Curriculum Vitae

Personal information

Name / Surname	**Fachechi, Alberto**
Qualification	PhD in Theoretical Physics
	Department of Mathematics and Physics "E. De Giorgi", Unisalento (Lecce, Italy)
Actual position	Post-doc researcher
Actual insitution	Department of Mathematics "G. Castelnuovo", Sapienza Università di Roma
	GNFM-INdAM (Gruppo Nazionale per la Fisica Matematica), Roma section
Previous position	Post-doc researcher
Previous insitution	Department of Mathematics and Physics "E. De Giorgi", Unisalento
	GNFM-INdAM (Gruppo Nazionale per la Fisica Matematica), Lecce section
	INFN (Istituto Nazionale di Fisica Nucleare), Lecce section

Main interests

My research activity

My research activity is placed in the wide discipline of statistical mechanics methods for complex systems analysis, in particular concerning **spin-glass theory** and its application to modern **Artificial Intelligence**.

In the last 3 years, I especially focused on a rigorous analysis of the Hopfield model (which is the prototype of Attractor Neural Network) and its related variants. In particular, in Pubs. 8 and 10 (see **Full list of publications**), I dealt with an extension of the Hopfield model obtained by revising the synaptic coupling among neurons so to account for possible correlation in the information stored by the networks. The resulting model (called **Dreaming Neural Networks**) exhibits appealing features, such as a maximal storage capacity (much higher than in the standard Hopfield model) and a vanishing spin-glass phase (at least in the replica symmetry regime). Further, in Pub. 7 I also studied a particular P-spin extension of the Hopfield model (based on a mechanical analogy relating it to **Hamilton-Jacobi PDEs**) whose Hamilton function series expansion can be exactly resummed. The model has been systematically analyzed also in Pub. 13 for the so-called high-storage regime and in Pub. 16 in the presence of pattern temporal correlation. Our methods can be also applied to other fields of mathematics, for instance in **random matrix theory** (see Pub. 9).

An important point in my research activity is the development of rigorous mathematical methods to deal with this kind of models, thus bypassing the replica trick approach. In this scenario, **Guerra's interpolating techniques** cover a prominent role, both for the reduction of the thermodynamic solution of the models to the straightforward application of **sum rules** (as is standard in mean-field theory) and the analysis of relation with **non-linear PDEs** (for example, in the forthcoming Pub. 17 I established the relation between P-spin Curie-Weiss extensions with the class of non-linear equations constituting the Burgers' hierarchy).

Finally, I also dealt with **statistical inference** methods for specific problems concerning complex systems. In Pubs. 14 and 15, I analyzed **heart rate variability** with a composite approach of maximum entropy principle, graph theory and (multi-layer feed-forward) neural networks design. Currently, I am also working on the analysis of *in vitro* diffusion experiments (by means of stochastic processes and classical statistical inference methods) in order to establish the effects of chemioterapic drugs on mutual **stroma-cancer cells interaction** for different pancreatic lines.

Previous interests

I also dealt with specific problems in supersymmetric quantum field theories, conformal field theories and string theory. In particular, I dealt with low-energy effective field theories of $\mathcal{N} = 2$ supersymmetric field theories, with particular attention to its relation with 2d conformal field theory (by means of Alday-Gaiotto-Tachikawa conjecture) and to integrable systems.

Highlights

Contributions

For a complete list of publications and talks, see next pages.

Metrics

Total number of papers: 22.
Total number of published papers: 20.
Total number of citations (GoogleScholar): 160.
Average number of citations per published paper: 8.
Total number of published papers within last solar year (2020): 6.
Number of citations within last solar year (2020): 55.
h-index (GoogleScholar): 7.
i10-index (GoogleScholar): 4.
ResearchGate score: 23.66.
ResearchGate recommendations: 27.
ResearchGate total interest: 150.2.
Total reads in ResearchGate: 2588.

Collaborations, communities and partecipations

During my activity, I collaborated with many scientists from both academic and research institutes. I also took part in national and international research communities supporting my research travels and particaptions to schools and international conferences. See next pages for more details.

