CURRICULUM VITAE

Personal data

Name:	Claudio BONANNO
Born:	25 July 1975, Siracusa (Italy)
Nationality:	Italian
Present position:	Associate Professor of Mathematical Physics, University of Pisa (Italy)
Work address:	Department of Mathematics
	Largo Bruno Pontecorvo, 5
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Marital Status:	Married, 3 sons

Education and employment

1993/98 *Degree in Mathematics* with full grades and distinction at the University of Pisa (Italy).

1998/99 *Certificate of Advanced Studies in Mathematics* at the University of Cambridge (UK) with full grades and distinction.

2000/02 *Ph. D. in Mathematics* at the University of Pisa (Italy), defending on the 1 July 2003 the dissertation "Applications of information measures to chaotic dynamical systems", supervised by Prof. Vieri Benci and Prof. Stefano Isola.

2003 *Post-doc position* at the University of Pisa (Italy). Research on: "Applied Mathematics". Period: 1 July - 31 December.

2004 *Post-doc position* at the University of Camerino (Italy). Research on: "Ergodic and information theory methods applied to complex systems". Period: 1 January - 31 December.

2005 *Post-doc position* for the *Istituto Nazionale di Alta Matematica "F.Severi"*. Period: 1 April - 31 October.

2005/07 *Temporary position as assistant professor of Mathematical Analysis*, University of Pisa (Italy). Period: 2 November 2005 - 19 December 2007.

2006 *Visiting researcher* at the Centre de Physique Theorique of the École Polytechnique, Palaiseau Cedex (France). Period: 22 May - 30 September.

2007/16 *Assistant Professor of Mathematical Analysis*, University of Pisa (Italy).

2016/today *Associate Professor of Mathematical Physics*, University of Pisa (Italy). Since November, 1st.

2017 *Italian qualification for the role of Full Professor of Mathematical Physics.*

Publications

- *Ergodic theory*

    1. C. Bonanno, R. Castorrini, "Dynamical zeta functions for differentiable parabolic maps of the interval", arXiv:2403.17700 [math.DS]

2. C. Bonanno, A. Del Vigna, S. Isola, "A Poincaré map for the horocycle flow on $PSL(2, \mathbb{Z})\backslash\mathbb{H}$ and the Stern-Brocot tree", *Annali della Scuola Normale Superiore di Pisa, Classe di Scienze*, in press

3. C. Bonanno, T.I. Schindler, "Almost sure limit theorems with applications to non-regular continued fraction algorithms", *Stochastic Processes and Their Applications*, **183** (2025), art. 104573

4. W. Baalbaki, C. Bonanno, A. Del Vigna, T. Garrity, S. Isola, "On integer partitions and continued fraction type algorithms", *The Ramanujan Journal*, **63** (2024), no. 3, 873–915

5. M. Lenci, C. Bonanno, G. Cristadoro, "Internal-wave billiards in trapezoids and similar tables", *Nonlinearity*, **36** (2023), no. 2, 1029–1052

6. C. Bonanno, "On the generalised transfer operators of the Farey map with complex temperature", *Mathematics*, **11** (2023), no. 1, art. no. 134

7. C. Bonanno, G. Cristadoro, M. Lenci, "Maximal escape rate for shifts", *Discrete and Continuous Dynamical Systems*, **42** (2022), no. 12, 6007–6029

8. C. Bonanno, T.I. Schindler, "Almost sure asymptotic behaviour of Birkhoff sums for infinite measure-preserving dynamical systems", *Discrete and Continuous Dynamical Systems*, **42** (2022), no. 11, 5541–5576

9. C. Bonanno, S. Marò, "Chaotic motion in the breathing circle billiard", *Annales Henri Poincaré*, **23** (2022), no. 1, 255–291

10. C. Bonanno, A. Del Vigna, "Representation and coding of rational pairs on a Triangular tree and Diophantine approximation in $\mathbb{R}^2$", *Acta Arithmetica*, **200** (2021), no. 4, 389–427

11. C. Bonanno, A. Del Vigna, S. Munday, "A slow triangle map with a segment of indifferent fixed points and a complete tree of rational pairs", *Monatshefte für Mathematik*, **194** (2021), 1–40

12. C. Bonanno, M. Lenci, "Pomeau-Manneville maps are global-local mixing", *Discrete and Continuous Dynamical Systems*, **41** (2021), 1051–1069

13. C. Bonanno, S. Isola, "Series expansions for Maass forms on the full modular group from the Farey transfer operators", *Journal of Number Theory*, **210** (2020), 183–230

14. C. Bonanno, P. Giulietti, M. Lenci, "Infinite mixing for one-dimensional maps with an indifferent fixed point", *Nonlinearity*, **31** (2018), 5180–5213

15. C. Bonanno, P. Giulietti, M. Lenci, "Global-local mixing for the Boole map", *Chaos Solitons and Fractals*, **111** (2018), 55–61

