

CURRICULUM VITAE of Ilenia EPIFANI

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Family status:

Present position and qualification

Present position: Associate Professor in Statistics (settore concorsuale 13/D1 Statistica, macrosettore concorsuale Area 13 - Scienze economiche e statistiche) at Politecnico di Milano

Previous positions

September 2000-December 2018 Tenured assistant professor in Probability and Mathematical Statistics at Politecnico di Milano

February 2003-August 2003, and October-November 2005 Visiting scholar at Department of Statistics, The Ohio State University, Columbus (OH), USA

December 1998-August 2000. Postdoctoral position at department of mathematics of the Politecnico of Milan. Research Topic: *“Construction and approximation random measures and statistical applications”*

March, 1995-October, 1995. Fellowship for research activity held at the Institute for Applications of Mathematics and Computer Science (Italian National Council for scientific research), Milan. Research Topic: *Robustness in Bayesian inference*

Education

- PhD in *Statistics* at Università di Trento, Italy. PhD dissertation defended on April, 20 1999; title of the dissertation *“Some results on the distributions of random Bernstein polynomials and their applications to Bayesian statistics”*. Advisor: Professor Eugenio Regazzini, Università di Pavia, Italy
- M.Sc. in Economics in 1995 (with honors) at Università Commerciale “L. Bocconi”, Milano, Italy. Graduation thesis on the topic *“Applications of the theory of empirical processes for the determination of the limit laws of some measures of monotone dependence”* Advisor: Professor Eugenio Regazzini

Overview of teaching activity

I taught courses for students of various Engineering undergraduated and graduated courses. Basically, the undergraduated courses provide an introduction to probability and statistics, whereas the graduated courses mainly cover topics of descriptive, exploratory, and inferential statistics. Most of them also include a statistical laboratory where students are introduced to data analysis with statistical software R. Projects and theses I supervised are in probability and statistics. A detailed list of my more recent teaching activity follows.

Probability and statistics helpdesk

Academic years 2015/16, 2016/17: statistic and probabilistic assistance through a helpdesk of probability and statistic offered to undergraduated and graduated students at Politecnico di Milano

- Since academic year 2016/17, Lecturer for graduate course: Statistical Models and Stochastic Processes for Environmental Engineers (Environmental and Land Planning Engineering Master of Science - Laurea magistrale) at Politecnico di Milano; (statistics module from 2018/19 provided with innovative teaching methods that include bottom-up structure of the contents, group working together over time, hands-on approach to solving problems, soft-skills)
- Since next academic year 2023/24, Lecturer for undergraduate course: Statistics for Energy Engineering at Politecnico di Milano

- Since academic year 2019/20 to 2022/23, Lecturer for undergraduate course: Probability and Statistics for Computer Science for Engineering of Computing System at Politecnico di Milano
- Since academic year 2009/10 to 2018/19, Lecturer for undergraduate course: Basics of Statistics and Biomedical Signals for Bioengineers at Politecnico di Milano
- Academic year 2015/16, Lecturer for course: Exploratory Data Analysis for high school students as part of the project “in Action with Math, Percorsi di matematica cre-attiva”
- Academic years 2014/15, 2015/16, Lecturer for undergraduate course: Statistic for Electrical Engineers at Politecnico di Milano
- Academic years 2011/12, 2012/13, 2013/14, Lecturer for graduate course: Applied Statistics for Electrical Engineers (Electrical Engineering Master of Science - Laurea magistrale) at Politecnico di Milano
- Since academic year 2003/04 to 2010/11, Lecturer for graduate course: Statistics for Information Engineers (Information Engineering Master of Science - Laurea magistrale) at Politecnico di Milano
- Academic years 2001/02, 2002/03, 2003/04, 2004/05: Lecturer for undergraduate courses in Probability Theory for engineers (First-level degree in Automation, Computer and Telecommunications Engineering) at Politecnico di Milano
- Since academic year 1997/98 to 2006/07: Teaching assistant for undergraduate courses in Probability and Statistics for engineers at Politecnico di Milano
- Since academic year 2001/02 to 2005/06: Lecturer for Master on Applications of Mathematics in Industry and Technology “Applicazioni della matematica nell’industria e nei servizi” organized by INdAM Istituto Nazionale di Alta Matematica Francesco Saveri. Title of the course: “Introduction to Stochastic Processes”