Teaching and supervising

During my activity, I covered teaching roles in technical university concerning mathematics, physics, complex systems and statistical mechanics for neural networks and mathematical methods. See next pages for details.

Positions

Dates

September 2021 - August 2023

Description

Post-doc researcher

Scientific sector	MAT/07
Subjects	Realization of Machine Learning models and algorithms (in particular, Deep Learning), both focusing on the analytical and numerical point of views, and with particular interest to biological and medical application (i.e. cancer diagnostic).
Additional informations	First place in the final ranking list (final mark 89/100)
Institution	Sapienza Università di Roma
Dates	March 2020 - March 2021
Description	**Post-doc researcher**
Scientific sector	MAT/07
Subjects	Realization of Machine Learning models and algorithms (in particular, Deep Learning), both focusing on the analytical and numerical point of views, and with particular interest to biological and medical application (i.e. cancer diagnostic).
Reference	Prof. Adriano Barra
Additional informations	First place in the final ranking list (final mark 60/60)
Institution	Università del Salento
Dates	February 2019 - February 2020
Description	**Post-doc researcher**
Scientific sector	MAT/07
Subjects	Realization of Machine Learning models and algorithms (in particular, Deep Learning), both focusing on the analytical and numerical point of views, with particular interest in their application to biological data analysis (e.g. analysis of peculiarities in heart-rate variability and related pathologies).
Denomination	POR CALABRIA FESR/FSE 2014/2020, "Rete Match: Progetto Pythagoras" project (ref. Dr. Adriano Barra)
Additional informations	First place in the final ranking list (final mark 60/60)
Institution	Università del Salento
Dates	January 2016 - January 2019
Description	**PhD student**
Subjects	Statistical mechanics for Artificial Intelligence
Additional informations	Second place in the final ranking list (final mark 81/100)
Scholarship	Yes
Institution	Università del Salento

Technical skills and competences

Basics	Excellent knowledge of many basic and advanced mathematical topics (such as real and complex analysis, linear and non-linear integrable systems), fundamental algebra and geometry (also regarding group theory and differential geometry).
	Excellent knowledge of physical phenomena and mathematical methods for dealing them and great ability in modelling problem in mathematical language.
Soft skills	Great ability in team working and social learning.

Technologies	Good knowledge of web-based programming language HTML.

Good knowledge of C programming language.

Advanced knowledge of object-oriented programming, in particular C++.

Excellent knowledge of Python (favorite) programming language, especially concerning (big) data analysis and neural networks design, and related libraries (in particular, *numpy* and *scipy*).

Excellent knowledge of Bash scripting language.

Good knowledge of deep learning frameworks, in particular *TensorFlow* and *Keras*.

Good knowledge of Julia programming language, in particular concerning scientific data analysis.

Operating Systems

Great ability in using Microsoft Windows (from XP version up to Windows 10) and GNU/Linux (most used) operating systems.

Basic knowledge of MacOS operating systems.

Environment

Great ability in using office suites, in particular Microsoft Office and OpenOffice (now LibreOffice).

Excellent knowledge of Wolfram Mathematica environment and programming.

Good knowledge of MatLab environment.

Excellent knowledge of Jupyter, Jupyter-lab, Atom and Spyder IDEs.

Other

Advanced knowledge of LaTeX language.

Basic knowledge of cyber-security (as certified by the basic Cyber-Security course of INFN)

Personal skills

Mother tongue **Italian**

Other language(s) English

Self-assessment
European level[(*)]

	Understanding		Speaking		Writing
	Listening	Reading	Spoken interaction	Spoken production	
English	Excellent	Excellent	Excellent	Excellent	Excellent

Education and training

Dates	2015 - 2019
Title of qualification	PhD in **Theoretical Physics**
Main subjects of research	Statistical models of complex networks dynamics and applications in epidemic diffusion processes. AdS/CFT and AGT correspondances, supersymmetric models and their integrability features.
Organization	Università del Salento
Level in national or international classification	Excellent (defended on 19th July 2019).

