Irene Crimaldi

Citizenship: Italian

Affiliation: IMT[1] School for Advanced Studies Lucca[2]
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Present academic position

- Since November 2014 full-time Associate Professor ("Professore di seconda fascia") of Statistics (Italian code: 13/STAT-01/A) at the IMT School for Advanced Studies, Lucca, Italy. (Position obtained as a consequence of the achievement of the Italian qualification ("abilitazione scientifica nazionale", call 2012, date: February 10, 2014) and of an evaluation procedure for promotion (art. 24, comma 6, L. 240/2010.)
- Member of the Scientific Board for various IMT PhD programs (since XXVIII cycle).
- Member of the Scientific Board of the PhD program "Social Sciences for Sustainability and Wellbeing", University of Florence (since XXXIX cycle).

Past academic positions

- *November 2018 - October 2024:* member of the IMT Joint Students and Teachers Board (in Italian "Commissione Paritetica Docenti-Studenti").
- *November 2012 - October 2017:*
  person appointed by the IMT Director for the coordination of the PhD activities: formative project, coursework and other didactic activities, higher education and research apprenticeship ("apprendistato di alta formazione e ricerca"), job placement.
- *April 2013 - October 2017:*
  IMT coordinator of the international mobility programs for students.
- *November 2011 - October 2014:*
  full-time tenured assistant professor ("Ricercatore universitario di ruolo confermato, in regime di tempo pieno") of Probability and Mathematical Statistics (Italian code: 01/A3-MAT/06) at IMT Lucca, Italy. (Position obtained as a consequence of a transfer call.)
- *Academic year 2011/12 - Academic year 2013/14:*
  "Professore aggregato" (art. 1, L. 230/2005 and art. 6, L. 240/2010) at IMT Lucca, Italy.

[1] "Institutions, Markets and Technologies"
[2] Italian public graduate school and research institute

- *November 2006 - October 2011:*
  full-time permanent Researcher ("Ricercatore universitario di ruolo, in regime di tempo pieno") in Probability and Mathematical Statistics (Italian code: MAT/06) at the Department of Mathematics of the University of Bologna (Faculty of Science), Italy. (Position obtained as a consequence of an open competition based on two written and one oral examinations and qualifications.) Tenure ("conferma in ruolo") since November 2009 (D.D. n. 726-2010, March 19, 2010).

- *Academic year 2006/07 - Academic year 2011/2012:*
  "Professore aggregato" (art. 1, L. 230/2005 and art. 6, L. 240/2010) at the Faculty of Science, University of Bologna, Italy.

- *April 2003 - October 2006:*
  postdoctoral position ("assegno di ricerca") in Probability and Mathematical Statistics (Italian code: MAT/06) at the Department of Mathematics, University of Bologna (Italy), for 40 months. Supervisor: Prof. M. Campanino. (Position obtained as a consequence of an open competition based on qualifications and an oral examination.)

- *January - March 2003:*
  fellowship from the Department of Applied Mathematics, University of Pisa, Italy. Supervisor: Prof. F. Flandoli.

Education, scholarships and internships

- *January 2000 - December 2002:*
  PhD scholarship in Financial Mathematics from the "Scuola Normale Superiore" of Pisa, Italy. Dissertation title: *Convergence of conditional expectations.* Grade: 70/70 cum laude. Supervisors: Prof. Giorgio Letta (University of Pisa, Italy) and Prof. Luca Pratelli (Naval Academy, Livorno, Italy). Referees: Prof. Francesco Russo (University of Paris 13, France) and Prof. Wolfgang Woess (University of Graz, Austria). Thesis defense date: 15 March 2004. (Scholarship obtained as a consequence of an open competition based on a written and an oral examinations and qualifications.)

- *December 20, 2001:* Appointment as "cultore della materia" of Probability and Mathematical Statistics (Italian code: MAT/06) by the board of the degree program in Mathematics of the University of Pisa, Italy.

- *March 26 - September 26, 2001:* internship with the "Monte dei Paschi di Siena" Bank, Risk Management area, Siena, Italy. Main activities:
  - study of the second Basel accord (Basel 2) and analysis of its impact on the capital requirements of the Bank;
  - participation in the project aimed at constructing a portfolio model for estimating the credit VaR.

- *January - December 1999:* scholarship from the National Institute for Advanced Mathematics ("Istituto Nazionale di Alta Matematica" [3], INdAM) at the University of "Milano-Bicocca", Milan, Italy. (Scholarship obtained as a consequence of an open competition based on qualifications.)

- *October 29, 1998:* graduated cum laude in Mathematics from the University of Pisa, Italy. Dissertation in Probability theory with title *Stable convergence and its applications.* Supervisor: Prof. G. Letta. Essay in Operational research with title *Global convergent versions of the Polak-Ribière method.* Supervisor: Prof. M. Pappalardo.

Awards

"Bruno de Finetti" prize (2001), awarded by the "Accademia Nazionale dei Lincei", Rome, Italy.