Supervised projects

Tutor for the Machine Learning Engineering Intern at Wayve Technologies Ltd - London (UK) startup Series- B of Nicole Nobili, Computer Engineering Bachelor degree (Laurea) (1st semester, AA 2022/23, 14 September-14 November 2022)

Tutor for the 5-CFU Computer Engineering project of Leonardo Marazzi: “Statistical analysis of computational tests of algorithms and heuristics” Computer Engineering Bachelor degree (Laurea) (2nd semester, AA 2021/22)

Since Academic year 2014/15, Supervisor of semester projects in Bayesian statistics, Mathematical Engineering Master of Science (Laurea magistrale):

- “Bayesian spatio-temporal models for PM10 in the Po valley” (February 2023)
- “Bayesian estimation of a spatial-lag autocorrelation model: the Poisson and ZIP cases” (February 2022)
- “Simulation and Bayesian estimation of a spatial Poisson hurdle model” (February 2021)
- “Modeling blood donations as recurrent events through time-varying covariates AVIS: modeling recurrent events” (February 2020)
- “Bayesian model for blood donations Robustness with respect to the prior” (January 2020)
- “Spatial dependence in shaping population distribution in Massachusetts in 2010” (March 2019)
- “Bayesian estimation for a parametric Markov renewal model applied to seismic data” (March 2018)
- “An application of a Bayesian semi-parametric Cox competing risk model for the analysis of the dropouts in Politecnico di Milano” (February 2018)
- “An application of a multistate Bayesian semi-parametric model to the analysis of the drop-out in Politecnico di Milano, at the first level” (February 2018)
- “A dynamical model with proper spatial CAR random effects in Stan for data on population densities” (February 2018) “Time series analysis to detect crisis in systemic capillary leak syndrome” (November 2017)

- “Bayesian latent growth models applied to the study of stress response in pre-school children” (February 2016)
- “Historical linkages in shaping population density across Space by means of dynamic log normal regression models with unobserved heterogeneity” (February 2016)
- “Modello dinamico Gamma per la distribuzione demografica nello stato del Massachussets” (March 2015)
- “Modello lineare dinamico generalizzato per la distribuzione demografica nello stato del Massachussets” (November 2014)
- “Gamma regression model for population density over time with spatial data” (March 2014)

Supervisor of the project “Indagine conoscitiva sui laureati in Ingegneria per l’Ambiente e il Territorio 2017. Analisi statistica dei risultati” (2018) (<https://www.ingegneriambientali.it/>) of Luca Gerini, Andrea Grioni and Dario Mansi, Environmental and Land Planning Engineering Master of Science (Laurea magistrale), published on the website of the Associazione Ingegneri per l’Ambiente e il Territorio <https://www.ingegneriambientali.it/>

Supervised Theses

Academic year 2021/22

- Co-advisor of the master thesis of Silvia Maria Bellù “Ecosystem dynamics and trophic cascades in shallow rocky reefs under different protection regimes. A case study from the Mediterranean marine protected area of Tavolara - Punta Coda Cavallo”, Supervisor Paco Melià, Environmental and land planning Engineering Master of Science (Laurea magistrale) at Politecnico di Milano (May 2023)

Academic year 2019/20

- Supervisor of the master thesis of Delia D’Agostino “Design and performance of Nearly Zero Energy Buildings (NZEBS) in present and future climatic conditions across different European locations.”, Environmental and land planning Engineering Master of Science (Laurea magistrale) at Politecnico di Milano (April 2021)
- Supervisor of the master thesis of Iliaria Martinelli “A Bayesian Approach to Blood Donation Process”, Mathematical Engineering Master of Science (Laurea magistrale) at Politecnico di Milano (April 2021)
- Co-advisor of the master thesis of Sara Soffientini “Global Warming’s Two Italies: An Audience Segmentation Analysis”, Supervisor Renato Casagrandi, Environmental and land planning Engineering Master of Science (Laurea magistrale) at Politecnico di Milano (December 2020)
- Co-advisor of the master thesis of Francesca Mora “Analisi del funzionamento dell’unità BAC di un potabilizzatore e della validità del monitoraggio online”, Supervisor Manuela Antonelli, Environmental and land planning Engineering Master of Science (Laurea magistrale) at Politecnico di Milano (October 2020)