16. C. Bonanno, I. Chouari, "Escape rates for the Farey map with approximated holes", *International Journal of Bifurcation and Chaos*, **26** (2016), issue 10, art. id. 1650169

17. S. Ben Ammou, C. Bonanno, I. Chouari, S. Isola, "On the spectrum of the transfer operators of a one-parameter family with intermittency transition", *Far East Journal of Dynamical Systems*, **27** (2015), 13–25

18. S. Ben Ammou, C. Bonanno, I. Chouari, S. Isola, "On the leading eigenvalue of transfer operators of the Farey map with real temperature", *Chaos Solitons and Fractals*, **71** (2015), 60–65

19. C. Bonanno, S. Isola, "A thermodynamic approach to two-variable Ruelle and Selberg zeta functions via the Farey map", *Nonlinearity*, **27** (2014), 897–926

20. C. Bonanno, C. Carminati, S. Isola, G. Tiozzo, "Dynamics of continued fractions and kneading sequences of unimodal maps", *Discrete and Continuous Dynamical Systems*, **33** (2013), 1313–1332

21. C. Bonanno, "Entropy and complexity in dynamical systems and PDEs", in J.S.Cánovas editor, *"Advances in discrete dynamics"*, pp. 189–224, Series: Mathematics Research Development, Nova Science Publishers, 2012

22. C. Bonanno, J.R. Chazottes, P. Collet, "Estimates of Kolmogorov complexity in approximating Cantor sets", *Nonlinearity*, **24** (2011), 459–479

23. C. Bonanno, S. Isola, "Orderings of the rationals and dynamical systems", *Colloquium Mathematicum*, **116** (2009), 165–189

24. C. Bonanno, S. Isola, "A renormalization approach to irrational rotations", *Annali di Matematica Pura e Applicata*, **188** (2009), 247–267

25. C. Bonanno, S. Graffi, S. Isola, "Spectral analysis of transfer operators associated to Farey fractions", *Atti Accad. Naz. Lincei Cl. Sci. Fis. Mat. Natur. Rend. Lincei (9) Mat. Appl.*, **19** (2008), 1–23

26. C. Bonanno, P. Collet, "Complexity for extended dynamical systems", *Communications in Mathematical Physics*, **275** (2007), 721–748

27. C. Bonanno, G. Menconi, V. Benci, P. Cerrai, "Computable information content and boolean networks dynamics", *Complex Systems*, **16** (2005), 155–174

28. C. Bonanno, S. Galatolo, "Algorithmic information for interval maps with an indifferent fixed point and infinite invariant measure", *Chaos*, **14** (2004), 756–762

29. V. Benci, C. Bonanno, S. Galatolo, G. Menconi, M. Virgilio, "Dynamical systems and computable information", *Discrete and Continuous Dynamical Systems - Series B*, **4** (2004), 935–960

30. C. Bonanno, "The Algorithmic Information Content for randomly perturbed systems", *Discrete and Continuous Dynamical Systems - Series B*, **4** (2004), 921–934

31. C. Bonanno, S. Galatolo, S. Isola, "Recurrence and algorithmic information", *Nonlinearity*, **17** (2004), 1057–1074

32. C. Bonanno, M.S. Mega, "Toward a dynamical model for prime numbers", *Chaos Solitons Fractals*, **20** (2004), 107–118

33. C. Bonanno, "Applications of information measures to chaotic dynamical systems", *PhD dissertation, Università di Pisa*, 2003

34. C. Bonanno, G. Menconi, "Computational information for the logistic map at the chaos threshold", *Discrete and Continuous Dynamical Systems - Series B*, **2** (2002), no. 3, 415–431

35. C. Bonanno, S. Galatolo, G. Menconi, "Information of sequences and applications", *Physica A*, **305** (2002), no. 1-2, 196–199

36. C. Bonanno, V. Manca, "Discrete dynamics in biological models", *Romanian Journal of Information Science and Technology*, **5** (2002), no. 1-2, 45–67

- *Nonlinear time serie analysis*

1. M. Bianco, A. Scarciglia, C. Bonanno, G. Valenza, "Heart rate variability series is the output of a non-chaotic system driven by dynamical noise", arXiv:2404.11385 [eess.SP]

2. A. Scarciglia, V. Catrambone, M. Bianco, C. Bonanno, N. Toschi, G. Valenza, "Age-Dependent Spatial Patterns of Brain Noise in fMRI Series", proceedings della *46th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, 2024, pp. 1–4

3. A. Scarciglia, V. Catrambone, M. Bianco, C. Bonanno, N. Toschi, G. Valenza, "Stochastic brain dynamics exhibits differential regional distribution and maturation-related changes", *NeuroImage*, **290** (2024), art. no. 120562

4. A. Scarciglia, V. Catrambone, C. Bonanno, G. Valenza, "Physiological noise: definition, estimation, and characterization in complex biomedical signals", *IEEE Transactions on Biomedical Engineering*, **71** (2024), no. 1, 45–55