Dates	2013 - 2015
Title of qualification	MS in **Theoretical and Fundamental Interactions Physics**
Organization	Università del Salento
Level in national or international classification	110/110 with honors

Dates	2009-2013
Title of qualification	BS in **Physics**
Organization	Università del Salento
Level in national or international classification	110/110

Dates	2009
Title of qualification	Scientific High School Diploma
Organization	Liceo Scientifico e Linguistico Antonio Vallone, Galatina (LE) - Italy
Level in national or international classification	100/100

Communities

Dates	2018 - Today
Institution	**GNFM-INdAM**
Description	Associate to GNFM-INdAM (Gruppo Nazionale per la Fisica Matematica).

Dates	2015 - Today
Institution	**INFN**, Lecce section
Description	Associate to INFN (Istituto Nazionale di Fisica Nucleare).

Dates	2016 - 2017
Project	**GATIS** - INFN, Bologna section
Description	GATIS (GAuge Theory as an Integrable System) is the European-wide Initial Training Network in High Energy Physics and Mathematics. Research on the GATIS topics is performed in many institutions around the world.

Funded projects

Dates	2018
Project	**Progetto Giovani GNFM**, 2018
Project title	**Approcci rigorosi al "Deep Learning"** (Rigorous approaches to Deep Learning)
Organization	GNFM (Gruppo Nazionale della Fisica Matematica)
Referent	Dr. Elena Agliari (La Sapienza University, Rome)
Keywords	Disordered Statistical Mechanics, Stochastic Differential Equations, Graph Theory
Role	Partecipant

Research travels

Dates	May 2016, 3-25
	November 2016, 24 - December 2016, 4
	May 2017, 21 - June 2017, 1

Location	**Alma Mater Studiorum University**, Bologna (IT)
Referent	Dr. Davide Fioravanti
Dates	February 2018, 8-9
	July 2018, 15-17
Location	**La Sapienza University**, Rome (IT)
Referent	Dr. Elena Agliari
Dates	October 2018, 1-5
Location	**King's College London**, London (UK)
Referent(s)	Dr. Alessia Annibale

Partecipations

Conferences

Dates	August 2016, 22-26
Title of the conference	**Integrability in Gauge and String Theory**, IGST 2016
Organization	Humboldt Berlin University
Location	Berlin (DE)
Subject(s)	Integrability features in holographic systems such as the AdS/CFT correspondence in various dimensions and in supersymmetric models such as $\mathcal{N} = 2$ and $\mathcal{N} = 4$ gauge theories.
Dates	June 2017, 6-10
Title of the conference	**XXVth International Conference on Integrable Systems and Quantum Symmetries** , ISQS25
Organization	Department of Mathematics, Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University Prague
	Bogoliubov Laboratory of Theoretical Physics of the Joint Institute for Nuclear Research.
Location	Prague (CZE)
Subject(s)	Main topics covered in the conference: quantum integrable systems; quantum groups; noncommutative geometry; quantum space-times and their quantum symmetries; discrete Integrable Systems and Painlevé equations; supersymmetry and integrability; spectral asymptotics of quantum integrable system; higher spin field theory; modern mathematical methods.
Dates	June 2017, 17-24
Title of the conference	**Physics and Mathematics of Nonlinear Phenomena - "50 years of IST"**, PMNP2017
Organization	Salento University
Location	Gallipoli (IT)
Subject(s)	Main topics covered in the conference: discovery and development of the IST method; state of the art and perspectives; Hamiltonian, geometric and algebraic aspects of integrable systems; integrable nonlinear equations in physics; integrability and mathematics.
Dates	May 2018, 18
Title of the conference	**Scent of Copulas**
Organization	Salento University
Location	Lecce (IT)

Description	Celebrative conference for the 70th birthday of Prof. Carlo Sempi
Subject(s)	The conference focuses on dependence models and copulas, and their use in several fields (such as Statistics, Finance, Environmental Sciences, and more).

Dates	April 2020, 27-28
Title of the conference	**Mathematical Methods and Models in Machine Learning**
Organization	Alma Mater Studiorum (Department of Mathematics)
Location	Bologna (IT) - Online conference because of COVID-19 lockdown
Subject(s)	The purpose of the conference is to present recent results on mathematical methods and models related to machine learning and link researchers coming from different areas.

