

4. E. Sysoeva. (2018). *Wilson loops and its correlators with chiral operators in $\mathcal{N} = 2, 4$ SCFT at large N*. J. High Energ. Phys., 155.
   https://doi.org/10.1007/JHEP03(2018)155

Publications unrelated to the application

1. E. Sysoeva, E. Gusakov, L. Simonchik, M. Usachenok. (2016). *Low-threshold parametric excitation of the upper hybrid wave in experiments on electron-cyclotron resonance heating by an ordinary wave*. Plasma Phys. Rep. 42 647.
   https://doi.org/10.1134/S1063780X16070114

2. E. Sysoeva, F. da Silva, E. Gusakov, S. Heuraux, A. Popov. (2015). *Electron cyclotron resonance heating beam broadening in the edge turbulent plasma of fusion machines*. Nucl. Fusion 55 033016.
   https://doi.org/10.1088/0029-5515/55/3/033016

3. E. Sysoeva, F. da Silva, E. Gusakov, S. Heuraux, A. Popov. (2014) AIP Conf. Proc. 1580, 522.
   https://doi.org/10.1063/1.4864603

4. E. Sysoeva, E. Gusakov, S. Heuraus. (2013). *Transition into diffusive regime of propagation of probing electromagnetic waves in a turburlent inhomogeneous plasma and limitations for microwave reflectometry in reactor scale devices*. Plasma Phys. Control. Fusion 55 115001.
   https://doi.org/10.1088/0741-3335/55/11/115001

Elenco delle pubblicazioni - Romina Travaglini

[1] Marzia Bisi, Maria Groppi, Giorgio Martalò, and Romina Travaglini. Optimal control of leachate recirculation for anaerobic processes in landfills. *Discrete & Continuous Dynamical Systems-Series B*, 26(6), 2021.

[2] Marzia Bisi and Romina Travaglini. A BGK model for mixtures of monoatomic and polyatomic gases with discrete internal energy. *Physica A: Statistical Mechanics and its Applications*, 547:124441, 2020.

[3] Marzia Bisi and Romina Travaglini. A kinetic BGK relaxation model for a reacting mixture of polyatomic gases. In *Recent Advances in Kinetic Equations and Applications*, pages 69–92. Springer, 2021.

[4] Marzia Bisi and Romina Travaglini. Reaction-diffusion equations derived from kinetic models and their turing instability. *Communications in Mathematical Sciences*, 20(3):763–801, 2022.

[5] Marzia Bisi and Romina Travaglini. BGK model for a mixture with two reversible reactions. In *From Kinetic Theory to Turbulence Modeling. The Legacy of Carlo Cercignani.* Springer, 2023 To be released.

[6] João Oliveira, Ana Jacinta Soares, and Romina Travaglini. Kinetic models leading to pattern formation in the response of the immune system. *special issue of Rivista di Matematica della Università di Parma in memory of Giampiero Spiga*, **Accepted for publication, editors letter included**.

[7] Romina Travaglini. *BGK Models and Reaction-Diffusion Equations for Reacting Mixtures of Monatomic and Polyatomic Gases.* PhD thesis, Universitá degli studi di Modena e Reggio Emilia, 2022.

Publications presented for evaluation

April 17, 2023

1. F. Ares, M. Rajabpour and J. Viti, *Exact full counting statistics for the staggered magnetization and the domain walls in the XY spin chain*, Phys. Rev. E 103, 042107 (2021).

2. F. Ares and J. Viti, *Emptiness formation probability and Painlevé V equation in the XY spin chain*, J. Stat. Mech. 1 013105 (2020).

3. G. Gori and J. Viti, *Four-point boundary connectivities in critical two-dimensional percolation from conformal invariance*, JHEP 12 131 (2018).

4. I. Lyberg, V. Korepin, G. A. P. Ribeiro and J. Viti, *Phase separation in the six-vertex model with a variety of boundary conditions*, Journal of Mathematical Physics 59, 053301 (2018) [Invited contribution to Journal of Mathematical Physics special issue "To the memory of Ludwig Faddeev".]

5. M. Collura, A. De Luca and J. Viti, *Analytic solution of the domain wall initial state*, Phys. Rev. B 97, 081111 (2018).

6. G. Gori and J. Viti, *Exact logarithmic four-point functions in the critical Ising model*, Phys. Rev. Lett. 119, 191601 (2017).

7. J. Dubail, J-M. Stéphan, J. Viti and P. Calabrese, *Conformal Field Theory for Inhomogeneous One-dimensional Quantum Systems: the Example of Non-Interacting Fermi Gases*, Sci. Post 002 (2017).

8. N. Allegra, J. Dubail, J.M. Stephan and J. Viti, *Inhomogeneous field theory inside the arctic circle* , J. Stat. Mech. (2016) 053108.

9. D. Bernard, B. Doyon and J. Viti, *Non-Equilibrium Conformal Field Theory with Impurities*, J. Phys. A 48 (2015) 05FT01 [Highlights 2015].

10. A. De Luca, J. Viti, D. Bernard and B. Doyon, *Non-equilibrium thermal transport in the quantum Ising chain*, Phys. Rev. B 88 134301 (2013).

11. G. Delfino and J. Viti, *On three-point connectivity in two-dimensional percolation*, J.Phys. A: Math. Theor.44: 032001, (2011).

12. G. Delfino, J. Viti and J. Cardy, *Universal amplitude ratios of two-dimensional percolation from field theory*, J. Phys. A: Math. Theor.43: 152001, (2010) [Highlights 2010].

13. J. Viti, *Universal properties of two dimensional percolation*, Ph.D thesis, SISSA, Trieste (2012).

Undergraduate Career

Undergraduate Education

- Bachelor of Science, Rutgers University, New Brunswick, New Jersey
- Double Major: Mathematics (with Highest Honors) and Physics (with Highest Honors)
- GPA: 4.0, Summa Cum Laude.

Undergraduate Awards and Scholarships

- Rutgers Excellence Award - 2011
- Richard J. Plano Summer Research Internship (Physics) - 2012
- Weill Scholarship (Mathematics) - 2013
- Phi Beta Kappa - 2013
- Rutgers Academic Excellence Award: 2014
- Joseph P. Bradley Memorial Prize in Mathematics - 2014
- College/School Honors: Summa Cum Laude - 2014

Teaching Experience Before Graduate School

- Instructor for 1 Analytical Physics Laboratory course (Electrodynamics for Engineers) at Rutgers University - 2014.
- Instructor for 2 General Physics Laboratory courses (Electrodynamics for Biologists and Chemists) at Rutgers University - Spring 2015.
- Instructor for 2 Analytical Physics Laboratory courses (Electrodynamics for Engineers) at Rutgers University - Fall 2015.

Undergraduate Thesis

- 2013-2014: Joint Departmental Senior Thesis (Math & Physics): "Einstein's Relativity Theory" (Advisers: Michael Kiessling and Natasa Sesum) - theoretical investigation of the basis and assumptions of General Relativity in addition to an exploration of renormalization.

Graduate Career

Graduate Education and Current Status

- Graduate student in the Department of Mechanical and Aerospace Engineering at Princeton University - Fall 2016.
- Completed PhD Defense - February 27th, 2023
- Specialization: Field Theory, Statistical Mechanics and Elasticity.
- Primary courses involved field theory, probability theory and mathematical methods and analysis.

Graduate Awards

- NSF Graduate Research Fellowship Program Honorable Mention.

Graduate Teaching Experience

- Assistant Instructor: Biomechanics and Biomaterials - MAE 344 - Spring 2018 (Professor Daniel Cohen).
- Assistant Instructor: Modern Solid Mechanics - MAE 223 - Fall 2018 (Professor Andrej Košmrlj).
- Assistant Instructor: Introduction to Engineering Dynamics - MAE 206 - Spring 2019 (Professor Anirudha Majumdar).
- Assistant Instructor: Modern Solid Mechanics - MAE 223 - Fall 2019 (Professor Andrej Košmrlj).
- Assistant Instructor: Modern Solid Mechanics- MAE 223 - Fall 2020 (Professor Andrej Košmrlj).

Graduate Research Projects. Adviser: Andrej Košmrlj. Collaborators: Siddhartha Sarkar, Daniel A. Matoz-Fernandez, Michael Aizenman. Specialization: Field Theory/Statistical Mechanics/Elasticity

- Projects are described further in a research statement that can be provided.
- Investigation of the renormalization of mechanical properties of anisotropic elastic membranes due to thermal fluctuations - 2018-2019. Work in preparation for publication.
- A study of the renormalization and mechanical response of elastic materials under the influence of applied uni-axial stresses - 2019-2020. Work submitted to arxiv (see 'Publications and Prints').
- A study of the effect of curvature of cylinders on the renormalization of elastic membranes - 2019-2020. Work in preparation for publication - Co-Author.
- A study of the q-state Potts model/random cluster model with Prof. Michael Aizenman: proving analogous partial differential inequalities to prove sharpness of phase transition in the random cluster model. We proved the "Phi^3" inequality (as per Aizenman & Barsky) but the susceptibility bound eluded us.
- Dynamical renormalization of odd elastic membranes that cannot be described by a Hamiltonian - 2021 to 2023.

Conference and Poster Presentations

- "Poisson's Ratio of Thermalized Sheets"- Presenter - 2018 - APS March Meeting.
- "Renormalization of Elastic Moduli of 2D Crystals" - Presenter - 2018 - Statistical Mechanics Conference Rutgers University Winter Session.
- "Statistical Mechanics of Anisotropic 2D Sheets"-Presenter - 2019 - APS March Meeting.
- "Influence of Thermal Fluctuations on the Mechanical Properties of 2D Anisotropic Materials" - Poster Presenter - 2019 - FACM & NCS 11.
- "Influence of Thermal Fluctuations on the Mechanical Properties of 2D Anisotropic Materials" - Presenter - 2019 - Statistical Mechanics Conference Rutgers University Spring Session.
- "Statistical Mechanics of 2D Sheets Under Uni-Axial Tension"-Presenter - 2021 - APS March Meeting.
- "Statistical Mechanics of Nanotubes"- Co-Author - 2021 - APS March Meeting.
- "Statistical Mechanics of Thermalized Odd Elastic Membranes"- Presenter - 2022 - APS March Meeting.

- “Statistical Mechanics of Thermalized Odd Elastic Membranes”- Presenter - 2022 - Statistical Mechanics Conference Rutgers University Winter Session.
- “Scaling of Moduli of Active and Thermal Elastic Membranes”- Presenter - 2023 - APS March Meeting.

Publications And Pre-Prints

- Bahri, M. E. H., and Y. Sinai. "Statistical Mechanics of Freely Fluctuating Two-Dimensional Elastic Crystals." *Journal of Statistical Physics* 180.1 (2020): 739-748. (In honor of Joel L. Lebowitz)
- “Emergent Reflection Symmetry In Thermally Fluctuating Monoclinic Elastic Membranes”. Authors: M.E.H. Bahri, S. Sarkar, A. Košmrlj. - in preparation for publication.
- “Mechanical Properties of Fluctuating Elastic Membranes Under Uni-Axial Tension”. Authors: M.E.H. Bahri, S. Sarkar, A. Košmrlj. - posted to the arxiv: https://arxiv.org/abs/2209.09350
- “Statistical Mechanics of Nano-Tubes”. Authors: S. Sarkar, M.E.H. Bahri, A. Košmrlj. - in preparation for publication. (ready for private communication)
- “Statistical Mechanics of Odd Elastic Membranes”. Authors: M.E.H. Bahri, S. Sarkar, D.A. Matoz-Fernandez, A. Košmrlj. - in preparation for publication. (ready for private communication)
- Thesis: “Thermal Fluctuations of Active and Anisotropic Elastic Membranes”. - Author: M.E.H. Bahri. Adviser: Andrej Košmrlj.

Bykov Aleksei

Interessi scientifiche

Sono generalmente interessato all'interazione tra le matematica e la fisica moderni avanzati . La mia attività principale, a partire dalla mia tesi di dottorato, si concentra sui fondamenti matematici delle teorie di campo quantistiche su spazi non commutativi (in particolare gli spazi quantistici di Doplicher-Fredenhagen-Roberts) e, più in generale, sulle teorie di campo quantistiche non locali, con particolare attenzione alle loro proprietà adiabatiche. Nella mia tesi di dottorato ho dimostrato l'esistenza del limite adiabatico debole (cioè il limite adiabatico per i correlatori) delle teorie di campo quantistiche perturbative hamiltoniane non locali. In seguito ho trovato il modo di dimostrare l'esistenza del limite adiabatico forte (cioè il limite adiabatico per l'operatore di scattering) nello stesso quadro, e anche il limite adiabatico delle teorie di campo quantistiche non locali di Yang-Feldman. La formulazione precisa di questo lavoro, tuttavia, ha richiesto un ulteriore lavoro tecnico che ho recentemente pubblicato come preprint, rimandando la pubblicazione del risultato principale. Oltre allo studio dei limiti adiabatici, ho intenzione di lavorare per trovare approcci più naturali alla quantizzazione delle teorie di campo non locali e per trovare un modo più diretto (rispetto all'originale Doplicher-Fredenhagen-Roberts) di derivare lo spaziotempo quantistico dalla gravità quantistica.

Recentemente sono stato coinvolto in un progetto che mira a calcolare gli invarianti diffeogeometrici per mezzo di (o ispirandosi a) teorie di campo quantistiche topologiche. Il mio ruolo principale in questo progetto è quello di trovare relazioni appropriate tra la descrizione fisica e matematica del problema, che permettano di scoprire approcci non visibili se si utilizza solo uno dei due punti di vista. Questo mi ha già aiutato, insieme al mio collaboratore, a generalizzare in modo significativo uno dei famosi risultati del campo (la relazione di ricorrenza di Zamolodchikov o, più precisamente, il suo duale AGT). Sono anche coinvolto nel lavoro in corso che sembra dimostrare completamente la congettura di Nekrasov, uno degli annosi problemi di questo settore di ricerca. Questa ricerca è anche collegata al mio interesse principale, perché la geometria non commutativa è coinvolta in molti modi. In particolare, uno dei modi per curare le singolarità delle teorie di campo quantistiche topologiche è quello di introdurre una deformazione non commutativa dello spaziotempo di fondo.

Esperienza di Ricerca Relevanta

2020-2021 Assegnista di ricerca presso il Dipartimento di Matematica dell'Università di Roma “Tor Vergata”.

2016-2020 Progetto di dottorato di ricerca Università di Roma “Tor Vergata”. Argomento: aspetti delle teorie quantistiche di campo nello spaziotempo quantistico di Doplicher-Fredenhagen-Roberts, specialmente nell'approccio hamiltoniano (limite adiabatico, rinormalizzazione, relazioni con l'approccio lagrangiano, modifiche e generalizzazioni). Risultato principale nella tesi di dottorato: esistenza del limite adiabatico debole nelle teorie di campo quantistiche hamiltoniane non locali.

Istruzione formale e titoli di studio

2016-2020 University of Rome “Tor vergata”
Dottorato in Matematica
Titolo della tesi: : Adiabatic limits and renormalization in quantum spacetime
Relatore di tesi: prof. G. Morsella
Corsi di dottorato: *Termine spettrali e teoria del potenziale in geometria non commutativa*(J-L. Sauvageot), *Spectral Triples and Potential Theory in Non-*

commutative Geometry (M.Gressing),*Algebra dei Operatori* (F. Radulescu),*Moment Graphs in Geometry, Combinatorics and Representation Theory* (M. Lanini)

2010-2012 Università politecnica statale di San Pietroburgo
Laurea Magistrale in Tecniche e Tecnologie (con lode)
Titolo della tesi: Studio dei plasmi periferici in dispositivi a confinamento magnetico
Voto finale: Eccellente

2006-2010 Università politecnica statale di San Pietroburgo
Laurea triennale in tecnica e tecnologia (con lode)
Titolo tesi: Progettazione di elemento della tecnologia a polvere di litio per la riduzione dei carichi termici su parete in materiale tokamak e per il condizionamento della parete
Voto finale: Eccellente

Esperienza di insegnamento

Lezione di esercitazioni per il corso di Analisi Matematica II, Corso di Laurea in Ingegneria, 2018-2019, Università di Roma "Tor Vergata" (in inglese, docenti: G.Morsella, Y. Tanimoto)

Lezione di esercitazioni di fisica "generale" per gli studenti del primo e del secondo anno del corso di laurea in Fisica, 2012-2014 presso l'Università Politecnica Statale (in russo)

Premi e sovvenzioni

1. Una borsa di studio del governo di San Pietroburgo per studenti, 2010
2. Una borsa di studio della Fondazione Zhores Alferov per il sostegno all'istruzione e alla scienza, 2011-2012
3. Membro di numerose sovvenzioni collettive concesse dal Ministero della Scienza e dell'Istruzione della Federazione Russa e dalla fondazione russa per le ricerca fondamentale.

Pubblicazioni e conferenze rilevanti

1. A. Bykov Ultraviolet finite non-local Hamiltonian perturbation Quantum Field Theories and their weak adiabatic limit, arXiv:2211.10349
2. E. Sysoeva, A.Bykov Recurrence relation for instanton partition function in SU(N) gauge theory, JHEP 220(2023), arXiv:2209.14949.
3. A. Bykov "Adiabatic limits and renormalization in Quantum Spacetime", oral talk at th 43th LQP workshop "Foundations and Constructive Aspects of QFT" (GGI, Florence, 20.02-22.02.2019)
4. A. Bykov "Existence of the weak adiabatic limit in quantum field theories with non-local Hamiltonian", oral talk at the "Operator Algebras in Quantum Field Theory and Quantum Probability" workshop (Tor Vergata, Rome, 4.12-7.12.2020)

Pubblicazioni selezionate nel campo precedente (Fisica del plasma):

1. V. Yu. Sergeev, B. V. Kuteev, A. S. Bykov, V. S. Petrov, A. A. Golikov, A. V. Golubeva, P. R. Goncharov, M. P. Gryaznevich, G. S. Kirnev, A. V. Klishchenko, V. V. Luk'yanov, A. V. Spitsyn, D. Yu. Sychugov, Yu. S. Shpansky, Concept of the divertor of a fusion neutron source based on a spherical tokamak, Plasma Physics Reports July 2012, Volume 38, Issue 7, pp 521-539
2. V.Yu. Sergeev, B.V. Kuteev, A.S. Bykov, S.V. Krylov, V.G. Skokov, V.M. Timokhin, Lithium technologies for edge plasma control, Fusion Engineering and Design Volume 87, Issue 10, October 2012, Pages 1765–1769, 2011, doi: 10.1016/j.fusengdes.2011.10.008

Conferenze selezionate nel campo precedente (Fisica del plasma):

- Plasma Edge Theory conference, Krakow, 2013, poster
- Seminar on volumetric neutron sources, 2013, oral talk
- Conference on plasma-surface interaction of Moscow Engineering Physics Institute, 2014, oral talk
- International conference on plasma physics and controlled fusion, Zvenigorod (Moscow reg.) (poster 2011, 2012; oral talk 2013)
- Seminar on stationary regimes of neutron sources, Moscow, oral talk, 2011

Esperienza di ricerca

01/05/2022 – In corso **Postdoc**, *Department of Mathematics, Uppsala University*, resp. Prof. J-Ll. Figueras.

01/04/2021 – 31/03/2022 **Assegnista di ricerca**, *Dipartimento di Matematica, Università degli studi di Milano*, PROGETTO: New frontiers of Celestial Mechanics: theory and applications, resp. PhD. M. Sansottera.

Formazione e titoli

09/02/2021 **Dottorato in Matematica**, *Università degli studi di Roma "Tor Vergata"*.
TITOLO DELLA TESI: On the stability in the neighborhood of invariant elliptic tori
SUPERVISOR: Prof U. Locatelli

23/09/2016 **Laurea magistrale in Matematica Pura e Applicata**, *Università degli studi di Roma "Tor Vergata"*, 110/110 e lode.
TITOLO DELLA TESI: Studio rigoroso della stabilità effettiva di sistemi Hamiltoniani quasi-integrabili: stime computer-assisted
SUPERVISOR: Prof U. Locatelli

18/12/2014 **Triennale in Matematica**, *Università degli studi di Roma "Tor Vergata"*, 105/110.

11/07/2011 **Diploma liceo scientifico**, *Liceo scientifico statale "Francesco D'Assisi"*, Roma, 100/100 e lode.

Ricerca

La mia ricerca riguarda lo studio della persistenza di tori invarianti KAM o bassodimensionali (di tipo ellittico) in sistemi quasi-integrabili. Principalmente, utilizzo tecniche costruttive, come i metodi di forma normale, che possono essere convertiti in programmi e utilizzati per applicazioni. In un lavoro in collaborazione con U. Locatelli, abbiamo costruito tori ellittici bassodimensionali nel modello FPU con pochi nodi, iterando un algoritmo di forma normale. Abbiamo anche studiato la stabilità nel loro intorno per mezzo di una forma normale di Birkhoff. Sono interessata anche allo studio di problemi di stabilità in Meccanica Celeste: in una serie di lavori in collaborazione con U. Locatelli, M. Sansottera, M. Volpi, abbiamo ottenuto risultati di stabilità di tipo KAM nella dinamica secolare per alcuni sistemi planetari (in modelli a tre corpi) con eccentricità $e \sim 0.1$. Alcuni di questi risultati sono stati resi rigorosi per mezzo di dimostrazioni computer-assisted. In particolare, in un lavoro con U. Locatelli, abbiamo definito uno schema di stime computer-assisted per la forma normale di Birkhoff, che permette di ottenere stime di del tempo di stabilità nell'intorno di equilibri ellittici. Attualmente, lavoro in un progetto di ricerca con J-Ll. Figueras e À. Haro, con l'obiettivo di calcolare tori ellittici bassodimensionali con il metodo di parametrizzazione.

Pubblicazioni

[LCSV] **Invariant KAM tori: from theory to applications to exoplanetary systems**, *U. Locatelli, C. Caracciolo, M. Sansottera, M. Volpi*, In: Baù, G., Di Ruzza, S., Páez, R.I., Penati, T., Sansottera, M. (eds) New Frontiers of Celestial Mechanics: Theory and Applications. I-CELMECH 2020., Springer Proceedings in Mathematics & Statistics, vol 399. Springer, Cham., 2023 doi:10.1007.

[LCSV] **A numerical criterion evaluating the robustness of planetary architectures; applications to the υ Andromedæ system**, *U. Locatelli, C. Caracciolo, M. Sansottera, M. Volpi*, Volume: Multi-scale (time and mass) dynamics of space objects, Proceedings IAU Symposium No. 364, A. Celletti, C. Beaugé, C. Gales, A. Lemaître, eds., 2022, doi:10.1017/S1743921322000461.

[CLSV] **Librational KAM tori in the secular dynamics of the υ Andromedæ planetary system**, *C. Caracciolo, U. Locatelli, M. Sansottera, M. Volpi*, Monthly Notices of the Royal Astronomical Society, 510, 2147–2166, 2022, doi:10.1093.

[C] **Normal form for lower dimensional elliptic tori in Hamiltonian systems**, *C. Caracciolo*, Mathematics in Engineering, 4(6), 1–40, 2022, doi:10.3934.

[CL2] **Elliptic tori in FPU non-linear chains with a small number of nodes**, *C. Caracciolo, U. Locatelli*, Communications in Nonlinear Science and Numerical Simulation, 97, 105759, 2021, doi:10.1016.

[PhD] **On the stability in the neighborhood of invariant elliptic tori**, *C. Caracciolo*, Ph.D. thesis, University of Rome "Tor Vergata", 2021, available here.

[CL1] **Computer-assisted estimates for Birkhoff normal forms**, *C. Caracciolo, U. Locatelli*, Journal of Computational Dynamics, 7(2), 425–460, 2020, doi:10.3934.

Seminari

2023 **Long-term stability of planetary systems: some computer-assisted result**, *New Frontiers of Celestial Mechanics: Theory and Applications*, Padova, Italia.

2022 **On the applicability of KAM theory to realistic problems: effective stability and computer-assisted proofs**, *Dynamical systems and Number Theory seminar*, Uppsala University, Uppsala, Svezia.