5. A. Scarciglia, V. Catrambone, C. Bonanno, G. Valenza, "Characterization of physiological noise in complex cardiovascular variability series", proceedings della *45th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, 2023, pp. 1–4

6. A. Scarciglia, F. Gini, V. Catrambone, C. Bonanno, G. Valenza, "Estimation of dynamical noise power in unknown systems", *IEEE Signal Processing Letters*, **30** (2023), 234–238

7. A. Scarciglia, V. Catrambone, C. Bonanno, G. Valenza, "Multiscale partition-based Kolmogorov-Sinai entropy: a preliminary HRV study on heart failure vs. atrial fibrillation", proceedings della *44th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, 2022, pp. 131–134

8. A. Scarciglia, V. Catrambone, C. Bonanno, G. Valenza, "A multiscale partition-based Kolmogorov-Sinai entropy for the complexity assessment of heartbeat dynamics", *Bioengineering*, **9** (2022), no. 2, 80

9. A. Scarciglia, V. Catrambone, C. Bonanno, G. Valenza, "Quantifying partition-based Kolmogorov-Sinai entropy on heart rate variability: a young vs. elderly study", proceedings della *43rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, 2021, pp. 5469–5472

10. G. Menconi, M. Franciosi, C. Bonanno, J. Bellazzini, "Information content towards a neonatal disease severity score system", in *Mathematical Modeling of Biological Systems"*, *Vol. I*, A. Deutsch, L. Brusch, H. Byrne, G. de Vries and H.-P. Herzel (eds), Birkhauser, Boston, pp. 323–330, 2007

- *Solitons in field theories*

1. C. Bonanno, "A complexity approach to the soliton resolution conjecture", *Journal of Statistical Physics*, **160** (2015), 1432–1448

2. C. Bonanno, "Long time dynamics of highly concentrated solitary waves for the nonlinear Schrödinger equation", *Journal of Differential Equations*, **258** (2015), 717–735

3. C. Bonanno, P. D'Avenia, M. Ghimenti, M. Squassina, "Soliton dynamics for the generalized Choquard equation", *Journal of Mathematical Analysis and Applications*, **417** (2014), 180–199

4. C. Bonanno, "Solitons in gauge theories: existence and dependence on the charge", *Advances in Nonlinear Analysis*, **3** (2014), issue S1, s1–s18

5. C. Bonanno, M. Ghimenti, M. Squassina, "Soliton dynamics of NLS with singular potentials", *Dynamics of Partial Differential Equations*, **10** (2013), 177–207

6. J. Bellazzini, V. Benci, C. Bonanno, E. Sinibaldi, "On the existence of hylomorphic vortices in the nonlinear Klein-Gordon equation", *Dynamics of Partial Differential Equations*, **10** (2013), 1–24

7. V. Benci, C. Bonanno, "Solitary waves and vortices in non-Abelian gauge theories with matter", *Advanced Nonlinear Studies*, **12** (2012), 717–735

8. J. Bellazzini, C. Bonanno, "Nonlinear Schrödinger equations with strongly singular potentials", *Proceedings of the Royal Society of Edinburgh Sect. A*, **140** (2010), 707–721

9. J. Bellazzini, V. Benci, C. Bonanno, A.M. Micheletti, "Solitons for the nonlinear Klein-Gordon equation", *Advanced Nonlinear Studies*, **10** (2010), 481–499

10. C. Bonanno, "Existence and multiplicity of stable bound states for the nonlinear Klein-Gordon equation", *Nonlinear Analysis. Theory Methods & Applications*, **72** (2010), 2031–2046

11. J. Bellazzini, V. Benci, C. Bonanno, E. Sinibaldi, "Hylomorphic solitons in the nonlinear Klein-Gordon equation", *Dynamics of Partial Differential Equations*, **6** (2009), 311–334

12. J. Bellazzini, C. Bonanno, G. Siciliano, "Magnetostatic vortices in two-dimensional abelian gauge theories", *Mediterranean Journal of Mathematics*, **6** (2009), 347–366

13. V. Benci, C. Bonanno, A.M. Micheletti, "On the multiplicity of solutions of a nonlinear elliptic problem on Riemannian manifolds", *Journal of Functional Analysis*, **252** (2007), 464–489

- *Celestial mechanics*

1. N. Bertozzi, C. Bonanno, "Asymptotic behaviour of the confidence region in orbit determination for hyperbolic maps with a parameter", *Physica D: Nonlinear Phenomena*, **470** (2024), part A, art. no. 134403

2. S. Marò, C. Bonanno, "Asymptotic behaviour of orbit determination for hyperbolic maps", *Celestial Mechanics and Dynamical Astronomy*, **133** (2021), no. 6, art. no. 29

3. A. Milani, D. Vokrouhlicky, D. Villani, C. Bonanno, A. Rossi, "Testing general relativity with the BepiColombo radio science experiment", *Physical Review D*, **66** (2002), 082001

4. C. Bonanno, A. Milani, "Symmetries and rank deficiencies in the orbit determination around another planet", *Celestial Mechanics and Dynamical Astronomy*, **83** (2002), 17–33

5. A. Milani, A. Rossi, D. Vokrouhlicky, D. Villani, C. Bonanno, "Gravity field and rotation state of Mercury from the BepiColombo Radio Science Experiments", *Planetary and Space Sciences*, **49** (2001), no. 14-15, 1579–1596

6. C. Bonanno, "An analytical formulation for the MOID and its consequences" *Astronomy and Astrophysics*, **360** (2000), 411–416

Editorial activity

- Guest editor of the journal *Bollettino dell'Unione Matematica Italiana* for the special issue "Advances in Dynamical Systems by the DinAmicI group", vol. 16, issue 2, June 2023.

