**Updated**
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## Personal information


Name / Surname **Simone Giannerini**

Address

Telephone

Professional Email simone.giannerini@unibz.it

Home page


## Current position

Institution **Associate Professor of Statistics** SSD: SECS-S/01 - Statistica
Dates University of Bologna, Department of Statistical Sciences
December 2014 – today

Dates **Italian ASN – Full Professor Habilitation**, 13/D1 – STATISTICA
31/03/2017 – 31/03/2028

Dates **Italian ASN – Full Professor Habilitation**, 13/A5 – ECONOMETRIA
21/11/2023 – 21/11/2034

## Past positions

Institution **Assistant Professor of Statistics** SSD: SECS-S/01 - Statistica
Dates University of Bologna, Faculty of Economics, Rimini campus
April 2005 – November 2014

## Education and training

Institution **Degree in Statistics** (laurea in Scienze statistiche demografiche e sociali)
Dates University of Bologna, Faculty of Statistics
Thesis March 1998
Supervisors Test statistici per fenomeni caotici (Statistical tests for chaotic phenomena)
Rodolfo Rosa, Antonella Capitanio

Institution **MSc in Statistics (with grant)**
Dates London School of Economics and Political Sciences
Supervisor Dec 2001
Howell Tong

Institution **PhD in Statistics (with grant)** (dottorato di ricerca in Metodologia statistica per la ricerca scientifica)
Dates University of Bologna, Department of Statistical Sciences
Thesis February 2002, XIV ciclo
Supervisor Sensitive dependence on initial conditions: chaos and stochastic processes
Domenico Costantini

Institution **Research fellowship** (assegno di ricerca)
Dates University of Bologna, Department of Statistical Sciences
Project August 2001 – August 2004
Supervisor Sequential methods in Epidemiology
Alessandra Giovagnoli

**Research fellowship** (assegno di ricerca)

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|---|---|
| Institution | University of Bologna, Department of Statistical Sciences |
| Dates | September 2004 - March 2005 |
| Project | Time series transformations |
| Supervisor | Estela Bee Dagum |

## Research visits

**Visiting Scholar**

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|---|---|
| Dates | October, 18 - 25, 2022 |
| Institution | Free University of Bolzano, Faculty of Economics and Management |
| Contact | Davide Ferrari, Greta Goracci |

**Visiting Scholar**

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| Dates | April, 04 - 11, 2021 |
| Institution | Free University of Bolzano, Faculty of Economics and Management |
| Contact | Davide Ferrari |

**Visiting Scholar**

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|---|---|
| Dates | August, 30 - November, 2, 2020 |
| Institution | University of Copenhagen, Department of Economics |
| Contact | Anders Rahbek |

**Visiting Scholar**

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| Dates | July 2018 |
| Institution | University of Iowa, Department of Statistics and Actuarial Science |
| Contact | Kung-Sik Chan |

**Visiting Scholar**

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|---|---|
| Dates | August 2017 |
| Institution | University of Iowa, Department of Statistics and Actuarial Science |
| Contact | Kung-Sik Chan |

**Visiting Scholar**

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| Dates | March 2012 |
| Institution | Mannheim University of Applied Sciences, Institute for Mathematical Biology |
| Contact | Elena Fimmel, Lutz Strüngmann |

**Visiting Scholar**

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|---|---|
| Dates | February 2011 |
| Institution | National University of Singapore, Institute for Mathematical Sciences |
| Contact | Howell Tong |

## Research interests

My strongest trait is the ability to manage multidisciplinary projects and to interact with researchers from different disciplines, covering both theoretical and applied aspects. Since my PhD I have collaborated with theoretical and experimental physicists, mathematicians, engineers, economists, medical doctors. In particular, my research topics are:

Project **Nonlinear time series and chaos**

I have been studying the multidisciplinary connections between chaos theory and Statistics and their implications on time series analysis since 1998. I am interested in the characterization of nonlinear/complex dependence and I have investigated inferential problems for measures of sensitivity to initial conditions. These allow to characterize peculiar features of a nonlinear process and to introduce tests for chaos and nonlinearity that can have a great practical impact. I have open collaborations with leading experts on this topic such as Howell Tong (London School of Economics), Kung-Sik Chan (University of Iowa) and Esfandiar Maasoumi (Emory University, Atlanta GA, USA). I am the author of software packages that include the time series tools motivated by chaos theory; I have applied successfully these tools in the fields of cardiovascular dynamics, solid state Physics, Astrophysics, DNA sequence analysis, climate studies and Econometrics. Since 2016, I have been studying the probabilistic and statistical properties of threshold autoregressive moving average models (TARMA), a flexible yet parsimonious extension of TAR models.

Project

**Econometrics of art markets and tourism**

I have been working at this topic from 2005. I participated at the formation of the first database on tribal artworks. I have supervised a PhD thesis and a post doc fellowship where we have introduced a multilevel random effect model with stochastic volatility for the analysis of repeated cross sections deriving from tribal art prices. Also, I have supervised a post doc fellowship on the impact of temporary art exhibitions on tourism flows. From 2009 to 2014 I have been part of the Nomisma-OMBA (Osservatorio sul Mercato dei beni Artistici). Several pieces of the works of the OMBA have appeared on national newspapers (such as Il Sole 24 ore, il Resto del Carlino, La Stampa) and local televisions.

Project

**Mathematical modelling of the genetic information**

I have been studying the management of genetic information under the paradigm of Coding Theory and Information Theory since 2004. We have proposed a mathematical model based on non-power representation systems of integer numbers; the model is able to describe exactly the degeneracy distribution of the genetic code; moreover, it uncovers a hierarchy of hidden symmetries that point to error detection and correction mechanisms at the informational level. This multidisciplinary research covers aspects from time series analysis, number theory, group theory, non linear dynamical systems. In this respect, we have set up a research network that led to the COST project DYNALIFE, funded by the EU. Such research has attracted attention from the press and institutions (see section on awards).

Project

**Copula functions and complex dependence**

I have been working on copula functions from 2007 to 2014. In particular, I have supervised a PhD thesis where we propose a copula based algorithm for cluster analysis of data with complex dependence. The research led to several publications and to a software package. We have applied successfully our algorithm to micorarray data. Moreover, I have been supervising a research grant funded by ISTAT for the study of a copula based technique for the multivariate imputation of missing data. Also in this case we have implemented an R package that has been employed by the ISTAT for the treatment of census data.

Project

**Design of Experiments (DoE) and Epidemiology**

I have collaborated with different researchers on these subjects until 2007. In the DoE field, I have proposed a class of generalized Pòlya urn sequential designs for the allocation of two treatments in clinical trials. I have derived a strong law of large numbers and a central limit theorem for the allocations under this scheme. Also I have studied the convergence rates of sequential designs based on Ehrenfest urns. As concerns Epidemiology, I have collaborated with several hospitals and have studied, among other topics, a new test for stochastic ordering applied to contingency tables for ordinal data.

## Working papers and technical reports

[WP1] Goracci, G.; Ferrari, D.; Giannerini, S.; and Ravazzolo, F. *Robust estimation for Threshold Autoregressive Moving-Average models.* **submitted**, https://arxiv.org/abs/2211.08205, 2023.

[WP2] Diaz Rubio G.A.; Giannerini S.; Goracci G., The Vectorial Misspecification-Resistant Information Criterion, https://arxiv.org/abs/2211.08205.

[WP3] Chan, K.-S.; Giannerini, S.; Goracci, G.; Tong, H., Unit-root test within a Threshold ARMA framework, https://arxiv.org/abs/2002.09968.

[WP4] Giannerini S.; Goracci G. ; Rahbek A., The validity of Bootstrap testing in the threshold framework, https://arxiv.org/abs/2201.00028.

[WP5] Angelini F.; Castellani M.; Giannerini S.; Goracci G.; Testing for threshold effects in presence of volatility and measurement error: the case of Italian strikes, University of Bologna and Free University of Bolzano. **submitted** https://arxiv.org/abs/2308.00444

[WP6] Goracci G.; Giannerini S.; Tong H. Markov Chains and the probabilistic structure of non-linear time series models.

[WP7] Giannerini, S.; Goracci, G.; Small Sample Asymptotics for Multinomial Goodness of Fit Tests.

[WP8] Giannerini, S.; Gonzalez, D.L.; Goracci, G., Dichotomic Classes and Entropy Optimization in Coding Sequences.

[WP9] Gonzalez, D.L.; Giannerini, S.; Rosa, R., On the origin of the mitochondrial genetic code: Towards a unified mathematical framework for the management of genetic information, **Nature Precedings**, Nature Publishing Group, 2012.