2022 **Exploring KAM stability for extrasolar planetary systems**, *Celmec VIII*, University of Rome "Tor Vergata", Roma, Italia.

2020 **Librational KAM tori in the secular dynamics of Upsilon–Andromedæ planetary system**, *I-CELMECH web seminars*, Università degli studi di Milano (su invito).

2020 **Elliptic tori in FPU chains**, *CAPA (Computer-aided proofs in analysis) web seminars*, Uppsala University (su invito).

2020 **Librational KAM tori in the secular dynamics of Upsilon–Andromedæ planetary system**, *working Seminar*, University of Barcelona (su invito).

2019 **Effective stability through computer assisted estimates for Birkhoff normal form**, *in "XLIV Summer school on Mathematical Physics"*, Ravello, Italia.

2018 **Elliptic tori in FPU chains**, *in "Dynamics, Topology and Computations"*, Będlewo, Polonia.

Partecipazione a scuole e conferenze

2023 **New frontiers of Celestial Mechanics: theory and application**, *Padova*, Italia.

2022 **Celmec VIII**, *Roma*, Italia.

2022 **International workshop on co-orbital motion: modeling, understanding and exploitation**, *Milano*, Italia.

2021 **IAU Symposium: "Multi-scale (time and mass) Dynamics of Space Objects"**, *Iaşi*, Romania.

2020 **I-CELMECH Training school**, *Milano*, Italia.

2019 **XLIV Summer school on Mathematical Physics**, *Ravello*, Italia.

2019 **New Trends in Celestial Mechanics**, *Cogne*, Italia.

2019 **Planetary Dynamics**, *Heidelberg*, Germania.

2019 **Leaning Tori, An Hamiltonian event under the tower**, *Pisa*, Italia.

2019 **Mathematical Models and Methods in Earth and Space Sciences**, *Roma*, Italia.

2019 **Dynamical Systems: from geometry to mechanics**, *Rome*, Italia.

2018 **Pisa-Hokkaido-Roma2 Summer School on Mathematics and Its Applications**, *Pisa*, Italia.

2018 **EMS Lectures Summer School**, *Roma*, Italia.

2018 **Dynamics, Topology and Computations**, *Będlewo*, Polonia.

2018 **Stable and Chaotic Motions in the Planetary Problem**, *Asiago*, Italia.

2017 **Satellite Dynamics and Space Missions**, *S. Martino al Cimino*, Italia.

Progetti di ricerca

2017-2021 **New frontiers of Celestial Mechanics: theory and applications**, *PRIN (Research Project of National Interest)*, PI Prof. M. Guzzo (precedente PI Prof. A. Celletti).

2019 **Low-dimensional Invariant Tori in FPU-like Lattices via Normal Forms**, *Progetto giovani GNFM (National Group of Mathematical Physics)*, PI PhD. M. Sansottera.

2018 **Isogeometric methoDs in Evolution: theory and ApplicationS (IDEAS)**, *in the framework of the projects scheme "Mission Sustainability 2017" funded by the Univ. of Rome "Tor Vergata"*, PI Prof. H. Speleers.

Premi e borse di studio

2022 **Esseen, L and C-G, for mathematical studies**, 18000 SEK.

2018 **Premio per la miglior tesi di laurea magistrale in Matematica Pura e Applicata all'Università di Roma "Tor Vergata"**.

Didattica

A.A. 2022 – 2023 **Docente del corso "Applied Mathematics"**, *Uppsala University*, 5CFU.
Freestanding course

A.A. 2019 – 2020 **Tutor per "Matematica 1"**, *Università di Roma "Tor Vergata"*.
Corso per la laurea triennale in "Chimica Applicata" e "Scienza dei materiali"

A.A. 2018 – 2019 **Lezione per il corso "Meccanica analitica e celeste"**, *Università di Roma "Tor Vergata"*, Teorema di Nekhoroshev e forma normale di Birkhoff.
Corso per la laurea magistrale in "Matematica Pura ed Applicata"

Visite scientifiche

1 settimana febbraio 2023 **Prof. A. Haro**, *University of Barcelona*.

2 settimane luglio 2022, 1 settimana marzo 2023 **Prof. U. Locatelli**, *University of Rome "Tor Vergata"*.

Altre attività

Co-supervisore, Tesi magistrale di MSc. R. Mastroianni: *Dinamica di un problema planetario con correzioni relativistiche* (2019) (Supervisore: Prof. U. Locatelli).

Reviewer, *Celestial Mechanics and Dynamical Astronomy*.

Altre attività lavorative

07/01/2017 – 31/10/2017 **Consulente tecnico**, *Techedge S.p.A.*, Roma.

Skills/ Linguaggi di programmazione

Scrittura in TeX/LaTeX; C, C++, Mathematica, Matlab; conoscenza base di Linux OS e calcolo parallelo (usando SLURM), integratori simplettici, analisi in frequenza e sviluppo di Computer Algebra Software (CAS, per la manipolazione di espansioni generate nell'ambito di teoria delle perturbazioni per sistemi Hamiltoniani).

Lingue

Italiano	Madrelingua
Inglese	Fluente
Francese	Principiante (DELF B1)
Svedese	Elementare

Referenze

locatell@mat.uniroma2.it	Prof. Ugo Locatelli (University of Rome "Tor Vergata")
marco.sansottera@unimi.it	PhD. Marco Sansottera (University of Milan)
figueras@math.uu.se	Prof. Jordi-Lluís Figueras (Uppsala University)

Roma, 7 aprile 2023

europass

Tiziano Gaudio

EDUCATION AND TRAINING

OCT 2017 – 3 AUG 2021 Lancaster, United Kingdom
DOCTOR OF PHILOSOPHY IN MATHEMATICS Lancaster University

Supervisor: *Dr. Robin Hillier*.

Address Lancaster, United Kingdom | **Level in EQF** EQF level 8 |

Thesis On the correspondence between graded-local conformal nets and vertex operator superalgebras with applications

SEP 2014 – 25 OCT 2016 Rome, Italy
MASTER'S DEGREE IN MATHEMATICS University of Rome "La Sapienza"

Thesis' title: *Bott periodicity theorem*. Supervisor: *Prof. Paolo Piazza*.

Address Rome, Italy | **Final grade** 110/110 con lode | **Level in EQF** EQF level 7 |

Thesis Il teorema di periodicità di Bott

SEP 2011 – 28 OCT 2014 Rome, Italy
BACHELOR'S DEGREE IN MATHEMATICS University of Rome "La Sapienza"

Thesis' title: *The Lorentz group*. Supervisor: *Prof. Sergio Caprara*.

Address Rome, Italy | **Final grade** 105/110 | **Level in EQF** EQF level 6 | **Thesis** Il gruppo di Lorentz

2006 – 2011 Rome, Italy
MATURITÀ SCIENTIFICA I.I.S. "Edoardo Amaldi"

Address Rome, Italy | **Final grade** 98/100 | **Level in EQF** EQF level 4

WORK EXPERIENCE

1 FEB 2023 – CURRENT Lancaster, United Kingdom
SENIOR RESEARCH ASSISTANT LANCASTER UNIVERSITY

Senior Research Associate, Leverhulme Trust at the Department of Mathematics and Statistics of The University of Lancaster, UK. *Supervisor:* Dr. Dirk Zeindler.

12 SEP 2022 – 31 AUG 2023 Anzio, Rome, Italy
HIGH SCHOOL TEACHER OF MATHEMATICS AND PHYSICS

Teacher of Mathematics (A026) at public italian high schools RMRC122516 - PERCORSO II LIV “COLONNA GATTI” in Anzio (RM), Italy (15 hours per week) and RMRF113515 - PERCORSO II LIV “SIBILLA ALERAMO” in Rome, Italy (3 hours per week). *On leave for research reasons from the 12 of September 2022 to the 31 of January 2023*.

1 FEB 2022 – 31 JAN 2023 Rome, Italy

POSTDOCTORAL FELLOWSHIP IN MATHEMATICAL ANALYSIS UNIVERSITY OF ROME "TOR VERGATA"

Second level grant for collaboration in research activities at the Department of Mathematics at the University of Rome “Tor Vergata”, Italy. Grant’s code: F2-2021-0055; Research Programme: "Operator algebras with applications to quantum field theory" (MUR – DIP – ECCELLENZA CUP: E8318000100006); Subject sector: MAT/05.

12 SEP 2022 – 22 SEP 2022 Rome, Italy

UNIVERSITY TEACHING UNIVERSITY OF ROME "TOR VERGATA"

In charge of the course "Matematica Zero II canale (M-Z)", meant as preparation for the course “Matematica Generale” (“General Mathematics”) for the bachelor-level degree in Economy and Management (CLEM). (About 18 hours.)

7 SEP 2021 – 31 AUG 2022 Anzio, Pomezia, Italy

HIGH SCHOOL TEACHER OF MATHEMATICS AND PHYSICS

Teacher of Mathematics and Physics (A027) at public italian high schools RMPC41000C - LICEO “CHRIS CAPPELL COLLEGE” in Anzio (RM), Italy (13 hours per week) and RMSD11000B - LICEO ARTISTICO E LINGUISTICO “PICASSO” in Pomezia (RM), Italy (5 hours per week). *On leave for research reasons from the 1 of February 2022 to the 31 of August 2022*.

25 OCT 2021 – 15 JUL 2022 Rome, Italy

UNIVERSITY TUTOR UNIVERSITY OF ROME "TOR VERGATA"

Tutoring sessions for the course “Analisi Matematica 1” (“Mathematical Analysis 1”) for the bachelor-level degrees in Engineering. (About 20 hours.)

5 NOV 2020 – 30 JUN 2021 Rome, Italy

HIGH SCHOOL TEACHER OF MATHEMATICS AND PHYSICS

Teacher of Mathematics and Physics (A027) at public italian high school RMPS24000N - LICEO “MORGAGNI” in Rome, Italy. (9 hours per week). *On extraordinary leave for Ph.D. from the 5 of November 2020 till the 30 of June 2021*.

9 JUN 2021 – 25 JUN 2021 Lancaster, United Kingdom

PH.D. DEMONSTRATOR LANCASTER UNIVERSITY

Online seminars, preparation and correction of a project as PhD Demonstrator for the "Online Summer School 2021" for Mathematics (meant as presentation course of the master-level degree in Mathematics). (About 19 hours.)

JAN 2021 – MAR 2021 Lancaster, United Kingdom

GRADUATE TEACHING ASSISTANT LANCASTER UNIVERSITY

Online workshop and coursework marking for the bachelor-level courses in Mathematics “MATH225 - Abstract Algebra” and “MATH114 - Integration and Differentiation”. (About 5 hours.)

JAN 2020 – MAR 2020 Lancaster, United Kingdom

GRADUATE TEACHING ASSISTANT LANCASTER UNIVERSITY

Workshop hours and coursework marking for the bachelor-level course in Mathematics “MATH225 - Abstract Algebra”. (About 25 hours.)

JAN 2019 – MAR 2019 Lancaster, United Kingdom

GRADUATE TEACHING ASSISTANT LANCASTER UNIVERSITY

Workshop hours and coursework marking for the bachelor-level course in Mathematics “MATH225 - Abstract Algebra”. (About 18 hours.)

OCT 2018 – DEC 2018 Lancaster, United Kingdom

GRADUATE TEACHING ASSISTANT LANCASTER UNIVERSITY

Workshop hours and coursework marking for the bachelor-level course in Mathematics “MATH210 - Real Analysis”. (About 20 hours.)

JAN 2018 – MAR 2018 Lancaster, United Kingdom

GRADUATE TEACHING ASSISTANT LANCASTER UNIVERSITY

Workshop hours and coursework marking for the bachelor-level course in Mathematics “MATH225 - Abstract Algebra”. (About 8 hours.)

JUL 2017 Guidonia, Italy

HIGH SCHOOL TEACHER OF MATHEMATICS

Teacher of Mathematics at public italian high school RMPS10601A - LIC. LING. E SCIENT. E. MAJORANA GUIDONIA in Guidonia (RM), Italy. (Summer lessons, about 20 hours.)

18 MAY 2017 – 3 JUN 2017 Guidonia, Italy

HIGH SCHOOL TEACHER OF MATHEMATICS

Teacher of Mathematics and Physics (A027) at public italian high school RMPS10601A - LIC. LING. E SCIENT. E. MAJORANA GUIDONIA in Guidonia (RM), Italy. (14 hours per week).

8 MAR 2017 – 8 APR 2017 Guidonia, Italy

HIGH SCHOOL TEACHER OF MATHEMATICS

Teacher of Mathematics (A026) at public italian high school RMTF010028 - I.T.T.S A. VOLTA GUIDONIA in Guidonia (RM), Italy. (4 hours per week).

ADDITIONAL INFORMATION

PUBLICATIONS

S. Carpi, T. Gaudio, L. Giorgetti, R. Hillier. Haploid algebras in C*-tensor categories and the Schellekens list.

– 2023

Accepted by Communications in Mathematical Physics.

T. Gaudio. On the correspondence between graded-local conformal nets and vertex operator superalgebras with applications.

– 2021

PhD Thesis, Lancaster University, Lancaster, UK, pp. 129

S. Carpi, T. Gaudio, R. Hillier. Classification of unitary vertex subalgebras and conformal subnets for rank-one lattice chiral CFT models.

– 2019

Selected as an *Editor’s Pick*

Journal of Mathematical Physics, vol. 60, issue 9

PAPERS IN PREPARATION

S. Carpi, T. Gaudio, R. Hillier. From vertex operator superalgebras to graded-local conformal nets and back.

(To appear)

CONFERENCES AND SEMINARS

17 JUN 2020
About the correspondence between vertex operator superalgebras and graded-local conformal nets Speaker at "First Virtual LQP/45th LQP Workshop"

Link https://www.entangled.eu/assets/pdf/events/vlqp/04-gaudio.pdf

15 JUN 2020 – Lancaster, UK
A taste of vertex superalgebras, II: conformal and unitary structures Local seminar at "Postgraduate Forum" of the Department of Mathematics and Statistics of Lancaster University

21 JAN 2020 – Lancaster, UK
A taste of vertex superalgebras Local seminar "Postgraduate Forum" of the Department of Mathematics and Statistics of Lancaster University

27 NOV 2019 – Rome, Italy
Constructing graded-local conformal nets from vertex operator superalgebras Local seminar at "Mathematics Seminars" of the Department of Mathematics of the University of Rome "Tor Vergata"

22 FEB 2019 – Galileo Galilei Institute, Florence, Italy
Classification of Subtheories for Rank-One Lattice Chiral CFT Models Speaker at "43 LQP Workshop: Foundations and Constructive Aspects of QFT"

Link https://drive.google.com/file/d/1St33kr2GSpWQNiQsxfZE54zM6kWeQDC0/view

30 OCT 2018 – Lancaster, UK
Vertex Operator Algebras and Conformal Field Theory Local seminar at "Postgraduate Forum" of the Department of Mathematics and Statistics of Lancaster University

FEB 2018 – Lancaster, UK
K-theory and Bott Periodicity Theorem Local seminar at "Postgraduate Forum" of the Department of Mathematics and Statistics of Lancaster University

ACADEMIC ROLES

JAN 2020 – JUN 2020
Organiser of the weekly "Postgraduate Forum" of the Department of Mathematics and Statistics of Lancaster University

SKILLS AND CERTIFICATIONS

10 FEB 2023
Equality, Diversity and Inclusion

I completed the online training "Equality, Diversity and Inclusion" of Lancaster University, Lancaster, UK.

15 AUG 2019
Information Security

I completed the online training "Information Security" of Lancaster University, Lancaster, UK. (Refresh training on the 8th of February 2023.)

4 SEP 2017 – 29 SEP 2017
English for Academic Purpose (Study Skills) Programme

I successfully completed the "English for Academic Purpose (Study Skills) Programme" at Lancaster University, Lancaster, UK.

8 JUL 2017
IELTS Academic

CEFR Level B2.

Data
15/04/2023

Curriculum Vitae

Contact Information

Address:	Dipartimento di Fisica e Astronomia 'Galileo Galilei', Università di Padova, Via Marzolo 8, 35131 Padova (Italy)
Telephone:E-mail:	stefano.giaccari@pd.infn.it

Education

2013 PhD in Physics
International School for Advanced Studies (SISSA/ISAS)
Thesis: *Conformal symmetry in String Field Theory and 4D field theories*
Advisor: Prof. Loriano Bonora

2008 Laurea Specialistica in Fisica (MS in Physics),
final mark:110/110 *cum laude*
University of Pisa, Dipartimento di Fisica "Enrico Fermi"
Thesis: *Gravitational Anomalies*
Advisor: Prof. Pietro Menotti

2004 Laurea Magistrale in Fisica (BS in Physics),
final mark:110/110 *cum laude*
University of Pisa, Dipartimento di Fisica "Enrico Fermi"
Thesis: *Lie groups and Special Functions*
Advisor: Prof. Luciano Bracci

Research Experience

Postdoctoral Research: Dipartimento di Fisica e Astronomia, Università di Padova,

(supervisor Prof. Roberto Volpato)

- Generalized symmetries and defects
- Orbifolds in Quantum Field Theory and String theory
- 2D Conformal Field Theories and string compactifications

Postdoctoral Research: Department of Sciences, Holon Institute of Technology (HIT) (supervisor Prof. Michael Kroyter)

- Modified gravity theories
- Higher spin theories
- Supersymmetric string field theories

Postdoctoral Research: Department of Physics, Faculty of Science, University of Zagreb (in the Gravity group of Prof. Maro Cvitan)

- Higher spin theories
- Chern-Simons theory of gravity
- Parity-violating anomalies in gravity

Postdoctoral Research: Fudan University, Shanghai(in the Quantum Gravity group of Prof. Leonardo Modesto)

- Super-renormalizable nonlocal theories of gravity
- Higher derivatives supergravity
- Black Hole Entanglement Entropy

Doctoral Research: SISSA (Research Advisor: Prof. Loriano Bonora)

- Analysis of formal aspects of lump solutions for Dp-branes in Witten's open string field theory
- Cohomological derivation of trace anomalies for different formulations of Supergravity

Undergraduate Research: Dipartimento di Fisica, Università di Pisa (Research Advisor: Prof. Pietro Menotti)

- Derivation of exact consistent gravitational anomaly for chiral scalars through Schwinger-DeWitt regularization and cohomological analysis.

Research Interests

- (Super-)gravity field theories, anomalies in supersymmetric field theories, Conformal and Liouville Field Theories, generalized symmetries, defects, Higher Spin theories.
- String theory, Dp-branes and non perturbative string effects, gauge/gravity string duality, effective string models of Condensed Matter systems
- Quantum Gravity, Modified gravity theories, Chern-Simons theories and Black Hole Physics

Editorial activities

Peer Reviewer	in	Symmetry (ISSN 2073-8994)
		Universe (ISSN 2218-1997)
Topic Editor	in	Universe (ISSN 2218-1997)

Teaching experience

- Assistant in undergraduate and graduate courses of Quantum Field Theory and General Relativity
- Tutoring Undergraduate, Graduate and PhD students

Other Professional Skills

1. Very good knowledge of Linux/Unix, Windows, Macintosh
2. Very good knowledge of Mathematica, Matlab, C-programming
3. Fluent knowledge of English

List of Publications

[1] S. Giaccari and R. Volpato, *A fresh view on string orbifolds,* JHEP **01**, 173 (2023) doi:10.1007/JHEP01(2023)173 [arXiv:2210.10034 [hep-th]].

[2] M. Cvitan, P. D. Prester, S. G. Giaccari, M. Paulišić and I. Vuković, *Gauging the Higher-Spin-Like Symmetries by the Moyal Product. II,* Symmetry **13**, no.9, 1581 (2021) doi:10.3390/sym13091581

[3] M. Cvitan, P. Dominis Prester, S. Giaccari, M. Paulišić and I. Vuković, *Gauging the higher-spin-like symmetries by the Moyal product,* JHEP **06**, 144 (2021) doi:10.1007/JHEP06(2021)144 [arXiv:2102.09254 [hep-th]].

[4] L. Bonora and S. Giaccari, *Supersymmetric HS Yang-Mills-like models,* Universe **6**, no.12, special issue "Supersymmetric Quantum Theory", (2020) doi:10.3390/universe6120245 [arXiv:2011.00734 [hep-th]].

[5] P. Jizba, L. Rachwał, S. G. Giaccari and J. Kňap, *Dark side of Weyl gravity,* Universe **6**, no.8, 123 (2020) doi:10.3390/universe6080123 [arXiv:2006.15596 [hep-th]].

[6] L. Bonora, M. Cvitan, P. Dominis Prester, S. Giaccari and T. Štemberga, *HS in flat spacetime. YM-like models,* [arXiv:1812.05030 [hep-th]].

[7] L. Bonora, M. Cvitan, P. Dominis Prester, S. Giaccari and T. Štemberga, *HS in flat spacetime. The effective action method,* Eur. Phys. J. C **79**, no.3, 258 (2019) doi:10.1140/epjc/s10052-019-6660-4 [arXiv:1811.04847 [hep-th]].

[8] L. Bonora, M. Cvitan, P. Dominis Prester, S. Giaccari, M. Paulišić and T. Štemberga, *Axial gravity: a non-perturbative approach to split anomalies,* Eur. Phys. J. C **78**, no.8, 652 (2018) doi:10.1140/epjc/s10052-018-6141-1 [arXiv:1807.01249 [hep-th]].

[9] S. Giaccari and L. Modesto, *Causality in Nonlocal Gravity,* [arXiv:1803.08748 [hep-th]].

[10] S. Giaccari, L. Modesto, L. Rachwał and Y. Zhu, *Finite Entanglement Entropy of Black Holes,* Eur. Phys. J. C **78**, no.6, 459 (2018) doi:10.1140/epjc/s10052-018-5942-6 [arXiv:1512.06206 [hep-th]].

[11] L. Bonora, M. Cvitan, P. Dominis Prester, S. Giaccari, M. Paulišić and T. Štemberga, *Worldline quantization of field theory, effective actions and L_∞ structure,* JHEP **04**, 095 (2018) doi:10.1007/JHEP04(2018)095 [arXiv:1802.02968 [hep-th]].

[12] L. Bonora, M. Cvitan, P. Dominis Prester, S. Giaccari and T. Štemberga, *One-loop effective actions and higher spins. Part II,* JHEP **1801**, 080 (2018) doi:10.1007/JHEP01(2018)080 [arXiv:1709.01738 [hep-th]].

[13] L. Bonora, M. Cvitan, P. Dominis Prester, A. Duarte Pereira, S. Giaccari and T. Štemberga, *Axial gravity, massless fermions and trace anomalies,* Eur. Phys. J. C **77**, no. 8, 511 (2017) doi:10.1140/epjc/s10052-017-5071-7 [arXiv:1703.10473 [hep-th]].

[14] L. Bonora, M. Cvitan, P. Dominis Prester, S. Giaccari, B. Lima de Souza and T. Štemberga, *One-loop effective actions and higher spins,* JHEP **612**, 084 (2016) doi:10.1007/JHEP12(2016)084 [arXiv:1609.02088 [hep-th]].

[15] S. Giaccari and J. Nian, *Dark Solitons, D-branes and Noncommutative Tachyon Field Theory,* Int. J. Mod. Phys. A **32**, 1750201 (2017) doi:10.1142/S0217751X17502013 [arXiv:1608.07262 [hep-th]].

[16] S. Giaccari and L. Modesto, *Nonlocal supergravity,* Phys. Rev. D **96**, no. 6, 066021 (2017) doi:10.1103/PhysRevD.96.066021 [arXiv:1605.03906 [hep-th]].

[17] P. Donà, S. Giaccari, L. Modesto, L. Rachwał and Y. Zhu, *Scattering amplitudes in super-renormalizable gravity,* JHEP **1508**, 038 (2015) doi:10.1007/JHEP08(2015)038 [arXiv:1506.04589 [hep-th]].

[18] L. Bonora, S. Giaccari and B. Lima de Souza, *Trace anomalies in chiral theories revisited,* JHEP **1407**, 117 (2014) doi:10.1007/JHEP07(2014)117 [arXiv:1403.2606 [hep-th]].