- Editor together with Alfonso Sorrentino and Corinna Ulcigrai of the book "Modern Aspects of Dynamical Systems", Lecture Notes in Mathematics, C.I.M.E. Foundation Subseries, Springer, 2024.

Conferences, workshops and seminars

As member of the scientific committee

- CIME Foundation School *Modern Aspects of Dynamical Systems*, 2 - 6 August 2021, Cetraro (Italy)

- Workshop *Regular and stochastic behaviour in dynamical systems*, 5 - 9 June 2023, Centro di Ricerca Matematica "De Giorgi", Pisa (Italy).

As member of the organizing committee

- Conference *Chaos, complexity, information: perspectives and methods*, 17 - 19 March 2003, University of Pisa (Italy)

- Conference *Mathematical problems in dynamics and statistical physics*, 27 - 30 September 2004, University of Camerino (Italy)

- Meeting *Statistical properties of dynamical systems and information*, 10 - 11 January 2005, University of Pisa (Italy)

- Workshop *Variational and Topological Methods in Nonlinear Phenomena*, 1 - 5 May 2008, Otranto (Italy)

- Workshop *Variational and Topological Methods in Nonlinear Phenomena*, 20 - 23 September 2010, Cortona (Italy)

- *Second Meeting of the Young Italian Hyperbolicians - a workshop on hyperbolic and anomalous dynamics*, 20 - 23 September 2011, University of Pisa (Italy)

- *Critical Point Theory and Nonlinear Differential Problems*, 2 - 4 September 2015, Alba di Canazei, Val di Fassa (Italy)

- *Renormalization in Dynamics*, 4 - 8 April 2016, Centro "De Giorgi", Pisa (Italy)

- *First DinAmicI Day*, 25 November 2016, Gran Sasso Science Institute, L'Aquila (Italy)

- *Workshop INdAM - DinAmicI V - Modern Trends in the Ergodic Theory of Dynamical Systems*, 5 - 9 June 2017, Roma (Italy)

- *Second DinAmicI Day*, 21 December 2018, Accademia dei Lincei, Roma (Italy)

- Workshop *Dynamical Systems and Beyond*, 25 - 27 March 2019, University of Pisa (Italy)

- Workshop *DinAmicI VI*, 4 - 7 June 2019, Centro di Ricerca Matematica "De Giorgi", Pisa (Italy)

- Workshop *Probabilistic methods in dynamics*, 29 May - 1 June 2023, Centro di Ricerca Matematica "De Giorgi", Pisa (Italy)

- *XXII Congress of the Italian Mathematical Union*, 4 - 9 September 2023, Pisa (Italy)

Talks - (IS) = invited speaker

- *International School and Workshop on Nonextensive Thermodynamics and Physical Applications*, 23 - 30 May 2001, Villasimius (Italy), talk *"Algorithmic complexity for the Manneville map"*

- Meeting *CELMEC III - A Celestial Mechanics meeting*, 18 - 22 June 2001, Monte Porzio Catone (Italy), talk *"Symmetries and rank deficiency in the orbit determination around another planet"*

- (IS) Workshop *Non-stationary Time Series: a Theoretical and Computational Challenge*, 13 - 20 October 2002, University of North Texas, Denton TX (USA), talk *"An approach to prime numbers using complexity methods"*

- Workshop *Chaos, complexity, information II*, 10 - 12 May 2004, Bologna (Italy), talk *"Some compression data experiments on networks"*

- Conference *Mathematical problems in dynamics and statistical physics*, 27 - 30 September 2004, University of Camerino (Italy), talk *"Algorithmic information for intermittent systems and some observations on the decay of correlations"*

- Conference *Nonlinear analysis and calculus of variations*, 17 - 22 October 2005, Scuola Normale Superiore, Pisa (Italy), talk *"Statistical properties for Markov interval maps"*

- (IS) Workshop *Variational and Topological Methods in Nonlinear Phenomena*, 1 - 5 May 2008, Otranto (Italy), talk *"Hylomorphic solitons: existence, properties and dynamics"*

- (IS) *First Meeting of the (mostly) Young Italian Hyperbolicians*, 8 - 12 June 2009, Corinaldo (Italy), talk *"Generalized transfer operators for the Farey map"*