Academic year 2018/19

- Co-advisor of the master thesis of Martina Sardo “Dynamic Modelling of the Influence of Water Resources on violent Conflicts in Central America”, Supervisor Maria Cristina Rulli, Environmental and land planning Engineering Master of Science (Laurea magistrale) at Politecnico di Milano (April 2020)
- Co-advisor of the master thesis of Nikolas Galli “Water resources availability as a boosting factor for human conflict in the lake Chad basin”, Supervisor Maria Cristina Rulli, Environmental and land planning Engineering Master of Science (Laurea magistrale) at Politecnico di Milano (July 2019)
- Supervisor of the thesis (First-level degree in Biomedical Engineering at Politecnico di Milano): Sara Cerrone, Alberto Savino, Alberto Scotti, Annelisa Valente Perrone “Acquisizione tramite eprom ed analisi statistica dei dati sulla soddisfazione di pazienti oncologici”

Academic year 2017/18

- Supervisor of the master thesis of Roberta Zanelli “Analisi statistica delle performance di circolazione della linea Milano Cadorna - Laveno Mombello”, Civil Engineering Master of Science (Laurea magistrale) at Politecnico di Milano
- Co-advisor of the master thesis of Luca Borsani “A Bayesian approach for network estimation with noisy data”, Supervisor Federico Bassetti, Mathematical Engineering Master of Science (Laurea magistrale) at Politecnico di Milano

- Supervisor of the master thesis of Arianna Riva “Survival analysis applied to the undergraduated dropouts in Politecnico di Milano”, Mathematical Engineering Master of Science (Laurea magistrale) at Politecnico di Milano
- Supervisor of the thesis of Riccardo Tegazi “Modellare la dipendenza con le copule”, First-level degree in Mathematical Engineering at Politecnico di Milano
- Co-advisor of thesis (First-level degree in Biomedical Engineering at Politecnico di Milano): Silvia Bellomo, Noemi Caloi, Antonio Coviello, Martina Di Gennaro “Sviluppo di modelli paziente-specifici per realtà aumentata”, Supervisor Alberto Cesare Luigi Redaelli
- Co-advisor of the master thesis of Marija Zdolsek “Time series analysis to detect crisis in systemic capillary leak syndrome”, Supervisor Alessandra Guglielmi, Mathematical Engineering Master of Science (Laurea magistrale) at Politecnico di Milano

Academic year 2016/17, Co-advisor of thesis (First-level degree in Biomedical Engineering at Politecnico di Milano): Giada Cremonesi, Clara Abbiati, Francesca Vergani “Monitoraggio dell’ematocrito nel corso della terapia emodialitica”, Supervisor Maria Laura Costantino

Academic year 2015/16,

- Supervisor of theses (First-level degree in Biomedical Engineering):
 - Gabriele Infante, “Epidemiologia clinica e biostatistica: analisi di poliformismi genetici nell’insorgenza di trombosi in pazienti con tumore metastatico al colon-retto” (outside internship at Fondazione IRCCS Istituto dei tumori, Milano) (with outside examiner)
 - Francesca Carminati, Festi Ludovica “Curve di crescita latente applicate a dati biologici e comportamentali per misurare i fattori predittivi della risposta allo stress”, (in collaboration with Fondazione IRCCS Eugenio Medea, Bosisio Parini (Lecco))
- Supervisor of master theses (Mathematical Engineering Master of Science - Laurea magistrale):
 - Elisabetta Rossi “Un modello multistato bayesiano per l’analisi dei tempi di permanenza in università degli allievi ingegneri del Politecnico di Milano” (with outside examiner)
 - Chiara Ghiringhelli “A new model for the population density over time: how spatial correlation matters”
- Academic tutor of the internship of Paolo Zappalà in Twitter Italia srl, Title: “Marketing Intern, Milan”