[19] L. Bonora and S. Giaccari, *Weyl transformations and trace anomalies in N=1, D=4 supergravities,* JHEP **1308**, 116 (2013) doi:10.1007/JHEP08(2013)116 [arXiv:1305.7116 [hep-th]].

[20] L. Bonora and S. Giaccari, *Generalized states in SFT,* Eur. Phys. J. C **73**, no. 12, 2644 (2013) doi:10.1140/epjc/s10052-013-2644-y [arXiv:1304.2159 [hep-th]].

[21] L. Bonora, S. Giaccari and D. D. Tolla, *Lump solutions in SFT. Complements*, arXiv:1109.4336 [hep-th].

[22] L. Bonora, S. Giaccari and D. D. Tolla, *Analytic solutions for Dp branes in SFT,* JHEP **1112**, 033 (2011) doi:10.1007/JHEP12(2011)033 [arXiv:1106.3914 [hep-th]].

[23] L. Bonora, S. Giaccari and D. D. Tolla, *The energy of the analytic lump solution in SFT,* JHEP **1108**, 158 (2011) Erratum: [JHEP **1204**, 001 (2012)] doi:10.1007/JHEP08(2011)158, 10.1007/JHEP04(2012)001 [arXiv:1105.5926 [hep-th]].

[24] S. Giaccari and P. Menotti, *Consistent gravitational anomalies for chiral bosons,* Phys. Rev. D **79**, 065015 (2009) doi:10.1103/PhysRevD.79.065015 [arXiv:0812.2810 [hep-th]].

Proceedings of Conferences

1. L. Rachwał and S. Giaccari, *Infrared behavior of Weyl Gravity,* J. Phys. Conf. Ser. **1956**, no.1, 012012 (2021) doi:10.1088/1742-6596/1956/1/012012 [arXiv:2107.07033 [hep-th]].

2. L. Bonora and S. Giaccari, *HS Yang-Mills-like models: a review,* Published in: Journal Physics AUC, Vol 30(II) 2020, [arXiv:2103.10105 [hep-th]].

3. S. Giaccari and L. Modesto, *Causality in Nonlocal Gravity,* Contribution to: 10th MATHEMATICAL PHYSICS MEETING, 121-136

4. L. Bonora, M. Cvitan, P. D. Prester, A. D. Pereira, S. Giaccari and T. štemberga, *Pontryagin trace anomaly,* EPJ Web Conf. **182**, 02100 (2018)

5. P. Dominis Prester, L. Bonora, M. Cvitan, S. Giaccari and T. Štemberga, *Induced actions for higher spin fields,* J. Phys. Conf. Ser. **1051**, no.1, 012008 (2018)

6. L. Bonora, M. Cvitan, P. D. Prester, S. Giaccari and T. Štemberga, *Higher Spins from One-Loop Effective Actions,* Springer Proc. Math. Stat. **255**, 17-30 (2017)

7. L. Bonora, M. Cvitan, P. Dominis Prester, S. Giaccari, B. Lima de Souza and T. Štemberga, *Massive Dirac field in 3D and induced equations for higher spin fields,*

8. L. Bonora, S. Giaccari and B. L. D. Souza, *Revisiting Trace Anomalies in Chiral Theories,* Springer Proc. Math. Stat. **111**, 3 (2014).

9. L. Bonora, S. Giaccari and B. Lima de Souza, *Revisiting Trace Anomalies in Chiral Theories,* Bled Workshops Phys. **14**, no. 2, 22 (2013).

10. L. Bonora, S. Giaccari and D. D. Tolla, *Mathematical problem with exact lump solutions in SFT,* PoS ICMP **2012**, 004 (2012).

PhD thesis

S. G. Giaccari, *Conformal symmetry in String Field Theory and 4D Field Theories.*

All my papers are available at the link

`https://inspirehep.net/authors/1060685`

List of recent talks

- XVIII AVOGADRO MEETING on Strings, Supergravity and Gauge Theories, INFN & University of Turin, Dec 20 – 22, 2022
  Title: A fresh view on string orbifolds
- TFI 2022: Theories of Fundamental Interactions 2022, Palazzo Franchetti - Venice, Jun 13 – 15, 2022
  Title: Orbifolds in spacetime
- Corfu 2021: Workshop on Quantum Geometry, Field Theory and Gravity, September 20 - 27, 2021
  Title: Moyal Yang Mills theory and higher spin in flat spacetime
- Israel Physical Society 65th Annual Meeting, Weizmann institute of science, 17 February 2020
  Title: Pseudo-Democratic Superstring Field Theory
- XV AVOGADRO MEETING on Strings, Supergravity and Gauge Theories, INFN & University of Naples "Federico II", 18-20 December 2019
  Title: Pseudo-Democratic Superstring Field Theory
- APCTP-KHU Workshop "Higher Spin Gravity: Chaotic, Conformal and Algebraic Aspects" , Pohang (South Korea), 23 September - 2 October 2019
  Title: An effective action approach to higher spin theories in flat spacetime
- 10th MATHEMATICAL PHYSICS MEETING: School and Conference on Modern Mathematical Physics, 9 - 14 September 2019, Belgrade, Serbia
  Title: Causality in nonlocal gravity
- Avenues of Quantum Field Theory in Curved Spacetime, Dipartimento di Scienze Fisiche, Informatiche e Matematiche, Università degli Studi di Modena e Reggio Emilia, 9-10 September 2019
  Title: A worldline quantization approach to higher spin theories
- Israel Physical Society 64th Annual Meeting, Hebrew University of Jerusalem, 9 December 2018
  Title: Higher spin theories from the effective action method

Research activity

My past research activity has mainly focused on string theory and quantum gravity. In particular, String field theory (SFT) plays a crucial role in our understanding of string theory at non-perturbative level. My initial work [1, 2, 3, 4] has mainly concerned a class of proposed solutions associated with the endpoint of Renormalization Group (RG) flows triggered by relevant boundary deformations on the string worldsheet. This work has contributed to enlightening how D-branes are encoded in solutions of Witten's Cubic Open String Field Theory (COSFT) defined on a worldsheet endowed with a fixed Boundary Conformal Field Theory (BCFT). Subsequently, I worked on a novel formulation of superstring field theory introduced a few years ago [5]. The main characteristic of this approach is the elimination of the picture redundancy in string vertices not by an explicit choice but rather by an extended gauge symmetry, thus providing a natural unification of the Neveu-Schwarz and Ramond sectors. Whereas the original formulation of the theory involved non-physical singularities due the insertion of Picture Changing Operators (PCOs) in the vertex midpoint, my research concerned several ways of introducing PCOs as line integrals in order to regularize the unphysical singularities while still keeping explicit gauge invariance, following a strategy similar to the one used to incorporate the Ramond sector in SFT [6].

At the same time, motivated also by recent investigations in perturbative aspects of SFT [7], I worked in higher derivative theories of gravity, where perturbative unitarity and quantum super-renormalizability or finiteness can be reproduced by the introduction of weakly nonlocal form factors. In order to better understand their relevance for physical observables, I studied the modifications on graviton scattering amplitudes induced by higher derivative terms [8], finding that, in the absence of higher derivative operators quadratic in the Riemann tensor, the amplitudes coincide with the ones found in Einstein gravity. More recently [9] the behavior of scattering amplitudes in the eikonal approximation in a class of weakly nonlocal theories has been shown to be consistent with the notion of causality discussed in [10]. Such a higher derivative theory of gravity as Weyl gravity, where conformal invariance is broken at quantum level, can also provide an interesting model to study the onset of an infrared fixed point by functional renormalization group, with interesting cosmological implications [11, 12]. I have also considered $N = 1$ nonlocal supergravity [13], which makes up a very interesting model where unitarity, consistent with the standard perturbative spectrum of local supergravity, is achieved not just order by order in the derivative expansion, but non-perturbatively in the energy. Moreover, UV finiteness, thanks to improved power-counting in superspace, requires a less restrictive choice of form factors than similar theories in ordinary space. Another line of research in the quantum properties of gravity has addressed an interesting phenomenon of CP violation induced by a Pontryagin density term in the trace anomaly of theories on curved backgrounds [14, 15].

The higher-spin modes that naturally show up in string theory have also received widespread attention over the years, in particular in the tensionless limit where they become massless and the higher spin gauge symmetry plays a crucial role in con-

straining the dynamics. The elusive nature of higher corrections to the symmetry and the lack of an action reproducing Vasiliev's equation of motion has been a motivation to study the effective action of scalar and fermion fields coupled to external higher-spin gauge fields in generic dimension and in the presence of a mass term [16, 17, 18, 14, 19]. This effective action can be interpreted in the light of the proposal [20] that the interacting higher-spin gauge theory in AdS spacetime can be holographically described in terms of N free massless scalar or fermion fields on the boundary and the infinite set of $O(N)$-singlet Noether currents. Most recently, a supersymmetric higher spin model inspired by this effective action was discussed in [21].

My most recent work concerns a reconsideration of the orbifold procedure in string theory. Usually, by this we mean an orbifold of the worldsheet sigma model, namely the new CFT that is obtained from the original one either by gauging a discrete global symmetry or by quotienting the string background by some isometry of the background. This procedure heavily relies on the worldsheet theory and its global symmetries and the background geometry as probed by the string itself, whereas all the plethora of other extended objects that characterize the string theory are determined by consistency from the worldsheet. This implies that the procedure itself is defined in a specific duality frame without having any general understanding of the action of non-pertubative dualities on the orbifold procedure [22]. On the other hand, recently the concept of global symmetry in Quantum Field Theory has been generalized in many different directions, so as to include higher form symmetries acting only on extended operators, higher group structures, where p-form symmetries of different degree p are mixed in a non-trivial way , and non-invertible symmetries, where the group structure of symmetry operators is replaced by some suitable category of topological defects [24, 23, 25, 26, 27]. These developments have led to refining the no global symmetry conjecture in quantum gravity [28, 29] to include (or, rather, exclude) all higher form global symmetries, as well as topological defects [30, 31, 32, 33]. These refinements allow one to relate the absence of global symmetries to other conjectural properties of quantum gravity, such as the completeness of the spectrum [28, 29] or the cobordism conjecture [34]. Motivated by this progress, we have proposed a new formulation of string orbifolds in terms of the group of gauge symmetries of a given string model. In such a formulation, the 'parent' and the 'child' theories correspond to different ways of breaking or gauging all potential global symmetries of their common subsector [35].

References

[1] L. Bonora, S. Giaccari and D. D. Tolla, [arXiv:1109.4336 [hep-th]].

[2] L. Bonora, S. Giaccari and D. D. Tolla, JHEP 12(2011)033; [arXiv:1106.3914 [hep-th]].

[3] L. Bonora, S. Giaccari and D. D. Tolla, JHEP 08(2011)158. [arXiv:1105.5926 [hep-th]]. Erratum: JHEP 04(2012)001

[4] L. Bonora and S. Giaccari, Eur. Phys. J. C **73**, 2644 (2013) [arXiv:1304.2159 [hep-th]].

[5] M. Kroyter, Adv. Theor. Math. Phys. **15**, no. 3, 741 (2011) [arXiv:0911.2962 [hep-th]].

[6] T. Erler, Y. Okawa and T. Takezaki, JHEP **1608**, 012 (2016) [arXiv:1602.02582 [hep-th]].

[7] A. Sen, JHEP **1701**, 108 (2017) [arXiv:1609.00459 [hep-th]].

[8] P. Donà, S. Giaccari, L. Modesto, L. Rachwal and Y. Zhu, JHEP **1508**, 038 (2015) [arXiv:1506.04589 [hep-th]].

[9] S. Giaccari and L. Modesto, Contribution to: 10th MATHEMATICAL PHYSICS MEETING, 121-136

[10] X. O. Camanho, J. D. Edelstein, J. Maldacena and A. Zhiboedov, JHEP **1602**, 020 (2016) [arXiv:1407.5597 [hep-th]].

[11] P. Jizba, L. Rachwał, S. G. Giaccari and J. Kňap, *Dark side of Weyl gravity,* Universe **6**, no.8, 123 (2020) doi:10.3390/universe6080123 [arXiv:2006.15596 [hep-th]].

[12] L. Rachwał and S. Giaccari, *Infrared behavior of Weyl Gravity,* J. Phys. Conf. Ser. **1956**, no.1, 012012 (2021) doi:10.1088/1742-6596/1956/1/012012 [arXiv:2107.07033 [hep-th]].

[13] S. Giaccari and L. Modesto, Phys. Rev. D **96**, no. 6, 066021 (2017) [arXiv:1605.03906 [hep-th]].

[14] L. Bonora, M. Cvitan, P. Dominis Prester, A. Duarte Pereira, S. Giaccari and T. Štemberga, Eur. Phys. J. C **77**, no. 8, 511 (2017) [arXiv:1703.10473 [hep-th]].

[15] L. Bonora, M. Cvitan, P. Dominis Prester, S. Giaccari, M. Paulišić and T. Štemberga, *Axial gravity: a non-perturbative approach to split anomalies,* Eur. Phys. J. C **78**, no.8, 652 (2018) doi:10.1140/epjc/s10052-018-6141-1 [arXiv:1807.01249 [hep-th]].

[16] L. Bonora, M. Cvitan, P. Dominis Prester, S. Giaccari and T. Štemberga, *HS in flat spacetime. The effective action method,* Eur. Phys. J. C **79**, no.3, 258 (2019) doi:10.1140/epjc/s10052-019-6660-4 [arXiv:1811.04847 [hep-th]].

[17] L. Bonora, M. Cvitan, P. Dominis Prester, S. Giaccari, M. Paulišić and T. Štemberga, JHEP **04**, 095 (2018) [arXiv:1802.02968 [hep-th]].

[18] L. Bonora, M. Cvitan, P. Dominis Prester, S. Giaccari and T. Štemberga, JHEP **1801**, 080 (2018) [arXiv:1709.01738 [hep-th]].

[19] L. Bonora, M. Cvitan, P. Dominis Prester, S. Giaccari, B. Lima de Souza and T. Štemberga, JHEP **612**, 084 (2016) [arXiv:1609.02088 [hep-th]].

[20] I. R. Klebanov and A. M. Polyakov, Phys. Lett. B **550**, 213 (2002) [hep-th/0210114].

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PostDoc researcher in Theoretical Physics and Biophysics

Employment

September 2020-
PostDoc, Theoretical Chemical Physics group, Department of Physics and Materials Science, University of Luxembourg, Luxembourg City, Luxembourg

January 2020-June 2020
PostDoc on DARPA project, Howard University, Quantum Biology Lab, Washington, Washington DC, USA

May 2018-December 2019
PostDoc Amidex, Centre de Physique Théorique (CPT), Marseille, France

December 2016- February 2018
PostDoc, Centre de Physique Théorique (CPT), Marseille, France

Education

2013-2016, Centre de Physique Théorique (CPT), Marseille, France
PhD in Theoretical and Mathematical Physics ("Très honorable avec felicitations du jury", highest mark with honors)

- Thesis: *Phase transition theory with applications to Biophysics*
  Improvement of a Necessity Theorem on the topological origin of phase transitions at thermal equilibrium. Theoretical contributions to fix the problem due to a "counterexample". Theoretical study of Fröhlich-like out-of-equilibrium phase transition in classical systems.Interpretation of THz spectroscopy experiments in biophysics. Numerical investigations on systems of mutually interacting and diffusing biomolecules for the validation of experimental methods.
- Advisor: Prof. M. Pettini

2010-2013, University of Florence, Italy
Master Degree in Theoretical Physics (110/110 with honors)

- Thesis: *Theoretical and numerical investigation on diffusion properties of biomolecules for experimental testing of long-range interactions between them*
  Numerical and theoretical studies of the effects on dynamics of long-range interactions among diffusing particles, with applications to interpret the outcomes of experiments on diffusion behavior of biomolecules.
- Advisors: Prof. S. Ruffo and M. Pettini

2007-2010, University of Florence, Italy
Bachelor's Degree in Physics (110/110 with honors)

- Thesis: *Geometrical description of Hamiltonian Dynamics*
  Description of classical Hamiltonian dynamics in terms of trajectories in configuration space endowed with Jacobi metric; application to study of chaos in terms of geodesic spread equations (Jacobi-Levi-Civita equations)
- Advisor: Prof. L. Casetti

Presentations at Conferences and Workshops

(19-24 March 2023), Emerging Methodologies to Investigate Quantum Effects in Biology, Galveston TX, USA
Speaker, "Application of Second Quantization to Many-Body Dispersion Interactions in Biomolecular Systems"

(March 28- April 1st 2022), Workshop "Multiscale Approaches in Quantum Mechanics", UCLA, Los Angeles, USA
Speaker, "Second-Quantization of Many-Body Dispersion Formalism: Towards Modeling of Million Atom Systems in Arbitrary Environments", available at https://www.youtube.com/watch?v=zRlDDb1HqVU

(8-11 March 2022), Workshop "Multiscale Approaches in Quantum Mechanics", UCLA, Los Angeles, USA
Speaker, "Field theory methods for multiscale description of quantum systems", available at https://www.youtube.com/watch?v=-uQTYB0Zyg8

(15-19 March 2021), APS March Meeting 2021, online
Speaker, "Second quantization of many-body dispersion: towards the description of million atoms systems in an arbitrary environment" and "Theory of four-wave mixing for biomolecular systems: Toward transduction of quantum information from fluorescent protein complexes to photonic readouts"

(28-29 March 2019), Workshop "Bose-Einstein Condensation in Inorganic and Organic Matter",Marseille, France
Speaker "Theoretical interpretation of the experimental outcomes on electrodynamic interaction between proteins"

(1-3 July 2016), 10th International Fröhlich's Symposium, Biophysical Aspects of Cancer, Prague, Czech Republic
Invited speaker, "THz near-field spectroscopy of proteins: towards detection of long-range electrodynamic interactions"

(1-4 July 2014), Reaction Kinetics in Soft and Condensed Matter 2014, Orleans, France
Speaker, "Experimental detection of long-distance interactions between biomolecules through their diffusion behaviour: Numerical study"

(24-25 October 2013), Macromolecular crowding effects in cell biology: models and experiments, Orleans, France
Poster Session

Partecipations at conferences and Workshops

(March 7- June 10 2022), Long Term Program "Advancing Quantum Mechanics with Mathematics and Statistics", Johns Hopkins University, Baltimore, MD, USA
Partecipant and speaker

(13-14 February 2020), Workshop "Quantum Biology for Quantum Sensing and Information Processing", Johns Hopkins University, Baltimore, MD, USA
Partecipant

(27 - 28 January, 2020), Chiral-Quantum Workshop, ASU Barrett & O'Connor Washington Center, Washington, D.C. 20006
Partecipant

Publications

1. *Topological theory of phase transitions*, MG, R. Franzosi, G. Pettini, M. Pettini.
   J. of Phys. A 55 (37), 375002 (2022)
2. *Experimental evidence for long-distance electrodynamic intermolecular forces*, M. Lechelon, Y. Meriguet, MG, S. Ruffenach, I. Nardecchia, E., D. Coquillat, F. Teppe, S. Mailfert, D. Marguet, P. Ferrier, L. Varani, J. Sturgis, J. Torres, M. Pettini.
   Sci. Adv. 8 (7), eabl5855 (2022)
3. *Topology and phase transitions: A first analytical step towards the definition of sufficient conditions*, Loris Di Cairano,MG, M. Pettini.
   Entropy 23 (11), 1414 (2021)
4. *Fine-Structure Constant Connects Electronic Polarizability and Geometric van-der-Waals Radius of Atoms*, A.Tkatchenko, D. Fedorov, MG.
   J. Phys. Chem. Lett. 12 (39), 9488-9492 (2021)
5. "*Geometrical and topological study of the Kosterlitz–Thouless phase transition in the XY model in two dimensions.*", G. Bel-Hadj-Aissa, MG, M. Pettini.
   J. Stat. Mech., 2021.2, 023206 (2021).
6. *Hamiltonian chaos and differential geometry of configuration space–time*, L. Di Cairano, MG, G. Pettini, M. Pettini.
   Physica D, 422, 132909 (2021).
7. *Geometrical Aspects in the Analysis of Microcanonical Phase-Transitions*, Ghofrane Bel-Hadj-Aissa,MG, V. Penna, G. Pettini, R. Franzosi.
   Entropy 2020, 22, 380 (2020)
8. *Coherent Riemannian-geometric description of Hamiltonian order and chaos with Jacobi metric*,
   L. Di Cairano, MG, M. Pettini.
   Chaos 29, 123134 (2019)
9. *On the origin of Phase Transitions in the absence of Symmetry-Breaking*, Giulio Pettini, MG, R. Franzosi, C. Clementi, M. Pettini.
   Physica A, 516, 376-392 (2019)
10. *Collective behavior of oscillating electric dipoles*,
    S. Olmi, MG, I. Donato, M. Pettini.
    Sci. Rep., 8(1), 15748 (2018)
11. *Out-of-equilibrium collective oscillation as phonon condensation in a model protein*,
    I. Nardecchia, M. Lechelon, J. Torres, V. Giliberti, M. Ortolani, P. Nouvel, MG, I. Donato, J. Preto, L. Varani, M. Pettini.
    Phys. Rev. X, 8(3), 031061 (2018)

12. *Topological origin of phase transitions in the absence of critical points of the energy landscape*,
MG, R. Franzosi, M. Pettini.
J. Stat. Mech.,9, 093204 (2018)

13. *Detection of long-distance interactions between biomolecules by means of Fluorescence Correlation Spectroscopy*,
I. Nardecchia, MG, M. Lechelon, I. Donato, J. Preto, E. Floriani, S. Jaeger, S. Mailfert, D. Marguet, P. Ferrier, M. Pettini.
Phys. Rev. E 96, 022403 (2017).

14. *Persistent Homology analysis of Phase Transitions*,
I. Donato,MG, M. Pettini, G. Petri, S. De Nigris, R. Franzosi, F. Vaccarino.
Phys. Rev. E 93, 052138 (2016).

15. *Random walk of passive tracers among randomly moving obstacles*,
MG, I. Donato, E. Floriani, I. Nardecchia, M. Pettini.
TBio. Med. 13(1) (2016).

16. *Experimental detection of long-distance interactions between biomolecules through their diffusion behavior: Numerical study*,
I. Nardecchia, L. Spinelli, J. Preto, MG, E. Floriani, S. Jaeger, P. Ferrier, and M. Pettini.
Phys. Rev. E 90, 022703 (2014).

Works in preparation or submitted to peer-review journals

1. *Phase Transitions in Abelian Lattice Gauge Theory: Production and Dissolution of Monopoles and Monopole-Antimonopole Pairs*, L. Di Cairano, MG, M. Sarkis, A. Tkatchenko.
arXiv:2303.05306 (2023). Submitted to PRL
2. *Examining the origins of observed terahertz modes from an optically pumped atomistic model protein in aqueous solution* K. Azizi, MG, U. Morzan, A. Hassanali, P. Kurian.
arXiv:2210.14912 (2022). Submitted to PNAS Next
3. *Second Quantization Approach to Many-Body Dispersion Interactions*,
MG, A.Tkatchenko, P.Kurian.
arXiv:2205.11549 (2022). Submitted to Nature Communication
4. *Configurational microcanonical statistical mechanics from Riemannian geometry of equipotential level sets*, MG
arXiv:2205.14536 (2022)
5. *Classification of the Kosterlitz-Thouless phase transition in the two dimensional XY model in the microcanonical ensemble*,
G. Bel-Hadj-Aissa, MG, R. Franzosi., M.Pettini
(2020).