- (IS) Workshop *Dynamics and Computation*, 8 - 12 February 2010, CIRM, Marseille (France), talk *"Applications of Kolmogorov complexity to dynamical systems"*

- (IS) Meeting *Nonlinear Phenomena: A View From Mathematics And Physics*, 10 - 14 January 2011, National Taiwan University, Taipei (Taiwan), talk *"Solitary waves and vortices in non-Abelian gauge theories"*

- (IS) Workshop *Cocompact Imbeddings, Profile Decompositions, and their Applications to PDE*, 5 - 9 January 2012, Tata Institute of Fundamental Research, Bangalore (India), talk *"Solitons and vortices for nonlinear field equations"*

- (IS) Workshop *New Perspective in Nonlinear PDE's*, 24 - 28 September 2012, Argiletum, Rome (Italy), talk *"Nontopological solitons in dynamical systems"*

- (IS) *DinAmicI - Third Workshop of the (Young) Italian Dynamicists*, 11 - 14 June 2013, Corinaldo (Italy), talk *"On the generalized transfer operators of the Farey map"*

- (IS) Workshop *Variational and Topological Methods in Nonlinear Phenomena*, 24 - 28 June 2013, Alghero (Italy), talk *"Stability of solitons via local minimization"*

- (IS) *International Workshop on Variational Problems and PDE's*, 2 - 6 September 2013, Universidade de São Paulo, Saõ Paulo (Brasil), talk *"Solitary waves and vortices in gauge theories"*

- (IS) Workshop *Dispersive PDE's: models and dynamics*, 18 - 20 September 2013, University of Pisa (Italy), talk *"Variational methods in soliton dynamics"*

- (IS) Workshop *PDE days in Roma*, 3 - 4 October 2013, University of Roma "La Sapienza" (Italy), talk *"Variational methods in soliton dynamics"*

- (IS) *Congreso de la Real Sociedad Matemática Española*, session *Elliptic and parabolic PDEs*, part of the , 2 - 6 February 2015, Granada (Spain), talk *"Dynamics of solitons in nonlinear Schrödinger equations"*

- (IS) *DinAmicI IV*, 22 - 26 June 2015, Corinaldo (Italy), talk *"A lecture on generalized transfer operators for intermittent maps and the special case of continued fractions"*

- (IS) Workshop *Dynamical systems in logic, complex analysis and ergodic theory*, 8 - 9 February 2016, University of Pisa (Italy), talk *"The Farey map and its role in ergodic and spectral theory"*.

- *7th European Congress of Mathematics*, 18 - 22 July 2016, Berlin (Germany), talk *"New series expansions for Maass wave forms on the full modular group from eigenfunctions of the transfer operator of the Farey map"*

- (IS) *Pisa-Hokkaido-Roma2 Summer School on Mathematics and Its Applications 2018*, 27 August - 8 September 2018, Centro di Ricerca Matematica "Ennio De Giorgi", Pisa (Italy), lecture course on *"Infinite Ergodic Theory"*

- (IS) Workshop *DCP'19 - Dynamics and Complexity, Pisa*, 1 - 3 July 2019, CNR, Pisa (Italy), talk *"Mixing in infinite measure-preserving systems"*

- (IS) *XXI Congress of the Italian Mathematical Union*, session *ODE and dynamical systems*, 2 - 7 September 2019, Pavia (Italy), talk *"Intermittency in a two-dimensional continued fraction system"*

- (IS) Workshop *Advances and Challenges in Nonlinear Analysis...and Beyond!*, 24 - 27 September 2019, Bari (Italy), talk *"A quick journey through complexity and solitons"*

- *International Congress of Mathematical Physics*, 2 - 7 August 2021, Geneva (Switzerland), talk *"Almost sure limit theorems for Birkhoff sums of integrable and non-integrable observables over an infinite measure space"* speaker Tanja Schindler, based on the paper arXiv:2104.10458 [math.DS]

- (IS) Workshop *DCP '22 - Dynamics and Complexity, Pisa*, 26 - 28 May 2022, Pisa (Italy), talk *"Strong laws of large numbers in infinite ergodic theory"*

Other seminars

- *"Applications of a method from Information Theory to the study of chaotic dynamical systems"*, University of Camerino (Italy), 29 October 2002

- *"An approach to complexity: compressibility of orbits"*, University of Pisa (Italy), 31 May 2004

- *"Nonuniformly expanding one-dimensional maps I-II"*, Centro di Ricerca Matematica "Ennio De Giorgi", Pisa (Italy), 26 April and 2 May 2006

- Intensive period *Dynamical Systems and Number Theory*, Centro di Ricerca Matematica "Ennio De Giorgi", 16 April - 13 July 2007, Pisa (Italy), talk *"The transfer operator of the Farey map and zeta functions"*

- *"Approximation in metric spaces and fractals"*, University of Verona (Italy), 22 May 2007

- *"Complexity in metric spaces and applications to dynamical systems in infinite dimension"*, University of Bologna (Italy), 12 November 2007