Academic year 2013/14, Supervisor of master thesis (Mathematical Engineering Master of Science - Laurea magistrale): Claudia Vezzosi “Modelli bayesiani dinamici e processi gamma applicati all’analisi dell’evoluzione temporale di densità di popolazione” (with outside examiner)

Academic year 2012/13,

- Supervisor of master thesis (Mathematical Engineering Master of Science - Laurea magistrale) at Politecnico di Milano: Michele Usuelli, “Big Data improvements in cluster analysis”
- Academic Tutor of the Internship of Michele Usuelli in Target Reply Srl con Socio Unico, Title: “Architetture BigData per analisi statistica e forecasting nell’ambito della grande distribuzione”

Academic year 2008/09, Supervisor of minor research of Giordano Tamburrelli on “Stima bayesiana di parametri di catene markoviane a tempo discreto ed identificazione del punto di cambiamento” (Ph.D. in Information Technology, Politecnico di Milano), Carlo Ghezzi Supervisor of the major project of Tamburrelli)

Lecture Notes

The following lecture notes are available on the website of the corresponding course:

- *Appunti per il corso di Calcolo delle Probabilità*, AY 2019-2020, 117 pp. (2020) (with Ladelli L. and Posta. G.)
- *Appunti di lezione sulla parte di statistica per il corso di Probabilità e statistica per l’informatica*, AY 2022-2023, 66 pp. (2023)

- *Appunti per il corso di MSPS* (for the Environmental and Land Planning Engineering Master of Science - Laurea magistrale), AY 2018-2019, 49 pp. (2018)
- *Eserciziario di Probabilità e Statistica per MSPS* (Statistical Models and Stochastic Processes), (for the Environmental and Land Planning Engineering Master of Science - Laurea magistrale) AY 2017-2018, 85 pp. (2017)
- *Appunti di statistica per il corso di Fondamenti di Statistica e Segnali Biomedici [Mod 1]*, AY 2014-2015, 29 pp. (2015)
- *Notes of Applied Statistics for the Electrical Engineering Master of Science - (Laurea Magistrale)*, AY 2012-2013, 120 pp. (2013)
- *Appunti di calcolo delle probabilità per il corso di Fondamenti di Statistica e Segnali Biomedici [Mod 1]*, AY 2010-2011, 85 pp. (2011)
- *Appunti per il corso di Statistica (2L)*, AY 2008-2009, 95 pp. (2009)

Service activities

- Internal Examiner: Ingegneria ambientale e delle infrastrutture / Environmental and infrastructure engineering Phd Program of Politecnico di Milano (February 2023)
- External examiner: Applied Economics Phd programme of Universitat Autònoma de Barcelona (UAB), Barcelona (July 2021)
- External examiner: Master in Science (Research) programme of School of Computer Science and Statistics, Trinity College, Dublin (October 2019)
- Member of Gruppo di Riesame, School of civil, environmental and land management engineering since academic year 2018/19
- Member of committee timetable, School of industrial and information engineering since academic year 2013/14
- Member of doctoral degree committees: doctoral programme in “Mathematical models and methods in engineering Politecnico di Milano” (2014), doctoral programme in “Matematica e Statistica” Università di Pavia (2011, 2017)
- Member of first level and master of science degree committees (commissioni di laurea triennale e laurea magistrale) for Biomedical Engineering, Environmental and Land Planning Engineering, Mathematical Engineering.
- Outside examiner of theses in Mathematical Engineering Master of Science - Laurea magistrale) at Politecnico di Milano
- Member of commissione di probabilità e statistica per tutorato, seminari didattici, didattica integrativa
- Member of committee for reading course for Mathematical Engineering
- Member of the Polytechnic commission for the drafting of new questions of the TOL (the test to enter the Engineering undergraduates programmes), section of Statistics (academic year 2017/18)
- Member of the electoral committee for the election of the Dean of Dipartimento di Matematica, Politecnico di Milano

Research

Interests

Nonparametric and parametric Bayesian inference: functionals of random probability measures, Bayesian econometric models for regional population, random frailty models, Bayesian nonparametric hazard models, Bayesian survival analysis. Statistical inference on Cox and Semi-Markov processes. Exchangeability, partial exchangeability and limit theorems. Statistical analysis of environmental data: censored data monitoring, statistical assessment of water quality parameters, Bayesian spatial count models for studying of the influence of water processes on conflict potential.