Language Skills

- Italian: mother language
- English: fluent written and spoken
- French: fluent spoken, basic written

Computer Skills

- OS: Windows, Linux;
- Programming Languages: C, Fortran 90/95, Mathematica, Matlab, Python.
- Molecular Visualization Software: PyMol, VMD.
- Quantum Mechanical Simulation Software: DFTB+

Teaching and Supervision

- **Co-supervision PhD Student (October 2021-)**, student: Benedikt Ames, Supervisor: Prof. Alexandre Tkatchenko, University of Luxembourg (Luxembourg, Luxembourg);
- **Teaching Bachelor Course (January-May 2021)**, 18hrs in the conceptual introduction in quantum mechanics, bachelor course "Theoretical physics 3 : Quantum mechanics " led by Prof. Alexandre Tkatchenko;
- **Co-supervision Master Thesis (March-July 2019)**, *Thermodynamic and geometrical characterization of Kosterlitz-Thouless phase transition in XY-2D model in the microcanonical ensemble*, student: Ghofrane Bel Hadj Aissa, Supervisor: Prof. Marco Pettini, University of Aix-Marseille (Marseille, France);
- **Teaching Master Course (February-October 2018)**, 8 hrs in differential geometry and topology, master course "Statistical Mechanics" led by Prof. Marco Pettini and Dr.Elena Floriani;
- **Co-supervision Master Thesis (February-October 2018)** *Geometric Approach to Hamiltonian Chaos*, student: Loris Di Cairano, Supervisors: Prof. Pettini, Prof. Roberto Benzi, University Tor Vergata (Rome, Italy);
- **Co-supervision Master Thesis (February-July 2018)** *Non-Perturbative methods of Quantum Field Theory to describe order at the macroscopic scale*, student: Yacine Larbaoui, Supervisors: Prof. Pettini, University of Aix-Marseille (Marseille, France);

Interests

Professional

Many-Body Dispersive Interactions, Quantum Mechanics, Quantum Field Theory, Biophysics,Collective behaviour of interacting biomolecules,Biological effects of electromagnetic fields, Statistical mechanics, Differential Geometry and Topology,

Giovanna Marcelli

Curriculum Vitae

Current position

1 January 2023 – **Postdoc at the Department of Mathematical Sciences of Aalborg University, Denmark** .
Supervisors: Prof. Horia Cornean and Prof. Jesper Møller

Past position

16 April 2020 – 31 December 2022 **Postdoc at Scuola Internazionale Superiore di Studi Avanzati (SISSA), Trieste, Italy** .
Supervisor: Prof. Marcello Porta

01 April 2018 – 31 March 2020 **Postdoc at Eberhard Karls Universität Tübingen, Germany** .
Supervisor: Prof. Stefan Teufel

Education

Nov. 2014 – Feb. 2018 **Ph.D. in Mathematics**, University of Rome, "La Sapienza".
Thesis defence: 27 February 2018.
Title: "A mathematical analysis of spin and charge transport in topological insulators".
Supervisor: Prof. Gianluca Panati (University of Rome, "La Sapienza").
Referees: Prof. Eric Cancès (Ecole des Ponts ParisTech, INRIA Paris) and Prof. Benjamin Schlein (Universität Zürich).
Committee: Prof. Eric Cancès (Ecole des Ponts ParisTech, INRIA Paris), Prof. Domenico Finco (Università Telematica Internazionale Uninettuno) and Prof. Alessandro Teta (University of Rome, "La Sapienza").

Oct. 2016 – Mar. 2017 **Erasmus + (Ph.D. level)**, Host Institution: Eberhard Karls Universität Tübingen.
Title of the project: "Adiabatic theorems and application to quantum spin Hall effect".
Supervisor at the mobility destination: Prof. Stefan Teufel.

Oct. 2012 – Oct. 2014 **Master Degree in Mathematics**, *within the study program "Probability and Mathematical Physics"*, University of Rome, "La Sapienza".
Title: "Metodi di Bloch–Floquet per il Laplaciano ergodico".
Supervisors: Prof. Gianluca Panati and Prof. Adriano Pisante (University of Rome, "La Sapienza").
Final mark: 110/110 cum laude.

April 2015 **Certificate of Excellent Graduate at the Faculty of Mathematical, Physical and Natural Sciences**, *Academic year 2013-2014*, University of Rome, "La Sapienza".

Oct. 2009 – Oct. 2012 **Bachelor Degree in Mathematics**, University of Rome, "La Sapienza".
Title: "Analogie fra la Meccanica classica e l'Ottica geometrica".
Supervisor: Prof. Gianluca Panati (University of Rome, "La Sapienza").
Final mark: 110/110 cum laude.

Oct. 2010 – Oct. 2012 **Certificate of completion of study program at the University School of Excellence**, *administrated by "Fondazione Tullio Levi–Civita" and "International Research Center for Mathematics & Mechanics of Complex System" of University of L'Aquila*, in Cisterna di Latina (Latina), Italy.
Coordinator: Prof. Alberto Maria Bersani (University of Rome, "La Sapienza").
Final mark: Excellent.

Sept. 2004 – July 2009 **High School Degree**, *Liceo Scientifico (Piano Nazionale Informatica (PNI)), "Guglielmo Marconi"*, Colleferro (Rome), Italy.
Final mark: 100/100 cum laude.

August 2008 **University orientation course**, *one-week course*, (participation reserved to the two most proficient students in each high school), Scuola Normale Superiore di Pisa, Italy.

Qualifications

Feb. 2022 – Dec. 2026 **Qualification aux fonctions de Maître de conférences**, *Section 25 - "Mathématiques" (qual. n. 22225372883) & Section 26 - "Mathématiques appliquées et applications des mathématiques" (qual. n. 22226372883)*, France.

Teaching

November 2023 **Adiabatic perturbation theory in quantum dynamics**, *Ph.D. course at the Department of Mathematical Sciences*, Aalborg University.
Duration: 15 hours.

Oct. 2019 – Feb. 2020 **Exercise Classes for "Mathematical Quantum Theory"**, *Master in Mathematical Physics Program*, Eberhard Karls Universität Tübingen.
Duration$^{(*)}$: 30 hours.

October 2019 **Preparatory Course for the Master in Mathematical Physics Program**, Eberhard Karls Universität Tübingen.
Duration$^{(*)}$: 60 hours.

Apr. 2019 – July 2019 **Exercise Classes for "Linear Algebra"**, *Bachelor of Science*, Eberhard Karls Universität Tübingen.
Duration$^{(*)}$: 60 hours.

Oct. 2018 – Feb. 2019 **Exercise Classes for "Geometry in Physics"**, *Master in Mathematical Physics Program*, Eberhard Karls Universität Tübingen.
Duration$^{(*)}$: 30 hours.

October 2018 **Preparatory Course for the Master in Mathematical Physics Program**, Eberhard Karls Universität Tübingen.
Duration$^{(*)}$: 30 hours.

Apr. 2018 – July 2018 **Exercise Classes for "Non-Linear Dispersive Partial Differential Equations"**, *Master in Mathematical Physics Program*, Eberhard Karls Universität Tübingen.
Duration$^{(*)}$: 30 hours.

May 2016	**Istituzioni di Fisica Matematica**, *Master in Mathematics*, University of Rome, "La Sapienza". Two two-hour lectures to conclude the course taught by Prof. Mario Pulvirenti. Duration: 4 hours.
September 2015	**Preparatory Course in Mathematics**, *Faculty of Information Engineering, Informatics, and Statistics*, University of Rome, "La Sapienza". Duration: 24 hours.

(*) This duration does not include the time used both for grading the solutions written weekly by each student and the office hours.

Grants

February 2021– July 2022	**Progetto Giovani GNFM 2020**: "Correnti di spin in presenza di interazioni spin-orbita e campi magnetici", jointly with Domenico Monaco, funded by: INdAM–GNFM.
2016 August	**Start-up research funds** for the project: "Adiabatic theorems and application to quantum spin Hall effect", University of Rome, "La Sapienza".
2016 March	**Erasmus + mobility fellowship (Ph.D. level)** for the project: "Adiabatic theorems and application to quantum spin Hall effect", University of Rome, "La Sapienza". Mobility destination: Eberhard Karls Universität Tübingen, Germany and supervisor at the mobility destination: Prof. Stefan Teufel.
2014 October	**Ph.D. fellowship**, University of Rome, "La Sapienza".
Oct. 2010 – Oct. 2012	**Fellowship** at University school of excellence, administrated by "Fondazione Tullio Levi–Civita" and "International Research Center for Mathematics & Mechanics of Complex System" of University of L'Aquila (Coordinator: Prof. Alberto Maria Bersani (University of Rome, "La Sapienza")).
2010 January	**"Anna Norvano" fellowship**, reserved to the most proficient students in the scientific high school "Guglielmo Marconi", awarded by Comune di Colleferro (Rome).

Research

Research field	**Mathematical physics**	*I am interested in mathematical problems related to Quantum Mechanics, arising mostly from condensed matter physics. In particular, analysis of the transport properties of observable quantities, e.g. charge or spin, with universality feature for a relevant class of models in quantum systems.*
Research experience	**Mathematical physics**	*During my Ph.D. and first postdoc I have consolidated my competencies in mathematical methods of one-body quantum mechanics and non-equilibrium quantum evolution. In the second postdoc I have enhanced my knowledge and competencies in mathematical methods of many-body quantum mechanics and renormalization group. Currently, I am strengthening my competencies in scattering theory, non-linear quantum evolution systems and stochastic processes.*

Publications

- **Localization of generalized Wannier bases implies Chern triviality in non-periodic insulators** (with Massimo Moscolari and Gianluca Panati). Ann. Henri Poincaré (2022).
  https://doi.org/10.1007/s00023-022-01232-7.

- **Purely linear response of the quantum Hall current to space-adiabatic perturbations** (with Domenico Monaco). Lett. Math. Phys. (2022).
  https://doi.org/10.1007/s11005-022-01574-7.

- **From charge to spin: analogies and differences in quantum transport coefficients** (with Domenico Monaco). J. Math. Phys. (2022).
  https://doi.org/10.1063/5.0089786.

- **Improved energy estimates for a class of time-dependent perturbed Hamiltonians**. Lett. Math. Phys. (2022).
  https://doi.org/10.1007/s11005-022-01543-0.

- **A new approach to transport coefficients in the quantum spin Hall effect** (with Gianluca Panati and Stefan Teufel). Ann. Henri Poincaré (2021).
  https://doi.org/10.1007/s00023-020-00974-6.

- **Spin conductance and spin conductivity in topological insulators: analysis of Kubo-like terms** (with Gianluca Panati and Clément Tauber). Ann. Henri Poincaré (2019).
  https://doi.org/10.1007/s00023-019-00784-5.

- **The Haldane model and its localization dichotomy** (with Domenico Monaco, Massimo Moscolari and Gianluca Panati). *Rend. Mat. Appl.* **39**, Issue 2 (2018), 307–327.
  http://www1.mat.uniroma1.it/ricerca/rendiconti/ARCHIVIO/2018(2)/307-327.pdf.
  Extended preprint at arXiv:1909.03298.

Preprints

- **Adiabatic evolution of low-temperature many-body systems** (with R. L. Greenblatt, M. Lange, and M. Porta). Preprint available at arXiv:2211.16836. *Submitted.*

Scientific communications

Invited talks

6–9 September 2022 — **Solid Math 2022: Mathematical and numerical methods for solid-state physics**, SISSA, Trieste, Italy.
Title of the talk: Purely linear response of the quantum Hall current to space-adiabatic perturbations.

20–24 June 2022 — **Workshop on Quantum Hall Effect and Topological Phases**, IRMA, Strasbourg & Institute of Advanced Studies of the University of Strasbourg.
Title of the talk: *Purely linear response of the quantum Hall current to space-adiabatic perturbations.*

7 April 2022 **Oberseminar Mathematical Physics**, Tuebingen University, Department of Mathematics.
Title of the talk: *A new approach to transport coefficients in the quantum spin Hall effect and to purely linear response of the quantum Hall current*.

31 March 2022 **Series of online seminars in Mathematical Challenges in Quantum Mechanics**.
Title of the talk: *Gentle introduction to adiabatic perturbation theory*.

30 March 2022 **Seminar series in the condensed matter theory group**, KTH Royal Institute of Technology, Stockholm University and Nordita, Stockholm.
Title of the talk: *A new approach to transport coefficients in the quantum spin Hall effect and to purely linear response of the quantum Hall current*.

20–22 December 2021 **Quantum before Christmas: Mathematical Physics from Many-Body Quantum Systems to Normal Forms**, Università degli Studi di Milano & Politecnico di Milano.
Title of the talk: *A new approach to purely linear response of the quantum Hall current and to transport coefficients in the quantum spin Hall effect* .

10 December 2021 **Séminaire Physique mathématique ICJ**, Institut Camille Jordan, Lyon.
Title of the talk: *A new approach to transport coefficients in the quantum spin Hall effect and to purely linear response of the quantum Hall current*.

25–27 August 2021 **Solid Math 2021: Mathematical and numerical methods for solid-state physics**, Écoles des Ponts, Marne la Vallée.
Title of the talk: *A new approach to transport coefficients in the quantum (spin) Hall effect*.

9–13 August 2021 **Learning from insulators: new trends in the study of conduction properties of metals**, *Leiden University*, Lorentz Center, Oort.
Title of the talk: *A new approach to transport coefficients in the quantum (spin) Hall effect*.

25–28 July 2021 **Topological phases of matter**, *ETH Zürich*, Institute for Theoretical Physics, Leysin.
Title of the talk: *A new approach to transport coefficients in the quantum (spin) Hall effect*.

11 May 2021 **SISSA for schools**, *SISSA*, online.
Participation in "SISSA for schools", which aims to promote SISSA high quality research and lively international status to the younger generation.

17–28 May 2021 **Conference on Mathematical Aspects of Materials Science**, *SIAM*, Basque center for applied mathematics, online.
Title of the talk: *A new approach to transport coefficients in the quantum spin Hall effect*.

5 March 2021 **Cossa xe...? Seminar**, *SISSA*, Mathematics Area.
Title of the talk: *The integer quantum Hall effect and the Kubo formula*.

23 February 2021 **Analysis and Mathematical physics seminars 2020-2021**, *SISSA*, Mathematics Area.
Title of the talk: *A new approach to transport coefficients in the quantum spin Hall effect*.

3-4 February 2020 **Noncommutative Geometry, Analysis, and Topological Insulators**, *Leiden University*, Mathematisch Instituut.
Title of the talk: *A new approach to transport coefficients in the quantum (spin) Hall effect*.

4-5 July 2019 **Tübingen-Zürich Meeting in Mathematical Physics**, *Eberhard Karls Universität Tübingen*, Department of Mathematics.
Title of the talk: *Non-equilibrium almost-stationary states and linear response for gapped non-interacting quantum systems*.

15 April 2019 **Stuttgart-Tübingen GRK-Seminar**, *Universität Stuttgart*, Department of Mathematics.
Title of the talk: *Improved energy estimates for a class of perturbed Hamiltonian*.

3-6 Sept. 2018 **Recent progress in mathematics of topological insulators**, *ETH Zürich*.
Title of the talk: *Quantum (spin) Hall conductivity: Kubo-like formula (and beyond)*.

1-3 August 2018 **SOLID MATH 2018**, *McGill University*, Montréal (Canada).
Title of the talk: *Derivation of a Kubo-like formula for charge and spin transport*.

8-10 July 2015 **Trails in Quantum Mechanics and Surroundings 2015**, *Università dell'Insubria*, Como (Italy).
Title of the talk: *The analogies between prototypes of periodic Schrödinger operators via Bloch-Floquet methods and the ergodic Laplacian*.

Contributed talks

31 May 2022 **Reading seminar on the Renormalization Group**, *based on Giuliani et al. in J. High Energ. Phys. 2021, 26*, SISSA, Trieste, Mathematics Area.
Title of the talk: *Determinant bounds for fermionic expectations (part II)*.

25 May 2022 **Reading seminar on the Renormalization Group**, *based on Giuliani et al. in J. High Energ. Phys. 2021, 26*, SISSA, Trieste, Mathematics Area.
Title of the talk: *Determinant bounds for fermionic expectations (part I)*.

2-7 August 2021 **XX International Congress on Mathematical Physics**, Geneva (Switzerland).
Title of the talk: *A new approach to transport coefficients in the quantum (spin) Hall effect*.

16-20 Sept. 2019 **Quantum Transport and Universality, From Topological Materials to Quantum Hydrodynamics**, *Università degli Studi Roma Tre*, Dipartimento di Matematica e Fisica.
Title of the talk: *Non-equilibrium almost-stationary states and linear response for gapped non-interacting quantum systems*.

12-16 August 2019 **QMath14: Mathematical Results in Quantum Physics**, *Aarhus University*, Department of Mathematics.
Title of the talk: *Non-equilibrium almost-stationary states and linear response for gapped non-interacting quantum systems*.

23-28 July 2019 **XIX International Congress on Mathematical Physics**, *Centre Mont Royal*, Montréal (Canada).
Title of the talk: *Spin conductance and spin conductivity in topological insulators: analysis of Kubo-like terms*.

20-21 July 2019 **Young Researchers Symposium**, *McGill University*, Montréal (Canada).
Title of the talk: *Spin conductance and spin conductivity in topological insulators: analysis of Kubo-like terms*.

21-27 April 2019 **Mathematical Methods in Quantum Molecular Dynamics**, *MFO, Oberwolfach Research Institute for Mathematics*, (Germany).
Title of the talk: *Quantum (spin) Hall conductivity: Kubo-like formula (and beyond)*.

Forthcoming visits and talks

1-10 May 2023 Scientific collaboration with Prof. Ira Herbst, *Department of Mathematics, University of Virginia*, (United States).

22-26 May 2023 Scientific collaboration with Sebastiano Peotta, *Quantum Dynamics Group, Aalto University*, (Finland).

24 May 2023	Invited speaker, Mathematical physics seminars, *University of Helsinki*, (Finland). Title of the talk: Adiabatic evolution of low-temperature many-body quantum systems.
12-16 June 2023	Scientific collaboration with Domenico Monaco, *Department of Mathematics, University of Rome "La Sapienza"*, (Italy).
14 June 2023	Invited speaker, Mathematical physics seminars, *Department of Mathematics, University of Rome "La Sapienza"*, (Italy). Title of the talk: TBA.
3-7 July 2023	Invited speaker, 29th Nordic congress of Mathematicians with EMS, *Session: Mathematics applied to solid state physics*, Aalborg University, (Denmark). Title of the talk: TBA.
27-31 May 2024	Invited speaker, Conference on quantum statistical mechanics (to be confirmed), *University of Toulouse* , (France). Title of the talk: TBA.

Organization of scientific events

Co-organizer	**Conference: *Trails in Quantum Mechanics and surroundings***, SISSA, Trieste, Italy, 8-10 February 2023.

Service to the scientific community, professional affiliations and other scientific activities

Reviewer	Journal of Mathematical Physics, Reviews in Mathematical Physics.
2015 –	National Affiliation: Gruppo Nazionale per la Fisica Matematica, Istituto Nazionale di Alta Matematica (GNFM–INdAM).
2022 –	International Affiliation: International Association of Mathematical Physics (IAMP).
April 2022	Contribution to the IAMP News Bulletin: *"Voices of women in mathematical physics: A series of five interviews"* (with G. Basti, C. Boccato, L. Bossmann, S. Cenatiempo, E. Giacomelli, and S. Rademacher).
Co-supervisor	together with Prof. Gianluca Panati of Vincenzo Rossi, Master student in Mathematics of University of Rome, "La Sapienza" (Summer 2022).

Spoken languages

Italian	**Mother tongue**
English	**Fluent**
German	**Basic**

Curriculum Vitae

Lavoro

2021 – oggi **Assegnista di Ricerca** in Fisica Matematica (SSD MAT/07), Università degli Studi della Campania "L. Vanvitelli"

2021 **Assegnista di Ricerca** in Fisica Matematica (SSD MAT/07), per progetto di ricerca Androids-Valere, Università degli Studi della Campania "L. Vanvitelli"

2020–2021 **Docente a Contratto** per il corso di Matematica, Dipartimento di Scienze e Tecnologie, Ambientali Biologiche e Farmaceutiche, Università degli Studi della Campania "L. Vanvitelli"

2017 – 2020 **Dottorando in Matematica, Fisica e Applicazioni per l'Ingegneria**, XXXIII cycle, Università degli Studi della Campania "L. Vanvitelli"

2017 – 2020 **Dottorando in Fisica**, Université de Cergy

Istruzione e Formazione

2021 **Corso 24 CFU per iscrizione FIT in percorso formativo docenti (D.M. 616)**, SSD: PSI/04, DEA/01, PED/01, PED/03, Università Telematica E-Campus

2021 Abilitazione **Maître de Conférences**, Francia, Section 26: Matematica Applicata ed Applicazioni della Matematica

2020 **Cultore della materia Elementi di Meccanica, MAT/07**, Università degli Studi della Campania "L. Vanvitelli", Dipartimento di Ingegneria.

2020 **Cultore della materia Meccanica Analitica, MAT/07**, Università degli Studi della Campania "L. Vanvitelli", Dipartimento di Matematica e Fisica.

2017 – 2020 **Dottorato di Ricerca in Matematica, Fisica e Applicazioni per l'Ingegneria**, XXXIII cycle, Università degli Studi della Campania "L. Vanvitelli"

2017 – 2020 **Dottorato di Ricerca in Fisica**, Université de Cergy

2016 – 2017 **Master in Giornalismo e Ufficio Stampa**, Università degli Studi della Campania "L. Vanvitelli", 110/110 cum laude, tesi "*Comunicazione scientifica: storia, motivazioni ed esperienze tra matematica e medicina*", relatrice: Professoressa Francesca Gimigliano

2015 **Erasmus+ 2015**, Leipzig Universität, esami: *Partial Differential Equations 2*, *Functional Analysis 2* and *Smooth Dynamical Systems*

2013 – 2016 **Laurea Magistrale in Matematica**, Università degli Studi della Campania "L. Vanvitelli" - Max Planck Institute for Mathematics, Leipzig (Germany), 110/110 cum laude, tesi "*Q-valued functions, up to an introduction of BV Q-valued functions, and Dirichlet minimizing energy*", relatori: Professore Giovanni Pisante e Professore Emanuele Nunzio Spadaro

2013 **Viaggio d'istruzione per potenziamento della lingua inglese**, Londra

2010 – 2013 **Laurea triennale in Matematica**, Università degli Studi della Campania "L. Vanvitelli", 110/110 cum laude, tesi "*Formulazione debole di equazioni differenziali alle derivate parziali ellittiche del secondo ordine*", relatore: Professore Giovanni Pisante

2005 – 2010 **Maturità Scientifica**, Liceo Scientifico "Enrico Fermi", Aversa (CE), 100/100

Interessi di Ricerca

FISICA MATEMATICA: Teoria Cinetica, Modelli, Sistemi Stocastici Interagenti, Equazioni Differenziali, Equazioni Integro-Differenaziali, Stabilità

- Modelli per sistemi stocastici interagenti;
- Sviluppo di modelli cinetici per sistemi stocastici interagenti;
- Analisi matematica delle equazioni di evoluzione di un modello cinetico;
- Proprietà analitiche della soluzione di un modello cinetico: esistenza, unicità, positività, limitatezza e stabilità;
- Dipendenza della soluzione di un modello cinetico dai parametri del sistema;
- Analisi numerica e simulazioni di modelli cinetici.