Publications

PREPRINTS

- G. Aletti - I. Crimaldi - A. Ghiglietti, *Statistical inference for interacting innovation processes and related general results*, arXiv (2501.09648, 2025), submitted.

- G. Aletti - A. Baldi Antognini - I. Crimaldi - R. Frieri - A. Ghiglietti, *Design and inference for multi-arm clinical trials with informational borrowing: the interacting urns design*, arXiv (2407.20819, 2024), submitted.

- R. Fuentes M.[4] - I. Crimaldi - A. Rungi, *Non-linear dependence and Granger causality: A vine copula approach*, arXiv (2409.15070, 2024), submitted.

- C. Tortù[4] - I. Crimaldi - F. Mealli - L. Forastiere, *Causal effects with hidden treatment diffusion on observed or partially observed networks*, arXiv (2109.07502, 2021).

IN JOURNALS OR IN BOOKS

- G. Aletti - I. Crimaldi - A. Ghiglietti (2024), *Networks of reinforced stochastic processes: a complete description of the first-order asymptotics*, Stochastic Processes and their Applications, 176, 104427, 28 pages, Elsevier, ISSN 0304-4149.

- G. Aletti - I. Crimaldi - A. Ghiglietti (2024), *Networks of reinforced stochastic processes: probability of asymptotic polarization and related general results*, Stochastic Processes and their Applications, 174, 104376, 19 pages, Elsevier, ISSN 0304-4149.

- C. Tortù[4] - I. Crimaldi - F. Mealli - L. Forastiere (2024), *Estimating causal effects of multi-valued treatments accounting for network interference: immigration policies and crime rates*, Sociological Methods and Research, 53(4), 1794-1828, SAGE Publications, ISSN 0049-1241.

[3] Italian self-governing state research institute

[4] PhD student at IMT Lucca under my supervision for the preparation of this work

- G. Aletti - I. Crimaldi - A. Ghiglietti (2023), *Interacting innovation processes*, Scientific Reports, 13, 17187, 12 pages (+ 2 supplementary files), Nature Portfolio, Springer Nature, ISSN 2045-2322.
- I. Crimaldi - P.-Y. Louis - I. G. Minelli (2023), *Interacting non-linear reinforced stochastic processes: synchronization or non-synchronization*, Advances in Applied Probability, 55(1), 275-320, Applied Probability Trust, ISSN 0001-8678.
- I. Crimaldi - P.-Y. Louis - I. G. Minelli (2023), *Statistical test for an urn model with random multidrawing and random addition*, Stochastic Processes and their Applications, 158, 342-360, Elsevier, ISSN 0304-4149.
- G. Aletti - I. Crimaldi (2022), *Generalized Rescaled Pólya urn and its statistical application*, Electronic Journal of Statistics, 16(1), 1635-1680, Institute of Mathematical Statistics and Bernoulli Society, ISSN 1935-7524.
- G. Aletti - I. Crimaldi (2022), *The Rescaled Pólya Urn: local reinforcement and chi-squared goodness-of-fit test*, Advances in Applied Probability, 54(3), 849-879, Applied Probability Trust, ISSN 0001-8678.
- I. Crimaldi - P.-Y. Louis - I. G. Minelli (2022), *An urn model with random multiple drawing and random addition*, Stochastic Processes and their Applications, 147, 270-299, Elsevier, ISSN 0304-4149.
- G. Aletti - I. Crimaldi (2021), *The Rescaled Pólya Urn and the Wright-Fisher process with mutation*, Mathematics, 9(22), 2909, 11 pages, part of the special issue "Bayesian Predictive Inference and Related Asymptotics - Festschrift for Eugenio Regazzini's 75th Birthday", MDPI, ISSN 2227-7390.
- G. Aletti - I. Crimaldi (2021), *Twitter as an innovation process with damping effect*, Scientific Reports, 11, 21243, 14 pages, Nature Portfolio, Springer Nature, ISSN 2045-2322.
- L. Gianfagna[4] - I. Crimaldi - D. Gallan (2021), *The regulation of multilateral development banks: is it needed? A preliminary analysis*, Journal of Financial Regulation and Compliance, 29(4), 434-453, Emerald Publishing Limited, ISSN 1358-1988.
- G. Aletti - I. Crimaldi - F. Saracco (2021), *A model for the Twitter sentiment curve*, PLoS One, 16(4), e0249634, 28 pages, PLoS, ISSN 1932-6203.
- F. Tria - I. Crimaldi - G. Aletti - V.D.P. Servedio (2020), *Taylor's Law in Innovation Processes*, Entropy, 22(5), article number 573, MDPI, ISSN 1099-4300.
- G. Aletti - I. Crimaldi - A. Ghiglietti (2020), *Interacting reinforced stochastic processes: statistical inference based on the weighted empirical means*, Bernoulli, 26(2), 1098-1138, International Statistical Institute and Bernoulli Society for Mathematical Statistics and Probability (ISI/BS), ISSN 1350-7265.