## Publications in scientific journals and books[1]

[A1] Rojo-Garibaldi, B.; Salas-de-León, A.; Monreal-Gómez, M.A.; Giannerini, S.; Cartwright, J.H.E., Nonlinear Time Series Analysis of Coastal Temperatures and El Niño–Southern Oscillation Events in the Eastern South Pacific, **Earth System Dynamics**, 2024, 14, 1125–1164 https://doi.org/10.5194/esd-2023-9

. [A2] Chan, K.-S.; Giannerini, S.; Goracci, G.; Tong, H., Testing for Threshold Regulation in Presence of Measurement Error, https://doi.org/doi:10.5705/ss.202022.0125, **Statistica Sinica**, 2024, 34(3).

[A3] Giannerini, S.; Goracci, G. Entropy-Based Tests for Complex Dependence in Economic and Financial Time Series with the R Package tseriesEntropy. https://doi.org/10.3390/math11030757, **Mathematics**, 2023, 11, 757.

[A4] Giannerini S.; Goracci G. ; Rahbek A., The validity of Bootstrap testing in the threshold framework, https://doi.org/10.1016/j.jeconom.2023.01.004, **Journal of Econometrics**, 2023, in press.

[A5] Goracci, G.; Giannerini, S.; Chan, K.-S.; Tong, H., Testing for threshold effects in the TARMA framework, https://doi.org/doi:10.5705/ss.202021.0120, **Statistica Sinica**, 2023, 33(3), 1879-1901.

[A6] Giannerini, S.; Danielli A.; Gonzalez, D.L.; Goracci, G.; A role for circular codes properties in translation, **Scientific Reports**, 2021 11, 9218.

[1]The label in orange indicates a publication in a journal classified as A by ANVUR (Area 13/D1).

[A7] Giannerini, S.; Montanari, A.,Introduction to the Theme Issue: The Skew-Normal and Related Distributions, **Statistica**, 2020, 80(2), 127-130.

[A8] Chemobrionics: From Self-Assembled Material Architectures to the Origin of Life, Cardoso, S.S.S.; Cartwright, J.H.E.; Č ejková, J.; Cronin, L.; De Wit, A.; Giannerini, S.; Horváth, D.; Rodrigues, A.; Russell, M.; Sainz-Díaz, I.; Tóth, A. **Artificial Life** 2020 26:3, 315-326.

[A9] Rojo-Garibaldi, B.; Salas-de-León, A.; Monreal-Gómez, M.A.; Giannerini, S.; Cartwright, J.H.E., Chaos and periodicities in a climatic time series of the Iberian Margin, **Chaos**, 2020, 30 (6), 063126.

[A10] Gonzalez, D.L.; Giannerini, S.; Rosa, R., Rumer's transformation: a symmetry puzzle standing for half a century, **Biosystems**, 2020, Volume 187, 104036.

[A11] Gonzalez, D.L.; Giannerini, S.; Rosa, R., On the origin of degeneracy in the genetic code, **Royal Society Interface Focus**, 2019, Volume 9, number 6, 20190038.

[A12] Di Lascio, F.M.L.; Giannerini, S., Clustering dependent observations with copula functions, **Statistical Papers**, 2019, Volume 60, pp. 35-51.

[A13] Cagnone, S.; Giannerini, S; Modugno, L., Multilevel Models with Stochastic Volatility for Repeated Cross-Sections: An Application to Tribal Art Prices, **Annals of Applied Statistics**, 2017, Volume 11, Number 2, 1040-1062.

[A14] Cartwright, J.H.E.; Giannerini, S.; Gonzalez, D.L., DNA as information: At the crossroads between biology, mathematics, physics and chemistry, **Philosophical Transactions of the Royal Society of London Series A: Mathematical Physical and Engineering Sciences**, 2016, 374, pp. 1-9.

[A15] Gonzalez, D.L.; Giannerini, S.; Rosa, R., The non-power model of the genetic code: A paradigm for interpreting genomic information, **Philosophical Transactions of the Royal Society of London Series A: Mathematical Physical and Engineering Sciences**, 2016, 374, pp. 1-16.

[A16] Modugno, L.; Cagnone, S.; Giannerini, S., A multilevel model with autoregressive components for the analysis of tribal art prices, **Journal of Applied Statistics**, 2015, 42, pp. 2141-2158.

[A17] Fimmel, E.; Giannerini, S.; Gonzalez, D.L.; Strungmann, L., Circular codes, symmetries and transformations, **Journal of Mathematical Biology**, 2015, 70, pp. 1623-1644.

[A18] Fimmel, E.; Giannerini, S.; Gonzalez, D.L.; Strungmann, L., Dinucleotide circular codes and bijective transformations, **Journal of Theoretical Biology**, 2015, 386, pp. 159-165.

[A19] Giannerini, S.; Maasoumi, E.; Bee Dagum E., Entropy testing for nonlinear serial dependence in time series, **Biometrika**, 2015, 102, pp. 661-675.

[A20] Di Lascio, F.M.L; Giannerini, S.; Reale, A., Exploring copulas for the imputation of complex dependent data, **Statistical Methods & Applications**, 2015, 24, pp. 159-175.

[A21] Modugno, L.; Giannerini, S., The wild bootstrap for multilevel models, **Communications in Statistics. Theory and Methods**, 2015, 44, pp. 4812-4825.

[A22] Cocchi, D.; Cavaliere, G.; Freo, M.; Giannerini, S.; Mazzocchi, M.; Trivisano, C.; Viroli, C., A support for classifying scientific papers in a University Department, **Procedia Economics And Finance**, 2014, 17, pp. 47-54.

[A23] Properzi, E.; Giannerini, S.; Gonzalez, D.L.; Rosa, R., Genome characterization through dichotomic classes: an analysis of the whole chromosome 1 of A. Thaliana, **Mathematical Biosciences And Engineering**, 2013, 10 Issue 1, pp. 199-219.

[A24] Candela, G.; Di Lascio, F.M.L; Giannerini, S.; Scorcu, A.E., L'impatto dell'offerta culturale contemporanea sui flussi turistici. Un'analisi empirica per le province italiane, in: Percorsi creativi di turismo urbano. Beni culturali e riqualificazione nella città contemporanea, Bologna, Patron, 2013, pp. 58-71.

[A25] Di Lascio, F.M.L; Giannerini, S., A Copula-Based Algorithm for Discovering Patterns of Dependent Observations, **Journal of Classification**, 2012, 29(1), pp. 50-75.

[A26] Modugno, L.; Giannerini, S.; Cagnone S., A Multilevel Model with Time Series Components for the Analysis of Tribal Art Prices, **Quaderni Di Statistica**, 2012, 14, pp. 169-172.

[A27] Di Lascio, F.M.L; Giannerini, S., Clustering Microarray Data: Theoretical and Practical Issues, **Communications in Statistics. Theory and Methods**, 2012, Vol. 41, Issues 16-17, pp. 3211-3232.

[A28] Giannerini, S.; Gonzalez, D.L.; Rosa, R., DNA, dichotomic classes and frame synchronization: a quasi-crystal framework, **Philosophical Transactions of the Royal Society of London Series A: Mathematical Physical and Engineering Sciences**, 2012, 370, Number 1969, pp. 2987-3006.

[A29] Giannerini, S., The quest for nonlinearity in time series, in: **Handbook of Statistics** Volume 30: Time Series Analysis: Methods and Applications, Oxford, Elsevier – North Hollhand, 2012, pp. 43-63.

[A30] Gonzalez, D.L.; Giannerini, S.; Rosa, R., Circular codes revisited: A statistical approach, **Journal of Theoretical Biology**, 2011, 275, pp. 21-28.

[A31] Di Lascio, F.M.L; Giannerini, S.; Scorcu, A.E.; Candela, G., Cultural tourism and temporary art exhibitions in Italy: a panel data analysis, **Statistical Methods & Applications**, 2011, 20, pp. 519-542.

[A32] Gonzalez, D.L.; Giannerini, S.; Valentinuzzi, M.E., Theoretical Models, in: M. E. Valentinuzzi, Cardiac Fibrillation-Defibrillation. Clinical and engineering aspects., Singapore, World Scientific Publishing, 2010, pp. 189-228.

[A33] Candela, G.; Giannerini, S.; Scorcu, A.E., Dieci anni di aste di opere d'arte etnica: Africa, Oceania e le Americhe, **Sistema Economico** 2009, 1/2009, pp. 21-35.

[A34] Gonzalez, D.L.; Giannerini, S.; Rosa, R., The mathematical structure of the genetic code: a tool for inquiring on the origin of life, **Statistica**, 2009, LXIX, pp. 143-157.

[A35] Modugno, L.; Giannerini, S., La prima banca dati dedicata all'arte etnica: prime evidenze empiriche., **Sistema Economico**, 2008, 2, pp. 45-57.

