Stefano Polizzi

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Date of birth: 20/03/1990
Nationality: Italian

Personal Summary

An enthusiastic, dedicated and versatile person, with a strong interest in research topics including non-linear dynamics, physics of biological systems, stochastic processes, avalanche processes, network theory, and more generally physics of complex systems. During his training and his experience he used skills of theoretical modeling, computer simulations and statistical data analysis, and often worked in research groups experiencing strong team work, because science is an emergent process! Always doing his best and keen to learn. Actually looking for a research/post-doc position to continue developing his projects.

Academic Qualification

Feb 2022 --	**Qualification Maître de Conference** (equivalent of qualification of lecturer/associate professor) assigned by the CNU (the French National Universtity Council)
April 2021 –	**Post-doc position (assegno di ricerca) – Università di Bologna, Dipartimento di Fisica e Astronomia "Augusto Righi"**
Topic:	Multiomics and biomedical data analysis, with statistical, complex systems and network methods
Supervisors:	Prof. D. Remondini and Prof. G. Castellani
Dec 2020 – Feb 2021	**3 months Research Contract at ENS Lyon**
Topic:	*Stochastic modeling of avalanches with analytical solutions*
Supervisor:	Françoise Argoul (francoise.argoul@u-bordeaux.fr)
Sep 2017 – Nov 2020	**PhD in Physics – Université de Bordeaux, CNRS, LOMA, UMR5798**
Title:	*Emergence of log-normal distributions in avalanche processes, validation of 1D stochastic and random network models, with an application to the characterization of cancer cells plasticity*
Topic:	Multidisciplinary project involving theoretical physics, experimental physics, biology and biostatistics.
Supervisor:	Françoise Argoul (francoise.argoul@u-bordeaux.fr)
2016 - 2017	**Master 2 Biostatistique,** *(Master in Biostatistics)* **– Université de Bordeaux, Bordeaux, France**
Main subjects:	Statistical modeling applied to biology and public health. Principal subjects: Mixed Models for Longitudinal and Grouped Data, Survival Models, Logistic Models, Large Dimensions Data Treatment (big data), Bayesian Statistics.

Mention:	bien (well)
2015 – 2016	**Master 2 Theoretical Physics of Complex Systems (International Master)** – Partnership: Université Paris Diderot-Paris 7 (home university), Université Pierre et Marie Curie (UPMC), Université Paris-Sud, Ecole Normale Supérieure de Cachan (ENS), Paris, France; Politecnico di Torino, Torino, Italy; SISSA (International School for Advanced Studies) and ICTP (Abdus Salam International Center for Theoretical Physics), Trieste, Italy.
Main subjects:	Statistical Field Theory, Non-linear Physics, Biophysics, Statistical Dynamics, Mathematical Tools (mostly complex analysis), Quantum Field Theory.
Mention:	assez bien (rather well)
2014 – 2015	**Master 1 Physique fondamentale et sciences pour l'ingénieur** *(Master first year in Fundamental Physics and Engineering Sciences)* **– Université Paris Diderot-Paris 7, Paris, France**
Main subjects:	Advanced Quantum Mechanics, Advanced Statistical Physics, Numerical Physics (in Python coding)
Mention:	assez bien (rather well)
2009 – Jul 2014	**Laurea triennale in Fisica e Astrofisica** *(bachelor's degree in Physics and Astrophysics)* **– Università degli Studi di Firenze (University of Florence), Florence, Italy**
Main subjects:	classical and quantum physics, advanced mathematics (option on differential topology), astrophysics and astronomy, informatics (C language), problem solving.
2004 -- 2009	**Diploma di maturità scientifica PNI** *(High school diploma in sciences with informatics national program)* **Liceo scientifico G. Castelnuovo** *(scientific public high school)***, Florence, Italy**
Main subjects:	English literature and language, history, philosophy, physics, maths, chemistry, biology, astronomy, Italian, Latin

Research Internships

Feb 2017 – Jul 2017	**Master 2 internship at Laboratoire Onde et Matière d'Aquitaine – LOMA (Université de Bordeaux, CNRS, Bordeaux, France)**
Title:	*A model for mechanical plasticity of cytoskeleton: differences between cancer and healthy cells.*
Supervisors:	Françoise Argoul (francoise.argoul@u-bordeaux.fr). Alain Arneodo
Short summary:	Studied the differences in the cythoskeleton mechanical response between cancer cells and healthy ones. Implemented a stochastic model to reproduce experimental data and used mixed model (biostatistical) tools to correlate different responses to cancer. Proposed a new marker for cancer cells.
2015/2016 – 3 months and a half	**Master 2 internship at Centre de Neurophysique Physiologie et Pathologie (Université Paris Descartes, Paris, France)** – .
Title:	*Learning with self-consistent temporal fluctuations.*

Supervisor:	Gianluigi Mongillo (gianluigi.mongillo@gmail.com)
Short summary:	Found a way to model learning with self-generated temporal fluctuations, in which patterns to be learned were temporal fluctuating. Adding the requirement of self-consistence found that it is possible to memorise patterns with temporal fluctuations in a recurrent network.
May 2015 – Jul 2015	**Master 1 internship** at **MSC laboratory (Université Paris Diderot-Paris 7, Paris, France)**
Title:	*Dissolution and diffusion in the landscape's shapes*.
Supervisor:	Sylvain Courrech-du-Pont (sylvain.courrech@univ-paris-diderot.fr)
Short summary:	On dissolution patterns in landscapes generated by hydrodynamics instability, in a research group. Involving images treatment, python coding, numerical simulation in FreeFem++ language, team-work.
Mar 2014 – Jul 2014	**Bachelor thesis** at **ISC of Florence (Complex Systems Institute), Florence, Italy**
Title:	*Dynamics of neuronal networks with disorder*
Supervisors:	Stefano Luccioli (stefano.luccioli@fi.isc.cnr.it) and Roberto Livi (roberto.livi@unif.it).