- C. Becatti[4] - I. Crimaldi - F. Saracco (2019), *Collaboration and followership: a stochastic model for activities in bipartite social networks*, PLoS One, 14(10), e0223768, 24 pages + supporting information (8 pages), PLoS, ISSN 1932-6203.

- G. Aletti - I. Crimaldi - A. Ghiglietti (2019), *Networks of reinforced stochastic processes: asymptotics for the empirical means*, Bernoulli, 25(4B), 3339-3378, International Statistical Institute and Bernoulli Society for Mathematical Statistics and Probability (ISI/BS), ISSN 1350-7265.

- I. Crimaldi - P. Dai Pra - P.-Y. Louis - I. G. Minelli (2019), *Synchronization and functional central limit theorems for interacting reinforced random walks*, Stochastic Processes and their Applications, 129(1), 70-101, Elsevier, ISSN 0304-4149.

- G. Aletti - I. Crimaldi - A. Ghiglietti (2017), *Synchronization of reinforced stochastic processes with a network-based interaction*, The Annals of Applied Probability, 27(6), 3787-3844, Institute of Mathematical Statistics, ISSN 1050-5164.

- I. Crimaldi - M. Del Vicario[4] - G. Morrison - W. Quattrociocchi - M. Riccaboni (2017), *Modeling networks with a growing feature-structure*, Interdisciplinary Information Sciences, 23(2), 127-144, Graduate School of Information Sciences, Tohoku University, ISSN 1340-9050.

- I. Crimaldi - P. Dai Pra - I. G. Minelli (2016), *Fluctuation theorems for synchronization of interacting Pólya's urns*, Stochastic Processes and their Applications, 126(3), 930-947, Elsevier, ISSN 0304-4149.

- P. Boldi - I. Crimaldi - C. Monti[5] (2016), *A network model characterized by a latent attribute structure with competition*, Information Sciences, 354, 236-256, Elsevier, ISSN 0020-0255.

- I. Crimaldi (2016), *Central limit theorems for a hypergeometric randomly reinforced urn*, Journal of Applied Probability, 53(3), 899-913, Applied Probability Trust, ISSN 0021-9002.

- P. Berti - I. Crimaldi - L. Pratelli - P. Rigo (2016), *Asymptotics for randomly reinforced urns with random barriers*, Journal of Applied Probability, 53(4), 1206-1220, Applied Probability Trust, ISSN 0021-9002.

- M. Bonollo - I. Crimaldi - A. Flori[4] - L. Gianfagna[4] - F. Pammolli (2016), *Assessing financial distress dependencies in OTC markets: a new approach by trade repositories data*, Financial Markets and Portfolio Management, 30(4), 397-426, Springer, ISSN 1934-4554.

- P. Berti - I. Crimaldi - L. Pratelli - P. Rigo (2015), *Central limit theorems for an Indian buffet model with random weights*, The Annals of Applied Probability, 25(2), 523-547, Institute of Mathematical Statistics, ISSN 1050-5164.

[5] During the preparation of this work, PhD student at the Dep. of Computer Science, Univ. of Milan, Italy

- M. Bonollo - I. Crimaldi - A. Flori[4] (2015), *Systemic importance of financial institutions: from a global to a local perspective? A network theory approach* (in Italian), Bancaria, 2/2015, 54-69, ABI - Associazione Bancaria Italiana - Bancaria Editrice, ISSN 0005-4623. English version by M. Bonollo, I. Crimaldi, A. Flori, F. Pammolli and M. Riccaboni available in EIC working paper series #9/2014 IMT Lucca.

- M. Bonollo - I. Crimaldi - A. Flori[4] - F. Pammolli - M. Riccaboni (2015), *Systemic risk and banking regulation: some facts on the new regulatory framework*, Corporate Ownership & Control, 12(2), 52-63, Virtus Interpress, ISSN 1727-9232.

- A. Chessa - I. Crimaldi - M. Riccaboni - L. Trapin[4] (2014), *Cluster analysis of weighted bipartite networks: a new copula-based approach*, PLoS One, 9 (10), e109507, 12 pages + supporting information (1 page), PLoS, ISSN 1932-6203.

- P. Berti - I. Crimaldi - L. Pratelli - P. Rigo (2014), *An Anscombe-type theorem*, Journal of Mathematical Sciences, 196(1), 15-22, Springer + Business Media New York, Editor: V. Korolev, ISSN 1072-3374.

- G. Caldarelli - A. Chessa - I. Crimaldi - F. Pammolli (2013), *Weighted networks as randomly reinforced urn processes*, Physical Review E (Statistical, nonlinear, and soft matter physics), 87(2), 020106(R), 1-4, American Physical Society, ISSN 1539-3755.

- I. Crimaldi - A. Di Crescenzo - A. Iuliano - B. Martinucci (2013), *A generalized telegraph process with velocity driven by random trials*, Advances in Applied Probability, 45(4), 1111-1136, Applied Probability Trust, ISSN 0001-8678.