Overview of scientific activity

My scientific activity has been always focussed on statistical methods, from both mathematical and applied viewpoints, also including the detailed study of limit theorems, asymptotics of random processes, characterization theorems and random measures as a tool for statistical inference. Most of my publications are appeared in journals of statistics that publish research papers containing original contributions in theoretical and applied statistics, in journals of economics covering statistical models and empirical analysis in the field of regional studies and, in journals for software, information, biomedical and environmental engineering. A short review of my main results follows.

Bayesian nonparametrics In statistical work many interesting properties of a family of distributions can be summarized by vectors of suitable means, so that it is of great interest to investigate the exact distributions of functionals of random probability measures. Under this perspective, in the field of Bayesian nonparametrics, I have been working on a) functionals of random probability measures and b) survival analysis. In collaboration with Guglielmi and Melilli, I have contributed to the determination of some distributional properties of the variance of a Dirichlet process (Statist. Probab. Lett., 2006) and to some moment-based approximations for vectors of means of Dirichlet processes (Appl. Math. Sci., 2009). Furthermore, a Bayesian nonparametric inference on a mean failure time modeled via neutral to the right priors has appeared in Epifani, Lijoi and Pruenster (Biometrika, 2013). In Bayesian survival analysis, I have defined and developed a new nonparametric prior for two-dimensional vectors of survival functions. The definition is based on the Lévy copula and has been used to model two-sample (complete and/or right-censored) survival data. The results are in Epifani and Lijoi (Stat Sin., 2010).

Statistical methods in software and information engineering From an applied viewpoint, I have been working on applications of Bayesian methods to software engineering. In this context, Ghezzi, Mirandola, Tamburelli and I first designed a Bayesian methodology to both verify and update the correctness of the parameters, the performance and reliability of a complex software system modeled by means of Markov chains and queuing network. Then, Ghezzi, Tamburelli and I defined a concept of change-point detection of the non-functional behavior of software services and provided an original Bayesian statistical technique aimed at identifying it, given an execution trace extracted by running instances of the service (ICSE 2009, and FSE 2010).

I collaborated with some experts in internet banking, financial fraud and fraud detection for the statistical aspects of a new framework (and score) for semi-supervised outlier-detection to discover online banking frauds (Carminati, Caron, E., Maggi and Zanero, 2014, 2015).

Statistical inference on Cox-Markov semi-Markov models Another research line I work on is the Bayesian analysis of time continuous semi-Markov processes. From a probabilistic point of view, Fortini, Ladelli and I have given a complete probabilistic characterization of a Bayesian semi-Markov process with discrete states (Statist. Probab. Lett., 2003). Hence, in collaboration with Ladelli and Pievatolo I have developed a complete methodology for Bayesian inference on a Weibull semi-Markov process, from the elicitation of the prior distribution, to the computation of posterior summaries and to decision making procedures based on the cross-state probabilities, addressing both short-term and long-term forecasting. The real application is to data of earthquakes of three types of severity (low, medium and high size) that occurred in the central Northern Apennines in Italy (Electron J Stat., 2015). Now I'm working on the developments of hierarchical priors for hidden semi-Markov models to analyse earthquakes from different heterogeneous regions (work in progress).

Another line of research has analyzed Cox Markov modeling of the bacterial cell cycle. Given that usually in the biological literature a) a sequence of growing cells is modeled by a suitable Markov chain and b) the distribution either of the doubling time or of the added size of a cell is modeled in terms of the (division) hazard rate, then Bassetti, Ladelli and I have been proposed an *extended* Cox Markov model for investigating the main mechanisms that control the cell cycle along with a statistical procedure to estimate the model's parameters. We have applied our method to some published datasets of Escherichia coli cells and it has proved to be a simple but effective way to estimate the division hazard cell size growth data and to discriminate between different cell-cycle paradigms (sizer, timer, adder and various forms of concerted control) proposed by biologists (Electron J Stat., 2017).

Hierarchical generalized linear models in regional science and environmental engineering In collaboration with Nicolini, I have been building Bayesian hierarchical generalized linear models suitable for regional science.