International Schools/Workshops/Symposia

28/07/2019 – 02/08/2019	**Second International Summer Institute on Network Physiology, Lake Como, Italy,** organised by Prof. Plamen Ivanov
12/06/2019 – 14/06/2019	**Wavelets and Beyond - A celebration for Alexandre Grossmann and Yves Meyer, Orsay, Paris, France**
29/04/2019 – 30/04/2019	**ANR meeting on the project Rheolife, LOMA, Université de Bordeaux, Bordeaux, France**
26/02/2018 – 11/03/2018	**Spring school: Physics of Life 49th IFF Spring School, Forschungszentrum, Jülich, Germany.**
Topic:	50 hours of lectures following topics divided in 6 great areas: Methods; Molecules; Membranes, Filaments and Networks; Cells; Multicellular and Collective Behavior; Diseases and Systems Biology.
28/01/2018 – 31/01/2018	**SoftComp Topical Workshop: Filaments, Membranes, Cells – and their Interactions 2018, Forschungszentrum, Jülich, Germany.** Organised by SoftComp, Forschungszentrum Jülich, Institut Curie
25/04/2016 – 22/05/2016	**Spring School on the Physics of Complex Systems – ICTP Trieste, Italy**
Topic:	5 courses with exams at the end: Conformal Field Theory, Model-based inference in ecology and epidemiology (with R), Statistical mechanics of cellular motion, Non-equilibrium quantum systems, Machine learning and physics of information processing.

Oral contributions in International Contexts

20-22/01/2021	**AQV Days 2021: Quantitative Approaches to Living Systems**
Title:	*Emergence of log-normal rupture avalanches in living cells*
Type:	15 min. talk online (Zoom)
Aug 2019	**Second International Summer Institute on Network Physiology, Lake Como, Italy**
Title:	*A random network model for living cell plasticity*
Type:	40 min. plenary lecture, and poster presentation with same title
11/07/2019	**LOMA Theory Day, LOMA, Université de Bordeaux, Bordeaux, France**
Title:	*A network model for living cell plasticity*
Type:	Invited talk (30 min.)
Jun 2019	**University of Aberdeen, King's College, Scoltland (UK)**
Title:	*A network model for living cell plasticity*
Type:	Department seminar
Jun 2019	**Symposium: Wavelets and Beyond - A celebration for Alexandre Grossmann and Yves Meyer, Orsay, Paris, France**
Title:	*Multiscale characterisation captures fracture events in cancer and healthy cells*
Type:	Poster presentation
Apr 2019	**ANR meeting on the project Rheolife, LOMA, Université de Bordeaux, Bordeaux, France**
Title:	*A random network model for living cell plasticity*
Type:	40 minute talk and discussion about the project
Jan 2018	**SoftComp Topical Workshop: Filaments, Membranes, Cells – and their Interactions 2018, Forschungszentrum, Jülich, Germany**
Title:	*A minimal rupture cascade model for living cell plasticity*
Type:	20 min selected talk

Research Visits

15/06/2019 – 30/06/2019	**Visiting student at ICSMB, (Physics Departement), University of Aberdeen, King's College, Scoltland (UK)**

Publications

Polizzi, S., Perez-Reche, F. J., & Argoul, F. (2021). Power-law and log-normal avalanche size statistics in random growth processes, *Physical Review E, 104*(5), L052101.

Polizzi, S., Perez-Reche, F. J., Arneodo, A., & Argoul, F. (2021). Emergence of log-normal type distributions in avalanche processes in living systems: a network model, *Frontiers in Applied Mathematics and Statistics,* 73.

Polizzi, S. (2021). An epistemological and bio-physical point of view on complex systems, *Science & Philosophy 9*(2), 115-127.

Polizzi, S., Laperrousaz, B., Perez-Reche, F. J., Nicolini, F. E., Satta, V. M., Arneodo, A., & Argoul, F. 2018). A minimal rupture cascade model for living cell plasticity. *New Journal of Physics*, *20*(05), 053057.

Work Experience

Sep 2019 – Aug 2020	**Teaching at Université de Bordeaux** (32 hours contract), Bachelor of Science level
09/2018 – 08/2019	**Teaching at Université de Bordeaux** (64 hours contract), Bachelor of Science level
24/10/2016 – 23/01/2017	**Fixed – term contract at CNRS (French National Center of Scientific Research) as statistical assistant at CNRS, Université de Bordeaux, LOMA**
Sep 2015 – Jun 2016	**Tutor in Physics – Université Paris Diderot-Paris 7, Paris, France**
Jan 2005 – Dec 2015	**Basketball referee – C national division – Federazione Italiana di Pallacanestro (FIP), Firenze**

Volunteering Experience

Jun 2006	**Libera:** 2 weeks in Corleone to work in properties of mafia seized by law

Language Skills

Italian	Mother tongue
English	Written and spoken (B2)
French	Written and spoken (B2)
Spanish	Scholar knowledge (A2)

Technical Skills

Documents	LaTeX, Microsoft Office Word, Excel, Power Point, Libre Office
Programming	C++, Wolfram Mathematica, Python
Data Analysis and Statistics	SAS, R, MATLAB

Personal Skills

- Managerial and organizing skills: high level basketball referee
- Full and clean driving license B
- Sport man, enjoying all sports, in particular basketball, played at national level, and climbing, skiing or trekking in the mountains.

- Fishing at the dawn