

# Roberta Sirovich

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## Education & Positions

- October 2006–Present. Assistant Professor, Department of Mathematics "G. Peano", University of Torino, Italy.
- March 2006. PhD in Mathematics (University of Torino) and PhD in Molecular Biology (University J. Fourier, Grenoble, France) with the thesis titled "Mathematical Models for the Study of Synchronization Phenomena in Neuronal Networks".
- July 2001, Master Degree in Mathematics from the University of Torino. 110/110 cum laude.

## Invited Research Fellowships and Advanced Teaching

- September 2019. Lecturer for the summer school "Primer on Data Science 2019", <http://datascience.maths.unitn.it/events/pds2019/>, Organized by the Università di Trento, Trento, 9-11 September 2019. Title of the short course "Advanced Sports Analytics through Statistical Machine Learning".
- February 2009–July 2009. One semester visiting at the Laboratoire de Probabilités et Modèles Aléatoires, Université Pierre et Marie Curie, Paris (France), invited by Prof. Michele Thieullen and with a WWS grant from the University of Torino.
- February 2008. One month visiting at the Laboratoire de Probabilités et Modèles Aléatoires, Université Pierre et Marie Curie, Paris (France), invited by Prof. Michele Thieullen.
- March 2007. One month visiting at the Institute of Physiology, Academy of Sciences of the Czech Republic, invited by Prof. Petr Lansky.
- January 2003–March 2006. PhD thesis cotutorship with the Laboratoire de Neurobiophysique, Inserm U318, Université Joseph Fourier, Grenoble, France. Advisor Prof. A.E.P. Villa.

## Investigator in Funded Research Projects (Last 10 years)

- Investigator in the research project "ReAMe - Un Registro per il monitoraggio e l'Analisi delle patologie croniche e della Multi-Morbidità nella Regione Piemonte", Funded by the CRT Foundation, 2021-2023.
- Investigator in the research project "Sviluppo di un framework computazionale per la modellazione e lo studio della febbre West Nile", Funded by the CRT Foundation, 2020-2022.
- Principal Investigator in the research project "Modelli Statistici e Probabilistici con Applicazioni". Funded by the University of Torino, 2020-2022.
- Principal Investigator in the research project "Modelli Probabilistici e Statistici con Applicazioni". Funded by the University of Torino, 2018-2019.
- Principal Investigator in the research project "Metodi Stocastici per le Applicazioni". Funded by Evo Europe Limited, London UK. Main topic of the research: sales forecasting and replenishments optimisation for fashion industry and retail, 2016-2017.
- Principal Investigator in the research project "Modelli Aleatori". Funded by the University of Torino, 2016-2017.
- Principal Investigator in the research project "Metodi Stocastici e Statistici per le Applicazioni". Funded by Evo Europe Limited, London UK. Main topic of the research: sales forecasting for fashion industry and retail, 2015-2016.
- Investigator in the research project "Metodi Stocastici e Statistici per le Applicazioni". Funded by the University of Torino, 2015-2016.
- Investigator in the research project "Application driven Markov and non-Markov models". Funded by the University of Torino, 2014-2015.
- Investigator in the research project "Stochastic Modelling Beyond Diffusions". Funded by the University of Torino, 2014-2015.
- Investigator in the research project "Funzionali di Processi Markoviani e non Markoviani". Funded by the University of Torino, 2013-2014.
- Investigator in the research project "Processi Stocastici e Applicazioni". Funded by the University of Torino, 2012-2013.
- Investigator in the research project "AMALFI: Advanced Methodologies for the Analysis and Management of the Future Internet". In collaboration between the Department of Mathematics and the Department of Computer Science. Funded by the University of Torino, 2012-2015.

## Grants

- Bando Vinci 2002: funded by the Italian-French University for the joint PhD program between University of Torino and University Joseph Fourier (Grenoble).
- World Wide Style (WWS). Funded for the research project "Stochastic Models for Neuronal Activity" in collaboration with Prof. Michèle Thieullen, Laboratoire de Probabilités et Modèles Aléatoires, University Pierre et Marie Curie (Paris), 2009.
- GNCS. Funded for visiting the Laboratoire de Probabilités et Modèles Aléatoires, University Pierre et Marie Curie (Paris), 2010.

## Organisation and Participation to international conferences

- I presented my works at more than 20 international conferences or seminars. Some of them as an invited speaker.
- Member of the organising committee for "The first Italian Meeting on Probability and Mathematical Statistics", Torino, 19-20 June 2017.
- Member of the organising committee and of the scientific committee for "Neural Coding 2018", Torino, 9-14 September 2018.
- Member of the organising committee for eRum2020 - The European R Users Meeting, Milano, June 17-20, 2020 (virtual).

## Teaching and Tutorship

- Advisor of the PhD thesis "A Global Fashion Forecasting System", XXXI PhD program in Pure and Applied Mathematics, University of Torino and Politecnico of Torino. To be defended in 2019 by Giuseppe Craparotta.
- Advisor of the PhD thesis "An Excursion approach to Integrate and Fire Neuronal Models", XXIX PhD program in Mathematics, Scuola di Dottorato in Scienze della Natura e Tecnologie Innovative, University of Torino. Defended in December 2017 by Dr. Luisa Testa.
- PhD course "Problemi di Stima per Processi Stocastici e Applicazioni" for the PhD program in Mathematics, University of Torino, 2011.
- PhD course "Modelli Stocastici per la codifica neuronale" for the PhD program in Mathematics, University of Torino, 2008.
- I have been teacher of probability and statistics courses at bachelor and master levels. I have been advisor for more than 50 bachelor and master theses.