First, we have developed a novel approach to study the distribution of the regional population density across space by means of a Bayesian “gamma-gamma” shared frailties spatial regression model and we have applied it to the 2000 Census town data of Massachusetts (J. Reg. Sci., 2013). Then we have proposed a dynamic version of it with the goal to evaluate the evolution of the population spatial distribution across time (Reg Stud., 2017). More recently, we have exploited a Bayesian dynamic log-normal hierarchical model with spatial CAR random effects and tested it on a spatio-temporal dataset of the Massachusetts census-tracts; we have succeeded in detecting the interplay between environmental effects and temporal correlation for location choices of the population (SIS, 2018 and Spat. Econ. Anal., 2020).

More recently, in collaboration with Galli, N, Rulli, MC, Sardo, M, Chiarelli D., and D’Odorico P we have been exploiting the application of Bayesian spatial count models to investigate the influence of water resources and food on human conflict potential in water-stressed regions, as the Lake Chad Basin and Central America. We have proposed dynamic versions of Poisson, Zero-Inflated Poisson and Hurdle Poisson models with spatial autocorrelation (Nature Sustainability, 2022; STAHY2022; and Nature Water, 2023). Furthermore, in collaboration with Frigeri, M., Guglielmi, A., and Lonati, G., we have been employing Bayesian spatial-temporal modeling to analyze the concentration of PM_{10} in the Po Valley.

Statistical analysis of environmental data I have been involved with Antonelli M and Cantoni B in the statistical analysis of water quality parameters.

Firstly, we focused on the analysis of left-censored data monitoring. The presence of micropollutants in drinking water has become a growing global concern, and due to their low concentrations, a large amount of data falls below the limit of quantification. We compared various methods for handling left-censored data, considering factors such as the time trend of contaminants, estimation of treatment removal efficiency, and risk assessment associated with micropollutants in drinking water. Based on our analysis, we provided guidelines for selecting the preferred data processing method (Chemosphere, 2020).

Secondly, we conducted a comprehensive statistical analysis to evaluate the factors influencing the removal performance of Contaminants of Emerging Concern (CECs) in fresh water through adsorption on activated carbon. This research was part of the European Project SafeCREW (Chemosphere, 2021; European Project SafeCREW, 2023-2025).

Furthermore, in the field of research on the disinfection stage in water treatment processes, we employed a meta-analysis approach to generate empirical linear regression models. These models aimed to estimate the kinetic parameters of the main kinetic models, including the first-order, second-order, and two-reactant models. Such models are commonly used to describe the decay of disinfectants in drinking water distribution systems (3rd IWA Specialized International Conference on Disinfection and Disinfection By-Products (DBPs) 2022).”

Publications

- Bayesian analysis of PM_{10} concentration by spatio-temporal ARIMA and STS models (with Frigeri M.). In *Book of short Papers SEAS IN 2023*. Pearson. (2023), ISBN: *to be defined*.
- Exploring the water-food dimension of urban conflicts (Sardo M., Epifani I., Galli N., Chiarelli D.D., D’Odorico P., Rulli M-C.) (2023) *Nature Water* [10.1038/s44221-023-00053-0](https://doi.org/10.1038/s44221-023-00053-0)
- Socio-hydrological features of armed conflicts in the Lake Chad Basin (Galli N., Dell’Angelo J., Epifani I., Chiarelli D.D., Rulli M.C.), *Nature Sustainability*, , **5(10)**, 1-10, <https://doi.org/10.1038/s41893-022-00936-2>
- Spatial econometrics and spatial clustering to explore the conflict potential of water in the Lake Chad Basin (Galli N., Dell’Angelo J., Epifani I., Chiarelli D.D., Rulli M-C.) (2022) *Extended abstract in Proc. of STAHY2022 International Workshop on Statistical Hydrology 2022 September 17th – 20st, 2022 - Chia, Sardinia, Italy* https://sites.unica.it/stahy2022/files/2022/08/108_Galli_Nikolas_STAHY2022.pdf
- Modelling the role of the water-food nexus in Central American urban human conflicts through Bayesian Econometric Zero-inflated Poisson Model (Sardo M., Epifani I., Galli N., Chiarelli D.D., D’Odorico P., Rulli M-C.) (2022) *Extended abstract in Proc. of STAHY2022 International Workshop on Statistical Hydrology 2022 September 17th – 20st, 2022 - Chia, Sardinia, Italy* https://sites.unica.it/stahy2022/files/2022/08/078_Sardo_Martina_STAHY2022.pdf