Dates	July 2020, 1-2/7-8
Title of the conference	**Stochastic models for complex systems**, SMOCS2020
Organizations	Università degli Studi di Salerno,
	Università degli Studi di Napoli Federico II,
	Unisalento
Location	Online conference because of COVID-19 restictions
Subject(s)	Mathematical and statistical mechanics of stochastic phenomena for complex systems.

Schools

Dates	September 2016, 5-10
Title of the school	**Parma International School of Theoretical Physics** (VII edition), 2016
Organization	Parma University
Location	Parma (IT)
Subject(s)	Advanced topics for path-integral in QFTs, with particular reference to resurgence, Lefschetz thimbles and non-perturbative methods.

Dates	September 2017, 3-8
Title of the school	**IV Mediterranean School of Complex Networks**, 2017
Location	Salina, Sicily (IT)
Subject(s)	Basics insights in network science from a statistical physics point of view, with particular reference to multilayer networks and their specific application to real world-problems.

Dates	October 2019, 7-11
Title of the school	**Mathematical and Computational Aspects of Machine Learning**, 2019
Location	Scuola Normale di Pisa, Pisa (IT)
Subject(s)	The present school aims at connecting international experts at the forefront of research on the mathematical and computational aspects of the problem with the interested scholars, especially the young generations.

Dates	10 June - 7 July, 2021
Title of the school	**Stochastic Models and Complex Systems - SMOCS2021**
Location	Online school because of COVID-19 restrictions
Subject(s)	Summer school in Probability and Statistics to be held online, as part of the activities of the PRIN 2017-Stochastic Models for Complex Systems project.

Popularization of science

Dates	September 2017, 29
Title of the event	**"Notte europea dei ricercatori" (European Researchers' Night 2017)**
Location	Lecce (IT)
Subject(s)	Public event dedicated to popular science. I took part discussing with people interested in complex systems and artificial intelligence.
Dates	September 2019, 27
Title of the event	**"Notte europea dei ricercatori" (European Researchers' Night 2019)**
Location	Lecce (IT)
Subject(s)	Public event dedicated to popular science. I took part discussing with people interested in complex systems and artificial intelligence.

Other courses

Dates	June 2019, 10-20
Prof.	Giorgio Buttazzo - Scuola Superiore Sant'Anna (Pisa)
Title of the event	**Neural Networks and Deep Learning**
Institution	Salento University
Location	Lecce (IT)
Subject(s)	Intensive course about Artificial Intelligence, machine learning and neural networks, with a particular interest in applications.
Dates	November-December, 2020
Prof.	Luca Manzoni - University of Trieste
Title of the event	**AI2S Julia Coursework**
Institution	Artificial Intelligence Student Society (AI2S)
Location	Online
Subject(s)	Julia programming language coursework with particular attention to Artificial Intellinge and Machine Learning.

Teaching and supervising activity

Teaching

Period	May, 2018
Course	Complex Systems
Reference	Dr. Adriano Barra
Institution	**ISUFI** school (Salento University)
Subjects	The lessons consist in the presentation of mathematical tools for dealing with complex systems, in particular for the application of replica trick and Guerra's interpolation method for the resolution of the Sherrington-Kirkpatrick and Hopfield models.
Period	February - July, 2020
Course	Mathematics for Economy and Finance
Reference	Dr. Luca Anzilli
Role	Practical exercises tutor
Institution	**Department of Economic Sciences** (Salento University)

Subjects	General notions on set theory, with particular regard to real numbers' theory. Elements of real analysis and functions of one real variable. Continuity, differentiability and integrability. General notions on differential calculus for functions of two real varaibles, numerical series and linear systems.
Period	November, 2020 - March, 2021
Course	Mathematics for Economy and Finance
Reference	Dr. Luca Anzilli
Role	Practical exercises tutor
Institution	**Department of Economic Sciences** (Salento University)
Subjects	General notions on set theory, with particular regard to real numbers' theory. Elements of real analysis and functions of one real variable. Continuity, differentiability and integrability. General notions on differential calculus for functions of two real varaibles, numerical series and linear systems. Real functions of two real variables, limits and partial differentiation. Constrained extremal problems. Planar geometry.