[A36] Gonzalez, D.L.; Giannerini, S.; Rosa, R., Strong short-range correlations and dichotomic codon classes in coding DNA sequences, **Physical Review E, Statistical, Nonlinear, and Soft Matter Physics**, 2008, 78, pp. 1-8.

[A37] Candela, G.; Giannerini, S.; Scorcu, A.E., Flussi e caratteristiche delle destinazioni e dei turismi. Una nota introduttiva, **Economia dei Servizi**, 2007, 1, Anno II, pp. 47-57.

[A38] Baldi Antognini, A.; Giannerini, S.,Generalized Pòlya Urn designs with null balance, **Journal of Applied Probability**, 2007, 44 (3), pp. 661-669.

[A39] Candela, G.; Giannerini, S.; Scorcu, A.E., Rimini. Le caratteristiche strutturali di una destinazione balneare matura, **Economia dei Servizi**, 2007, 1, Anno II, pp. 123-146.

[A40] Giannerini, S.; Gonzalez, D.L.; Rosa, R., Testing Chaotic dynamics in systems with two positive Lyapunov exponents: a bootstrap solution, **International Journal of Bifurcation and Chaos**, 2007, 17, 1, pp. 169-182.

[A41] Bee Dagum E.; Giannerini, S., A critical investigation on detrending procedures for non-linear processes, **Journal of Macroeconomics**, 2006, 28 (1), pp. 175-191.

[A42] Desalvo, A.; Giannerini, S.; Rosa, R., Chaotic phenomena of charged particles in crystal lattices, **CHAOS**, 2006, 16(2) 023114, pp. 1-12.

[A43] Gonzalez, D.L.; Giannerini, S.; Rosa, R., Detecting Structure in Parity Binary Sequences, **IEEE Engineering in Medicine and Biology Magazine**, 2006, 25, n°1, pp. 69-81.

[A44] Bonetto, C.; Giannerini, S.; Giovagnoli, A., The analysis of contingency tables with ordinal data: an application to monitoring antibiotic resistance, **Statistics in Medicine**, 2006, 25, pp. 3560-3575.

[A45] Bonifacino, A.; Petrocelli, V.; Pisani, T.; Giannerini S.; Giovagnoli, A.; Vecchione, A.; Mingazzini, P.L; Giovagnoli, M.R., Accuracy Rates of US-guided Vacuum-assisted Breast Biopsy, **Anticancer Research**, 2005, 25(4), pp. 2465-2470.

[A46] Giannerini, S.; Rosa, R., Assessing chaos in time series: statistical aspects and perspectives, **Studies in Nonlinear Dynamics and Econometrics**, 2004, 8, Article 11.

[A47] Giannerini, S.; Rosa, R., Caos, Statistica e metodi di ricampionamento, **Statistica**, 2002, anno LXII, n. 3, pp. 359-378.

[A48] Giannerini, S.; Rosa, R., New resampling method to assess the accuracy of the maximal Lyapunov exponent estimation, **Physica D**, 2001, 155, pp. 101-111.

[A49] Giannerini, S.; Rosa, R., Generating replications of chaotic time series, **Nonlinear Dynamics, Psychology and Life Sciences**, 5, pp. 77-87.

[A50] Mignani, S.; Giannerini, S.; Gonzalez, D.L., Test di non linearita' per la ricerca di un'eventuale dinamica caotica nel sistema cardiovascolare, **Statistica**, 2000, anno LXIV, n. 4, pp. 515-522.

## Publications in conference proceedings

[A51] Visentin, M; Tuan, A: Giannerini, S., Going viral or falling down? Incorporating temporal dynamics into the analysis of social media posts Atti del convegno Proceedings of the XX Conference of the Italian Marketing Society, Firenze Oct. 2023, pp. 1-5.

[A52] Giannerini, S.; Goracci, G., A note on testing for threshold non-linearity in presence of heteroskedasticity in time series, Proceedings of the 51st scientific meeting of the Italian Statistical Society (Caserta, June, 22-24, 2022), 2022, pp. 1-6.

[A53] Diaz Rubio G.A.; Giannerini S.; Goracci G.; On the asymptotic mean-squared prediction error for multivariate time series, in: PROCEEDINGS of the 50th scientific meeting of the Italian Statistical Society, 2021, (Pisa, June 21–25, 2021) pp. 1-6.

[A54] Giannerini, S.; Goracci, G., Asymptotics and power of entropy based tests of dependence for categorical data., in: M. Pratesi, C. Pena, Proceedings of the 48th scientific meeting of the Italian Statistical Society (Salerno, June, 8-10, 2016), 2016, pp. 1-6.

[A55] Di Lascio, F.M.L and Giannerini, S., CoImp R package: copula-based multivariate imputation, Proceedings of the SIS 2015 Conference: Statistics and Demography: the Legacy of Corrado Gini, (Treviso, Italy), 2015, pp. 1-6, ISBN: 978 886787, 4521.

[A56] Di Lascio, F.M.L and Giannerini, S. and Reale, A., Imputation of complex dependent data by conditional copulas: analytic versus semiparametric approach, Proceedings of the 21st International Conference on Computational Statistics (COMPSTAT 2014), p. 491-497. ISBN 9782839913478.

[A57] Modugno L.; Cagnone S.; Giannerini S., A multilevel model for repeated cross-sectional data with stochastic volatility, in: Proceedings of 47th Scientific Meeting of the Italian Statistical Society, 2014, pp. 1-8 (atti di: SIS 2014, Cagliari, 11-13 giugno 2014).

[A58] Giannerini, S.; Maasoumi, E.; Bee Dagum, E., Testing for nonlinear serial dependence in time series with surrogate data and entropy measures, in: SIS 2014, Proceedings of the 47th Scientific Meeting of the Italian Statistical Society, (atti di: SIS 2014, Cagliari, 11-13 giugno 2014), 2014, pp. 1-7.

[A59] Di Lascio, F.M.L and Giannerini, S. , A copula-based approach for discovering inter-cluster dependence relationships, in: proceedings, CLADAG 2013, CLEUP, 2013, pp. 162 - 165 (atti di: Cladag 2013 - 9th Meeting of the Classification and data Analysis Group, Modena, 18 - 20 settembre 2013), ISBN 9788867871179.

[A60] Bianchi G.; Di Lascio F.M.L.; Giannerini S.; Manzari A.; Reale A.; Ruocco G., Exploring copulas for the imputation of missing nonlinearly dependent data, in: Classification and Data Analysis 2009. Book of Short Papers, PADOVA, CLEUP, 2009, pp. 429-432 (CLADAG, Università di Catania, Italy, 9-11 settembre 2009).

[A61] Giannerini, S.; Maasoumi, E.; Bee Dagum, E., An entropy based test for non-linear dependence in time series, in: S.Co. 2007, Book of short papers, Complex models and computational intensive methods for estimation and prediction. (Venezia, 06-08 settembre 2007), PADOVA, CLEUP, 2007, pp. 249-253.

[A62] Giannerini, S.; Maasoumi, E. ; Bee Dagum, E., Entropy testing for nonlinearity in time series, in: Bulletin of the International Statistical Institute, 56th session., LISBOA (Lisboa, August 22-29 2007), International Statistical Institute, 2007, pp. 3920-3923.

[A63] Baldi Antognini A.; Giannerini S., Convergence rate for Ehrenfest-type urn designs, in: Volume degli Atti della XLIII Riunione Scientifica della SIS - (Torino, 14-16 giugno 2006), 2006, pp. 495-498.

[A64] Giannerini, S., Deterministic and Stochastic Linear and Nonlinear Mean Prediction of Time Series, in: 2004 Proceedings of the American Statistical Association, Business And Economics Section, (atti di: ASA Joint Statistical Meeting, Toronto, CA, 8-12 Agosto 2004), Alexandria, Va, Asa, 2004, pp. 1195-1201.

[A65] Giannerini, S.; Rosa, R., Assessing chaos in time series: statistical aspects and perspectives, proceedings of the International Workshop: Linear and Nonlinear Dynamics in Time Series, Brixen, 6-7 June 2003; Estela Bee Dagum et al. (Eds), 2004, Pitagora Editore, Bologna, pp. 303-327.

[A66] Giannerini, S.; Rosa, R.; Bee Dagum, E., Characterizing nonlinearity in time series data from different perspectives, Proceedings of the CLADAG 2003 conference, September 22-24, Bologna, 2003, pp. 33-36.

[A67] Giannerini, S.; Rosa, R., Analysis of cardiovascular time series from a dynamical system perspective, Proceedings of the CLADAG 2003 conference, September 22-24, Bologna, 2003, pp. 169-172.

[A68] Giannerini, S.; Rosa, R., Bootstrap accuracy estimation in chaotic time series, SIS 2002, Proceedings of the XLI meeting of the Italian Statistical Society, Milano, 5-7 June 2002, pp. 627-630.