- *"A class of soliton-like solutions to field equations"*, University of Camerino (Italy), 28 May 2008

- *"Poincaré - Selberg - Ruelle: a mathematical golden braid "*, University of Pisa (Italy), 7 April 2009

- *"Solitary waves and vortices in gauge theories"*, Department of Mathematics, King Saud University, Riyadh (Saudi Arabia), 4 December 2011

- *"Solitons and vortices for nonlinear field equations"*, University of Basilicata, Potenza (Italy), 19 September 2012

- *"A generalisation of the thermodynamic approach to the Selberg zeta function via the Farey map"*, Department of Mathematics, Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen (Germany), 20 December 2012

- *"The eigenfunctions of the transfer operator of the Farey map and their role in the spectral theory on the modular surface"*, University of Bologna (Italy), 24 February 2014

- *"On an unexpected connection between the bifurcation parameters of two families of dynamical systems and applications"*, University of Roma Tre (Italy), 23 May 2014

- *"Variational methods in soliton dynamics"*, University of Camerino (Italy), 1 July 2014

- *"Complexity and solitons"*, Université de Cergy-Pontoise, Cergy-Pontoise Cedex (France), 13 April 2015

- *"Complexity and solitons"*, University of Milano (Italy), 28 May 2018

- *"Zero entropy - mathematics and applications"*, University of Bologna (Italy), 30 January 2019

- *"Asymptotic behaviour of chains of interacting particles"*, University of Roma "Tor Vergata" (Italy), 26 February 2019

- *"Infinite ergodic theory and a tree of rational pairs"*, One World Numeration Seminar (online), 25 January 2022

- *"Closed horocycles and trees of rational numbers"*, Centro di Ricerca Matematica "Ennio De Giorgi", Pisa (Italy), 11 February 2022

- *"Flows on the modular surface and trees of fractions"*, Fakultät für Mathematik, Universität Wien, Vienna (Austria), 14 July 2022

- *"Extending the Birkhoff Ergodic Theorem to systems preserving an infinite measure"*, University of Milano-Bicocca (Italy), 15 November 2022

- *"The billiard-like motion of waves in stratified fluids"*, Billiard Online Meetings (online), 12 May 2023

- *"Asymptotic behaviour of the sums of the digits for continued fraction algorithms"*, One World Numeration Seminar (online), 28 November 2023

Research projects

Principal investigator

- Research project GNAMPA - INdAM, "Solitons in classical and semi-relativistic field theories", 2012

- Research project "MIUR - PRIN2017 - Regular and stochastic behaviour in dynamical systems", principal investigator of the University of Pisa unit (national principal investigator Prof. C. Liverani)

- Research project "MUR - PRIN2022 - Stochastic properties of dynamical systems", principal investigator of the University of Pisa unit (national principal investigator Prof. C. Liverani)

Participant

- Research project GNFM - INdAM "Complexity, statistics and spectral properties at the chaos edge", 2002 (principal investigator Prof. S. Isola)

- Research project INdAM "Does noise simplify or not the dynamics of nonlinear systems?", 2003 (principal investigator Prof. L. Sacerdote)

- Research project MIUR - PRIN2003, "Variational and Topological Methods in the Study of Nonlinear Phenomena", 2003 (principal investigator Prof. V. Benci)

- Research project GNAMPA - INdAM "Dynamical systems and computable information", 2004 (principal investigator Prof. V. Benci)

- Research project MIUR - PRIN2005, "Variational and Topological Methods in the Study of Nonlinear Phenomena", 2005 (principal investigator Prof. V. Benci)

- Research project MIUR - PRIN2007, "Variational and Topological Methods in the Study of Nonlinear Phenomena", 2007 (principal investigator Prof. V. Benci)

- Research project MIUR - PRIN2009, "Variational and Topological Methods in the Study of Nonlinear Phenomena", 2009 (principal investigator Prof. V. Benci)

- Research project GNAMPA - INdAM, "Dynamics and properties of concentrated solutions in nonlinear field theories", 2011 (principal investigator Dr. M. Ghimenti)

- Research project "Distinguished Scientist Fellowship Program (DSFP)", King Saud University, Riyadh, Saudi Arabia (principal investigators Prof. V. Benci and Prof. M.A. Al-Gwaiz), 2011-2013

- Research project GNAMPA - INdAM, "Solitons in nonlinear dispersive equations", 2013 (principal investigator Dr. J. Bellazzini)

- Research project "BREUDS (Brazilian-European partnership in Dynamical Systems)", supported by an FP7 International International Research Staff Exchange Scheme (IRSES) grant of the European Union, 2013-2017, member of the University of Pisa team, coordinated by Dr. S. Galatolo

- Research project "Métodos Variacionais e problemas elípticos não-lineares" supported by Conselho Nacional de Desenvolvimento Científico e Tecnológico, Brasil, (principal investigator Dr. G. Siciliano), 2013-2016