Supervising

Period	July, 2018
Activity	External supervisor for Master Degree Thesis
Field	Applied Mathematics
Candidate	Chiara Marullo
Title	Neural network beyond the Hebbian paradigma
Reference	Dr. Elena Agliari
Institution	**La Sapienza** University (Rome)
Subjects	Quantitative analysis of dreaming neural networks with dilution.
Level in national or international classification	110/110

Scientific activity

Full list of publications

1. M. Beccaria, A. Fachechi and G. Macorini
   Virasoro vacuum block at next-to-leading order in the heavy-light limit
   [arXiv:1511.05452], November 2015
   Published on **JHEP**, February 2016

2. M. Beccaria, A. Fachechi and G. Macorini
   On the cusp anomalous dimension in the ladder limit of $\mathcal{N} = 4$ SYM
   [arXiv:1604.00897], April 2016
   Published on **JHEP**, June 2016

3. M. Beccaria, A. Fachechi, G. Macorini and L. Martina
   Exact partition functions for the Ω-deformed $\mathcal{N} = 2$ $SU(2)$ gauge theory with $N_f = 4$ flavours
   [arXiv:1609.01189], September 2016
   Published on **JHEP**, December 2016

4. E. Alfinito, M. Beccaria, A. Fachechi and G. Macorini
   Reactive immunization on complex networks
   [arXiv:1701.03943], January 2017
   Published on **EPL**, February 2017

5. M. Beccaria, A. Fachechi and G. Macorini
   Chiral trace relations in Ω-deformed $\mathcal{N} = 2$ theories
   [arXiv:1702.01254] - February 2017
   Published on **JHEP**, May 2017

6. E. Alfinito, A. Barra, M. Beccaria, A. Fachechi and G. Macorini
Global awareness and risk-aversion, an evolutionary game model for behavioral gambit of loyalists
[arXiv:1801.05373], January 2018
Published on **EPL**, March 2018

7. A. Barra, M. Beccaria and A. Fachechi
A new mechanical approach to handle generalized Hopfield neural networks
[arXiv:1801.01743], January 2018
Published on **Neural Networks**, October 2018

8. E. Agliari, A. Barra and A. Fachechi
Dreaming neural networks: forgetting spurious memories and reinforcing pure ones
[arXiv:1810.12217] - January 2018
Published in **Neural Networks**, April 2019

9. E. Agliari, A. Barra, F. Alemanno and A. Fachechi
A novel derivation of the Marchenko-Pastur law through analog bipartite spin-glasses
[arXiv:1811.08298], November 2018
Published in **JPhysA**, (Journal of Physics A: Mathematical and Theoretical - special issue for Giorgio Parisi 70th birthday), as *On the Marchenko-Pastur law in analog bipartite spin-glasses*, April 2019.

10. E. Agliari, F. Alemanno, A. Barra, A. Fachechi
Dreaming neural networks: rigorous results
[arXiv:1812.09077], December 2018
Published in **JStat** (Journal of Statistical Mechanics: Theory and Experiment), August 2019.

11. E. Agliari, F. Alemanno, A. Barra, M. Centonze, A. Fachechi
Neural networks with redundant representation: detecting the undetectable
[arXiv:1911.12689], November 2019
Published in **PRL** (Physical Review Letters), January 2020.

12. F. Alemanno, M. Centonze, A. Fachechi
Interpolating between boolean and extremely high noisy patterns through Dense Associative Memories
[arXiv:1912.00666], December 2019
Published in **JPhysA** (Journal of Physics A: Mathematical and Theoretical - special issue "Machine Learning and Statistical Physics: Theory, Inspiration, Application"), January 2020

13. E. Agliari, F. Alemanno, A. Barra, A. Fachechi
Generalized Guerra's interpolation schemes for dense associative neural networks
[arXiv:1911.12707], November 2019
Published in **Neural Networks**, May 2020

14. E. Agliari, A. Barra, O. A. Barra, A. Fachechi, L. Franceschi-Vento, L. Moretti
Detecting cardiac pathologies via machine learning on heart-rate variability time series and related markers
Published in **SciRep** (Nature Scientific Reports), June 2020 (link)