[A69] Giannerini, S.; Rosa, R., Sono ricampionabili le serie storiche caotiche?, SIS 2000, Proceedings of the XL meeting of the Italian Statistical Society, Firenze, 26-28 April 2000, pp. 295-298.

[A70] Mignani, S.; Giannerini, S.; Gonzalez, D.L., Test di non linearita' per la ricerca di un'eventuale dinamica caotica nel sistema cardiovascolare, Proceedings of the meeting of the Italian Biometric Society, Roma, July 1999, pp. 33-36.

## Invited talks[2]

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|---|---|
| ✓ | Giannerini S.; Diaz Rubio G.A.; Goracci G., Consistent and efficient model selection with possible misspecification for vector time series, Complex time series analysis: high-dimensionality, change-point, forecasting and causality, TSIMF, Sanya, China, January 3-7, 2024 |
| • | Giannerini S.; Diaz Rubio G.A.; Goracci G., Consistent and efficient model selection with possible misspecification for vector time series, 2nd Bergamo Workshop in Econometrics and Statistics, University of Bergamo, September 7-8, 2023. |
| ✓ | Giannerini S.; Diaz Rubio G.A.; Goracci G., The Multivariate Misspecification-Resistant Information Criterion, Waseda-Bolzano workshop on Statistics and time series analysis, Selva di val Gardena April 1-3, 2023. |
| ✓ | Giannerini S. et al., Nonlinear Time Series Analysis of Coastal Temperatures and El Niño–Southern Oscillation Events in the Eastern South Pacific, IMR-Waseda Workshop, March 28-29, 2023, Institute for Marine Research, Bergen, Norway. |
| ✓ | Giannerini S., Protein translation and error correcting codes: a close look at the mathematical structure of genetic information, March 16 2023, Radboud University Nijmegen, The Netherlands. |
| ✓ | Giannerini S., Goracci G., Angelini F., Castellani, M., Testing for threshold effects in presence of volatility and measurement error: the case of Italian strikes, Waseda time series Workshop, February 06-07 2023, Waseda University, Tokyo. |
| ✓ | Giannerini S., Goracci G., Angelini F., Castellani, M., Testing for threshold effects in presence of volatility and measurement error: the case of Italian strikes, Workshop on statistical learning and econometrics, December 12-13 2022, Free University of Bolzano/Bozen. |
| ✓ | Giannerini S., Goracci G., Rahbek A., The validity of Bootstrap testing in the threshold framework, Roma-Waseda Time Series Symposium, October 2022 05-07, Villa Mondragone, University of Rome Tor Vergata. |
| ✓ | Giannerini S., Angelini F., Castellani M., Goracci G., Testing for threshold effects in presence of volatility and measurement error: the case of Italian strikes, Bologna-Waseda Time Series Symposium, October 08-09 2022, Accademia delle Scienze, University of Bologna. |
| ✓ | Giannerini S., Gonzalez, D.L., Goracci G., Dichotomic Classes and Entropy Optimization in Coding Sequences., Chemobrionics final meeting, September 05-07, 2022, University of Pisa. |
| • | Giannerini S.; Goracci G. ; Rahbek A., The validity of Bootstrap testing in the threshold framework, IMS Annual Meeting in Probability and Statistics, 27-30 June 2022, Senate House, London. |
| ✓ | Giannerini S., Goracci G., Rahbek A., The validity of Bootstrap testing in the threshold framework with an application to climate change. Workshop: Econometric Models of Climate Change, March 13, 2022, University of Ferrara. |
| ✓ | Giannerini S., Goracci G., Chan K.-S., Tong H., Testing for threshold regulation, eMAF2020 Mathematical and Statistical Methods for Actuarial Sciences and Finance, 18 - 22 - 25 September 2020 (**Keynote talk**). |
| ✓ | NSF Workshop: Biology Through Information, Communication & Coding Theory, January 21-22, 2020. Alexandria, Virginia, USA. |
| ✓ | A new mathematics for the origin of life, from numeration systems to the genetic code, COST Action CA17120 CHEMOBRIONICS 30/80 MEETING March 11-13, 2019 Granada Science Park Spain. |
| ✓ | Revisiting Feature Matching in Time Series Modelling, Workshop on Non-likelihood Based Statistical Modelling, Centre for Research in Statistical Methodology, Warwick University, (7 – 9 Sep 2015). |

[2]The symbol ✓indicates that the invitation covered either all or part of travel and accommodation expenses.

✓ Dichotomic classes and Entropy, Workshop on Understanding of the origin and the management of the genetic information, University of Applied Sciences, Mannheim. 15-16 June 2015.

✓ Nonparametric tests of nonlinear serial dependence in time series based on entropy measures, Seminars on non parametric and semiparametric techniques, University of Ferrara, 13 Feb 2015.

✓ Dichotomic classes, correlations and entropy optimization in coding sequences, Workshop RNA: structure, function and evolution, SISSA, Trieste, June 5 – 6, 2015.

• Dichotomic classes, correlations and entropy optimization in coding sequences, First International Conference of the Code Biology Society, Universitè Paris Decartes, 20-24th May 2014.

✓ A mathematical model for the genetic code, Workshop on DNA coding, Mannheim Hochschule, 28-30 March 2012.

✓ Entropy based tests for nonlinearity, Workshop on Recent Advances in Nonlinear Time Series Analysis, Institute for Mathematical Sciences, National University of Singapore, (7 – 18 Feb 2011).

• Predicting turning points through information reduction techniques, Mathematical and Statistical Methods for Actuarial Sciences and Finance MAF 2010, 7 - 9 April 2010 Villa Rufolo - Ravello, Italy.

• Information reduction techniques for turning point prediction" European Regional Meeting of the International Society for Business and Industrial Statistics, Cagliari, May 30th – June 3rd, 2009.

• An entropy based test for non-linear dependence in time series, S.Co. 2007, Venice 6-8th September 2007.

• Deterministic and Stochastic Linear and Nonlinear Mean Prediction of Time Series, ASA 2004, Joint Statistical Meeting, Toronto (Canada) 8-12 Aug 2004.

## Invited seminars

✓ Modelli matematici del codice genetico: cosa sono e a cosa servono, 11 aprile 2023, Università di Ferrara, Genetica Medica, Dipartimento di Scienze Mediche.

✓ Robust estimation for threshold autoregressive moving-average models, October 26, 2022, Department of Mathematics, University of Trento.

✓ Testing for threshold regulation in presence of measurement error with an application to the PPP hypothesis., 07th October 2021, Free University of Bolzano, Faculty of Economics and Management.

✓ Small Sample Asymptotics for Multinomial Goodness of fit Tests, September, 6 2017, Department of Statistical and Actuarial Sciences, University of Iowa.

✓ Entropy based tests for nonlinear dependence in time series,14th January 2014, Free University of Bolzano, Faculty of Economics and Management.

✓ Un modello matematico del codice genetico: simmetria e informazione nelle sequenze geniche: Department of Mathematics, University of Bologna, February 3, 2014.

• A mathematical model for the genetic code: theory and applications: Department of Pharmacy and Biotechnology, University of Bologna, 15th March 2013.

✓ Copula based cluster analysis: IMT Lucca, January 16, 2013.

• A mathematical model for the genetic code: time series aspects: Mannheim Hochschule, March 29, 2012.

• A Powerful Entropy Test for Linearity against Nonlinearity in Time Series Econometrics Workshop@ Vanderbilt University, November 3, 2011. (Presented by the co-author Esfandiar Maasoumi, Emory University).

✓ Un test di non linearità per serie storiche basato su di una misura di entropia, May 14, 2009, Dipartimento di Scienze Economiche e Statistiche. Università di Salerno.

✓ Generalized Pòlya Urn designs with null balance, Department of Physics, University of Genova, July 16th, 2007.