- Research project GNAMPA - INdAM, "Nonlinear field equations: solitons and dispersion", 2014 (principal investigator Dr. M. Ghimenti)

- Research project funded by the University of Pisa, "Connections between holomorphic dynamics, ergodic theory and mathematical logic in dynamical systems", 2015 (principal investigator Prof. M. Abate)

- Research project GNAMPA - INdAM, "Nonlinear dispersive equations", 2016 (principal investigator Dr. J. Bellazzini)

- Research project funded by the University of Pisa, "Dynamical systems in analysis, geometry, logic and celestial mechanics", 2017 (principal investigator Prof. M. Abate)

- Research project funded by the University of Pisa, "Combining biomedical signal processing and proteomics for a new quantitative stress", 2020 (principal investigator Dr. G. Valenza)

- H2020 FET-Proactive European collaborative project "EXPERIENCE" at University of Pisa (coordinator Prof. G. Valenza)

Post-doc mentoring at University of Pisa

2017/18 Sara Munday.

2021 Alessio Del Vigna.

2022/23 Roberto Castorrini.

2024/26 Sharvari Tikekar.

Ph.D. students

2012/15 Imen Chouari, "Opérateurs de transfert en Théorie Ergodique associés à la transformation de Farey", University of Tunis El Manar (Tunisia).

2021/24 Andrea Scarciglia, "Physiological noise in complex neuro-cardiovascular systems", University of Pisa.

2022/25 Nicola Bertozzi, "", University of Pisa.

2024/27 Martina Bianco, "", University of Pisa

Member of the committee for Ph.D. theses defenses

- Daniele Galli, "A cohomological approach to Ruelle-Pollicott resonances and speed of mixing of Anosov diffeomorphisms", University of Bologna, June 30, 2023

Undergraduate students

2005/06 Eleonora Castaldo, "An application of Markov chains to self-reproducing automata" (in Italian), University of Pisa

2005/06 Roberto Pacella, "Non-equilibrium entropy and Kolmogorov entropy" (in Italian), University of Pisa

2006/07 Irene Caivano, "The complexity of the advertising marketing" (in Italian), University of Pisa

2008/09 Giacomo Biagini, "Multi-variate analysis methods for the segmentation of marketing" (in Italian), University of Pisa

2015/16 Arianna Santini, "Universal properties of families of unimodal maps" (in Italian), University of Pisa

2017/18 Roberto Paoli, "Chaos in the Anisotropic Kepler Problem", University of Pisa

2018/19 Nicola Bertozzi, "Hyperbolic billiards: geometrical principles to have chaotic orbits" (in Italian), University of Pisa

2018/19 Federico Carta, "Different versions of Szemerédi Theorem and the Green-Tao Theorem" (in Italian), University of Pisa

2018/19 Daniele Galli, "The Selberg Zeta Function: a golden thread through hyperbolic geometry, dynamics and number theory", University of Bologna

2018/19 Francesco Zigliotto, "Billiards with positive entropy" (presentation), Scuola Normale Superiore

2019/20 Guglielmo Baldi, "Ergodic theory and applications to the continued fraction expansions of real numbers" (in Italian), University of Pisa

2019/20 Martina Bianco, "Dynamical systems and noise estimates in time series", University of Pisa

2019/20 Gabriele Nemano, "Decay of correlations and dynamical zeta functions" (in Italian), University of Pisa

2019/20 Andrea Scarciglia, "Embedding and complexity of time series: theory and applications", University of Pisa

2020/21 Elettra Apolloni, "Complexity and entropy for strings", University of Pisa

2020/21 Silvia Ballotta, "Dinamics of bouncing balls" (in Italian), University of Pisa

2020/21 Gabriel Franceschi, "On the dynamics of bouncing balls" (in Italian), University of Pisa

2020/21 Federica Sassetti, "Entropy of random perturbations of dynamical systems" (in Italian), University of Pisa

2021/22 Alessio Bernazzi, "Open dynamical systems", University of Pisa

2021/22 Nicola Bertozzi, "Asymptotic behaviour of the confidence region in orbit determination problems", University of Pisa

2021/22 Simona Felice, "On the hyperbolic dynamics of geodesic flows" (in Italian), University of Pisa

2021/22 Agostino Pigozzi, "The geodesic flow on the modular surface and the Gauss map" (in Italian), University of Pisa

2021/22 Sara Rossi, "Parametric resonance in Hamiltonian systems" (in Italian), University of Pisa

2022/23 Lorenzo Femia, "Dynamics on the quotients of the hyperbolic plane and ergodicity of the Gauss map", (in Italian), University of Pisa

2022/23 Francesca Rindi, "Twist maps and billiards in convex domains" (in Italian), University of Pisa

2024/25 Martina Bianco, "The 0-1 test for chaos and applications to time series", University of Pisa

2024/25 Ruggero Benetti, "The arcsine law: a study of the fluctuations of random walks driven by deterministic systems", University of Pisa

2024/25 Agostino Pigozzi, "Cohomological equations for horocycle flows", University of Pisa

Teaching

- Ph.D. level

2012 Part of the course "Variational tools in nonlinear elliptic equations" for the Graduate Studies in Mathematics, University of Basilicata, Potenza.