Pubblicazioni Scientifiche

[22] R. Della Marca, N. Loy & M. Menale, Intransigent vs. volatile opinions in a kinetic epidemic model with imitation game dynamics, *Mathematical Medicine and Biology: A Journal of the IMA*, (2022), DOI: dqac018

[21] T. Kentaro, M. Menale, G. Pisante & E. Di Maio, A design tool for core-back timing in foam injection molding, *Journal of Applied Polymer Science*, **139** (45) (2022), e53121

[20] C. Bianca & M. Menale, On the initial-boundary-value problem and moments evolution in a thermostatted framework with nonhomogeneous boundary conditions, *Applied Mathematics and Information Sciences*, **16** (5) (2022), 781–788

[19] C. Bianca & M. Menale, A nonconservative-thermostat kinetic theory framework: density and linear-momentum evolution, *Applied Mathematics and Information Sciences*, **16** (5) (2022), 681–687

[18] C. Bianca & M. Menale, On the existence of self-similar solutions in the thermostatted kinetic theory within unbounded activity domain, *Mathematics*, **10** (9) (2021), 1407

[17] C. Bianca & M. Menale, Macroscopic quantities evolution in homogeneous thermostatted kinetic models, *Mathematics in Engineering, Science & Aerospace (MESA)*, **12** (3) (2021), 831–843

[16] B. Carbonaro & M. Menale, Towards the dependence on parameters for the solution of the thermostatted kinetic framework, *Axioms*, **10** (2) (2021), 59

[15] C. Bianca & M. Menale, Existence and uniqueness of the weak solution for a space–velocity thermostatted kinetic theory framework, *European Physical Journal Plus*, **136** (2) (2021), 243

[14] C. Bianca & M. Menale, Multi-active-particle modeling of complex systems within the discrete thermostatted kinetic theory, *Mathematics in Engineering, Science & Aerospace (MESA)*, **12** (4) (2021), 1081–1090

[13] C. Bianca & M. Menale, Mathematical analysis of a nonconservative discrete kinetic theory framework with thermostat, *Nonlinear Studies*, **28** (3) (2021), 903–914

[12] C. Bianca & M. Menale, Large time behaviour of homogeneous systems in the continuous thermostatted kinetic theory, *Nonlinear Studies*, **28** (4) (2021), 931–938

[11] C. Bianca & M. Menale, A note on the nonequilibrium stationary state in continuous-activity thermostatted models, *Applied Mathematics and Information Sciences*, **4** (5) (2020), 755–759

[10] C. Bianca & M. Menale, The maximum-entropy-based weight function in discrete-activity-thermostatted models, *Applied Mathematics and Information Sciences*, **14** (4) (2020), 527–532

[9] C. Bianca, B. Carbonaro & M. Menale, On the Cauchy problem of vectorial thermostatted kinetic frameworks, *Symmetry* , **12** (4) (2020), 517

[8] B. Carbonaro & M. Menale, The mathematical analysis towards the dependence on the initial data for a discrete thermostatted kinetic framework for biological systems composed of interacting entities, *AIMS Biophysics*, **7** (2020), 204–218

[7] C. Bianca & M. Menale, Mathematical Analysis of a Thermostatted Equation with a Discrete Real Activity Variable, *Mathematics*, **8** (1) (2020), 57

[6] C. Bianca & M. Menale, On the convergence towards nonequilibrium stationary states in thermostatted kinetic models, *Mathematical Methods in the Applied Sciences*, **42** (18) (2019), 6624–6634

[5] C. Bianca & M. Menale, Existence and uniqueness of nonequilibrium stationary solutions in discrete thermostatted models, *Communications in Nonlinear Science and Numerical Simulation*, **73** (2019), 25–34

[4] B. Carbonaro & M. Menale, Dependence on the Initial Data for the Continuous Thermostatted Framework, *Mathematics*, **7** (7) (2019), 602

[3] C. Bianca & M. Menale, On the interaction domain reconstruction in the weighted thermostatted kinetic framework, *European Physical Journal Plus*, **134** (4) (2019), 143

[2] C. Bianca & M. Menale, A Convergence Theorem for the Nonequilibrium States in the Discrete Thermostatted Kinetic Theory, *Mathematics*, **7** (8) (2019), 673

[1] C. Bianca & M. Menale, On the weighted interactions in the discrete thermostatted kinetic theory, *Nonlinear Studies*, **26** (1) (2019), 95–108

Articoli Sottomessi

[1] B. Carbonaro & M. Menale, The inverse problem for the reconstruction of the weight functions in a socio-economic system modelled by the discrete thermostatted kinetic framework

Libri Didattici

[2] B. Carbonaro & M. Menale, Fondamenti di meccanica: Cinematica e Dinamica, Mc-Graw Hill Italia, Milano, 2020

[1] B. Carbonaro & M. Menale, Fondamenti di Meccanica: strumenti matematici, Mc-Graw Hill Italia, Milano, 2019

Partecipazione a Conferenze

Ottobre 2022	Congresso Nazionale Mathesis 2022, Procida
Ottobre 2022	Current Trends in Kinetic Theory and Related Models, in memory of Prof. Giampiero Spiga, Università di Parma
Settembre 2022	CIME School "Mathematical modeling for epidemiology: analysis, simulation and forecasting", Cetraro
Giugno 2022	**Seminario**, MPDEE 2022 - Models in Population Dynamics, Ecology and Evolution, Torino, titolo: *Intransigent vs. volatile opinions in a kinetic epidemic model with imitation game dynamics*
Giugno 2022	**Seminario**, XXI International Conference on Waves and Stability in Continuous Media (WASCOM), Catania, titolo: *Intransigent vs. volatile opinions in a kinetic epidemic model with imitation game dynamics*
Maggio 2022	Assemblea Scientifica GNFM 2022, Montecatini Terme
Marzo – Giugno 2022	Mathematical Models in Epidemiology (MME), BCAM - Basque Center of Applied Mathematics
Febbraio 2022	Due Giorni di Algebra Lineare Numerica e Applicazioni, Centro Congressi Federico II, Napoli

Febbraio 2022	The Virtual 13th Conference on Dynamical Systems Applied to Biology and Natural Sciences, DSABNS 2022, Basque Center for Applied Mathematics in Bilbao
Dicembre 2021	Numerical Aspects of Hyperbolic Balance Laws and Related Problems - Young Researchers Conference, Università di Verona
Dicembre 2021	Young Researchers Workshop on Mathematical and Numerical Cardiac Modeling, On-line Workshop, Università di Pavia
Ottobre 2021	Large-scale limits of interacting particle systems, On-line Workshop, Institut des Hautes Études Scientifiques, Université Paris-Saclay
Settembre 2021	Waiting for the BioTOMath Conference Mathematics Challenges in Biology and Medicine, On-line Workshop, Dipartimento di Scienze Matematiche (DISMA) "G.L. Lagrange", Politecnico di Torino
Settembre 2021	Mathematical Modelling and Control for Healthcare and Biomedical Systems (MCHBS 2021 Virtual Workshop), Italian National Research Council (CNR), Roma
Settembre 2021	**Seminario**, XLVI Scuola Estiva di Fisica Matematica, Ravello, titolo: *A thermostatted kinetic framework for modeling Complex Systems*
Settembre 2021	MACH2021, Mathematical modeling and Analysis of degradation and restoration in Cultural Heritage, On-line INDAM Workshop, Roma
Settembre 2021	MATRIX x IMAGINARY, Raduno On-line, Institut Henri Poincaré
Settembre 2021	Present Research Trends in Conservation Laws, On-line INDAM Workshop, Roma
Settembre 2021	Modelling Diffusive Systems: Theory & Biological Applications, On-line Workshop
Maggio 2021	The Legacy of Carlo Cercignani: from Kinetic Theory to Turbulence Modeling, Conferenza on-line, Politecnico di Milano
Aprile 2021	NonInvasive Mathematics, On-line INDAM Workshop
Aprile 2021	Hausdorff School on Diffusive Systems: Pattern Formation, Bifurcations, and Biological Applications, Bonn
Marzo 2021	**Seminario**, Young Researcher Seminars, Maths Applications & Models, Università di Verona, titolo: *Towards a thermostatted kinetic theory for modeling Complex Systems*
Febbraio 2021	An on-line winter prelude to Methods and Models of Kinetic Theory 2022
Settembre 2020	**Seminario**, XLV Scuola Estiva di Fisica Matematica, Ravello, titolo: *Towards a thermostatted kinetic theory for modeling Complex Systems*
Settembre 2019	**Seminario**, XLIV Scuola Estiva di Fisica Matematica, Ravello, titolo: *Some new properties of a suitable weak solution to the Navier-Stokes equations*

Aprile 2019	Analysis and Applications - Contributions from young researchers, Dipartimento di Scienze Matematiche "G.L. Lagrange", Politecnico di Torino
Dicembre 2018	Mathematical and Numerical Models for Multi-physics Applications, a cura del Professore Alfio Quarteroni, Scuola Politecnica e delle Scienze di Base, Università degli Studi di Napoli Federico II, Napoli
Ottobre 2018	Recent Trends in Kinetic Modelling and Related Fields, Dipartimento di Scienze Matematiche "G.L. Lagrange", Politecnico di Torino
Settembre 2018	**Sessione Poster**, Nonlinear Analysis and PDEs, Università degli Studi della Campania "L. Vanvitelli", Caserta, titolo: *Thermostatted Kinetic Theory*
Aprile 2018	**Seminario**, ECAM-EPMI, Cergy-Pontoise (Francia): *Entropy method for the inverse problem related to the thermostatted framework*
Maggio 2016	Congresso Nazionale Mathesis, Dipartimento di Matematica e Fisica, Università degli Studi della Campania "L. Vanvitelli"
Giugno 2015	Geometric Analysis, Free Boundary Problems and Measure Theory, Max Planck Institute for Mathematics, Leipzig (Germania)

Ospite presso Università e Centri di Ricerca

Novembre 2021	**Ricercatore Ospite**, Centro di Ricerca Matematica "E. De Giorgio", Scuola Normale Superiore, Pisa
Aprile 2018	**Studente Ospite**, ECAM-EPMI, Université de Cergy-Pontoise, Cergy-Pontoise (France)
Febbraio 2016	**Studente Ospite**, Max Planck Institute for Mathematics, Leipzig (Germania)

Membro del Comitato Organizzativo di Conferenze

Giugno 2022	51st Scientific Meeting of the Italian Statistical Society, Caserta
2021 – oggi	Ciclo di Seminari di Fisica Matematica del gruppo DNFM (Divulgazioni Notturne di Fisica Matematica)
Settembre 2021	Promuovere le competenze matematiche nella scuola secondaria di secondo grado, Università degli Studi della Campania "L. Vanvitelli", Dipartimento di Matematica e Fisica, Caserta

Membro del Comitato Editoriale di Riviste

[4]	Promuovere le competenze di matematica nella scuola secondaria di secondo grado, atti del convegno "Toward a more efficient teaching in Numeracy", Settembre 2021, Università degli Stui della Campania "L. Vanvitelli", Dipartimento di Matematica e Fisica, Caserta
[3]	Mathematical Biology (specialty section of Frontiers in Applied Mathematics and Statistics)
[2]	Periodico di Matematiche, Mathesis

[1] Overlapping of Mathematics and Humanities, quaderni di matematica volume 29, Aracne, 2017

Attività di Referaggio

Riviste Advances in Mathematical Physics; Applied Mathematical Modelling; Axioms; Communications in Nonlinear Science and Numerical Simulation; Communications in Partial Differential Equations; Computational Statistics; Inverse Problems; Journal of Biological Systems; Mathematical Biosciences; Mathematics and Computers in Simulation Periodico di Matematiche; The European Physical Journal Plus

Partecipazione a Progetti di Ricerca

2021 – oggi **Modellistica socio-epidemiologica (MSE)**, UMI, Unione Matematica Italiana

2020 – oggi **Matematica per l'intelligenza artificiale e il machine learning (AI&ML&MAT)**, UMI, Unione Matematica Italiana

2019 – oggi **ANDROIDS, AutoNomous DiscoveRy Of depressIve Disorder Signs**, VALERE (VAnviteLli pEr la RicErca) program 2019, Università degli Studi della Campania "L. Vanvitelli"

Insegnamento

2021 – 2022 **Meccanica Analitica, Esercitazioni e Complementi**, Dipartimento di Matematica e Fisica, Università degli Studi della Campania "L. Vanvitelli"

2021 Docente Esperto del progetto di Formazione personale docente I livello per **Discipline Scientifiche e Tecnologiche (STEM)**, argomento: modelli per popolazioni ed epidemiologici, Liceo Statale "A. Manzoni", Caserta

2020–2021 Docente a Contratto **Matematica**, Dipartimento di Scienze e Tecnologie, Ambientali Biologiche e Farmaceutiche, Università degli Studi della Campania "L. Vanvitelli"

2020 – 2021 **A-Level Mathematics**, Liceo Scientifico "A. Manzoni", Caserta, indirizzo Cambridge

2020 – 2021 Tutor **Analisi Matematica 2**, Dipartimento di Ingegneria, Università degli Studi della Campania "L. Vanvitelli"

2020 – 2021 Tutor **Analisi Matematica 1**, Dipartimento di Matematica e Fisica, Università degli Studi della Campania "L. Vanvitelli"

2019 – 2020 Tutor **Probability Theory**, Dipartimento di Matematica e Fisica, Università degli Studi della Campania "L. Vanvitelli"

2019 – 2020 Tutor **Meccanica Analitica**, Dipartimento di Matematica e Fisica, Università degli Studi della Campania "L. Vanvitelli"

2019 – 2020 Tutor **Istituzioni di Matematica**, Dipartimento di Ingegneria, Università degli Studi della Campania "L. Vanvitelli"

2019 – 2020 Tutor **Analisi Matematica 1**, Dipartimento di Matematica e Fisica, Università degli Studi della Campania "L. Vanvitelli"

2018 – 2019 Tutor **Matematica Generale**, Dipartimento di Architettura, Università degli Studi della Campania "L. Vanvitelli"

2018 – 2019 Tutor **Analisi Matematica 2**, Dipartimento di Ingegneria, Università degli Studi della Campania "L. Vanvitelli"

2018 – 2019 Tutor **Analisi Matematica 1**, Dipartimento di Matematica e Fisica, Università degli Studi della Campania "L. Vanvitelli"

2017 – 2018 Tutor **Analisi Matematica 2**, Dipartimento di Ingegneria, Università degli Studi della Campania "L. Vanvitelli"

2017 – 2018 Tutor **Analisi Matematica 2**, Dipartimento di Ingegneria, Università degli Studi della Campania "L. Vanvitelli"

2017 – 2018 Tutor **Algebra Lineare e Geometria Analitica**, Dipartimento di Ingegneria, Università degli Studi della Campania "L. Vanvitelli"

2017 – 2018 Tutor **Corso di recupero OFA**, Dipartimento di Ingegneria, Università degli Studi della Campania "L. Vanvitelli"

2017 – 2018 Tutor **Analisi Matematica 1**, Dipartimento di Matematica e Fisica, Università degli Studi della Campania "L. Vanvitelli"

2016 – 2017 Tutor **Matematica Generale**, Dipartimento di Architettura, Università degli Studi della Campania "L. Vanvitelli"

2016 – 2017 Tutor **Analisi Matematica 2**, Dipartimento di Ingegneria, Università degli Studi della Campania "L. Vanvitelli"

2016 – 2017 Tutor **Geometria 1**, Dipartimento di Matematica e Fisica, Università degli Studi della Campania "L. Vanvitelli"

2016 – 2017 Tutor **Algebra Lineare e Geometria Analitica**, Dipartimento di Ingegneria, Università degli Studi della Campania "L. Vanvitelli"

2016 – 2017 Tutor **Probabilità e Statistica**, Dipartimento di Matematica e Fisica, Università degli Studi della Campania "L. Vanvitelli"

2016 – 2017 Tutor **Analisi Matematica 1**, Dipartimento di Ingegneria, Università degli Studi della Campania "L. Vanvitelli"

2016 – 2017 Tutor **Analisi Matematica 1**, Dipartimento di Matematica e Fisica, Università degli Studi della Campania "L. Vanvitelli"

2016 – 2017 Tutor **Algebra e Geometria**, Dipartimento di Ingegneria, Università degli Studi della Campania "L. Vanvitelli"

2016 – 2017 Tutor **Corso di recupero OFA**, Dipartimento di Ingegneria, Università degli Studi della Campania "L. Vanvitelli"

2016 – 2017 Tutor **Corso di recupero OFA**, Dipartimento di Ingegneria, Università degli Studi della Campania "L. Vanvitelli"

2016 – 2017 Tutor **Matematica ed Informatica**, Dipartimento di Scienze e Tecnologie Ambientali Biologiche e Farmaceutiche, Università degli Studi della Campania "L. Vanvitelli"

2015 – 2016 Tutor **Meccanica**, Dipartimento di Ingegneria, Università degli Studi della Campania "L. Vanvitelli"

2015 – 2016 Tutor **Matematica ed Informatica**, Dipartimento di Scienze e Tecnologie Ambientali Biologiche e Farmaceutiche, Università degli Studi della Campania "L. Vanvitelli"

2014 – 2015 **Tutorato alla pari per studenti con handicap, Analisi Mateamtica 1 ed Algebra 1**, Dipartimento di Matematica e Fisica, Università degli Studi della Campania "L. Vanvitelli"

Attività di Divulgazione e Disseminazione

2023 Attività di Disseminazione INDAM **"PAM: PodcAst di Matemtica - Comunicare contenuti di matematica nell'era dell'Industria 4.0"**, Responsabile Scientifico

2022 **Notte Europea dei Ricercatori 2022 - Caserta**, Responsabile della Comunicazione nel Comitato Organizzatore

Agosto 2022 Communicating Mathematics, On-line Workshop, Cornell University

2020 – oggi **Fondatore** e **Autore** della rubrica **La Lente Matematica** per **MaddMaths!** sulla matematica e le sue applicazioni

2019 – oggi **Organizzatore** e **Relatore** per **"PiGreco Day - Giornata Internazionale della Matematica"** presso Scuole Secondarie

2019-2020 Articoli divulgativi per **Devstatistics** sugli aspetti matematici della statistica

2019 – oggi **Notte Europea dei Ricercatori - Caserta**, Organizzatore dello "Stand della Matematica"

2018 – 2021 Articoli divulgativi per **Ius in Itinere** sugli aspetti matematici dell'economia

2018 **Notte Europea dei Ricercatori - Caserta, 2018**, comitato organizzativo

2017 **Stage in Cochrane Rehabilitation** per la pubblicazione di articoli di divulgazione medica nell'ambito del Master in Giornalismo e Ufficio Stampa

Aprile 2016 Matematica e Letteratura 2016. Alla scoperta di nuove convergenze, Dipartimento di Matematica, Università degli Studi di Salerno

Pubblicazioni di Divulgazione e Disseminazione

2019 B. Carbonaro & M. Menale, I sistemi complessi e l'anima umana: più che una metafora, *Periodico di Matematiche*, **11** (1-2-3) (2019)

2018 B. Carbonaro, M. Menale & A. Russo, Karl Marx: una lezione sul calcolo differenziale, *Periodico di Matematiche*, **10** (3) (2018)

Altre Attività

2022 – oggi **Rappresentante degli Assegnisti di Ricerca in Giunta**, Dipartimento di Matematica e Fisica, Università degli Studi della Campania "L. Vanvitelli"

2021 – oggi **Rappresentante degli Assegnisti di Ricerca in Consiglio di Dipartimento**, Dipartimento di Matematica e Fisica, Università degli Studi della Campania "L. Vanvitelli"

2021 – oggi **Consigliere Nazionale per SIDRI** (Società italiana del Dottorato di Ricerca)

2020 – oggi **Seminari di preparazione alle Olimpiadi della Matematica**

2020 – 2021 **Coordinatore per SIDRI** (Società italiana del Dottorato di Ricerca) presso l'Università degli studi della Campania "L. Vanvitelli"

2019 – 2020 **Tutor Supervisore e Coordinatore**, Dipartimento di Matematica e Fisica, Università degli Studi della Campania "L. Vanvitelli"

2019 – 2021 **Rappresentante dei dottorandi in Giunta**, Dipartimento di Matematica e Fisica, Università degli Studi della Campania "L. Vanvitelli"

2018 – 2021 **Rappresentante dei dottorandi in Consiglio di Dipartimento**, Dipartimento di Matematica e Fisica, Università degli Studi della Campania "L. Vanvitelli"

2018 – oggi **Seminari di Orientamento** presso Licei

2015 – 2016 **Rappresentante degli studenti in Commissione paritetica**, Scuola Politecnica delle Scienze di Base, Università degli Studi della Campania "L. Vanvitelli"

2015 – 2016 **Rappresentante degli studenti in Consiglio di Dipartimento**, Dipartimento di Matematica e Fisica, Università degli Studi della Campania "L. Vanvitelli"

Affiliazioni

2020 – oggi **EMS**, European Mathematical Society

2020 – oggi **SIMAI**, Società Italiana di Matematica Applicata e Industriale

2018 – oggi **Dinamici**, Comunità italiana di chi studia dinamica

2017 – oggi **UMI**, Unione Matematica Italiana

2017 – oggi **GNFM**, Gruppo Nazione per a Fisica Matematica

2016 – oggi **Mathesis**, sezione Caserta

2016 – oggi **SICC**, Società Italiana Caos e Complessità

Borse di Studio e Riconoscimenti

2014 **Borsa di Studio**, Università degli Studi della Campania "L. Vanvitelli"
2013 **Borsa di Studio**, Università degli Studi della Campania "L. Vanvitelli"
2012 **Borsa di Studio**, Università degli Studi della Campania "L. Vanvitelli"
2011 **Borsa di Studio**, Università degli Studi della Campania "L. Vanvitelli"

Lingue

Italiano **Lingua madre**
Inglese **Livello C1**: speaking, listening, reading and writing

Competenze Informatiche

Sistemi Operativi **Windows**, **Linux**
Linguaggi di Programmazione **C**, **C++**, **SQL**, **Python**
Programmi **Matlab**, **Wolfram**, **LaTex**

Altri Interessi

Scrittura; Poesia; Divulgazione; Divulgazione Scientifica; Sport

Altri Libri

[7] M. Menale et al., 2° Premio Internazionale Salvatore Quasimodo, Aletti Editore, Roma, 2017

[6] M. Menale et al., Dieci Anni VIII, Limina Mentis editore, Monza Brianza, 2017

[5] M. Menale et al., Festival Poetico - Il Federiciano - Edizione 2016, Aletti Editore, Roma, 2016

[4] M. Menale et al., Messaggi, Pagine, Roma, 2016

[3] M. Menale et al., Traguardi, Limina Mentis editore, Monza Brianza, 2016

[2] M. Menale et al., Tracce, Pagine, Roma, 2016

[1] M. Menale et al., Colori, Pagine, Roma, 2016

Competenze

Ricerca, Problem Solving, Insegnamento, Comunicazione, Pianificazione, Organizzazione, Gestione, Team Leader

Altre Competenze

Patente B

Curriculum Vitae – Aprile 2023

Formazione

Gennaio 2011 – Dicembre 2013
Corso di dottorato in Fisica e Astrofisica (curriculum teorico)

Istituzione: Università degli Studi di Torino, via Verdi 8, Torino, Italia
Titolo conseguito: Dottore di Ricerca
Data di conseguimento: 20 Giugno 2014
Votazione: Eccellente
Supervisori: Roberto Tateo (UNITO), Fedor Smirnov (UPMC)
Titolo della tesi: "ODE/IM correspondence in Toda field theories and fermionic basis in sin(h)-Gordon model"

Settembre 2012 – Settembre 2013
Progetto di co-tutela di tesi di dottorato

Istituzione partner: Université Pierre et Marie Curie, Laboratoire de Physique Théorique et Hautes Energies, Paris, France
Supervisore all'istituzione partner: Fedor Smirnov
Nota: progetto parzialmente finanziato dal grant "Vinci2012", assegnato dall'"Università Italo-Francese" in virtù della qualità eccezionale del progetto di ricerca dottorale.

Settembre 2008 – Luglio 2010
Corso di laurea specialistica in Fisica delle Interazioni Fondamentali

Istituzione: Università degli Studi di Torino, via Verdi 8, Torino, Italia
Titolo conseguito: Laurea Specialistica
Data di conseguimento: 15 Luglio 2010
Votazione: 110/110 cum laude
Supervisore: Ferdinando Gliozzi
Titolo della tesi: Monopole clusters, center vortices and quark confinement in gauge models

Settembre 2005 – Ottobre 2008
Corso di laurea triennale in Fisica

Istituzione: Università degli Studi di Torino, via Verdi 8, Torino, Italia
Titolo conseguito: Laurea Triennale
Data di conseguimento: 15 Ottobre 2008
Votazione: 110/110
Supervisore: Michele Caselle

Esperienze Lavorative

Qualifiche

27 Gennaio 2022
Abilitazione Scientifica Nazionale
Settore concorsuale: 02/A2
Fascia: II
Data di Scadenza: 27 Gennaio 2031

Posizioni Accademiche

01 Settembre 2020 – ad oggi
Post-doctoral Associate
Istituzione: New York University, Center for Cosmology and Particle Physics, New York, U.S.A.
Principali collaboratori: Sergei Dubovski, Massimo Porrati e Yifang Wang

01 Settembre 2017 – 31 Ottobre 2020
Post-doctoral Associate
Istituzione: Stony Brook University, C.N. Yang Institute for Theoretical Physics, Stony Brook, U.S.A.
Principali collaboratori: Vladimir Korepin e Alexander Zamolodchikov

01 Gennaio 2015 – 31 Dicembre 2016
Post-Doctorant
Istituzione: École Normale Supérieure de Paris, Laboratoire de Physique Théorique, Paris, France
Principali collaboratori: Gregory Korchemsky e Vladimir Kazakov

13 Gennaio 2014 – 31 Dicembre 2014
Marie Curie Early-Stage Researcher
Istituzione: Durham University, Department of Mathematical Sciences, Durham, U.K.
Principali collaboratori: Patrick Dorey e Roberto Tateo
Nota: Posizione finanziata dal Marie Curie Initial Training Network GATIS (`https://gatis.desy.eu/`)

2010 – ad oggi
Membro Associato
Istituzione: INFN, Torino, Italia.