## Other selected presentations at conferences[3]

- Giannerini S.; Diaz Rubio G.A.; Goracci G., Consistent and efficient model selection with possible misspecification for vector time series, 4th Italian Workshop of Econometrics and Empirical Economics: "Climate and Energy Econometrics", Free University of Bolzano, January 25-26, 2024.
- Giannerini S., the COST Action "Information, Coding, and Biological Function: the Dynamics of Life" , 20th IEEE Conference on Computational Intelligence in Bioinformatics and Computational Biology, Eindhoven University of Technology, The Netherlands, Aug 29-31, 2023.
- Giannerini S., Goracci G., Angelini F., Castellani, M., Testing for threshold effects in presence of volatility and measurement error: the case of Italian strikes, ICEEE 2023 10th Italian Congress of Econometrics and Empirical Economics University of Cagliari, May 26-28, 2023.
- Goracci G.; Giannerini S.; Rahbek A., The validity of Bootstrap testing in the threshold framework, Vienna–Copenhagen Conference on Financial Econometrics, June 2-4 2022, Department of Economics, Copenhagen.
- Giannerini S.; Danielli A.; Gonzalez D. L.; Goracci G. *"A role for circular code properties in translation."*,7th International Code Biology Conference Lužnica 31 August – 4 September 2021
- Gonzalez D. L.; Boulay J.Y.; Giannerini S.; Goracci G. *"Mathematical regularities in the genetic code: a unifying view based on symmetry and group theory."*, 7th International Code Biology Conference Lužnica 31 August – 4 September 2021
- G. Goracci, S. Giannerini, K.-S. Chan , H. Tong, Testing for threshold effects in the TARMA framework, 7th Rimini Center for Economic Analysis (RCEA) Workshop, 25 - 26 June 2021.
- G.A. Diaz Rubio, S. Giannerini, G. Goracci On the asymptotic mean-squared prediction error for multivariate time series., 50th scientific meeting of the Italian Statistical Society, Pisa 21 - 25 June 2021.
- S. Giannerini, G. Goracci, K.-S. Chan, H. Tong, Unit-root test within a threshold ARMA framework, ICEEE 2021: Ninth Italian Congress Of Econometrics And Empirical Economics, 21 - 23 January 2021.
- G. Goracci, S. Giannerini, K.-S. Chan, H. Tong. Tests for threshold effects in the ARMA framework, eMAF2020, 18 - 22 - 25 September 2020 (*invited session*).
- S. Giannerini; D.L. Gonzalez; G. Goracci, Evolution and Degeneracy in the Genetic Code, in: Code biology 2019, book of abstracts, 2019, pp. 40-40 (atti di: Code Biology 2019, Friedrichsdorf, 3 - 7 June 2019).
- S. Giannerini; D.L. Gonzalez; G. Goracci. A new mathematics for the origin of life, from numeration systems to the genetic code, COST Action CA17120 CHEMOBRIONICS 30/80 MEETING, Granada Science Park Spain, March 11 - 13, 2019.
- G. Goracci, S. Giannerini; D.L. Gonzalez : Code biology 2018, book of abstracts, 2018, pp. 34 - 34 (atti di: Code Biology 2018, Granada, 5 - 9 June 2018).
- S. Giannerini; G. Goracci, Small Sample Asymptotics for Multinomial Goodness of Fit Tests., in: IMPS 2017, book of abstracts, 2017, pp. 25-25 (atti di: International Meeting of the Psychometric Society 2017, Zurigo, 17-21 July 2017).
- K.-S. Chan, S. Giannerini, G. Goracci, and H. Tong, Testing for Unit-root Nonstationarity against Threshold Stationarity, 2017 NBER-NSF Time Series Conference, September 8–9, 2017, Kellogg School of Management, Evanston, IL (poster).
- S. Giannerini; G. Goracci, Entropy based tests of dependence for categorical time series, PRIN final conference: Forecasting Economic and Financial Time Series, September 12–13, 2016, Villa Mondragone, Monteporzio Catone (RM).

[3]The first name is the presenter.

- S. Giannerini; G. Goracci, Asymptotics and power of entropy based tests of dependence for categorical data, in: CompStat 2016, book of abstracts, 2016, pp. 32 - 32 (atti di: 22nd International Conference on Computational Statistics, Oviedo, 23-26 August 2016).
- S. Giannerini, E. Maasoumi, E. Bee Dagum, Entropy based tests for non-linear dependence in time series, CFE/ERCIM Senate House, University of London, UK, 10-12 December 2010.
- A. Luati, P. Foschi, S. Giannerini, Information reduction techniques for turning point prediction 6th Eurostat Colloquium on Modern Tools for Business Cycle Analysis, Luxembourg, 26th - 29th September 2010.
- S. Giannerini, P. Foschi, A. Luati Predicting turning points through information reduction techniques Mathematical and Statistical Methods for Actuarial Sciences and Finance MAF 2010, 7 - 9 April 2010 Villa Rufolo - Ravello, Italy.
- S. Giannerini, F.M.L Di Lascio, A new copula-based clustering algorithm with applications in bioinformatics Evolutionary Computation in Statistics March 17-19, Ca' Foscari University, Venice.
- S. Giannerini, P. Foschi, A. Luati Information reduction techniques for turning point prediction Evolutionary Computation in Statistics March 17-19, Ca' Foscari University, Venice.
- A. Luati, P. Foschi, S. Giannerini, Information reduction techniques for turning point prediction Computational and Financial Econometrics conference (CFE'09), Cyprus, 29-31 October 2009.
- F.M.L. Di Lascio, G. Bianchi, S. Giannerini, A. Manzari, A. Reale, G. Ruocco Exploring copulas for the imputation of missing nonlinearly dependent data, CLADAG 2009, 9-11 September, Catania.
- F.M.L Di Lascio, G. Bianchi, S. Giannerini, A. Manzari, A. Reale, e G. Ruocco (2009). Exploring copulas for the imputation of missing data, Poster session, New Techniques and Techlologies for Statistics (NTTS) conference, Brussels, 18 - 20th February, 2009.
- F.M.L Di Lascio, S. Giannerini, A new copula-based clustering algorithm with applications to microarray data, SIS 2008, XLIV meeting of the Italian Statistical Society, 25-27th June 2008.
- S. Giannerini, D.L. Gonzalez, R. Rosa,: Strong Short-Range Correlations and Codon Class Dichotomies in coding DNA sequences , SER2008, Venice 28-29th March 2008.
- S. Giannerini, E. Maasoumi, E. Bee Dagum, An entropy based test for non-linear dependence in time series, S.Co. 2007, Venice 6-8th September 2007.
- S. Giannerini, E. Maasoumi, E. Bee Dagum, Entropy testing for nonlinearity in time series, ISI 2007, 56th Session of the ISI International Statistical Institute Lisboa, 22-29th August 2007.
- S. Giannerini, E. Maasoumi, E. Bee Dagum, Entropy testing for nonlinearity in time series, Final workshop Parametric and non parametric estimation and forecasting of time series conditional moment dynamics, June 14 - 16, 2007 Centro Congressi Villa Mondragone, Roma.
- S. Giannerini, G. Candela, A.E. Scorcu, Structural features and tourist movements of holiday destinations, SOEGW 2006, 29/08 - 02/09 Rimini.
- S. Giannerini, A. Baldi Antognini, Convergence rate for Ehrenfest-type urn designs, SIS 2006, XLIII meeting of the Italian Statistical Society, Torino, June 2006.
- S. Giannerini,D.L. Gonzalez, R. Rosa, Dichot omic classes and serial dependence in DNA sequences, Poster, SER 2006, Villa Mondragone, Roma, 18-19 April 2006.
- S. Giannerini, E. Bee Dagum, E. Maasoumi, An entropy based bootstrap test for nonlinear dependence in time series, CSDA world conference 2005, Limassol, Cyprus.
- S. Giannerini, D.L. Gonzalez, R. Rosa, Testing for Nonlinearity in Binary Sequences, COFIN Workshop: Linear and Non-Linear Dynamics in Time Series, Bressanone , 9-11 June 2005.