## Publications

1. Multi-institutional analysis of outcomes for thermosphere microwave ablation treatment of colorectal liver metastases: the SMAC study (with F. De Cobelli, M. Calandri, A. Della Corte et al.). *Eur Radiol.*, (Published on line Jan 29), 2022.
2. Usefulness of <sup>99m</sup>Tc-pertechnetate SPECT-CT in thyroid tissue volumetry: phantom studies and a clinical case series (with E. Calandri, M. T. Girauda et al.). *Curr Radiopharm.*, (Published on line Jan 11), 2022.
3. e-Rum2020: How we turned a physical conference into a successful virtual event (with M. Fortuna, F. Vitalini, et al.). *R Journal*, 12(2), 416-424, 2020.
4. Following the gold trail: reward influences on spatial exploration in neglect (with M. Neppi Modona, A. Cicerale, N. Richard, P. Pradat-Diehl, A. Sirigu, J.R. Duhamel). *Cortex*, vol. 27(4), 2-32, 2020.
5. On the first positive and negative excursion exceeding a given length (with L. Testa). *Statistics and Probability Letters*, vol. 150, p. 137-145, 2019.
6. An Intelligent Fashion Replenishment System Based on Data Analytics and Expert Judgment (with G. Craparotta and E. Marocco). In: *Artificial Intelligence for Fashion Industry in the Big Data Era*, Springer, 2018.
7. A review of the deterministic and diffusion approximations for stochastic chemical reaction networks (with P. Mozgunov, M. Beccuti, A. Horvath, T. Jaki, E. Bibbona). *Reaction Kinetics, Mechanics and Catalysis*, vol. 123, p. 289-312, 2018.
8. A mathematical model to study breast cancer growth (with G. Chiavassa, C. Fornari, M. Pennisi, M. Beccuti, F. Cordero). In: 2017 IEEE International Conference on Bioinformatics and Biomedicine (BIBM), p. 1438-1445, 2017.
9. Analysis of timed properties using the jump-diffusion approximation (with P. Ballarini, M. Beccuti, E. Bibbona, A. Horvath, J. Sproston). In: *Lecture Notes in Computer Sciences*, vol. 10497, p. 69-84, 2017.
10. A new firing paradigm for integrate and fire stochastic neuronal models (with Luisa Testa). *Mathematical Biosciences and Engineering*, vol. 13, p. 597-611, 2016.
11. Approximate analysis of biological systems by hybrid switching jump diffusion (with A. Angius, G. Balbo, M. Beccuti, E. Bibbona, A. Horvath). *Theoretical Computer Science*, vol. 587, p. 49-72, 2015.

12. Analysis of Petri Net models through Stochastic Differential Equations (with M. Beccuti, E. Bibbona, A. Horvath, A. Angius, and G. Balbo). In: *Application and Theory of Petri Nets and Concurrency*, vol. 8489, p. 273-293, Berlin: Springer, 2014.
13. Cooperative behavior in a jump diffusion model for a simple network of spiking neurons (with L. Sacerdote and A.E.P. Villa). *Mathematical Biosciences and Engineering*, vol. 11(2), p. 385-401, 2014.
14. Non-parametric Estimation of Mutual Information through the Entropy of the Linkage (with M.T. Giraudo and L. Sacerdote). *Entropy*, vol. 15, p. 5154-5177, 2013.
15. Estimating input parameters from intracellular recordings in the Feller neuronal model (with E. Bibbona and P. Lansky). *Physical Review E*, vol. 81, p. 031916-1-031916-13, 2010.
16. A copulas approach to neuronal networks models (with L. Sacerdote). *Journal of Physiology*, vol. 104, p. 223-230, 2010.
17. Altered molecular pathways in melanocytic lesions (with M. Scatolini, M. Mello Grand, E. Grosso, T. Venesio, A. Pisacane, A. Balsamo, M. Risio, G. Chiorino). *International Journal of Cancer*, vol. 126, p. 1869-1881, 2010.
18. Errors in estimation of the input signal for integrate-and-fire neuronal models (with E. Bibbona, P. Lansky, L. Sacerdote). *Physical Review E*, vol. 78(1), p. 011918-3-011918-10, 2008.
19. Information measures in a small network of spiking neurons (with M.T. Giraudo and L. Sacerdote). *Scientiae Mathematicae Japonicae*, vol. 67, p. 191-204, 2008.
20. Effect of increasing inhibitory inputs on information processing within a small network of spiking neurons (with L. Sacerdote and A.E.P. Villa). *Lecture Notes in Computer Sciences*, vol. 4507, p. 23-30, 2007.
21. Stochastic leaky integrate and fire neuronal model: examples of its application to neuronal coding study (with L. Sacerdote and C. Zucca). *Proceedings of NeuroMat III: Computational Neuroscience*. V. Capasso Editor.
22. Noise induced phenomena in jump diffusion models for single neuron spike activity (with L. Sacerdote). *IJCNN2004 CD-ROM Conference Proceedings*, IEEE Catalog Number 04CH37541C, ISBN: 0-7803-8360-5.
23. Multimodality if the Interspike Interval Distribution in a simple jump-diffusion model (with L. Sacerdote). *Scientiae Mathematicae Japonicae*, vol. 8, p. 359-374, 2003.
24. A Wiener process with Inverse Gaussian time distributed jumps as a model for neuronal activity. *Proceedings of the 5th ESMTB Conference*, 2002, V. Capasso Editor.
25. Effects of random jumps on a very simple neuronal diffusion model (with M.T. Giraudo and L. Sacerdote). *BioSystems*, vol. 67, p. 74-83, 2002.