Attività Didattica

Primavera 2023
Collaborazione di attività didattica (lezioni)
Attività svolta (in corso): Lezioni (30h), preparazione e valutazione di esercitazioni ed esami
Titolo del corso: "Quantum Field Theory II"
Livello: Laurea Magistrale
Istituzione: New York University, New York, U.S.A.

Primavera 2020
Collaborazione di attività didattica (lezioni)
Attività svolta: Lezioni (20h), tutoraggio (20h), preparazione e valutazione di esercitazioni ed esami
Titolo del corso: "Quantum Field Theory"
Livello: Laurea Magistrale
Istituzione: Stony Brook University, Stony Brook, U.S.A.

Febbraio 2017
Titolarità di Incarico (lezioni)
Attività svolta: Lezioni (3h), esercitazioni (3h)
Titolo del corso: "ODE/IM correspondence"
Livello: Dottorato
Istituzione: Trinity College, Dublin, Ireland (Scuola di Specializzazione YRISW)

Luglio 2015
Titolarità di Incarico (lezioni)
Attività svolta: Lezioni (10h)
Titolo del corso: "Integrable structures in CFT"
Livello: Dottorato
Istituzione: Durham University, Durham, U.K. (Scuola di Specializzazione YRIS)

2008 – 2010
Titolarità di Incarico (tutoraggio)
Attività svolta: Tutoraggio (100h per anno)
Titolo del corso: "Esperimentazioni I/II"
Livello: Laurea triennale
Istituzione: Università degli Studi di Torino, Torino, Italia

Attività di Supervisione

"Co-supervisore" dello studente di dottorato Nicolò Brizio (2022 – ad oggi), Università degli Studi di Torino.
"Co-supervisore" dello studente di laurea magistrale Fabrizio Aramini (2021 – 2022), Università degli Studi di Torino.
"Co-supervisore" dello studente di laurea magistrale Francesco Giordano (2020 – 2021), Università degli Studi di Torino.
"Co-supervisore" dello studente di dottorato Riccardo Conti (2016 – 2019), Università degli Studi di Torino.
"Co-supervisore" dello studente di laurea magistrale Leonardo Iannella (2017 – 2018), Università degli Studi di Torino.

Attività Organizzative e Progettuali

Oggi (per il 2024)
Organizzazione di conferenze
Titolo Conferenza (previsto): "Conformal Field Theory, Integrability and Geometry",
Presso (previsto): Simons Center for Geometry and Physics, Stony Brook, U.S.A.
Date (previste): 11 Marzo 2024 – 15 Marzo 2024

Oggi (per l'estate 2023)
Organizzazione di conferenze
Titolo Conferenza: "InTropea2023: Great Lessons From Exact Techniques And Beyond 2023",
Presso: Hotel Tropis, Tropea, Italy
Date: 28 Agosto 2023 – 1 Settembre 2023

Settembre 2021 – ad oggi
Organizzazione di seminari settimanali
Presso: Center for Cosmology and Particle Physice, New York University, New York, U.S.A.

2019
Organizzazione di conferenze
Titolo Conferenza: "$T\bar{T}$ and Other Solvable Deformations of Quantum Field Theories",
Presso: Simons Center for Geometry and Physics, Stony Brook, U.S.A.
Date: 08 Aprile 2019 – 12 Aprile 2019
Nota: 60+ partecipanti
Pagina web: `http://scgp.stonybrook.edu/archives/27792`

Settembre 2015 – 2017
Organizzazione di seminari settimanali
Presso: Laboratoire de Physique Théorique de l'École Normale Supérieure de Paris e Institut de Physique Théorique, Saclay, France

Attività Amministrative

2010 – 2014
Amministratore Informatico
Attività svolta: Amministrazione del cluster informatico del gruppo "Lattice Field Theory and Integrable Models"
Presso: Università degli Studi di Torino, Torino, Italia

Attività di Peer-Reviewing

Dal 2016
JHEP (7) | Physica Scripta (2) | Journal of Physics A (4) | Nuclear Physics B (3) | Sci-Post (6) | Physics Letters B (1)
JSTAT (1) | Communications in Mathematical Physics (1)

Relazioni su Invito a Conferenze

2023

Ottobre

Evento: Conferenza "Integrable systems and Field Theories"
Luogo: LPTHE, Université Pierre et Marie Curie, Paris, France
Titolo della Relazione: TBA

Luglio

Evento: Conferenza "Integrability, Dualities and Deformations"
Luogo: Durham University, U.K.
Titolo della Relazione: TBA

Febbraio

Evento: Workshop "Integrability in Condensed Matter Physics and Quantum Field Theory"
Luogo: MAP research centre, Les Diablerets, Switzerland
Pagina Web dell'evento: `https://indico.cern.ch/event/1131187/`
Titolo della Relazione: "Topological gauging and non-relevant deformations of Quantum Field Theories"

2022

Novembre

Evento: Focus program "Integrability, Duality and Related Topics"
Luogo: APCTP, Korea
Pagina Web dell'evento: `https://apctpstring.wixsite.com/integrability2022`
Titolo della Relazione: "Topological gauging and non-relevant deformations of Quantum Field Theories"

Agosto

Evento: Conferenza "Talking Integrability: Spins, Fields and Strings"
Luogo: Kavli Institute for Theoretical Physics (University of California at Santa Barbara)
Pagina Web dell'evento: `https://www.kitp.ucsb.edu/activities/integrable-c22`
Titolo della Relazione: "The relevance of being irrelevant"

2020

August

Evento: Conferenza "Integrability in Gauge and String Theories 2020"
Luogo: ICTP SAIFR, São Paulo, Brazil (via ZOOM)
Pagina Web dell'evento: `http://exact.ictp-saifr.org/`
Titolo della Relazione: "CDD deformations of 2D integrable field theories"

2019

Settembre

Evento: Conferenza "New frontiers of integrable deformations"
Luogo: Villa Garbald, Castasegna, Switzerland
Pagina Web dell'evento: `http://conf.itp.phys.ethz.ch/intdef19/`
Titolo della Relazione: "On irrelevant deformations, factorizable S-matrices and the generalized Gibbs ensemble"

Luglio

Evento: Conferenza "(Ir)regular singularities and Quantum Field Theory"
Luogo: Universidade de Lisboa, Lisboa, Portugal
Pagina Web dell'evento: `http://irregular.rd.ciencias.ulisboa.pt/Conferenza`
Titolo della Relazione: "The $T\overline{T}$ deformation: a gentle introduction"

Evento: Conferenza "Integrability in Gauge and String Theories 2019"
Luogo: Kräftriket, Stockholm, Sweden
Pagina Web dell'evento: `https://agenda.albanova.se/ConferenzaDisplay.py?confId=6241`
Titolo della Relazione: "A "gentle" introduction to TTbar deformed QFTs"

2018

Dicembre

Evento: Conferenza "XIV Avogadro Meeting on Strings, Supergravity and Gauge Theories"
Luogo: Università di Roma, Tor Vergata, Roma, Italia
Pagina Web dell'evento: https://agenda.infn.it/Evento/16768/
Titolo della Relazione: "$T\overline{T}$ Deformations"

Ottobre

Evento: Workshop "Exactly Solvable Models of Quantum Field Theory and Statistical Mechanics"
Luogo: Simons Center for Geometry and Physics, Stony Brook, U.S
Pagina Web dell'evento: http://scgp.stonybrook.edu/archives/24234
Titolo della Relazione: "$T\overline{T}$ deformations, integrability and geometry"

Seminari su Invito

2023

Marzo

Evento: Seminari settimanali del "High Energy Theory Center"
Luogo: Rutgers University, Piscataway, U.S.A.
Titolo del Seminario: "The relevance of being irrelevant"

Evento: Seminari settimanali dell'ITMP
Luogo: ITMP, Mosca, Russia (via ZOOM)
Titolo del Seminario: "Deterministic chaos and classical integrability"

Evento: Seminari settimanali del Gruppo di Fisica Teorica
Luogo: City College, New York, U.S.A.
Titolo del Seminario: "Topological gauging and non-relevant deformations of Quantum Field Theories"

Gennaio

Evento: Seminari settimanali del Dipartimento di Fisica
Luogo: Università degli Studi di Torino, Torino, Italy
Titolo del Seminario: "Topological gauging and non-relevant deformations of Quantum Field Theories"

2022

Dicembre

Evento: Seminari settimanali del LPTHE
Luogo: Université Pierre et Marie Curie, Paris, France
Titolo del Seminario: "Topological gauging and non-relevant deformations of Quantum Field Theories"

Novembre

Evento: Seminari settimanali del Dipartimento di Fisica Teorica
Luogo: CERN, Geneva, Switzerland
Titolo del Seminario: "Topological gauging and non-relevant deformations of Quantum Field Theories"

Evento: Seminari settimanali del Dipartimento di Matematica
Luogo: Università degli Studi di Modena e Reggio Emilia, Modena, Italy
Titolo del Seminario: "The generalised Born oscillator and the Hilbert-Pólya Conjecture"

Evento: Seminari settimanali del Dipartimento di Fisica
Luogo: Università degli Studi di Firenze, Firenze, Italy
Titolo del Seminario: "Topological gauging and non-relevant deformations of Quantum Field Theories"

Evento: Seminari settimanali del Statistical Physics Group
Luogo: SISSA, Trieste, Italy
Titolo del Seminario: "Topological gauging and non-relevant deformations of Quantum Field Theories"

Ottobre

Evento: Seminari settimanali del Dipartimento di Matematica
Luogo: University of York, York, U.K.
Titolo del Seminario: "The generalised Born oscillator and the Hilbert-Pólya Conjecture"

Evento: Seminari settimanali del Department of Mathematical Sciences
Luogo: University of Durham, Durham, U.K.
Titolo del Seminario: "Deterministic chaos and classical integrability"

Evento: Seminari settimanali del Dipartimento di Fisica
Luogo: Università degli Studi di Bologna, Bologna, Italy
Titolo del Seminario: "Classical/quantum correspondence and solvable irrelevant deformations"

Evento: Seminari settimanali del Dipartimento di Fisica
Luogo: Università degli Studi di Milano Bicocca, Milano, Italy
Titolo del Seminario: "Topological gauging and non-relevant deformations of Quantum Field Theories"

May

Evento: Seminari settimanali del Dipartimento di Fisica
Luogo: Università degli Studi di Bologna, Bologna, Italy
Titolo del Seminario: "Explorations in the space of Quantum Field Theories"

April

Evento: Seminari settimanali del Dipartimento di Fisica
Luogo: Università degli Studi di Parma, Parma, Italy
Titolo del Seminario: "Integrable irrelevant deformations: a "gentle" introduction"

January

Evento: Journal Club of the Dipartimento di Matematica
Luogo: Durham University, U.K. (via ZOOM)
Titolo del Seminario: "The Relevance of Being Irrelevant"

2021

Novembre

Evento: Seminari settimanali del Landau Institute
Luogo: L. D. Landau Institute for Theoretical Physics, Chernogolovka, Russia (via ZOOM)
Titolo del Seminario: "The Relevance of Being Irrelevant."

May

Evento: Seminari settimanali del Dipartimento di Fisica Matematica
Luogo: DESY, Hamburg, Germany (via ZOOM)
Titolo del Seminario: "The ODE/IM correspondence. A look to the past and one to the future"

January

Evento: Seminari settimanali del CCPP
Luogo: NYU, New York, U.S.A. (via ZOOM)
Titolo del Seminario: "Explorations in the space of Quantum Field Theories"

2020

Novembre

Evento: Seminari settimanali del Dipartimento di Fisica Matematica
Luogo: Oxford University, Oxford, U.K. (via ZOOM)
Titolo del Seminario: "Chiral field theory, fishnets and integrable spin chains"

April

Evento: Nordic Remote weekly HEP seminar
Luogo: Nordita, Stockholm, Sweden (via ZOOM)
Titolo del Seminario: "Irrelevant deformations of integrable QFTs: CDD factors and generalized Gibbs ensemble"

Febbraio

Evento: Seminari settimanali del LPTHE
Luogo: Université Pierre et Marie Curie, Paris VI, Paris, France
Titolo del Seminario: “Irrelevant deformations of integrable QFTs: CDD factors and generalized Gibbs ensemble”

2019

Novembre

Evento: Seminari settimanali del CCPP
Luogo: NYU, New York, U.S.A.
Titolo del Seminario: “The geometry of irrelevant deformations: classical surfaces and quantum integrability”

May

Evento: Seminari settimanali del SCGP
Luogo: Stony Brook, U.S.A.
Titolo del Seminario: “The quantum integrablity of surfaces in AdS”

March

Evento: Seminari settimanali del YITP
Luogo: Stony Brook, U.S.A.
Titolo del Seminario: “Higher-spin conserved charges and CDD deformations”

2018

June

Evento: Seminari settimanali del Dipartimento di Matematica
Luogo: Universidade de Lisboa, Lisbon, Portugal
Titolo del Seminario: “The $T\overline{T}$ deformation as a coordinate transformation”

Evento: Seminari settimanali del LPTHE
Luogo: Université Pierre et Marie Curie, Paris, France
Titolo del Seminario: “Fishnet Feynman diagrams and integrable non-compact spin chains”

January

Evento: Seminari settimanali del SCGP
Luogo: Stony Brook, U.S.A.
Titolo del Seminario: “An exact formula for one-point functions in sin(h)-Gordon model”

2017

Novembre

Evento: Seminari settimanali del YITP
Luogo: Stony Brook, U.S.A.
Titolo del Seminario: “The $T\overline{T}$ deformation”

June

Evento: Seminari settimanali del Dipartimento di Matematica
Luogo: Universidade de Lisboa, Lisbon, Portugal
Titolo del Seminario: “Fishnets and chains: integrability in four dimensions”

Evento: Meeting “Strings and Sugra in Piedmont”
Luogo: Università degli Studi di Torino, Torino, Italy
Seminar Titile: “Irrelevant Deformations of 2D Quantum Field Theories”

March

Evento: Seminari settimanali del Dipartimento di Matematica
Luogo: IMB, Dijon, France
Titolo del Seminario: “The ODE/IM correspondence for Affine Toda Field Theories”

2016

Ottobre

Evento: Seminari settimanali del IPhT
Luogo: Saclay, France
Titolo del Seminario: "The $T\overline{T}$ Deformation of 2D Quantum Field Theories"

June

Evento: Seminari settimanali del Dipartimento di Fisica
Luogo: Università degli Studi di Bologna, Bologna, Italy
Titolo del Seminario: "The $T\overline{T}$ Deformation of 2D Quantum Field Theories"

April

Evento: Seminari settimanali del LPTM
Luogo: Université de Cergy-Pontoise, France
Titolo del Seminario: "One-point functions in sin(h)-Gordon theory and the fermionic basis"

2015

Novembre

Evento: Seminari settimanali del IPhT
Luogo: Saclay, France
Titolo del Seminario: "The ODE/IM correspondence for Affine Toda Field Theories"

March

Evento: Seminari settimanali del Dipartimento di Matematica
Luogo: Universidade de Lisboa, Lisbon, Portugal
Titolo del Seminario: "The ODE/IM correspondence for Affine Toda Field Theories"

January

Evento: Seminari settimanali del LPTENS
Luogo: École Normale Supérieure, Paris, France
Titolo del Seminario: "Determinants and fermions: an exact formula for one-point functions"

2014

Novembre

Evento: Seminari settimanali del Dipartimento di Fisica
Luogo: Università degli Studi di Bologna, Bologna, Italy
Titolo del Seminario: "The ODE/IM correspondence for Affine Toda Field Theories"

June

Evento: Seminari settimanali del Dipartimento di Matematica
Luogo: IMB, Dijon, France
Titolo del Seminario: "One-point functions in sin(h)-Gordon theory and the fermionic basis"

April

Evento: Seminari settimanali del Dipartimento di Fisica
Luogo: King's College, London, U.K.
Titolo del Seminario: "One-point functions in sin(h)-Gordon theory and the fermionic basis"

Febbraio

Evento: Seminari settimanali del Dipartimento di Matematica
Luogo: Durham University, Durham, U.K.
Titolo del Seminario: "The ODE/IM correspondence for Affine Toda Field Theories"

2013

Febbraio

Evento: Seminari settimanali del LPTHE
Luogo: Université Pierre et Marie Curie, Paris, France
Titolo del Seminario: "The ODE/IM correspondence for Affine Toda Field Theories"

Premi, Finanziamenti e Riconoscimenti

13 Febbraio 2023
Ottenuto il risultato di 88.80% per un progetto MSCA Individual Postdoctoral Fellowship, con conseguente ottenimento del "Seal of Excellence".

15 Ottobre 2018
Ottenuto dal Simons Center for Geometry and Physics, a seguito della vittoria di un "call for proposals", i fondi ($35.000) per organizzare la conferenza internazionale "$T\bar{T}$ and Other Solvable Deformations of Quantum Field Theories", tenutasi presso il Simons Center for Geometry and Physics dal 08 Aprile 2019 al 12 Aprile 2019.

2014
Elezione a Fellow dell'"Initial Training Marie Curie Network" GATIS, finanziato dall'Unione Europea (grant agreement no. 317089). Questa onorificenza è risultata nel finanziamento della posizione come "Marie Curie Researcher" presso la Durham University dal 13 Gennaio 2014 al 31 Dicembre2014.
Webpage: https://gatis.desy.eu/scientists/

19 Luglio 2012
Premio Vinci2012 consistente in un contributo di €4500 per progetti eccezionali di tesi di dottorato in co-tutela.

Novembre 2010
Secondo posto all'esame di ammissione al corso di Dottorato presso l'Università degli Studi di Torino, ottenendo quindi una delle sei borse di studio disponibili, assegnate dal Ministero per l'Università e la Ricerca. Il contributo di tali borse ammontava a €13.638,47 per anno, per una durata di tre anni, per un totale di €40.915,41.

Collaborazioni Internazionali

Gennaio 2016 – ad oggi
Partecipazione alle attività di ricerca di un gruppo internazionale composto, principalmente, da me e Roberto Tateo (Università degli Studi di Torino), oltre che da vari studenti di Master e Dottorato.
Le attività di questo gruppo sono state supportate (e continuano ad esserlo) da numerosi finanziamenti:
- Simons Collaboration on Confinement and QCD Strings
- NSF Award PHY-2210349
- INFN project SFT
- FCT Project PTDC/MAT-PUR/30234/2017 "Irregular connections on algebraic curves and Quantum Field Theory"
- NSF Award PHY-1620628
- Programme Ideas ERC- 2012-AdG 320769 AdS-CFT-solvable
- INFN grant FTECP and the UniTo-SanPaolo research grant Nr TO-Call3-2012-0088 "Modern Applications of String Theory" (MAST)
- People Programme (Marie Curie Actions) of the European Unions Seventh Framework Programme FP7/2007- 2013/ under REA Grant Agreement No 317089 (GATIS).

Settembre 2022 – ad oggi
Team Member della "Simons Collaboration on Confinement and QCD Strings":
https://simonsconfinementcollaboration.org/people/

Settembre 2020 – ad oggi
Partecipazione alle attivita' di ricerca del gruppo composto da Sergei Dubovski, Gregory Gabadadze, Massimo Porrati e Yifan Wang (CCPP, NYU), finanziato dal grant NSF PHY-1915219.

Settembre 2017 – Agosto 2022
Team Member del progetto internazionale "(Ir)Regular Singularities and Quantum Field Theory":
https://irregular.rd.ciencias.ulisboa.pt/the-project/

Settembre 2017 – Agosto 2020
Partecipazione alle attivita' di ricerca del gruppo composto da Vladimir Korepin e Alexander Zamolodchikov (YITP, Stony Brook University), finanziata dal grant NSF Award PHY-1620628. Tale collaborazione continua ad oggi e si e' estesa a comprendere ricercatori in svariati centri di ricerca internazionali, tra cui Giancarlo Camilo, Lucia Cordova, Thiago Fleury, Guzmán Hernandéz-Chifflet, Maté Lencsés, Fidel Schaposnik e Alessandro Sfondrini.

Gennaio 2015 – Dicembre 2016
Partecipazione alle attivita' di ricerca del gruppo composto da Benjamin Basso e Vladimir Kazakov (École Normale Supérieure de Paris), finanziata dall'European Research Council (Programme "Ideas" ERC-2012-AdG 320769 AdS- CFT-solvable). In particolare collaborazione con Vladimir Kazakov, estesa a ricercatori dell'IPhT, CEA, Saclay, tra cui Gregory Korchemski, Ivan Kostov e Didina Serban e del King's College, London, tra i quali Nikolai Gromov.

Gennaio 2014 – Dicembre 2014
Partecipazione alle attività di ricerca del gruppo di Patrick Dorey (Durham University) in qualità di Marie-Sklodowska Curie Fellow del Network Europeo e Internazionale di ricerca e training "GAuge Theory as an Integrable System" (GATIS, grant no 317089) e da questo finanziata. Collaborazione, in particolare, con Patrick Dorey, Istvan Szécsényi e Rouven Frassek e più in generale inserita nel network GATIS, comprendente svariati gruppi e centri di ricerca.

Collaboratori

Dr. Riccardo Borsato (Santiago de Compostela U.) — Dr. Giancarlo Camilo (Technology Innovation Institute, Abu Dhabi)
Prof. Olalla Castro-Alvaredo (City, University of London) — Dr. Andrea Cavagliá (King's College, London)
Dr. Lucia G. Córdova (ENS Paris) — Prof. Patrick E. Dorey (Durham University)
Prof. Benjamin Doyon (King's College, London) — Prof. Sergei Dubovski (NYU)
Prof. Clare Dunning (University of Kent) — Dr. Thiago Fleury (Federal University of Rio Grande do Norte)
Dr. Rouven Frassek (ENS, Paris) — Prof. Guzmán Hernández-Chifflet (Universidad de la República, Montevideo)
Dr. Máté Lencsés (Budapest University) — Prof. Davide Masoero (Lisbon University)
Dr. Fedor Popov (NYU) — Prof. Massimo Porrati (NYU) — Dr. Fidel I. Schaposnik (IHES)
Dr. Alessandro Sfondrini (UNIPD) — Prof. Jacob Sonnenschein (Tel Aviv university)
Prof. Fedor Smirnov (UPMC Paris) — Dr. István M. Szécsényi (Royal Institute of Technology, Stockholm)
Prof. Roberto Tateo (UNITO) — Prof. A. B. Zamolodchikov (Stony Brook University)

Abilità informatiche

Sistemi Operativi
Mac OS, Linux, Windows

Programmi
Mathematica, Office package, LyX

Online services
Overleaf, Dropbox, Google docs

Linguaggi di composizione tipografica
TEXand LATEX

Linguaggi di programmazione
C, C++, Python, R

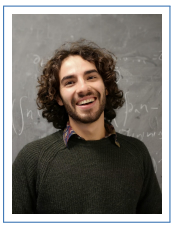
Lingue

Italiano (Madrelingua)
Inglese (Fluente, C2)
Francese (Fluente, C2)
Spagnolo (Intermedio, B1)

Eugenio Pozzoli

Curriculum Vitae

✉ *eugenio.pozzoli@uniba.it*
sites.google.com/view/eugeniopozzoli/home



Current position

from mar. 23 **Research fellow (R.T.D.A)**, *in Mathematical Physics (three-year contract), Dipartimento di Matematica*, Università degli studi di Bari, Bari, Italy.