- A. Bianchi - M. Campanino - I. Crimaldi (2012), *Asymptotic normality of a Hurst parameter estimator based on the modified Allan variance*, International Journal of Stochastic Analysis, vol. 2012, ID 905082, 20 pages, Hindawi Publ. Corporation, ISSN 2090-3332.

- P. Berti - I. Crimaldi - L. Pratelli - P. Rigo (2011), *A central limit theorem and its applications to multicolor randomly reinforced urns*, Journal of Applied Probability, 48(2), 527-546, Applied Probability Trust, ISSN 0021-9002.

- P. Berti - I. Crimaldi - L. Pratelli - P. Rigo (2010), *Central limit theorems for multicolor urns with dominated colors*, Stochastic Processes and their Applications, 120(8), 1473-1491, Elsevier, ISSN 0304-4149.

- F. Bassetti - I. Crimaldi - F. Leisen (2010), *Conditionally identically distributed species sampling sequences*, Advances in Applied Probability, 42(2), 433-459, Applied Probability Trust, ISSN 0001-8678.

- P. Berti - I. Crimaldi - L. Pratelli - P. Rigo (2009), *Rate of convergence of predictive distributions for dependent data*, Bernoulli, 15(4), 1351-1367, International Statistical Institute and Bernoulli Society for Mathematical Statistics and Probability (ISI/BS), ISSN 1350-7265.

- I. Crimaldi (2009), *An almost sure conditional convergence result and an application to a generalized Pólya urn*, International Mathematical F., 4, no. 23, 1139-1156, Hikari Ltd., ISSN 1312-7594.

- I. Crimaldi - F. Leisen (2008), *Asymptotic results for a generalized Pólya urn with "multi-updating" and applications to clinical trials*, Communications in Statistics - Theory and Methods, vol. 37(17), 2777-2794, Taylor & Francis, ISSN 0361-0926.

- I. Crimaldi - G. Letta - L. Pratelli (2007), *A strong form of stable convergence*, Séminaire de Probabilités XL (ISSN 0720-8766), Lecture Notes in Mathematics vol. 1899 (ISSN 0075-8434, ISBN 978-3-540-71188-9), 203-225, Springer Verlag, Editors: C. Donati-Martin, M. Émery, A. Rouault, C. Stricker.

- I. Crimaldi - G. Letta - L. Pratelli (2007), *Sur l'interversion de l'ordre entre deux opérations sur les tribus*, Comptes Rendus Mathématiques, Acad. Sci. Paris, Ser. I, 345(6), 341-344, Elsevier, ISSN 1631-073X.

- I. Crimaldi - L. Pratelli (2005), *Convergence results for multivariate martingales*, Stochastic Processes and their Applications, vol. 115(4), 571-577, Elsevier, ISSN 0304-4149.

- I. Crimaldi - L. Pratelli (2005), *Convergence results for conditional expectations*, Bernoulli, vol. 11(4), 737-745, International Statistical Institute and Bernoulli Society for Mathematical Statistics and Probability (ISI/BS), ISSN 1350-7265.

- I. Crimaldi - L. Pratelli (2005), *Two inequalities for conditional expectations and convergence results for filters*, Statistics & Probability Letters, vol. 74(2), 151-162, Elsevier, ISSN 0167-7152.

- I. Crimaldi (2004), *On the behavior of the conditional expectations in Skorohod representation theorem*, Statistics & Probability Letters, vol. 67(2), 141-148, Elsevier, ISSN 0167-7152.

- I. Crimaldi (2002), *Convergence results for a normalized triangular array of symmetric random variables*, Expositiones Mathematicae, vol. 20(4), 375-384, Urban & Fischer Verlag, ISSN 0723-0869.

- I. Crimaldi - G. Letta (2000), *Sur la tribu borélienne de l'espace de Skorohod*, Rend. Accademia Nazionale delle Scienze detta dei XL, Memorie di matematica e applicazioni, 118^o, Vol. XXIV, fasc. 1, 255-268, Monograf, ISSN 1128-8582.

- I. Crimaldi - L. Pratelli (1998), *Paul Lévy type inequalities for symmetric random variables*, Rend. Accademia Nazionale delle Scienze detta dei XL, Memorie di matematica e applicazioni, 116^o, Vol. XXII, fasc. 1, 77-84, Monograf, ISSN 1128-8582.

In Proceedings

- I. Crimaldi - L. Forastiere - F. Mealli - C. Tortù[4] (2020), *The causal effect of immigration policies on income inequality*, in Book of short papers - SIS 2020, Italian Statistical Society (SIS), pp. 1549-1556, PEARSON, isbn 9788891910776.

- C. Becatti[4] - I. Crimaldi - F. Saracco (2019), *Keywords dynamics in online social networks: a case-study from Twitter*, in SIS 2019: "Smart Statistics for Smart Applications", Italian Statistical Society (SIS), June 2019, Milan, pp. 63-70, PEARSON, isbn 9788891915108.