15. E. Agliari, F.Alemanno, A. Barra, O. A. Barra, A. Fachechi, L. Franceschi-Vento, L. Moretti
Analysis of temporal correlation in heart rate variability through maximum entropy principle in a minimal pairwise glassy model
Published in **SciRep** (Nature Scientific Reports), September 2020
(link)

16. E. Agliari, A. Fachechi, C. Marullo
The "relativistic" Hopfield model with correlated patterns
Published in **JMP** (Journal of Mathematical Physics), December 2020
(link)

17. A. Fachechi
PDE/statistical mechanics duality: relation between Guerra's interpolated p-spin ferromagnets and the Burgers hierarchy,
[arXiv:2103.13116], March 2021
Published in **JSP** (Journal of Statistical Physics), April 2021 (link)

18. E. Agliari, L. Albanese, F. Alemanno, A. Fachechi
A transport equation approach for deep neural networks
Submitted to **JPhysA** (Journal of Physics A: Mathematical and Theoretical), February 2021

19. E. Agliari, F. Alemanno, A. Barra, A. Fachechi
Dreaming neural networks: improving Boltzmann Machine learning/retrieving by autonomous dreaming time choice
Submitted to **IEEE-TNNLS** (IEEE Transactions on Neural Networks and Learning Systems), July 2021

Conference papers/Proceedings

1. E. Alfinito, M. Beccaria, A. Fachechi and G. Macorini
Probing complexity with epidemics: a new reactive immunization strategy
Proceedings of the 2nd International Conference on Complexity, Future Information Systems and Risk (COMPLEXIS 2017)
ISBN: 978-989-758-244-8, edited by **SciTePress**, DOI: 10.5220/0006361301160123, link

2. M. Beccaria, A. Fachechi and G. Macorini
Chiral trace relations in Ω-deformed $\mathcal{N}=2$ theories
Proceedings of XXVth International Conference on Integrable Systems and Quantum symmetries (ISQS25)
Published in **JPCS** and edited by **IopScience**, Vol. 965 (2018) 012013, link

3. M. Beccaria, A. Fachechi and G. Macorini
Chiral trace relations in $\mathcal{N}=2^*$ theories
Proceedings of Physics and Mathematics of Nonlinear Phenomena - "50 years of IST" (PMNP2017)
Published on **Theoretical and Mathematical Physics** and edited by **Springer**, Vol. 196:3 (2018) 390-403

List of talks/posters

1. Talk
Gauge theories: a geometrical approach
Ref. Prof. Luigi Martina
Università del Salento, Lecce (IT), 23/11/2016

2. Talk
   Basics in instanton counting - Physics beyond the perturbative regime,
   Refs. Prof. Luigi Martina and Dr. Luca Girlanda
   Università del Salento, Lecce (IT), 10/04/2017

3. Talk
   Chiral trace relations in Ω-deformed $\mathcal{N} = 2$ theories, based on the works 5
   XXVth International Conference on Integrable Systems and Quantum symmetries, Prague University (CZ), 08/06/2017

4. Talk
   Chiral trace relations in Ω-deformed $\mathcal{N} = 2$ theories, based on the works 5
   Physics and Mathematics of Nonlinear Phenomena - "50 years of IST", Gallipoli (IT), 21/06/2017

5. Talk
   Global and local complexities in the immunization problem, based on the work 4
   Mediterranean School of Complex Networks (MSCX) - IV edition, Salina (IT), 04/09/2017

6. Talk
   Sleeping in Hopfield neural networks: some recent results, based on the work 8
   Ref. Dr. Alessia Annibale
   King's College London, London (UK), 03/10/2018

7. Talk
   Reti di Hopfield nella fase REM, based on the work 8
   Ref. Dr. Adriano Barra
   Unisalento, Lecce (IT), 19/12/2018

8. Educational talk
   Uno sguardo semplice alla complessità - Sistemi complessi e intelligenza artificiale
   "Popular University" Association, Galatina (IT), 09/04/2018

9. Poster
   On the cusp anomalous dimension in the ladder limit of $\mathcal{N} = 4$ SYM, based on the work 1
   IGST (Integrability in Gauge and String Theory), Humboldt University, Berlin (DE), 22/08/2016