- A. Desalvo, S. Giannerini, R. Rosa, Chaotic Phenomena Arising in the Interaction of MeV Protons with Silicon Crystals, Workshop on Nonlinear Dynamics and Complexity in Information and Communication Technology, Bologna, 6-8 Settembre 2004, Poster.
- S. Giannerini, Deterministic and Stochastic Linear and Nonlinear Mean Prediction of Time Series, ASA 2004, Joint Statistical Meeting, Toronto (Canada) 8-12 Agosto 2004.
- S. Giannerini, D.L. Gonzalez, R. Rosa, A new Insight into DNA: detecting structure in parity binary sequences, ECC8, Experimental Chaos Conference, Firenze 14 June 2004, Poster.
- S. Giannerini, R. Rosa, Assessing chaos in time series: statistical aspects and perspectives, COFIN 2000 Workshop: Linearita' e non linearita' nella dinamica di serie storiche, Bressanone , 6-7 June 2003.
- E. Bee Dagum, S. Giannerini, R. Rosa, Characterizing nonlinearity in time series data from different perspectives, CLADAG 2003, 22-24 September Bologna.
- S. Giannerini, R. Rosa, Analysis of cardiovascular time series from a dynamical system perspective, CLADAG 2003, 22-24 September, Bologna.
- C. Bonetto, S. Giannerini, A. Giovagnoli (2003) Monitoring antibiotic resistance: A solution based on nonparametric tests for stochastic dominance Abstracts/Controlled Clinical Trials 24 Suppl. 3 81S.
- S. Giannerini, R. Rosa, D. L. Gonzalez, Chaotic behaviour in cardiovascular time series: a case study, Convegno Finale MURST: Modelli Stocastici e Metodi di Simulazione per l'Analisi di Dati Dipendenti, Campobasso, 28-29 Aprile 2003.
- S. Giannerini, Sensitivity to initial conditions and non-linear time series, RSS 2002, International Conference of the Royal Statistical Society, Plymouth, 3-6 September 2002, 138.
- S. Giannerini, R. Rosa, Analisi della dinamica del sistema cardiovascolare del rospo Bufo Arenarum in regime di fibrillazione, SICC meeting of the Italian Society for Chaos and Complexity: Complessita' e Scienze della vita, Pisa, 14-15 June 2002.
- R. Rosa, S. Giannerini, Bootstrap accuracy estimation in chaotic time series, SIS 2002, XLI meeting of the Italian Statistical Society, Milano, 5-7 June 2002.
- R. Rosa, S. Giannerini, Caos e Statistica, conferenza della SIFF, Societa' Italiana Fondamenti della Fisica Fondamenti della meccanica quantistica e statistica, Bertinoro, 13-14 Sett. 2001.
- S. Giannerini, R. Rosa, Largest Lyapunov exponent accuracy: a bootstrap approach, conferenza della SICC, meeting of the Italian Society for Chaos and Complexity: Chaos and Complexity in the new millennium, Padova, 3-5 Nov. 2000.
- R. Rosa, S. Giannerini, Sono ricampionabili le serie storiche caotiche?, SIS 2000, XL meeting of the Italian Statistical Society, Firenze, 26-28 April 2000.
- S. Mignani, S. Giannerini, D. L. Gonzalez, Test di non linearità per la ricerca di un'eventuale dinamica caotica nel sistema cardiovascolare Meeting of the Italian Biometric Society, Roma, July 1999.
- S. Giannerini, R. Rosa, Generating replications of chaotic time series, meeting of the Italian Society for Chaos and Complexity, Roma, October 1998.
- Participation to the workshop: Elementi di Dinamica non lineare: Stabilita', Biforcazione e Caos, FEEM SICC DEI, Politecnico di Milano, 14-16 February 2000.

## Supervision of PhD students and post doc fellowships

- Gery Andres Diaz Rubio, Post-doc fellowship in Statistics: "Dynamic panel data modelling of the Italian football league statistics". Jan 2023 - Jan 2024
- Gery Andres Diaz Rubio, PhD In Statistics, University of Bologna (XXXIV cycle): "Model Selection and the Vectorial Misspecification Resistant Information Criterion for Multivariate Time Series".

- Julio Emilio Sandubete, PhD In Statistics, Universidad Complutense de Madrid, "Quantifying Chaos From Time-Series Data Through Lyapunov Exponents" (in co-supervision with Lorenzo Escot).
- Greta Goracci, Nov. 2020, Nov. 2021, post doc research fellowship in Statistics, University of Bologna on, "Threshold Autoregressive Moving-Average models: probabilistic structure and inferential problems".
- Greta Goracci, Nov. 2019, Nov. 2020, post doc research fellowship in Statistics, University of Bologna on, "Probabilistic aspects and statistical inference for Threshold Autoregressive Moving-Average models".
- Greta Goracci, Nov. 2018, Nov. 2019, post doc research fellowship in Statistics, University of Bologna on, "Threshold Autoregressive Moving-Average models: probabilistic structure, statistical aspects and applications".
- Greta Goracci, 2015-2018, PhD In Statistics, University of Bologna (XXXI cycle), "Probabilistic properties and statistical inference for TARMA models", external supervisors: K.-S. Chan, University of Iowa and Howell Tong, LSE.
- Lucia Modugno, 2009-2011, PhD In Statistics, University of Bologna:"A multilevel model with time series components for the analysis of tribal art prices" (in co-supervision).
- Enrico Properzi, 2011-2013, PhD In Statistics, University of Bologna: "Genome characterization through the mathematical structure of the genetic code" (in co-supervision).
- F. Marta L. di Lascio, 2011-2012, post doc research fellowship in Statistics, University of Bologna on "Imputation methods based on copula functions" .
- F. Marta L. di Lascio, 2009-2010, post doc research fellowship in Statistics, University of Bologna (venue of Rimini) on "Tourist flow and cultural destinations".
- F. Marta L. di Lascio, 2006-2008, PhD In Statistics, University of Bologna:"Analyzing the dependence structure of microarray data: A copula based approach" (in co-supervision).
- Laura Sardonini, 2005-2007, PhD In Statistics, University of Bologna, "Invariants Estimation for Nonlinear Time Series" (in co-supervision).

## Software projects

| | |
|---|---|
| Name and description | tseriesTARMA, R package for the analysis of non-linear time series through TARMA models (with Greta Goracci and contributions by K.-S. Chan.) |
| Status | on CRAN: https://cran.r-project.org/package=tseriesTARMA |
| Name and description | tseriesChaos, R package for the Analysis of Nonlinear Time Series (with Antonio Fabio di Narzo and contributions by Mototsugu Shintani, Vanderbilt University). |
| Status | on CRAN: https://cran.r-project.org/package=tseriesChaos |
| Name and description | tseriesEntropy: R package for entropy based tests for time series (with Greta Goracci). |
| Status | on CRAN: https://cran.r-project.org/package=tseriesEntropy |
| Name and description | CoClust: R package for copula based cluster analysis (with F.M.L Di Lascio). |
| Status | on CRAN: https://cran.r-project.org/package=CoClust |
| Name and description | CoImp: R package for copula based multivariate imputation (with F.M.L Di Lascio). |
| Status | on CRAN: https://cran.r-project.org/package=CoImp |
| Name and description | mathDNA: R package for genomic sequence analysis motivated by the non-power model of the genetic code. |
| Status | In preparation https://github.com/sgiannerini/mathDNA |
| Name and description | multilevelRCS: R package: Multilevel Models for Repeated Cross Sections. |
| Status | Alpha |

## Service as referee

- Journal of Agricultural, Biological, and Environmental Statistics
- Econometric Reviews
- Studies in Nonlinear Dynamics and Econometrics
- Computational Statistics and Data Analysis
- Statistics and Computing
- Journal of Multivariate Analysis
- SMA (Statistical Methods and Applications)
- Econometrics and Statistics
- Communications in Statistics
- Metrika
- Statistica
- Quantitative Finance and Economics
- Physica A
- Physica D
- Physical Review E
- Physical Review Letters
- Physical Review Applied
- Physics of Fluids
- Physics Letters A
- CHAOS
- Journal of Theoretical Biology
- Biosystems
- Energy Economics
- Nonlinear Dynamics Psychology and Life Sciences
- Entropy
- Information
- Symmetry
- Life
- Mathematical Biosciences
- BMC Bioinformatics
- Royal Society Interface Focus
- Philosophical Transactions of the Royal Society, A
- Scientific Reports
- Progress in Biophysics and Molecular Biology

## Editorial appointments

| | |
|---|---|
| Journal | **Statistica** https://rivista-statistica.unibo.it |
| Position | Editor in chief |
| Dates | 2017 - 2022 |
| Journal | **Philosophical Transactions of the Royal Society, series A** |
| Position | co-Editor of the theme issue: DNA as Information, https://royalsocietypublishing.org/toc/rsta/374/2063 |
| Dates | March 2016; volume 374, issue 2063 |

## Program committees and scientific panels

- 11th International Conference: Mathematical And Statistical Methods For Actuarial Sciences And Finance - MAF2024, University of Le Havre Normandie, Le Havre Cedex (FR) - April 4-6, 2024. Role: member of the scientific committee.
- COST Action CA21169 DYNALIFE WG1 Meeting: COST CA21169 WG1 Workshop: Nonlinear Dynamics of the Biological Information Flow. January 18-19, 2024, Universidade do Porto, Porto, Portugal. Role: member of the scientific commitee.

- COST Action CA21169 DYNALIFE Interdisciplinary Workshop. October 26-28, 2023, Parkhotel Luna Mondschein, Bozen-Bolzano, Italy. Role: main organizer.
- COST Action CA21169 DYNALIFE WG1 Meeting: Modelling Information Flow in Biological Coding Systems. June 20-21, 2023, Metropol Palace Hotel Belgrade, Belgrade, Serbia. Role: member of the scientific commitee.
- Opening conference of the COST Action CA21169 DYNALIFE: 80, 70, 20 Conference: towards excellence and convergence research in theoretical biology. May 02-04, 2023, University of Venice. Role: member of the organizing commitee.
- Workshop "Mathematical and Statistical models for genetic coding" September 26-28, 2013, Mannheim University of Applied Sciences. Role: organization and direction.
- Third International Workshop on "Mathematical structure of the genetic information" February 25-26, 2014, University of Bologna. Role: organization and direction.
- Seventh International Workshop on Simulation May 21-25, 2013, University of Bologna, Rimini campus. Role: organization.
- Second International Workshop on "Mathematical structure of the genetic information", September 6-9, 2012, University of Palma de Mallorca UIB (Spain). Role: organization and direction.
- International Workshop: Parametric and non parametric estimation and forecasting of time series conditional moment dynamics, Roma, June 15-17, 2007. Role: organization.
- International Workshop: Linear and Non-Linear Dynamics in Time Series, Bressanone, June 9-11, 2005. Role: organization.
- International Workshop: "Linear and Nonlinear Dynamics in Time Series", Bressanone, June 6-7, 2003. Role: organization.