Previous position

nov.22-feb.23 **Postdoctoral associate**, *Dipartimento di Matematica "Tullio Levi-Civita"*, Università degli studi di Padova, Padua, Italy.

Supervisor Davide Barilari

nov.21-oct.22 **Postdoctoral associate**, *Institut de Mathématiques de Bourgogne*, Université Bourgogne Franche-Comté, Dijon, France.

Supervisor Thomas Chambrion

Education

Ph.D thesis

sep.18-oct.21 **Ph.D in Mathematics**, Sorbonne Université, INRIA, Paris, France.

Advisors Ugo Boscain and Mario Sigalotti

Title *Some problems of evolution and control in quantum mechanics*

oct. 21 **Ph.D defence**, *doctoral examination commitee: M. Mirrahimi and G. Panati (referees), C. Fermanian Kammerer, C.P. Koch, M. Léautaud and E. Trélat (examiners), U. Boscain and M. Sigalotti (advisors).* .

Master thesis

sep.16-july 18 **Master degree in mathematics**, *SISSA*, joint degree with *Università degli studi di Trieste*, Italy.
110/110 cum laude

Advisor Alessandro Michelangeli

Title *Models of quantum confinement and perturbative methods for point interaction*

Bachelor thesis

sep.13-july 16 **Bachelor degree in mathematics**, Università la Sapienza, Rome, Italy.
110/110 cum laude

Advisor Adriano Pisante

Title *Orbite periodiche per sistemi Lagrangiani su varietà*

Research visits

oct. 22 **Princeton University**, *New Jersey, USA*, (H. Rabitz), 1 week.

sep. 22 **Iowa State University**, *Iowa, USA*, (D. D'Alessandro), 2 weeks.

nov.-dec. 20 **Free University of Berlin**, *Germany*, (C.P. Koch and M. Leibscher), 2 months.

may 19 **University of Kassel**, *Germany*, (C.P. Koch and M. Leibscher), 1 month.

Papers

Journal articles

- **Small-time bilinear control of Schrödinger equations with application to rotating linear molecules**, *T.Chambrion, E.Pozzoli*, Automatica (to appear), 8 pages arXiv.
- **Quantum geometric confinement and dynamical transmission in Grushin cylinder**, *M.Gallone, A.Michelangeli, E.Pozzoli*, Reviews in Mathematical Physics, vol. 34 (91 pages) (2022) arXiv DOI.
- **Single-input perturbative control of a quantum symmetric rotor**, *T.Chambrion, E.Pozzoli*, IEEE Control Systems Letters, vol.6, pp. 2425-2430 (2022) arXiv DOI.
- **Full Quantum Control of Enantiomer-Selective State Transfer in Chiral Molecules Despite Degeneracy**, *M.Leibscher, E.Pozzoli, C.Pérez, M.Schnell, M.Sigalotti, U.Boscain, and C.P.Koch*, Communications Physics 5, 110 (16 pages) (2022) arXiv DOI.
- **Lie algebra for rotational subsystems of a driven asymmetric top**, *E.Pozzoli, M.Leibscher, M.Sigalotti, U.Boscain, C.P.Koch*, Journal of Physics A: Mathematical and Theoretical 55, 215301 (16 pages) (2022) arXiv DOI.
- **Classical and quantum controllability of a rotating asymmetric molecule**, *E.Pozzoli*, Applied Mathematics and Optimization, 85 (2022), page 1-27. arXiv DOI.
- **Classical and quantum controllability of a rotating symmetric molecule**, *U.Boscain, M.Sigalotti, E.Pozzoli*, SIAM Journal on Control and Optimization, 59 (2021), page 156-184. arXiv DOI.
- **Quantum confinement for the curvature Laplacian $-\Delta + cK$ on 2D-almost-Riemannian manifolds**, *I.Beschastnyi, U.Boscain, E.Pozzoli*, Potential Analysis (24 pages) (2021) arXiv DOI.
- **On geometric quantum confinement in Grushin-type manifolds**, *M.Gallone, A.Michelangeli, E.Pozzoli*, Z. Angew. Math. Phys., 70 (17 pages) (2019). arXiv DOI.

Proceedings

- **Reachable sets for a 3D accidentally symmetric molecule**, *U.Boscain, M.Sigalotti, E.Pozzoli*, IFAC-PapersOnLine, 53, 2, 21st IFAC World Congress (2020), page 1943-1948 hal DOI.

Book chapters

- **Heat equation with inverse-square potential of bridging type across two half-lines**, *M.Gallone, A.Michelangeli, E.Pozzoli*, In: Georgiev, V., Michelangeli, A., Scandone, R. (eds) Qualitative Properties of Dispersive PDEs., INdAM 2021. Springer INdAM Series, vol 52. Springer, Singapore. pp 141-164 arXiv DOI.
- **Quantum confinement in α-Grushin planes**, *E.Pozzoli*, In: Michelangeli, A. (eds) Mathematical Challenges of Zero-Range Physics, Springer-INdAM series, vol.42, page 229-238 (2020). arXiv DOI.

Codes

- **Single-input perturbative control of a quantum symmetric rotor [source code]**, *T.Chambrion, E.Pozzoli*, IEEE Xplore Code Ocean (2022) arXiv DOI.

Teaching activities

feb.-mar. 21 **Teaching assistant**, *Evolution equations, control and stabilization, Sorbonne Université, master course*, (18 hrs.).
[course held in French]

sep. 19- jan. 20 **Teaching assistant**, *Calculus, Sorbonne Université*, (52 hrs.).
[course held in French]

Communications

International workshops & conferences as invited speaker

aug. 23 **ICIAM 2023**, *Interplay between controllability and qualitative aspects of stochastic dynamical systems*, Tokyo, Japan.

july 23 **SIAM Conference on Control and its Applications 2023**, *Geometric Control Theory with Quantum and Classical Applications*, Philadelphia, USA.

june 23 **Singularities, Asymptotics and Limiting Models**, *Bari, Italy*.

nov. 22 **Workshop on Singular Perturbations and Geometric Structures**, *SISSA (International School for Advanced Studies)*, Trieste, Italy.

sep. 22 **Analysis and control of (bi)linear PDEs**, *Università di Roma "Tor Vergata"*, Italy.

Conferences

dec. 22 **CDC 2022**, *Conference on Decision and Control*, Cancún, Mexico.

june 21 **SMAI congress**, *La Grande Motte*, France.

july 20 **IFAC World Congress 2020**, *online*.

Seminars

feb. 23 **Séminaire EDP et Interfaces des mathématiques et systèmes complexes**, *Laboratoire J.A. Dieudonné, Université Côte Azur, Nice*, France.

oct. 22 **Séminaire d'Automatique**, *GIPSA-LAB*, Grenoble, France.

oct. 22 **Séminaire d'Automatique**, *LIS*, Toulon, France.

oct. 22 **Séminaire d'Automatique**, *CentraleSupélec*, Gif-sur-Yvette, France.

oct. 22 **Herschel Rabitz's research group seminar**, *Princeton University*, New Jersey, USA.

sep. 22 **Algebra and Geometry seminar**, *Iowa State University*, Iowa, USA.

feb. 22 **Exploring Quantum Matter seminar**, *Technical University of Munich (TUM)*, Germany.

sep. 21 **Team SPOC seminar**, *IMB*, Dijon, France.

may 20 **Symplectic Geometry Seminar**, *Heidelberg University*, Germany.

PhD seminars

dec. 21 **Quantum information center Sorbonne (QICS)**, *Sorbonne Université*, Paris, France.

oct. 21 **Quantum Control in Quantum Technologies**, *Obergurgl*, Austria.

sep. 20 **QuSCo 2nd School**, *online*.

may 20 **Groupe de Travail des Thèsards du LJLL**, *Sorbonne Université*, France.

jan. 19 **Groupe de Travail des Thèsards du LJLL**, *Sorbonne Université*, France.

Projects

mar.23-mar.26 **Participant (as R.T.D.A Research fellow) to PNRR project**, *Mathematical methods for complex quantum systems*, National Quantum Science and Technology Institute, Università degli studi di Bari, Italy.
P.I.: Marilena Ligabò

sep.18-oct.21 **Participant (as PhD fellow) to the ITN QuSCo project**, *Quantum-enhanced Sensing via Quantum Control*, MSCA EU Horizon 2020.

Programming skills

Python, C++, Mathematica, MatLab.

Languages

Italian (mother tongue), English, French.

Giuseppe Scola

Academic education

November 2017 - April 2021	PhD in Mathematics of Natural, Social and Life Sciences at **GSSI**, L'Aquila, Italy Cum laude PhD Thesis: Applications of cluster expansion Advisor: Prof. Dimitrios Tsagkarogiannis
December 2016	Master of Science Mathematics at **UNICAL (Università della Calabria)**, Arcavacata di Rende, Cosenza, Italy 110/110 *cum Laude* | Major: Probability Thesis: "Consensus models on social networks" Advisor: Prof. Michele Gianfelice
July 2014	Bachelor of Sciences in Mathematics (direction APPLIED) at **Università degli Studi di Perugia**, Perugia, Italy 102/110 | Major: Mathematical models for economics Thesis: "Comparison of different market models" Advisor: Prof. Irene Benedetti
July 2008	High School Diploma at **Liceo Classico Pitagora**, Crotone, Italy 100/100

Research experience

May 2021 - Present	Postdoctoral Researcher at **Università Roma Tre**,Roma, Italy PRIN 2017 project MaQuMA, PRIN201719VMAST01 Scientist responsible for the research activity: Prof. Alessandro Giuliani Members of the research group: Prof. Alessandro Giuliani, Prof. Vieri Mastropietro, Prof. Slava Rychkov

Research interests

Probability and Statistical Mechanics	Renormalization Group. Critical exponents for a ϕ_d^4 fermionic theory. Large and moderate deviations. Cluster expansion. Colloids model. Consensus models. Models for complex systems.

Talks

January 9 2023	**Mathematical Quantum Matter** (Jan 9-11 2023) at Mathematics Department of the University of Milano, Milano, Italy **Title of the talk**: non-trivial fixed point of a ϕ_d^4 fermionic theory: critical exponents
February 3 2020	**Junior Applied Math Seminars** (January-February 2020) at GSSI and University of L'Aquila, L'Aquila, Italy **Title of the talk**: precise large and local moderate deviations via cluster expansion

Conferences, workshops and schools attended

Feb 6-8 2023	**Universality in Condensed Matter and Statistical Mechanics.** at Roma Tre University, Roma, Italy.
Jan 26-27 2023	**Quantum Transport: Disorder, Interactions and Integrability.** at Accademia Nazionale dei Lincei, Roma, Italy.
Oct 3-14 2022	**Mini-course in Mathematical Physics - Constructive renormalization group approach to lattice gauge theories by Prof. Jonathan Dimock.** at Roma Tre University, Roma, Italy.
May 11-13 2022	**Advances in Classical, Quantum and Statistical Mechanics. A celebration of the work and contributions of Giovanni Gallavotti, in the occasion of his 80th birthday.** at Roma Tre University, Roma, Italy.
September 27 - October 1 2021	**Workshop "Exact Quantisation and Applications to Condensed Matter Physics"** at SISSA, Trieste, Italy.
September 2-7 2019	**Stochastic and Analytic Methods in Mathematical Physics** at AUA, Yerevan, Armenia.
June 12-14 2019	**Statistical Mechanics of Active MatterStatistical Mechanics of Active Matter** at GSSI, L'Aquila, Italy
May 9-11 2018	**Women in applied and computational Mathematics** at GSSI, L'Aquila, Italy
May 21- June 15 2018	**Intensive program on fluids and waves** at GSSI, L'Aquila, Italy
September 24-26 2018	**Young Women in Mathematical Physics** at University of Bonn, Bonn, Germany

Organizing committee

September 20-23 2021	**STATISTICAL AND QUANTUM MECHANICS: reconsidering their foundations in the light of new cutting edge experiments and theoretical models** GSSI, L'Aquila - Sapienza Universita'di Roma, INFN, Italy (https://indico.gssi.it/event/93/)
October 6-13 2020	**Le Meccaniche: considerazioni e proposte per la didattica delle leggi di evoluzione dei sistemi fisici** GSSI, L'Aquila - Universita' degli Studi di Napoli Federico II, Italy (https://indico.gssi.it/event/134/)

Publications

G. Scola	Local moderate and precise large deviations via cluster expansions. Journal of Statistical Physics, 2021, 183: 1-25.
G. Scola	Cluster expansion for the Ising model in the canonical ensemble. Mathematical Physics, Analysis and Geometry, 2021, 24: 1-33.
M. Gianfelice, G. Scola	The consensus problem for opinion dynamics withlocal average random interactions Submitted for publication Preprint: https://arxiv.org/pdf/2204.05689.pdf
T. X. Nguyen, G. Scola, D. Tsagkarogiannis	Free energy expansions for renormalized systems with applications to colloids In preparation.
A. Giuliani, V. Mastropietro, S. Rychkov G. Scola	Non-trivial fixed point of a ϕ_d^4 fermionic theory: critical exponents In preparation.

Referring Professors

Michele Gianfelice	gianfelice@mat.unical.it
Errico Presutti	errico.presutti@gmail.com
Dimitrios Tsagkarogiannis	dimitrios.tsagkarogiannis@univaq.it
Alessandro Giuliani	giuliani@mat.uniroma3.it

Languages

Italian:	Mother-tongue
English:	Fluent

Musical education

July 2017	Pre-Accademic Diploma at **Istituto Suoperiore di Studi Musicali P.I. Tchaikovsky**, Nocera Terinese, Catanzaro, Italy 6.5/10 | Instrument: Cello Advisor: Master Antonio Salvati
September 2008	School-leaving examination of Complementary Piano at **Conservatorio di Musica S.Giacomantonio**, Cosenza, Italy 8.4/10
September 2007	School-leaving examination of Theory and Solfeggio at **Conservatorio di Musica S.Giacomantonio**, Cosenza, Italy 6.4/10

Work Experience

September 2014- November 2014	Sales clerk/courier service, at *Libreria Giuseppe Cerrelli ed Eredi* - Crotone, Italy
September 2016- November 2016	Sales clerk/courier service, at *Libreria Giuseppe Cerrelli ed Eredi* - Crotone, Italy
January 2017 - August 2017	Private tutoring of Mathematics Helping in preparing tests, exams for middle/high school and university students.
April 2017 - May 2017	High School Substitute Professor at *Liceo Scientifico Statale Filolao* - Crotone, Italy

Activities

December 2011 - December 2016	Cello player in the musical group Teresa la Notte
September 2012 - December 2013	Technician and Speaker for Radio UNINOMADE
January 2015 - April 2015	Speaker for Radio Ciroma
September 2017 - August 2017	Cello player in the musical group Audio Chaos
Jun 2017 - July 2017	Cello player in the musical group USB (Unione Suonatori di Base)

Luca Suriano

Curriculum scientifico-professionale

Carriera accademica

01/06/2004:

Laurea in Fisica (voto: 110/110), conseguita presso l'Università di Roma "La Sapienza", sotto la supervisione del prof. Francesco Guerra (Università di Roma "La Sapienza") e del prof. Daniele Guido (Università di Roma "Tor Vergata"), con una Tesi dal titolo *Indipendenza statistica delle algebre locali associate a campi liberi bosonici*.

16/06/2010:

Dottorato in Matematica, conseguito presso l'Università di Roma "Tor Vergata", sotto la supervisione del prof. Daniele Guido (Università di Roma "Tor Vergata"), con una Tesi dal titolo *A quantum distance for noncommutative measure spaces and an application to quantum field theory*.

18/07/2013:

Abilitazione all'insegnamento nella scuola secondaria superiore (classe A049: matematica e fisica), conseguita presso l'Università di Roma "Tor Vergata" (**TFA 2011/2012**; voto: 97/100).

Altre esperienze formative

10/1997-07/1998:

Borsa di studio del **Programma Erasmus** presso l'Università "Johannes Gutenberg" di Magonza (Germania).

Servizio civile

06/2000-03/2001:
Servizio civile per l'espletamento dell'obbligo di leva presso il Centro don Orione Montemario di Roma.

Abilità linguistiche

Lingua madre:
Italiano.

Inglese:
Comprensione: B2; parlato: B2; produzione scritta: B2 [autovalutazione].

Tedesco:
Comprensione: A2; parlato: A2; produzione scritta: A1 [autovalutazione].

Abilità informatiche

Sistemi Operativi:
Windows*, Mac-OS, Linux [utente autonomo].

Programmi di scrittura:
Latex, Microsoft Word [utente autonomo].

Fogli elettronici:
Open Office, Microsoft Office [utente autonomo].

Scuole e Conferenze

20/03/2006-24/03/2006:
"Topics in Operator Algebras and Noncommutative Geometry", Scuola di dottorato, Università di Trento.

8/11/2006-11/11/2006:
"Recent Advances in Operator Algebras - On the occasion of the 60th birthday of Laszlo Zsido", Conferenza, Università di Roma "La Sapienza".

23/11/2007-25/11/2007:
"Inaugural Meeting of the GREFI-GENCO", Primo incontro del gruppo di ricerca italo-francese sulla geometria noncommutativa, Università di Roma "La Sapienza".

29/09/2008-04/10/2008:
"Quantum space-time and noncommutative geometry", Workshop, Università di Roma "La Sapienza".

03/10/2008-07/10/2008:
"Noncommutative geometry and quantum field theory", Miniworkshop del *European Network on Noncommutative Geometry*, Università di Roma "La Sapienza".

29/07/2009-31/07/2009:
"Algebraic quantum field theory, the first 50 years", Conferenza, Università "Georg-Augustus" di Göttingen (Germania).

31/08/2009-05/09/2009:
"Non commutative geometry and quantum physics", Terzo incontro del gruppo di ricerca italo-francese sulla geometria noncommutativa, Vietri sul Mare (Salerno).

22/09/2010-25/09/2010:
"Seminal Interactions between Mathematics and Physics", Conferenza inaugurale del *Center for Mathematics and Theoretical Physics*, Roma, Accademia Nazionale dei Lincei.

10/01/2011-11/01/2011:
"Two days in QFT" dedicated to the memory of Claudio D'Antoni", Conferenza organizzata dal *Center for Mathematics and Theoretical Physics*, Università di Roma "Tor Vergata" e Laboratori Nazionali di Frascati-INFN.

08/07/2013-12/07/2013:
"Mathematics and Quantum Physics", Conferenza organizzata dal *Center for Mathematics and Theoretical Physics*, Roma, Accademia Nazionale dei Lincei.

Attività di docenza scolastica

a.s.2014/2015:
Supplenza su posto di sostegno presso il Liceo Classico Statale "Orazio" di Roma dal 07/11/2014 al 30/06/2015 [ore settimanali: 4].

a.s.2015/2016:
Supplenza su c.c.A049 presso il Liceo Classico Statale "Aristofane" di Roma dal 24/09/2015 al 14/11/2015 [ore settimanali: 18].

a.s.2015/2016:
Supplenza su c.c.A049 presso il Liceo Classico Statale "P. Albertelli" di Roma dal 14/12/2015 al 30/06/2016 [ore settimanali: 8].

a.s.2016/2017:
Supplenza su c.c.A049 presso il Liceo Scientico Statale "I. Newton" di Roma dal 25/10/2016 al 22/12/2016 [ore settimanali: 18].

a.s.2016/2017:
Supplenza su c.c.A049 presso il Liceo Scientico Statale "Nomentano" di Roma dal 13/01/2017 al 31/01/2017 [ore settimanali: 16].

a.s.2016/2017:
Supplenza su c.c.A049 presso il Liceo Classico Statale "P. Albertelli" di Roma dal 28/02/2017 al 05/04/2017 [ore settimanali: 18].

a.s.2016/2017:
Supplenza su c.c.A049 presso l'I.T.I.S. "G. Galilei" di Roma dal 04/05/2017 al 29/05/2017 [ore settimanali: 18].

a.s.2017/2018:
Assunzione in servizio effettivo nel ruolo di docente di scuola secondaria superiore nella c.d.c.A-27 (Matematica e Fisica) dal 01/09/2017 per effetto di Concorso Ordinario Personale Docente DDG n.106 del 23 febbraio 2016, presso l'I.P.S.S.E.O.A. "S. Pertini" di Magliano Sabina (RI).

a.s.2018/2019 - oggi:
In servizio presso il Liceo Classico Statale "P. Albertelli" di Roma.

Attività di docenza universitaria

2005-2006:
Esercitazioni per il corso di Matematica (titolare: prof. Daniele Guido), corso di Laurea Triennale in Biologia Cellulare e Molecolare, Università di Roma "Tor Vergata".

2006-2007:
Esercitazioni per il corso di Matematica (titolare: prof. Florin Radulescu), corso di Laurea Triennale in Ecologia, Università di Roma "Tor Vergata".

2013-2014:
Esercitazioni per il corso di Matematica generale (titolare: dott. Stefano Viaggiu), corso di Laurea Triennale in Scienze Economiche (CLESE), Università di Roma "Tor Vergata".

2013-2014:
Esercitazioni e complementi al corso di Analisi matematica 1 (titolare: prof. Alberto Berretti), corso di Laurea in Ingegneria, Università di Roma "Tor Vergata".

2014-2015:
Esercitazioni per il corso di Matematica generale (titolare: dott. Stefano Viaggiu), corso di Laurea Triennale in Scienze Economiche (CLESE), Università di Roma "Tor Vergata".

2014-2015:
Esercitazioni e complementi al corso di Analisi matematica 1 (titolare: prof. Alberto Berretti), corso di Laurea in Ingegneria, Università di Roma "Tor Vergata".

2015-2016:
Esercitazioni e complementi al corso di Analisi matematica 1 (titolare: prof. Alberto Berretti), corso di Laurea in Ingegneria, Università di Roma "Tor Vergata".

2016-2017:
Esercitazioni e complementi al corso di Analisi matematica 1 (titolare: prof. Alberto Berretti), corso di Laurea in Ingegneria, Università di Roma "Tor Vergata".

2018-2019:

Esercitazioni e complementi al corso di Analisi matematica 1 (titolare: prof. Alberto Berretti), corso di Laurea in Ingegneria, Università di Roma "Tor Vergata".

2019-2020:

Esercitazioni e complementi al corso di Analisi matematica 1 (titolare: prof. Alberto Berretti), corso di Laurea in Ingegneria, Università di Roma "Tor Vergata".

Pubblicazioni scientifiche

2017:

D. Guido, N. Marotta, G. Morsella, L. Suriano. *A Gromov-Hausdorff distance between von Neumann algebras and an application to free quantum fields*, Journal of Functional Analysis v.272 n.8 (2017), pp.3238-3258 [D.O.I.: 10.1016/j.jfa.2016.12.029].

2017:

D. Guido, N. Marotta, G. Morsella, L. Suriano. *A quantum distance between von Neumann algebras and applications to quantum field theory*, Proceedings of the MG14 Meeting on General Relativity, University of Rome "La Sapienza", Italy, 12 - 18 July 2015 (2017), pp.3870-3875 [D.O.I.: 10.1142/9789813226609_0513].

2018:

F. Fidaleo, L. Suriano. *Type III representations and modular spectral triples for the noncommutative torus*, Journal of Functional Analysis v.275 n.6, pp.1321-1602 [D.O.I.: 10.1016/j.jfa.2018.06.009].

Roma, 15/04/2023

Ekaterina Sysoeva

Esperienza di ricerca prima il conseguimento del dottorato

- 1.10.2019-12.03.2023 SISSA, Area Matematica, Trieste, Italia, assegnista di ricerca

Research experience before completion of PhD degree

- 1.11.2015-23.10.2018 Università degli Studi di Roma "Tor Vergata", Gruppo Teoria delle stringhe, Roma, Italia, attività di ricerca al fine di conseguire il dottorato di ricerca
- 01.07.2012-30.09.2015 Istituto Ioffe, Gruppo di fisica teorica del plasma, San Pietroburgo, Russia, ricercatore junior
- 01.09.2008-30.06.2012 Istituto Ioffe, Gruppo di fisica teorica del plasma, San Pietroburgo, Russia, attività di ricerca per il conseguimento di diplomi di laurea e di master

L'attività di ricerca è stata interrotta due volte a causa della nascita dei figli. Date di nascita: 17.03.2019 e 31.12.2020.