- A. Bianchi - S. Bregni - I. Crimaldi - M. Ferrari (2012), *Analysis of a Hurst parameter estimator based on the modified Allan variance*, in 2012 IEEE Global Communications Conference (GLOBECOM), communications QoS, reliability and modelling symposium, 3-7 December 2012, Anaheim, CA, USA, pp. 1716-1721, IEEE, issn 1930-529X, isbn 978-1-4673-0921-9.

- A. Baldi Antognini - I. Crimaldi (2006), *A dose-finding sequential method for targeting a given mean response: up & down experiments*, Invited Session "Adaptive experiments", XLIII scientific meeting of the Italian Statistical Society (SIS) - plenary and specialized sessions, 14-16 June 2006, Turin, pp. 415-426, CLEUP Padua, isbn 88-7178-791-9.

Monographs

- I. Crimaldi (2016), *Introduction to the notion of stable convergence and its variants*, in Italian, published by "Unione Matematica Italiana", n. 57, total number of pages: xv + 155, Monograf s.r.l., Bologna, isbn 978-88-96336-22-9.

- I. Crimaldi (2002), *An introduction to point random measures*, in Italian, published by the Department of Mathematics, University of Pisa, n. 2.458.1429 (section "Mathematical Analysis and Probability"), total number of pages: 29.

- I. Crimaldi (2000), *The Skorohod space*, in Italian, published by the Department of Mathematics, University of Pisa, n. 2.379.1257 (section "Mathematical Analysis and Probability"), total number of pages: 23.

Curatorship

- I. Crimaldi (curated by) (2001), *Tomas Björk, A geometric view of the term structure of interest rates, Cattedra Galileiana 2000 (Lecture notes written by Irene Crimaldi)*, lecture notes of the course by Prof. T. Björk (Stockholm School of Economics) at the "Scuola Normale Superiore", Pisa ("Cattedra Galileiana" 3-12 April 2000), published by the "Scuola Normale Superiore" of Pisa, CompoMat, total number of pages: vi + 68.

Other experiences

June - July 2003: Collaboration with the "Istituto della Enciclopedia Italiana Treccani" for the 9th volume of the collection "Storia della Scienza" (Science History).

Funded research projects

- Participation in the research project *"Public Sector Indicators for Sustainability and Wellbeing"*, funded by the European Union/Italian Government (MUR, PE "Growing resilient, inclusive and sustainable", PNRR, 2022). Duration: 1 year (period: June 15, 2024 - June 14, 2025).

- Participation in the research project *"Automated Analysis and Prediction of Human Movement Qualities"*, funded by the European Union/Italian Government (MUR, PRIN 2022, PNRR). ERC field: PE (Physical Sciences and Engineering). Duration: 2 years (period: December 01, 2023 - November 30, 2025).

- Participation in the research project *"Optimal and adaptive designs for modern medical experimentation"*, funded by the European Union/Italian Government (MUR, PRIN 2022). ERC field: LS (Life Sciences). Duration: 2 years (period: September 28, 2023 - September 27, 2025).

- Participation in the Italian "Programma di Attività Integrata (PAI)", research project *TOol for Fighting FakEs (TOFFE)*, funded by IMT School for Advanced Studies Lucca. Period: January 21, 2019 - June 30, 2023.

- Participation in the research project *"Large Scale Random Structures"*, funded by the Italian Government (MIUR, PRIN 2015). ERC panel: PE1 (Mathematics). Duration: 3 years (period: February 5, 2017 - February 5, 2020).

- Scientific coordination (in collaboration with Dr. M. Bonollo, IASON ltd.) of the unit *"Instability, contagion and crisis in financial networks"* of the research project *"CRISIS Lab"*, funded by the Italian Government (MIUR, PNR 2011-2013), managed by IMT Lucca and CNR Institute of Complex Systems (ISC). Scientific Directors: Prof. F. Pammolli, Prof. L. Pietronero. Duration: 3 years since January 2012 (effective period: April 2012 - June 2016).

- Participation in the research project *"Probabilistic models for network traffic"*, financed by the National Group for Mathematical Analysis, Probability and their Applications ("Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le loro Applicazioni", GNAMPA) of the National Institute for Advanced Mathematics ("Istituto Nazionale di Alta Matematica", INdAM). Year: 2011. Duration: 1 year.

- Participation in the research project *"Exchangeable sequences, copulas and their generalizations"*, financed by the National Group for Mathematical Analysis, Probability and their Applications ("Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le loro Applicazioni", GNAMPA) of the National Institute for Advanced Mathematics ("Istituto Nazionale di Alta Matematica", INdAM). Year: 2009. Duration: 1 year.

- Participation in the research project *"Bayesian methods: theory and applications"* (unit *"Nonparametric Bayesian inference and limit theorems for dependent data"*), funded by the Italian Government (MIUR, PRIN 2008). Area: Economics and Statistics (Italian code: 13). Duration: 2 years.