- How to face PFAS challenge in drinking water treatment plants: an holistic approach for plant upgrade and management (Cantoni B., Manenti A., Wellnitz, J., Epifani I., Marelli, F., Ruhl, A.S., Antonelli M.) (2022), *Extended abstract in Proc. of Canadian National Water and Wastewater Conference 2022 June 27th – July 1st, 2022 - Milan, Italy*
- Meta-analysis approach to generalize chlorine decay first-order kinetic model along drinking water distribution networks (with Pani G., Mostarda L., Biasibetti M., Turolla A., Cadei G., Epifani I., Bozza S., Antonelli M.) (2022), *Short paper in Proc. of 3rd IWA Specialized International Conference on Disinfection and Disinfection By-Products (DBPs) 2022 June 27th – July 1st, 2022 - Milan, Italy*
- Datasets on energy simulations of standard and optimized buildings under current and future weather conditions across Europe (with D'Agostino D., Parker D., Crawley D., Linda Lawrie, L.) (2022) *Data*, **7**(5):66. <https://www.mdpi.com/2306-5729/7/5/66>, (2022)
- How will future climate impact the design and performance of Nearly Zero Energy Buildings (NZEBs)? (D'Agostino D., Parker D., Epifani I., Crawley D., Lawrie L.) (2022), *Energy*, **240**, <https://doi.org/10.1016/j.energy.2021.122479>, (2022)
- Characterization of the competing role of surface-contact and shear stress on platelet activation in the setting of blood contacting devices (Bozzi S., Roka-Moiiia Y., Mencarini T., Vercellino F., Epifani I., Consolo F., Ammann R.K., Consolo F., Slepian M., Redaelli A.C.S.), *The International Journal of Artificial Organs*, **12**, doi: 10.1177/03913988211009909, (2021)
- Population distribution and local spatial dependence (with Nicolini R.) Featured in UABDivulga <https://www.uab.cat/web/uabdivulga-1345468981732.html>, (2020)
- A statistical assessment of micropollutants occurrence, time trend, fate and human health risk using left-censored water quality data, (Cantoni, B., Delli Compagni, R., Turolla, A., Epifani, I. and Antonelli, M.), *Chemosphere*, **257**, <https://doi.org/10.1016/j.chemosphere.2020.127095>, (2020)
- Population distribution over time: modeling local spatial dependence with a CAR process, (Epifani, I., Ghiringhelli, C. and Nicolini, R.), *Spatial Economic Analysis*, **15-2**, 120-144, (2020)
- A novel multi-parametric score for the detection and grading of prosthetic mitral valve obstruction in cases with different disc motion abnormalities, (Meskin, M., Dimasi, A., Votta, E., Jaworek, M., Fusini, L., Zappa, E., Epifani, I., Pepi, M. and Redaelli, A.), *Ultrasound in Medicine & Biology*, **45-7**, **1708-1720**, (2019) <https://doi.org/10.1016/j.ultrasmedbio.2019.03.011>
- The Importance of Historical Linkages in Shaping Population Density across Space (with Nicolini R.). In *Book of short Papers SIS 2018*. Pearson. (2018), ISBN: 9788891910233.
- Cox Markov models for estimating single cell growth, (with Bassetti, F. and Ladelli L.), *Electronic Journal of Statistics (EJS)*, **11**, **2931-2977**, (2017)
- Modelling Population Density Over Time: How Spatial Distance Matters, (with Nicolini, R.), *Regional Studies*, **51-4**, **602-615**, (2017)
- BankSealer: A decision support system for online banking fraud analysis and investigation, (with Carminati, M., Caron, R., Maggi, F. and Zanero, S.), *Computers & Security*, **53**, **175-186**, (2015)
- BankSealer: An Online Banking Fraud Analysis and Decision Support System, (with Carminati, M., Caron, R., Maggi, F. and Zanero, S.) *Proceedings of the International Information Security and Privacy Conference*: pp. 380-394, SEC'14, Springer Berlin Heidelberg, Marrakech, Morocco, ISBN: 978-3-642-55414-8, 978-3-642-55415-5, (2014)
- Bayesian estimation for a parametric Markov Renewal model applied to seismic data, (with Ladelli, L. and Pivatolo, A.), *Electronic Journal of Statistics (EJS)*, **8**, **2264-2295**, (2014)