Esperienza didattica

- 01.09.2012-30.06.2015 Problem solving sull'elettrodinamica quantistica per gli studenti del primo anno di master dell'Università Accademica di San Pietroburgo

Istruzione superiore

- 1.11.2015-23.10.2018 Università degli Studi di Roma "Tor Vergata", Dottorato di ricerca in Fisica (Teoretica). Difeso nel 2018, ottobre, 23; titolo della tesi: "Loop di Wilson in diverse rappresentazioni e i suoi correlatori"; supervisore: Prof. Francesco Fucito
- 21.11.2016 - 09.12.2016 Galileo Galilei Institute, Firenze, LACES 2016 - Lezioni Avanzate di Campi e Stringhe
- 01.09.2010-30.06.2012 Università Accademica di San Pietroburgo, programma di riqualificazione "Fisica teorica e matematica".
- 01.09.2010-30.06.2012 Università Politecnica Statale di San Pietroburgo, Master in Fisica del Plasma
- 01.09.2006-30.06.2010 Università Politecnica Statale di San Pietroburgo, laurea in fisica del plasma

Oral talks

- *Higher rank equivariant Donaldson-Witten theory*, Workshop "String Theory as a bridge between Gauge Theories and Quantum Gravity", Feb 23-24, 2023, Torino, Italia
- *Diffusive regime of electromagnetic wave propagation in the turburlent inhomogeneous plasma*, Culham-Ioffe Symposium, Jan 27-31, 2014, Culhum, Gran Bretagna

Borse di studio

- Dynasty Foundation Scholarship, 2012
- Zhores Alferov Scholarship, 2011

Interessi scientifici

In generale, i miei interessi di ricerca riguardano la teoria quantistica dei campi e il suo legame con la matematica moderna.

Più precisamente, si trovano nella aria di teorie di campo quantistiche topologiche supersimmetriche a 4 dimensioni con simmetria di gauge e la teoria dei fasci come il sua controparte geometrica.

Il progetto più recente è stato dedicato alla derivazione di una relazione di ricorrenza per la funzione di partizione dell'istantone in una teoria supersimmetrica $\mathcal{N} = 2$ con gruppo di gauge $SU(N)$, che generalizza la relazione di ricorrenza di Zamolodchikov. È stato completato affrontando il problema sia dal punto di vista fisico che algebrico-geometrico.

La mia attuale attività di ricerca si concentra sulla ricerca delle osservabili di una teoria di gauge supersimmetrica su varietà toriche compatte, sia attraverso la localizzazione equivariante che dal punto di vista della teoria dei fasci.

Ho anche esperienza nei calcoli dei duali di supergravità delle osservabili di tali QFT in corrispondenza di AdS/CFT.

Parole chiave

Teoria quantistica dei campi, teoria topologica dei campi, teoria dei fasci, supersimmetria, localizzazione equivariante, invarianti di Donaldson, corrispondenza AdS/CFT

Romina **Travaglini**

Current position

Sep 2022 - Actual

Postdoctoral fellow, University of Minho, Braga, Portugal
Funding institution: CMAT (Centre of Mathematics)
Supervisor: A. J. Soares
Position end: August 2023

Education and training

Nov 2018 – Feb 2022

PhD in Mathematics, Università degli studi di Modena e Reggio Emilia in convention with Università degli Studi di Parma and Università degli Studi di Ferrara
Thesis: *BGK models and reaction-diffusion equations for reacting mixtures of monatomic and polyatomic gases* (Advisor: M. Bisi (Parma))
Final Exam: 24/02/2022 at Università degli Studi di Modena e Reggio Emilia, Dipartimento di Scienze Fisiche, Informatiche e Matematiche

Oct 2015 – Dec 2017

Master Degree in Mathematics, Università degli Studi dell'Aquila
Final mark 110/110 e lode (full mark with honors)

Oct 2011 – Mar 2015

Bachelor Degree in Mathematics, Università degli Studi dell'Aquila
Final mark 110/110 e lode (full mark with honors)

Scientific activity

Research Interests

Kinetic models for gas mixtures and biological systems; Hydrodynamic limits of kinetic equations; ODEs and PDEs for macroscopic fields, Reaction-diffusion systems; Turing instability and pattern formation.

Research papers

- M. Bisi, **R. Travaglini**, BGK model for a mixture with two reversible reactions in *From Kinetic theory to Turbulence Modeling, The Legacy of Carlo Cercignani*, P. Barbante, F. D. Belgiorno, S. Lorenzani, L. Valdettaro eds., Springer INdAM Series, **51**, Springer Singapore, 2023.
- M. Bisi, **R. Travaglini**, Reaction-diffusion equations derived from kinetic models and their Turing instability, *Comm. Math. Sci.*, **20**, 763-801, 2022.
- M. Bisi, **R. Travaglini**, A kinetic BGK relaxation model for a reacting mixture of polyatomic gases, in *Recent Advances in Kinetic Equations and Applications*, F. Salvarani ed., Springer INdAM Series, **48**, Springer International Publishing, 2021.
- M. Bisi, M. Groppi, G. Martalò, **R. Travaglini**, Optimal control of leachate recirculation for anaerobic processes in landfills. *Discrete & Continuous Dynamical Systems - B*, **26**, 2957-2976, 2021.

Scientific activity

• M. Bisi, **R. Travaglini**, A BGK model for mixtures of monoatomic and polyatomic gases with discrete internal energy, *Physica A: Statistical Mechanics and its Applications* **547**, 124441, 2020.
• J. M. S. Oliveira, A. J. Soares, **R. Travaglini**, Kinetic models leading to pattern formation in the response of the immune system. *Special issue of Rivista di Matematica della Università di Parma in memory of Giampiero Spiga Accepted for pubblication*

In progress

• J. M. S. Oliveira, **R. Travaglini**, Pattern formation from kinetic models for Multiple Sclerosis. *In preparation*

• G. Martalò, A.J. Soares, **R. Travaglini**, A consistent BGK model for a mixture undergoing a chemical reaction. *In preparation*

• G. Martalò, **R. Travaglini**, Derivation of a nonlinear reaction diffusion model for a gas mixture and Turing instability analysis . *In preparation*

• M. Menale **R. Travaglini**, Action of an external field over a kinetic structure: a model for autoimmunity. *In preparation*

Funded projects

• *Mathematical Modeling of Multi-scale Control Systems: applications to human diseases*, FCT Grant for Scientific Research and Technological Development Projects, from 01-04-2023 to 28-02-2026.
P.I.: Cristiana João Soares da Silva, Budget: 249 756,120 €, Role: member

• *Kinetic equations, macroscopic models and applications*, Italian National Group of Mathematical Physics (GNFM-INdAM) Grant for Young Researchers, 2021-2022.
P.I.: G. Martalò, Budget: 2800 €, Role: member

Merits

Grantee of INdAM Postdoctoral fellowship 2022-2023

Research visits

University of Parma, Italy, Feb. 27 - Mar. 5 2023, Hosted by Prof. M. Bisi.

Talks

• *Derivation of reaction-diffusion models from kinetic equations applied to biology*, Mar. 22 2023, Braga, Portugal.

• *Reaction-diffusion systems derived from kinetic models for autoimmune diseases*, Conference Dynamical Systems Applied to Biology and Natural Science, Feb. 5-9 2023, Bilbao, Spain.

• *Derivation from kinetic models and study of reaction-diffusion systems for reacting mixtures of gases*, Nov. 7-9 2022, Granada, Spain.

• *Reaction-diffusion systems derived from kinetic models for gas mixtures applied to autoimmune diseases*, Oct. 17 2022, Parma, Italy.

• **Invited speaker** *Reaction-diffusion systems derived from kinetic models for reacting mixtures of monatomic and polyatomic gases*, COST Action CA18232 – Mathematical models for interacting dynamics on networks, Sorbonne Université, Apr. 20-22 2022, Paris, France

• *Reaction-diffusion equations derived from kinetic models and their Turing instability*, Conference of SIMAI - Italian Society of Applied and Industrial Mathematics, Aug. 30 - Sept. 3 2021, Parma, Italy.

• *An optimal control problem for degradation of waste in landfills under anaerobic conditions*, Conference Dynamical Systems Applied to Biology and Natural Science, Feb. 4-7 2020, Trento, Italy.

• Seminars at Mathematical Physics School at Ravello (Itlay), in September 2019, 2020, 2021.

Posters

A BGK model for mixtures of monatomic and polyatomic gases with discrete internal energy levels, Summer School “Trails in kinetic theory: foundational aspects and numerical methods", Hausdorff Research Institute for Mathematics, Bonn (Germany) May 20-24 2019.

Teaching activity

Oct 2019 – Jun 2021 **Tutoring activity,** Tutoring for the course of Mathematical Methods for the Biotechnology degree course and for the course of Algebra for the Mathematics degree course. Activities: Exercises for students, Assistance during the examination

Science communication experiences

Sept 2018 – Present **Member of Scientificast,**
`https://www.scientificast.it/author/rominatravaglini/`
Writing of **blog articles** about Mathematics, recording of interviews and participation to the **podcast**.
Collaboration with the **publishing house De Agostini**: writing of deepening articles addressed to middle school teachers.

Giu 2022 **High school orientation seminar** *Mathematics and other stories* `https://www.youtube.com/watch?v=iqKeVJYJQC0`

Apr 2021 **Participation to Famelab 2021** Section of Genova, Italy. `https://life.unige.it/Famelab-2021-Genova-vincitori`

Jan 2019 – Feb 2020 **Guide to the interactive exhibition Pythagoras and his theorem,** for middle school pupils, Università degli Studi di Parma, Italy

Personal skills

Languages **English**: Level **B2** First Certificate in English issued by "Cambridge Institute".

Management Good skills of **expression**, **interaction** with the public and with the working group. **Problem Solving,** ability to investigate and critical attitude towards problems to be solved both individually and in group

Digital Good competence in building **Matlab** codes for solving ODEs and PDEs problems numerically. Mastery of the **Latex** language for documents, papers and posters.

Curriculum vitae

PERSONAL INFORMATION

Jacopo Viti

ACADEMIC POSITIONS

Jan 2023–present

Research associate (Post-doc)

University of Florence, Italy

On leave form a permanent teaching position at Italian Ministry of Education and Merit.

Aug 2017 – Sep 2022

Research Leader in Statistical Physics

International Institute of Physics (IIP), Natal, Brazil.

Feb 2016 – Sep 2022

Assistant Professor

Federal University of Rio Grande do Norte (UFRN), Natal, Brazil.

Affiliated to the mathematics department of the School of Science and Technology (ECT).

Oct 2014 – Feb 2016

Research Associate (Post-doc)

Max Planck Institute for the Physics of Complex Systems (MPIPKS), Dresden, Germany.

Independent post-doc in the group of Prof. R. Moessner.

Oct 2012 – Sep 2014

Research Associate (Post-doc)

LPT-École Normale Supérieure, Paris, France.

Supervisor: Prof. D. Bernard.

EDUCATION

2008–2012

PhD in Statistical Physics

SISSA, Trieste, Italy

Thesis title: *'Universal properties of two-dimensional percolation'*, Advisor: Prof. G. Delfino.

2005–2008

Laurea Specialistica (Master) in Physics

University of Florence, Florence, Italy

Thesis title: *'Entanglement entropy in two-dimensional conformal field theories' (in italian)*, Advisor: Dr. A. Cappelli, Mark: 110/110 (cum laude).

2001–2005

Laurea Magistrale (Bachelor) in Physics

University of Florence, Florence, Italy

Thesis title: *'La precessione di Thomas e le sue applicazioni'*, Advisor: Prof. G. Longhi, Mark: 110/110 (cum laude).

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VISITING POSITIONS

Jan 2020 – Jun 2021 INFN Researcher at Florence University (Florence, Italy)

Jul 2024 – Dec 2024 Jean D'Alembert junior fellowship (Paris-Saclay University, Paris)

ADDITIONAL INFORMATION

Italian Habilitations (ASN) Full Professor FIS 02/A2—Physics of fundamental interactions—(until 07/01/2027), Associate Professor FIS 02/B2—Physics of matter—(until 10/05/2025).

Grants 2019-2023, Bolsista de produtividade CNPQ (Personal fellowship awarded by the Brazilian national research agency)

Referee activity Referee for JHEP, JSTAT, JPhys A, PRA, PRB, PRE, PRL, PRR, SciPost

Research activity (keywords) Statistical Mechanics and Critical Phenomena, Conformal Field Theory, Quantum Dynamics and Entanglement, Lattice Models.

Civil Status Married with one son

PERSONAL SKILLS

Mother tongue Italian

Other languages

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2
Portuguese	C2	C2	C2	C2	C2
French	B1	B1	B1	B1	B1
German	A1	A1	A1	A1	A1

Levels: A1 and A2: Basic user – B1 and B2: Independent user – C1 and C2: Proficient user
Common European Framework of Reference for Languages

Digital competences

SELF-ASSESSMENT				
Information Processing	Communication	Content creation	Safety	Problem solving
Proficient user	Proficient user	Proficient user	Proficient user	Proficient user

Digital competences - Self-assessment grid

Computer skills – Proficient user (professional): Linux, Mathematica

Driving license B

TEACHING AND SUPERVISING ACTIVITY

Undergraduate level *From February 2016 to April 2022*, I taught the semestral courses (one per semester) *Calculo* (Calculus), *Vetores e Geometria Analítica* (Vectors and Analytic Geometry) and *Álgebra Linear* (Linear Algebra), for 1st and 2nd year undergraduates respectively. The total number of teaching hours per year is 120h/semester, including exams. The total amount of students attending each course is around 200 for each semester. The courses are mandatory for first and second year students at the School of Science and Technology of UFRN.

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Graduate level

- *July 2019-December 2019:* I taught the graduate course (60h/semester) *Teoria dos grupos e álgebras de Lie* (Group Theory and Lie Algebras) for graduate students at the Physics department of the UFRN. The course introduces elementary notions of Lie Algebras and Lie Groups.
- *February 2019-June 2019:* I taught the graduate course (60h/semester) *Teoria dos campos I* (Quantum Field Theory I) for graduate students at the Physics department of the UFRN. The course introduces the basic computational tools of Quantum Field Theory.
- *February 2018-June 2018:* I taught the graduate course (60h/semester) *Teoria dos campos II* (Quantum Field Theory II) for graduate students at the Physics department of the UFRN. The course introduces the concepts of scaling and renormalization.
- *February 2017:* Topic course on 'Some aspects of quantum transport', three invited lectures (10h) at the PhD School 'Statistical Field Theory Lectures', GGI, Florence, Italy.

Projects for Postdocs

- *Dr. Ivar Lyberg (two papers), 2016-2018; 'Monte Carlo study of vertex models'*. Now working for Nordic Investment Bank (Tallin, Estonia).
- *Dr. Máté Lencses (three papers), 2018-2020; 'Entanglement in 1+1 QFTs and Truncated Conformal Space Approach'*. Now at Budapest University.
- *Dr. Filiberto Ares (four papers), 2018-2021; 'Fluctuations in quantum spin chains'*. Now at SISSA (Italy).

Master students

- *Bruno Enrique Nogueira*; '*Conectividades no Modelo de Potts Crítico Bidimensional'* (March 2020)

ORGANIZATION ACTIVITY

International Conferences

- *March 2022 (postponed due to the pandemic):* Organizer together with P. Calabrese (SISSA, Italy), O. Castro-Alvaredo (City London, UK), M. Rajapbour (UFF, Brazil) and S. Ryu (Chicago, USA) of the conference *'Entanglement measures in many-body systems'*, two weeks, approx. 60 participants. The conference is hosted by the IIP.
- *June 2020 (postponed due to the pandemic):* Organizer together with H. Babujian (Yerevan), B. Conrey (AMS), G. Mussardo (SISSA), X. De la Ossa (Oxford), G. Sierra (Madrid), H. Mosavati (IMPA) of the conference *'Number theory and Physics'*, two weeks, approx. 50 participants. The conference is hosted by the IIP.
- *May 2019:* Organizer together with B. Doyon (Kings College, UK), J. Dubail (CNRS, France), G. Mussardo (SISSA, Italy), M. Rajapbour (UFF, Brazil) of the conference *'Emergent hydrodynamics in low-dimensional systems'*, three weeks, approx. 60 participants. The conference is hosted by the IIP.
- I also contributed in the local organization and secured financial support through the CAPES agency (http://www.capes.gov.br/index.php) for the following programs held at IIP: 'New Trends in Integrable models' (Aug 2016-Nov 2016), 'Finite Systems in Nonequilibrium: From Quantum Quenches to the Formation of Strong Correlations' (Sep 2017), 'Number theory and physics' (Jun 2020).

Schools

- *From February 2020:* Organizer together with P. Calabrese (SISSA, Italy), A. Cappelli (INFN Florence, Italy), J. Dubail (CNRS, France), F. Essler (Oxford, UK), C. Morais-Smith (Utrecht, Netherlands) and A. Trombettoni (Trieste, Italy) of the *'Statistical Field Theory School'* at GGI (Florence, Italy)

TALKS IN INTERNATIONAL CONFERENCES

Fall 2022 — Invited to the programs 'Number theory and physics' at the Simons Center for Geometry and Physics, Stony Brook University, USA and 'Integrability in String, Field, and Condensed Matter Theory' at KITP, Santa Barbara, USA; both declined for family reasons.

Oct 2021 — 'Entanglement negativity in 2d CFTs and Z3 Riemann surfaces', invited talk at the conference 'Mathematical harmony and the quantum world, celebrating 60 years of Denis Bernard', LPT-ENS Paris, France

May 2021 — 'Geometrical correlators in 2d CFTs: an introduction with some open problems', invited talk at the conference 'Bootstat 2021: conformal bootstrap and statistical models', Institut Pascal, Orsay, France.

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Oct 2019 'Emptiness formation probability and the Painlevé V equation in the Ising spin chain', invited talk presented during the conference 'The beauty of theoretical physics, celebrating 60 years of Giuseppe Mussardo', ICTP, Trieste, Italy.

Jul 2019 'Logarithmic correlations in statistical mechanics', invited talk presented during the program 'Random Geometry and Multifractality in Condensed Matter and Statistical Mechanics', IIP, Natal, Brazil.

Oct 2018 'Exact logarithmic correlations in critical percolation', invited talk presented during the program 'Exactly Solvable Model', Simon Center for Geometry and Physics, Stony Brook University, USA.

Jun 2018 'Exact logarithmic correlations in critical percolation', invited talk presented during the program 'Entanglement in Quantum Systems', GGI, Florence, Italy.

Jun 2018 'Exact logarithmic correlations in critical percolation', invited talk presented at the Workshop 'Quantum spin chains and integrable models', IIP, Natal, Brazil.

Sep 2017 'Analytic solution of the Domain Wall Initial State', invited talk presented at the Workshop 'Finite Systems in Nonequilibrium: From Quantum Quenches to the Formation of Strong Correlations', IIP, Natal, Brazil.

Aug 2017 'Analytic solution of the Domain Wall Initial State', contributed talk presented at the Workshop 'Quantum Devices', IIP, Natal, Brazil.

Aug 2016 'Arctic curves in fermionic systems', invited talk presented at the Workshop 'Boundary degrees of freedom and thermodynamic of integrable models', IIP, Natal, Brazil.

Jul 2016 'Quantum dynamics after connecting two integrable spin chains', invited talk presented at the Workshop 'Quantum Systems out-of-equilibrium', IIP, Natal, Brazil.

Apr 2016 'Arctic curves in fermionic systems', invited talk presented at the Workshop 'Statistical Mechanics and Combinatorics', Simon Center for Geometry and Physics, Stony Brook, USA.

Jan 2016 'Inhomogeneous quenches and arctic curves in fermionic systems', contributed talk presented at the Workshop 'Mathematical aspects of quantum systems out-of-equilibrium', Isaac Newton Institute for Mathematics, Cambridge, UK.

Nov 2015 'Inhomogeneous quenches and arctic curves in fermionic systems', invited talk presented at the Workshop 'Quantum many-body systems out-of-equilibrium', Bad-Honnef, Germany.

Aug 2015 'Inhomogeneous quenches and arctic curves in fermionic systems', invited talk presented at the Workshop 'Strongly Coupled Field Theory for Condensed Matter', IIP, Natal, Brazil.

Apr 2015 'Non-equilibrium CFT (with impurities)', invited talk presented at the Workshop 'Statistical physics and low-dimensional systems', Pont-à-Mousson, France.

Mar 2014 'Imaginary Liouville Theory and applications', contributed talk presented at the Workshop 'Quantum Integrability, CFT and Topological Quantum Computation', IIP, Natal, Brazil.

Apr 2013 'The three-point connectivity in the Q-color Potts model', invited talk presented at the Workshop 'Conformal Invariance in Continuous and Discrete Systems', Simon Center for Geometry and Physics, Stony Brook, USA.

Mar 2013 'Non-equilibrium thermal transport in the Quantum Ising chain', contributed talk presented at the Workshop 'MECO, 38-th European Conference for the Middle European Cooperation in Statistical Physics', ICTP, Trieste, Italy.

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Apr 2012 'Field Theory approach to percolation and the Potts model', contributed talk presented at the Workshop '2012 British Mathematical Colloquium', Kent University, UK.

Sep 2012 'Universal properties of two-dimensional percolation', contributed talk presented at the conference '8th Bologna workshop on CFT and Integrable models', Bologna, Italy.

INVITED SEMINARS

Mar 2022 'The $\hbar \to 0$ limit of the Entanglement Entropy', GQFI-WST seminar series, Potsdam AEI (Germany), Gent (Belgium), Warsaw (Poland).

May 2021 'Dynamics of Entanglement in low dimensional systems', Florence (Italy).

Mar 2021 'Dynamics of Entanglement in low dimensional systems', Genoa (Italy)

Dec 2020 'Entanglement entropies in 2d CFTs and the bootstrap', SISSA (Italy)

Nov 2020 'Entanglement dynamics in 1+1 dimensions', online seminar at City University London, London, UK.

Jul 2020 'Entanglement oscillations near a Quantum Critical Point', online seminar at International Institute of Physics, Natal, Brazil.

Jan 2020 'Emptiness formation probability and the Painlevé V equation in the Ising spin chain', seminar at Racah Institute for Theoretical Physics, Jerusalem, Israel.

Jun 2018 'Exact logarithmic correlations in critical percolation', seminar at Oxford Physics Department, Oxford, UK.

Jan 2018 'Logarithmic correlations in the Ising model', seminar at Florence University, Florence, Italy.

Dec 2017 'Analytic solution of the Domain Wall initial state', seminar at UFF, Niteroi, RJ, Brazil.

Sep 2017 'Logarithmic correlations in the Ising model', seminar at ICTP-SAIFR, São Paulo, Brazil.

Jul 2017 'Logarithmic correlations in the Ising model', seminar at Lorraine University, Nancy, France.

Feb 2017 'Quantum Quenches near a quantum critical point', seminar at SISSA, Trieste, Italy.

Feb 2017 'Arctic curves in fermionic systems', seminar at Florence University, Florence, Italy.

Apr 2016 'Dimers on the honeycomb lattice', seminar at Simon Center for Geometry and Physics, Stony Brook, USA.

Aug 2015 'Inhomogeneous quenches and arctic curves in fermionic systems', seminar at UFRN, Natal, Brazil.

Nov 2014 'Non-equilibrium steady states in quantum spin chains', seminar at TUD, Dresden, Germany.

May 2014 'Non-equilibrium steady states in quantum spin chains', seminar at Pisa University, Pisa, Italy.

Apr 2014 'Non-equilibrium steady states in quantum spin chains', seminar at MPIPKS, Dresden, Germany.

Sep 2012 'A Field Theory approach to percolation and phase separation in two dimensions', seminar at LPTMS, Orsay, France.

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Jun 2012 'Universal properties of two-dimensional percolation', seminar at LPT-ENS, Paris, France.

Sesto Fiorentino, 17/4/2023

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