Teaching experience

Supervision activity

- IMT PhD students currently under my supervision:
  Roberto Fuentes Martinez (XXXVIII, in collaboration with Prof. Juan Mora, Universidad de Alicante).

- Supervisor of some IMT PhD students for the preparation of publications.

- Supervisor (in collaboration with Prof. Roberto Renò, ESSEC Business School, University of Verona) of the PhD thesis with title *Essays on financial stability: old and new risk sources.* Student: Ilaria Gianstefani, IMT PhD program (Economics, Network, Business Analytics), XXXIV cycle.

- Supervisor (in collaboration with Prof. Fabrizia Mealli, University of Florence, and Dr. Laura Forastiere, Yale University) of the PhD thesis with title *Essays on Causal Inference and Complex Networks.* Student: Costanza Tortù, IMT PhD program (Economics, Management and Data Science), XXXII cycle.

- Supervisor (in collaboration with Prof. Fabio Pammolli, Politecnico di Milano, and Prof. Giorgio Gnecco, IMT Lucca) of the PhD thesis with title *Public-Private Insurance for the Management of Natural Disasters.* Student: Selene Perazzini, IMT PhD program (Economics, Management and Data Science), XXXI cycle.

- Supervisor (in collaboration with Prof. Guido Caldarelli and Dr. Fabio Saracco, IMT Lucca) of the PhD thesis with title *Essays on statistical methods for the analysis of social networks.* Student: Carolina Becatti, IMT PhD program (Economics, Management and Data Science), XXXI cycle.

- Supervisor (in collaboration with Dr. Armando Rungi, IMT Lucca) of the PhD thesis with title *Four essays on hidden risks into the global financial architecture.* Student: Laura Gianfagna, IMT PhD program (Economics), XXIX cycle.

- Supervisor (in collaboration with Prof. Fabio Pammolli, IMT Lucca) of the PhD thesis with title *Three essays on systemic risk and financial stability.* Student: Andrea Flori, IMT PhD program (Economics), XXVIII cycle.

- Supervisor of the dissertation with title *Discrete martingales and some applications.* Student: Roberto Luzi, bachelor degree in Mathematics, academic year 2010/11, University of Bologna, Italy.

- Supervisor of the dissertation *Stationary processes and time series analysis.* Student: Gianluca Vasile, master degree in Mathematics (laurea specialistica), academic year 2010/11, University of Bologna, Italy. Assistant supervisor: Dr. Marta Di Lascio (Dep. of Statistics, Univ. of Bologna).

- Supervisor of the dissertation with title *An introduction to simple random walks.* Student: Sara Garzia, bachelor degree in Mathematics, academic year 2008/09, University of Bologna, Italy.

- Supervisor of the dissertation with title *Point processes and duration data analysis*. Student: Grazia Di Cosmo, master degree in Mathematics (laurea specialistica), academic year 2007/08, University of Bologna, Italy. Assistant supervisor: Dr. Angelina Mazzocchetti (Regione Emilia-Romagna).

- Supervisor of the dissertation with title *Markov chains and their applications in PageRank and SALSA algorithms*. Student: Kevin Nicola Giove, bachelor degree in Computer science, academic year 2007/08, University of Bologna, Italy.

- Supervisor of the essay with title *Construction of a Wiener process*. Student: Matteo Camaggi, degree in Mathematics, academic year 2006/07, University of Bologna, Italy.

Courses

Academic year 2024/25:

- Lecturer of *Foundations of Probability and Statistical Inference* (in English), IMT PhD programs, IMT Lucca, Italy.

- Lecturer of *Stochastic Processes* (in English), IMT PhD programs, IMT Lucca, Italy.

- Lecturer of *Markov Processes* (in English), IMT PhD programs, IMT Lucca, Italy.

Academic year 2023/24:

- Lecturer of *Foundations of Probability and Statistical Inference* (in English), IMT PhD programs, IMT Lucca, Italy.

- Lecturer of *Stochastic Processes* (in English), IMT PhD programs, IMT Lucca, Italy.

- Lecturer of *Markov Processes* (in English), IMT PhD programs, IMT Lucca, Italy.

Academic year 2022/23:

- Lecturer of *Foundations of Probability and Statistical Inference* (in English), IMT PhD programs, IMT Lucca, Italy.

- Lecturer of *Stochastic Processes* (in English), IMT PhD programs, IMT Lucca, Italy.

- Lecturer of *Markov Processes* (in English), IMT PhD programs and Scuola S. Anna PhD program in Economics, IMT Lucca, Italy.

Academic year 2021/22:

- Lecturer of *Foundations of Probability and Statistical Inference* (in English), IMT PhD programs, IMT Lucca, Italy.

- Lecturer of *Stochastic Processes and Stochastic Calculus* (in English), IMT PhD programs, IMT Lucca, Italy.

- Lecturer of *Markov Processes* (in English), IMT PhD programs and Scuola S. Anna PhD program in Economics, IMT Lucca, Italy.