- On the population density distribution across space: a probabilistic approach, (with Nicolini, R.), *Journal of Regional Science (JRS)*, **53**, 481-510, (2013)
- Change-point detection for black-box services, (with Ghezzi, C. and Tamburrelli, G.), *SIGSOFT FSE 2010*: **227-236**, (2010)
- Nonparametric priors for vector of survival functions, (with Lijoi, A.), *Statist. Sinica* **20**, 1455-1484, (2010)
- Moment-based Approximations for the law of Functionals of Dirichlet Processes, (with Guglielmi, A. and Melilli, E.), *Appl. Math. Sci.* **3**, 979-1004, (2009)
- Model evolution by run-time parameter adaptation, (with Ghezzi, C., Mirandola, R. and Tamburrelli, G.) In S. Fickas, J. Atlee, and P. Inverardi, editors, *Proc. 31st International Conference on Software Engineering, ICSE 2009* **4839**, 111-121, IEEE, (2009)
- Case-deletion importance sampling estimators: central limit theorems and related results (with Steven MacEachern and Mario Peruggia), *Electronic Journal of Statistics (EJS)* **2**, 774-806, (2008)
- A stochastic equation for the law of the random Dirichlet variance (with Guglielmi, A. and Melilli, E.), *Statistics & Probability Letters* **76**, 495-502, (2006)
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Research Projects

- Horizon Europe, call: HORIZON-CL6-2022-ZEROPOLLUTION-01-04, title: SafeCREW Climate-resilient management for safe disinfected and non-disinfected water supply systems, Project Coordinator: German Association for Gas and Water, local research branch at Hamburg University of Technology. (November/2022-October/2025).
- Research group Generalitat de Catalunya, Title: Cohesion social y territorial: reto demografico y politicas publicas (Social and territorial cohesion: the demographic challenge and public policies), Official recognition: PID2021-124713OB-I00, Project head: Miguel-Ángel García López and Rosella Nicolini, (September/2022-August/2025).

- Research group Generalitat de Catalunya (SGR, official recognition: 2017SGR207) (2017-2019). Project: Public policies and economic analysis. (Project head: Miguel Ángel López Garcia)
- Research grant Ministerio de Economía y Competitividad (2015-2018): “Socio-economic and territorial challenges: a new proposal for new empirical strategies and its applications”. (Project head: Michael Creel; reference: ECO2014-52506-R)
- MIUR research project (PRIN) 2008: “Metodi bayesiani: sviluppi teorici e nuove applicazioni”
- MIUR research project (PRIN) 2006: “Il punto di vista di de Finetti sul paradigma di Bayes-Laplace: nuovi sviluppi metodologici e applicazioni”
- MIUR research project (PRIN) 2002: “Impiego di metodi non parametrici nell’inferenza bayesiana”
- MIUR research project (PRIN) 2001: “Processi Stocastici e applicazioni a Filtraggio, Controllo, Simulazione e Finanza Matematica”
- MIUR research project (PRIN) 1999: “Processi Stocastici, Calcolo Stocastico e Applicazioni”

Scientific collaborations

- European Commission, Joint Research Centre (JRC), Ispra (VA)
- Institut d’Anàlisi Econòmica - CSIC, Campus de la Universitat Autònoma de Barcelona
- Dipartimento di Ingegneria Civile e Ambientale, Politecnico di Milano
- Dipartimento di Elettronica, Informazione e Bioingegneria, Politecnico di Milano
- Department of Statistics, The Ohio State University, Columbus (OH), USA
- Dipartimento di scienze delle decisioni, Università Commerciale L. Bocconi, Milano
- Istituto di matematica applicata e tecnologie informatiche (IMATI), CNR, Milano

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