10. Poster
    Quantising $\mathcal{N} = 2^{*}SU(2)$ gauge theory: integrability and modular anomaly
    Physics and Mathematics of Nonlinear Phenomena - "50 years of IST", Gallipoli (IT), 20/06/2017

Reviewing and editorial activity

1. 2017 - Today
Referee for Nature Scientific Reports (SciRep), **Nature Publishing Group**
Number of peer-reviewed papers: 4

2. 2018 - Today
Review Editor for **Frontiers in Physics** in Social Physics

3. 2018 - Today
Referee for Helyion, **Elsevier**
Number of peer-reviewed papers: 1

4. 2018 - Today
Referee for Journal of Mathematical Physics (JMP), **AIP Publishing**
Number of peer-reviewed papers: 1

5. 2019 - Today
Referee for Journal of Physics A: Mathematical and Theoretical (JPhysA), **IOP Publishing**
Number of peer-reviewed papers: 1

6. 2021 - Today
Member of the Reviewer Board for Entropy, **MDPI**

7. 2021 - Today
Referee for Frontiers in Physics
Number of peer-reviewed papers: 1

Recognitions

* 2020
Awarded as Trusted Reviewer by **IOP Publishing**

* April 2021
Special mention for my PhD thesis "Statistical mechanics for Artificial Intelligence: Learning, Retrieving, Unlearning and Sleeping" from the selection board of **Sergio Fubini prize**, 2020 edition (INFN)

People talking about our work

1. Divulgative communication
A New Mathematical Tool For Artificial Intelligence Borrowed From Physics, based on the work 7
Written by A. Barra and published on **ScienceTrends** [link]
October 2018

2. Divulgative communication
If Neural Networks Are Allowed To Sleep And Dream, Their Performance Sensibly Increases, based on the work 8
Written by A. Barra and published on **ScienceTrends** [link]
February 2019

3. Divulgative communication
Anche l'Intelligenza Artificiale ha bisogno di dormire, based on the work 8
Published on **Ansa.it** (Scienza&Tecnica) [link], February 2019

4. Divulgative communication
L'Intelligenza Artificiale sa dormire e pare ne abbia bisogno. Forse un giorno sognerà, based on the work 8
Published on **Repubblica.it** Tecnologia [link], February 2019

5. Divulgative communication
Con un buon sonno anche l'Intelligenza Artificiale migliora, based on the work 8
Published on **TG24 Sky** Tecnologia [link], February 2019

6. Divulgative communication
Così l'Intelligenza artificiale "dorme" e dopo immagazzina più informazioni, based on the work 8
Published on **IlFattoQuotidiano.it** Scienza [link], February 2019

7. Divulgative communication
L'Intelligenza Artificiale sa dormire, e forse sognerà, based on the work 8
Published on **IlSole24Ore** Ricerca (Video) [link], February 2019

8. Other divulgative articles related to the work 8:
Researchers Made an AI Whose Performance Increases if They Let It Sleep And Dream, [link], February 2019
L'Intelligenza Artificiale sa dormire, e forse sognerà, [link], February 2019

9. Divulgative communication
Why Machines Need to Dream, based on the work 8
Published on **OneZero** [link], June 2019

10. Divulgative communication
I misteri del sonno, based on the work 8
Special interview in **Speciale Tg1** (8/12/2019 edition) [link], December 2019

Dichiaro che quanto riportato nel presente Curriculum Vitae corrisponde a verità, ai sensi degli artt. 46 e 47 del D.P.R. 28 Dicembre 2000, n. 445 e successive modificazioni e integrazioni.
Autorizzo il trattamento dei dati personali contenuti nel presente curriculum vitae ai sensi del D.Lgs. 196/2003 "Codice in materia di protezione dei dati personali. Autorizzo la pubblicazione del presente curriculum vitae sul portale di Ateneo "Amministrazione trasparente" in ottemperanza al D.Lgs. 33/2013 e al D.Lgs. 97/2016 e sul portale PERLAPA ai sensi del D.Lgs 165/2001.

Lecce, 01/09/2021

Dichiarante, ALBERTO FACHECHI