2015 Part of the course "Nonlinear field equations: stationary solutions and solitons" for the Graduate Studies in Mathematics, University of Pisa.

2024 "Nonlinear dynamical systems and complexity" for the Graduate Studies in Information Engineering, University of Pisa.

2025 "Ergodic theory of geodesic flows" for the Graduate Studies in Mathematics, University of Pisa.

- Undergraduate level

2000/01 "Mathematical Analysis I" for Information Theory Degree, University of Pisa.

2002/03 "Mathematics" for Engineering Degree, University of Pisa.

2003/04 "Mathematics and Statistics" for Molecular Biological Sciences Degree, University of Pisa.

2003/04 "Complexity, chaos and information" for Mathematics Degree, University of Camerino.

2004/05 "Complexity, chaos and information" for Mathematics Degree, University of Camerino.

2004/05 "Biological Information Theory" for Bioinformatics Degree, University of Camerino.

2005/06 "Nonlinear dynamics and chaos" for Engineering Degree, University of Pisa, with Prof. Benci.

2006/07 "Mathematical III" for Engineering Degree, University of Pisa.

2006/07 "Dynamical systems" for Engineering Degree, University of Pisa, with Prof. Benci.

2007/08 "Mathematical Analysis III" for Engineering Degree, University of Pisa.

2007/08 "PDEs for Mathematical Physics" for Engineering Degree, University of Pisa, with Prof. Benci.

2008/09 "Mathematical Analysis III" for Engineering Degree, University of Pisa.

2009/10 "Mathematical Analysis I" for Engineering Degree, University of Pisa.

2009/10 "Mathematical Analysis II" for Engineering Degree, University of Pisa.

2010/11 "Linear Algebra" for Engineering Degree, University of Pisa.

2011/12 "Mathematical Analysis II" for Engineering Degree, University of Pisa.

2011/12 "Ergodic theory" for Engineering Degree, University of Pisa

2012/13 "Complements of Mathematics and Physics" for Environmental Sciences, University of Pisa.

2012/13 "Ergodic theory" for Mathematics Degree, University of Pisa.

2013/14 "Mathematical Analysis II" for Engineering Degree, University of Pisa.

2014/15 "Mathematical Analysis II" for Engineering Degree, University of Pisa.

2015/16 "Mathematical Physics" for Master in Mathematics, University of Pisa.

2015/16 "Mathematical Analysis II" for Engineering Degree, University of Pisa.

2016/17 "Advanced Mechanics" for Master in Mathematics, University of Pisa.

2016/17 "Mathematical Analysis I" for Engineering Degree, University of Pisa.

2016/17 "Mathematical Analysis II" for Engineering Degree, University of Pisa.

2017/18 "Principles of Mathematical Physics" for Master in Mathematics, University of Pisa, with Prof. Gronchi

2017/18 "Mathematical Physics" for Master in Mathematics, University of Pisa.

2017/18 "Mathematical Analysis II" for Engineering Degree, University of Pisa.

2018/19 "Advanced Mechanics" for Master in Mathematics, University of Pisa.

2018/19 "Dynamical Systems" for Mathematics Degree, University of Pisa.

2018/19 "Mathematical Analysis II" for Engineering Degree, University of Pisa.

2019/20 "Mathematical Physics" for Master in Mathematics, University of Pisa.

2019/20 "Dynamical Systems" for Mathematics Degree, University of Pisa.

2019/20 "Mathematical Analysis II" for Engineering Degree, University of Pisa.

2020/21 "Advanced Mechanics" for Master in Mathematics, University of Pisa.

2020/21 "Dynamical Systems" for Mathematics Degree, University of Pisa.

2020/21 "Probability and Statistics" for Computer Science Degree, University of Pisa.

2021/22 "Mathematical Physics" for Master in Mathematics, University of Pisa.

2021/22 "Dynamical Systems" for Mathematics Degree, University of Pisa.

2021/22 "Statistics" for Computer Science Degree, University of Pisa.

2022/23 "Advanced Mechanics" for Master in Mathematics, University of Pisa.

2022/23 "Dynamical Systems" for Mathematics Degree, University of Pisa.

2022/23 "Mathematical Physics" for Master in Mathematics, University of Pisa.

2023/24 "Advanced Mechanics" for Master in Mathematics, University of Pisa.

2023/24 "Dynamical Systems" for Mathematics Degree, University of Pisa.

2023/24 "Mathematical Physics" for Master in Mathematics, University of Pisa.

2024/25 "Dynamical Systems" for Mathematics Degree, University of Pisa.

2024/25 "Mathematical Physics" for Master in Mathematics, University of Pisa.

2024/25 "Elements of Mathematics and Statistics" for Engineering Degree, University of Pisa.