## Involvement in European projects

| | |
|---|---|
| Project: | COST Action CA21169 - **DYNALIFE** supported by the EU Framework Programme Horizon Europe https://www.cost.eu/actions/CA21169/,www.dynalife.eu |
| Position | **Management Commitee member, Core Group member** |
| Dates | Sep. 2022 - Sep. 2026 |
| Amount in euros | ~130000 per year |
| Project: | COST Action CA17120 - **Chemobrionics** supported by the EU Framework Programme Horizon 2020 http://www.chemobrionics.eu/ |
| Position | **Vice Chair** and **Management Commitee member** |
| Dates | Oct. 2018 - Mar. 2023 |
| Amount in euros | ~130000 per year |

## Funding ID as principal investigator

| | |
|---|---|
| Project Title: | Nonlinear Time Series Analysis of El Niño-Southern Oscillation Events in the Eastern South Pacific: Implications for the Regional Bioclimate System. Funding Institution: University of Bologna – ALMArie Curie project; Duration (months): 18, Feb. 2022 - Sep. 2023; |
| Amount in euros | 10000. |
| Project Title: | Evolutionary computation in Statistics. Funding Institution: Italian MIUR – PRIN project; Duration (months): 24, 2007-2009; |
| Amount in euros | 52315 (total), 12000 to my Unit. |
| Project Title: | Tourist flow and cultural destinations. Funding Institution: UNIBO - Rimini Campus; Duration (months): 12, Oct 2009 – Oct. 2010; |
| Amount in euros | 18798. |

| | |
|---|---|
| Project Title: | Imputation methods based on copula functions. Funding Institution: ISTAT; Duration (months): 24, October 2010, October 2012; |
| Amount in euros | 30000. |
| Project Title: | Organization of the workshop “Mathematical and Statistical models for genetic coding” 26-28 September 2013, Mannheim University of Applied Sciences. Funding Institution: DAAD. |
| Amount in euros | 20000. |

## Funding ID as participant

| | |
|---|---|
| Project Title: | PRIN 2000-2001 (biannual), Linear and Non-Linear Dynamics in Time Series, (Linearita’ e non linearita’ nelle dinamiche di serie storiche), National coordinator: Estela Bee Dagum. |
| Amount in euros | 86.248. |
| Project Title: | PRIN 2002-2003 (biannual), Statistical Inference for time series dynamics, (Inferenza statistica sulla dinamica stocastica e deterministica di serie storiche osservate, National coordinator: Estela Bee Dagum. |
| Amount in euros | 112000. |
| Project Title: | PRIN 2004-2005 (biannual), Parametric and non parametric estimation and forecasting of time series conditional moment dynamics (Stima parametrica e non parametrica delle dinamiche di momenti condizionali di serie storiche), National coordinator: Estela Bee Dagum. |
| Amount in euros | 65000. |
| Project Title: | PRIN 2005-2006 (biannual) Statistical design of continuous innovation (Progettazione statistica dell’innovazione "continua" di prodotto), National coordinator: Pasquale Erto. |
| Amount in euros | 119000. |
| Project Title: | PRIN 2010-2011 (biannual Forecasting Economic and Financial Time Series: understanding the complexity and modelling structural change, (La previsione economica e finanziaria: il ruolo dell’informazione e la capacità di modellare il cambiamento). National coordinator: Tommaso Proietti. |
| Amount in euros | 93172. |

## Membership

Italian Statistical Society (SIS) from 1999.

Royal Statistical Society (RSS) from 2002.

Società Italiana di Econometria SIdE) from 2021.

American Statistical Association (ASA) 2004-2006.

Psychometric Society 2017-2018

Italian Society for Chaos and Complexity (SICC)1999-2003

## Awards and dissemination

- In 2009 I have been selected as a top (1%) researcher in Europe by Atomium Culture, the permanent platform for European excellence funded by the EU (http://atomiumculture.eu/). Atomium Culture, was launched publicly by the former French President Valéry Giscard d'Estaing on the 27th November 2009 at the European Parliament in Brussels. I was invited at the event and with the support of Atomium Culture, I have written a newspaper article based on my research on DNA and titled "Counting on the tree of life". The article has been published on the most important European newspapers:
  - Italy: Il Sole 24 Ore http://www.atomium-culture.ilsole24ore.com/?p=10
  - Spain: El Pais http://www.elpais.com/articulo/sociedad/Counting/on/the/Tree/of/Life/elpepusoc/20110726elpepusoc_13/Tes
  - Austria – Der Standard http://derstandard.at/1285199352166/Counting-on-the-Tree-of-Life
  - Germany: Frankfurter Allgemeine Zeitung http://www.faz.net/artikel/C31277/mehrdeutige-nummern-in-der-dna-das-leben-kann-zaehlen-30331235.html
  - Ireland Irish Times http://195.7.33.36/newspaper/atomium/2010/2010121335.html
  - Poland: Rzeczpospolita http://www.rp.pl/artykul/567922.html
- Prize for the best poster: D.L. Gonzalez, S. Giannerini, R. Rosa, "Dichotomic classes and serial dependence in DNA sequences", SER 2006, Villa Mondragone, Roma, 18-19 April 2006.
- I have been interviewed at the Radio program "PiGreco Party", Radio Città del Capo on the connections between Statistics and Biology http://fmblu.formicablu.it/index.php?id=521
- The theme issue 'DNA as Information' of Philosophical Transactions of the Royal Society which I have co-edited has been mentioned in different press releases:
  - Unibo Magazine: https://magazine.unibo.it/archivio/2016/03/14/codifica-e-decodifica-del-dna-su-philosophical-transactions-of-the-royal-society
  - CNR: https://www.cnr.it/it/news/6516
- The article A role for circular code properties in translation has been mentioned in different press releases, some of which are mentioned below:
  - Unibo Magazine: https://magazine.unibo.it/archivio/2021/05/31/la-teoria-dei-codici-in-aiuto-delle-biotecnologie
  - CNR: https://www.cnr.it/it/comunicato-stampa/10326
  - Le Scienze: https://www.lescienze.it/news/2021/05/31/news/la_teoria_dei_codici_in_aiuto_delle_biotecnologie-4935716/

## Teaching activity[4]

### Teaching as Associate Professor

| | |
|---|---|
| Academic Year: | 2018/2019 - 2022/2023 |
| Course | Introductory Statistics (in English, 55h, 6cfu) |
| Degree | International first cycle degree (L) in Genomics |

[4]Courses under full responsibility. Unless otherwise noted, all the courses pertain to the SSD SECS-S/01, SC: 13/D1.

| | |
|---|---|
| Institution | University of Bologna, School of Pharmacy and Biotechnology. |
| Course | Processi stocastici (Stochastic processes, 30h 5cfu) |
| Degree | Second cycle degree (LM) in Scienze statistiche finanziarie e attuariali |
| Institution | University of Bologna, Department of Statistical Sciences, Rimini campus |
| Course | Metodi statistici per i mercati finanziari, (Statistical methods for financial markets, 35h, 8cfu) |
| Degree | First cycle degree (L) in Finanza, assicurazioni e impresa |
| Institution | University of Bologna, Department of Statistical Sciences, Rimini campus |
| | |
| Academic Year: | 2017/2018 |
| Course | Statistica Applicata (Applied statistics, 60h, 8cfu) |
| Degree | First cycle degree (L) in Economia dell'impresa |
| Institution | University of Bologna, School of Economics, Management and Statistics, Rimini campus |
| Course | Processi Stocastici (Stochastic processes, 30h 5cfu) |
| Degree | Second cycle degree (LM) in scienze statistiche finanziarie e attuariali |
| Institution | University of Bologna, School of Economics, Management and Statistics, Rimini campus |
| Course | Probability II (in English, 30h, 6cfu) |
| Degree | First cycle degree (L) in Scienze statistiche |
| Institution | University of Bologna, School of Economics, Management and Statistics |
| | |
| Academic Year: | 2016/2017 |
| Course | Statistica Applicata (Applied statistics, 60h, 8cfu) |
| Degree | First cycle degree (L) in Economia dell'impresa |
| Institution | University of Bologna, School of Economics, Management and Statistics, Rimini campus |
| Course | Processi Stocastici (Stochastic processes, 30h 5cfu) |
| Degree | Second cycle degree (LM) in Scienze statistiche finanziarie e attuariali |
| Institution | University of Bologna, School of Economics, Management and Statistics, Rimini campus |
| Course | Probabilità Corso Avanzato (Advanced Probability, 30h, 6cfu) |
| Degree | Second cycle degree (LM) in Scienze statistiche |
| Institution | University of Bologna, School of Economics, Management and Statistics |
| | |
| Academic Year: | 2014/2015, 2015/2016 |
| Course | Statistica Applicata (Applied statistics, 60h, 8cfu) |
| Degree | First cycle degree (L) in Economia dell'impresa |
| Institution | University of Bologna, School of Economics, Management and Statistics, Rimini campus |
| Course | Processi Stocastici (Stochastic processes, 30h 5cfu) |
| Degree | Second cycle degree (LM) in Scienze statistiche finanziarie e attuariali |
| Institution | University of Bologna, School of Economics, Management and Statistics, Rimini campus |
| Course | Statistica per la sperimentazione biologica (Statistics for Biology, 24h, 4cfu) |
| Degree | Second cycle degree (LM) in Biotecnologie molecolari e industriali |
| Institution | University of Bologna, School of Pharmacy and Biotechnology |