Academic year 2020/21:

- Lecturer of *Foundations of Probability and Statistical Inference* (in English), IMT PhD programs, IMT Lucca, Italy.
- Lecturer of *Stochastic Processes and Stochastic Calculus* (in English), IMT PhD programs, IMT Lucca, Italy.
- Lecturer of *Markov Processes* (in English), IMT PhD programs and Scuola S. Anna PhD program in Economics, IMT Lucca, Italy.

Academic year 2019/20:

- Lecturer of *Foundations of Probability and Statistical Inference* (in English), IMT PhD programs, IMT Lucca, Italy.
- Lecturer of *Stochastic Processes and Stochastic Calculus* (in English), IMT PhD programs, IMT Lucca, Italy.
- Lecturer of *Markov Processes* (in English), IMT PhD programs and Scuola S. Anna PhD program in Economics, Pisa, Italy.

Academic year 2018/19:

- Lecturer of *Foundations of Probability and Statistical Inference* (in English), IMT PhD programs, IMT Lucca, Italy.
- Lecturer of *Stochastic Processes and Stochastic Calculus* (in English), IMT PhD programs, IMT Lucca, Italy.

Academic year 2017/18:

- Lecturer of *Foundations of Probability and Statistical Inference* (in English), IMT PhD programs, IMT Lucca, Italy.
- Lecturer of *Stochastic Processes and Stochastic Calculus* (in English), IMT PhD programs, IMT Lucca, Italy.

Academic year 2016/17:

- Lecturer of *Foundations of Probability and Statistical Inference* (in English), IMT PhD program, IMT Lucca, Italy.
- Lecturer of *Stochastic Processes and Stochastic Calculus* (in English), IMT PhD program, IMT Lucca, Italy.

Academic year 2015/16:

- Lecturer of *Foundations of Probability and Statistical Inference* (in English), IMT PhD program, IMT Lucca, Italy.
- Lecturer of *Stochastic Processes and Stochastic Calculus* (in English), IMT PhD program, IMT Lucca, Italy.

Academic year 2014/15:

- Lecturer of *Foundations of Probability Theory and Statistical Inference* (in English), IMT PhD program, IMT Lucca, Italy.
- Lecturer of *Statistics Lab* (in English), IMT PhD program, IMT Lucca, Italy. In collaboration with Rodolfo Metulini (IMT Lucca).
- Lecturer of *Stochastic Processes and Stochastic Calculus* (in English), IMT PhD program, IMT Lucca, Italy. In collaboration with Andrea Gabrielli (Istituto dei Sistemi Complessi (ISC), CNR).

Academic year 2013/14:

- Lecturer of *Foundations of Probability Theory* (in English), IMT PhD program, IMT Lucca, Italy.
- Lecturer of *Introduction to Mathematical Statistics and Stochastic Processes* (in English), IMT PhD program, IMT Lucca, Italy.

Academic year 2012/13:

- Lecturer of *Probability Theory, Stochastic Processes and Mathematical Statistics I* (in English), IMT PhD program, IMT Lucca, Italy.
- Lecturer of *Probability Theory, Stochastic Processes and Mathematical Statistics II* (in English), IMT PhD program, IMT Lucca, Italy.

Academic year 2011/12:

- Lecturer of *Probability theory, Stochastic Processes and Mathematical Statistics* (in English), IMT PhD program, IMT Lucca, Italy.
- Lecturer of *Complements of probability and mathematical statistics* (6 credits, in Italian), master in Mathematics (laurea magistrale), University of Bologna, Italy.

Academic year 2010/11:

- Lecturer of *Mathematics, Probability theory and Statistics*, IMT PhD program, IMT Lucca, Italy. Activity coordinator: Prof. L. Pratelli.
- Lecturer of *Probability calculus and mathematical statistics* (8 credits, in Italian), degree program in Information Science for Management, University of Bologna, Italy.

- Lecturer of *Complements of probability and mathematical statistics* (6 credits, in Italian), master in Mathematics (laurea magistrale), University of Bologna, Italy.

Academic year 2009/10:

- Lecturer of *Complements of probability and statistics* (6 credits, in Italian), master in Mathematics (laurea magistrale), University of Bologna, Italy.

- Lecturer of *Probability calculus and mathematical statistics* (8 credits, in Italian), degree program in Information Science for Management, University of Bologna, Italy.

Academic year 2008/09:

- Lecturer of *Stochastic processes* (6 credits, in Italian), master in Mathematics (laurea specialistica), University of Bologna, Italy.

- Lecturer of *Probability calculus and mathematical statistics* (8 credits, in Italian), degree program in Internet Sciences, University of Bologna, Italy.

- Teaching assistant for *Probability calculus and mathematical statistics* (in Italian), degree program in Computer Science, University of Bologna, Italy.

Academic year 2007/08:

- Lecturer of *Stochastic processes* (6 credits, in Italian), master in Mathematics (laurea specialistica), University of Bologna, Italy.

- Lecturer of *Probability calculus and mathematical statistics (M-Z)* (6 credits, in Italian), degree program in Computer Science, University of Bologna, Italy.

Academic year 2006/07:

- 14 hours of lecture on Markov chains, title course *Markov chains and hidden Markov chains* (in Italian), PhD program in Mathematics, University of Bologna, Italy. Activity coordinator: Prof. M. Campanino.

- Lecturer of *Probability calculus and mathematical statistics (M-Z)* (6 credits, in Italian), degree program in Computer science, University of Bologna, Italy.

- Teaching assistant for *Stochastic processes* (in Italian), master in Mathematics (laurea specialistica), University of Bologna, Italy.

Academic year 2005/06:

- Teaching assistant for *Mathematical models for financial markets* (in Italian), second level master in Mathematics for Applications, University of Bologna, Italy.

- Teaching assistant for *Stochastic processes* (in Italian), master in Mathematics (laurea specialistica), University of Bologna, Italy.

- Teaching assistant for *Probability and mathematical statistics 1* (in Italian), degree program in Mathematics, University of Bologna, Italy.
- Teaching assistant for *Numerical analysis-Probability and statistics* (in Italian), master in Bioinformatics (laurea specialistica), University of Bologna, Italy.
- Teaching assistant for *Probability and mathematical statistics 2* (in Italian), degree program in Mathematics, University of Bologna, Italy.

Academic year 2004/05:

- Teaching assistant for *Mathematical models for financial markets* (in Italian), second level master in Mathematics for Applications, University of Bologna, Italy.
- Teaching assistant for *Probability calculus and mathematical statistics (M-Z)* (in Italian), degree program in Computer Science, University of Bologna, Italy.

Academic year 2003/04:

- Teaching assistant for *Mathematical models for financial markets* (in Italian), second level master in Mathematics for Applications, University of Bologna, Italy.
- Teaching assistant for *Probability and mathematical statistics 2* (in Italian), degree program in Mathematics, University of Bologna, Italy.

Academic year 2002/03:

- Teaching assistant for *Stochastic processes* (in Italian), degree program in Mathematics, University of Pisa, Italy.

Academic year 2001/02:

- Teaching assistant for *Stochastic processes* (in Italian), degree program in Mathematics, University of Pisa, Italy.
- Teaching assistant for *Probability* (in Italian), degree program in Mathematics, University of Pisa, Italy.

Other

- Member of the National Group for Mathematical Analysis, Probability and their Applications ("Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le loro Applicazioni", GNAMPA) of the National Institute for Advanced Mathematics ("Istituto Nazionale di Alta Matematica", INdAM).
- *2025-2027:* Associate Editor for *ALEA - Latin American Journal of Probability and Mathematical Statistics*, ISSN 1980-0436, Inst. Mat. Pura Apl. (IMPA).
- Reviewer for *Mathematical Reviews*, American Mathematical Society.

- Referee reports for the following journals: Bernoulli, Stochastic Processes and their Applications, Annals of Statistics, Journal of the Royal Statistical Society, Electronic Communications in Probability, Applied Probability Trust Journals, Statistical Methods & Applications, Alea - Latin American journal of Probability and Mathematical Statistics, Statistics & Probability Letters, Stochastic Models, Environmental and Ecological Statistics, Indian Journal of Pure and Applied Mathematics, Mathematics, Journal of Economic Interaction and Coordination, Physical Review E, Chaos, Solitons & Fractals, Signal Processing.

- Referee reports for the following PhD theses:

  - "Stochastic processes of the urn type with convergent predictive distributions" (Hristo Sariev, Bocconi Univ., Milan, 2019).
  - "Negatively reinforced balanced urn models" (Gursharn Kaur, Indian Statistical Institute, 2018).
  - "Three essays on the spreading of digital misinformation" (Alessandro Bessi, IUSS Institute for Advanced Study of Pavia, 2016).

- *November 2023:* Reviewer of research proposals within the scope of the program for young researchers "Rita Levi Montalcini", Italian Ministry of University and Research.

- *November 2020:* Reviewer of research proposals on the topic "COVID-19", within the scope of the initiative "FISR - Fondo Integrativo Speciale per la Ricerca", Italian Ministry of University and Research.

- *September 2019:* Reviewer of research proposals within the scope of the initiative "Research for innovation (REFIN)", Agenzia Regionale per la Tecnologia e l'Innovazione (ARTI), Regione Puglia.

- *January 24, 2014:* seminar on "The higher education and research apprenticeship" ("L'apprendistato di alta formazione e ricerca") at the Association of Industrialists, Lucca.

- Cooperation to high school senior advising ("Giornate per l'orientamento") organized by the University of Bologna, Italy. Activity coordinator: Prof. E. Caliceti.

- *May 7 - June 7, 2007:*
  Guest scholar at the Institut Galilée, University of Paris 13, France. Supervisor: Prof. F. Russo.

Foreign languages

English.

Leave periods

Maternity leave: May 22 - October 11, 2017.
Parental leave: October 12 - December 11, 2017.

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