**Teaching as Assistant Professor**

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|---|---|
| Academic Year: | 2013/2014 |
| Course | Statistica Applicata (Applied statistics, 60h, 8cfu) |

| | |
|---|---|
| Degree | First cycle degree (L) in Economia dell'impresa |
| Institution | University of Bologna, School of Economics, Management and Statistics, Rimini campus |
| Course | Processi Stocastici (Stochastic processes, 30h 5cfu) |
| Degree | Second cycle degree (LM) in Scienze statistiche finanziarie e attuariali |
| Institution | University of Bologna, School of Economics, Management and Statistics, Rimini campus |
| Course | Statistica per la sperimentazione biologica (Statistics for Biology, 24h, 4cfu) |
| Degree | Second cycle degree (LM) in Biotecnologie molecolari e industriali |
| Institution | University of Bologna, School of Pharmacy and Biotechnology |
| Academic Year: | 2012/2013 |
| Course | Statistica Applicata (Applied statistics, 60h, 8cfu) |
| Degree | First cycle degree (L) in Economia dell'impresa |
| Institution | University of Bologna, School of Economics, Management and Statistics, Rimini campus |
| Course | Processi Stocastici (Stochastic processes, 30h 5cfu) |
| Degree | Second cycle degree (LM) in Scienze statistiche finanziarie e attuariali |
| Institution | University of Bologna, School of Economics, Management and Statistics, Rimini campus |
| Academic Year: | 2009/2010 - 2010/2011 - 2011/2012 |
| Course | Statistica Applicata (Applied statistics, 60h, 8cfu) |
| Degree | First cycle degree (L) in Economia dell'impresa |
| Institution | University of Bologna, Faculty of Economics, Rimini campus |
| Course | Analisi delle serie storiche e previsioni nel turismo (Time series analysis for tourism, 30h, 4cfu) |
| Degree | Second cycle degree (LM) in Economia e management del turismo (EMT) |
| Institution | University of Bologna, Faculty of Economics, Rimini campus |
| Academic Year: | 2005/2006 – 2006/2007 – 2007/2008 – 2008/2009 |
| Course | Statistica Applicata (Applied statistics, 60h, 8cfu) |
| Degree | First cycle degree (L) in Economia e management |
| Institution | University of Bologna, Faculty of Economics, Rimini campus |
| Course | Statistica per le Decisioni di Impresa (Statistics for business decision, 30h, 4cfu) |
| Degree | Second cycle degree in Economia e politica dei mercati (EPM) |
| Institution | University of Bologna, Faculty of Economics, Rimini campus |

**Supervision of degree/master theses**

Since 2005, I have been the supervisor of 26 degree/master theses.

**Teaching assistance as PhD student/post-doc**

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|---|---|
| Academic Year: | 1998/1999, 1999/2000 |
| class | Statistica |
| Institution | University of Bologna, Faculty of Statistics |
| Academic Year: | 2002/2003, 2003/2004, 2004/2005 |
| class | Statistica II, Metodi Statistici per l'Economia e l'Azienda |
| Institution | University of Bologna, Faculty of Economics, Forlì campus |
| Academic Year: | 2002/2003 |

| | |
|---|---|
| class | Statistica, Statistica per la Ricerca Sociale |
| Institution | University of Bologna, Faculty of Political Sciences |
| Academic Year: | 2002/2003, 2003/2004, 2004/2005 |
| class | Statistica II, Metodi Statistici per l'Economia e l'Azienda |
| Institution | University of Bologna, Faculty of Economics, Forlì campus |

## PhD courses held

I am a Faculty member of the PhD program of my department since 2012.

| | |
|---|---|
| 2009 | Introduction to R (6h). PhD in Statistics, University of Bologna. |
| 2010 | Introduction to R (6h). PhD in Statistics, University of Bologna. |
| 2014 | Nonlinear time series and chaos (9h). PhD in Statistics XXIX cycle, University of Bologna. |
| 2015 | Introduction to time series analysis (9h). PhD in Statistics XXX cycle, University of Bologna. |
| 2016 | Nonlinear time series and chaos (9h). PhD in Statistics XXXI cycle, University of Bologna. |
| 2017 | Nonlinear time series and chaos (4h). PhD in Statistics XXXII cycle, University of Bologna. |
| 2018 | Nonlinear time series and chaos (12h). PhD in Statistics XXXIII cycle, University of Bologna. |
| 2019 | Nonlinear time series and chaos (12h). PhD in Statistics XXXIV cycle, University of Bologna. |
| 2022 | Nonlinear time series and chaos (10h). PhD in Statistics XXXVII cycle, University of Bologna. |
| 2023 | Nonlinear time series and chaos (12h). PhD in Statistics XXXVIII cycle, University of Bologna. |

## Service

| | |
|---|---|
| Dates | Sep 2021 - today |
| Description | Deputy Director of the Ph.D. programme in Statistics https://phd.unibo.it/statistics/en/. |
| Dates | July 2017 - 2019 |
| Description | Member of: VRA panel (Area 13) for research assessment (Valutazione della Ricerca di Ateneo). |
| Dates | 2017 - 2018 |
| Description | Voluntary mentor for students confined in jail. |
| Dates | Oct 2012 - today |
| Description | Member of the Faculty of the PhD program in Statistics. |
| Dates | 2006 - today |
| Description | Manager of the departmental server for HPC |
| Dates | Mar. 2017 - 2022 |
| Description | Editor of the journal STATISTICA |
| Dates | Oct. 2012 - Apr. 2015 |
| Description | Member of: departmental board (giunta di dipartimento) |
| Dates | 2008 - 2018 |
| Description | Member of: commissione bandi tutorato/affidamento di Facoltà e Scuola |

| | |
|---|---|
| Dates | 2012 - 2014 |
| Description | Member of: editorial staff of the departmental journal STATISTICA |
| Dates | 2012 - 2014 |
| Description | Member of: department research board (commissione ricerca di dipartimento) |

## Consultancy Activity

| | |
|---|---|
| Dates | 2018-today |
| Description | Statistical consultant for ENI - (project subject to NDA) |
| Dates | 2009-2014 |
| Description | Founding member and consultant of OMBA, Osservatorio per il Mercato dei Beni Artistici, NOMISMA-LUM |
| Dates | 2009-2010 |
| Description | Statistical consultant for ISTAT to develop a software library based on copula functions to impute missing data in censuses. |
| Dates | 2007 |
| Description | Statistical consultant for the FIRB project “Le dinamiche evolutive dei cluster di imprese: nuove architetture organizzative e tecnologiche (n°RBNE03HJZZ). Principal Investigator: Vittorio Coda, Bocconi University. |
| Dates | 1998 |
| Description | Statistical consultant for the project “Qualità del Front-Office”, Dipartimento di Scienze Economiche ed Aziendali, Università degli studi di Bologna. |

## Personal skills and competencies

First language **Italian**

Other languages

*Self-assessment*
*European level*(*)

| | Understanding | | Speaking | | Writing |
|---|---|---|---|---|---|
| | Listening | Reading | Spoken interaction | Spoken production | |
| **English** | C2 | C2 | C2 | C2 | C2 |
| **French** | A2 | A2 | A2 | A2 | A2 |
| **German** | A1 | A1 | A1 | A1 | A1 |

(*) *Common European Framework of Reference* (CEF) level