

Personal information



Ivan Bonamassa

📍 Via Golfo di Taranto 5 sc.E, 74121 Taranto (TA), Italy

☎ +39 345 02 18 194 / +39 099 7761428

✉ bonamassai@ceu.edu / ivan.bms.2011@gmail.com

🌐 ivanbms2011.wix.com/physivan

📅 Date of birth 24 November 1987 | 🇮🇹 Nationality(-ies) Italian

Postdoctoral Researcher @ DNDS-CEU, Vienna

ACADEMIC POSITIONS

April 2022 – today

Postdoctoral Researcher

Department of Networks and Data Science, Central European University, Vienna (Austria).
ERC Synergy grant project: “DYNASNET”. *Topics*: “Physical networks”.
Supervisors: Prof. A.-L. Bárabasi, Prof. J. Kertész, Dr. M. Pósfai.

Feb. 2022 – March 2022

Assistant Professor, MAT-07 RTDa

ALMA Mater Studiorum, Department of Mathematics, Bologna (Italy).
Topic: “A mathematical-physics approach to improve energy efficiency in machine learning”.
Supervisors: Prof. P. Contucci, Prof. D. Tantari.

Oct. 2019 – March 2022

Assistant Researcher in Physics

Prof. Em. S. Havlin’s research lab, Dip. of Physics, Bar-Ilan University, Ramat Gan (Israel).
Topic: “Towards a physical theory of interdependent systems”.
ITA-ISR bilateral grant “EXPLICS”; *PIs*: Prof. S. Havlin, Prof. A. Frydman.

EDUCATION AND TRAINING

January 2016 – October 2021

Ph. D. in Physics

Bar-Ilan University, Physics Department, Ramat Gan (Israel).
Thesis: “When more is different: exploring coupled collective phenomena in multilayer dynamical systems”
Supervisor: Prof. S. Havlin. [Exams’ average grade: 98.6/100.]

October 2010 – April 2015

M. Sc. (II level) in Theoretical Physics (110/110 cum Laude)

Università del Salento - Facoltà di Scienze Matematiche, Fisiche e Naturali (Lecce)
Thesis: “Spin Models on Complex Networks”
Supervisors: Prof. R. A. Leo, Prof. P. Tempesta.

October 2007 – April 2010

B. Sc. in Physics (110/110 cum Laude)

Università del Salento – Facoltà di Scienze Matematiche, Fisiche e Naturali (Lecce)
Thesis: “Nonextensive Statistical Mechanics and Dynamical Systems”
Supervisors: Prof. M. Leo, Prof. P. Tempesta.

October 2006 – September 2007

Undergraduate student in Biomedical Engineering

Università di Pavia – Facoltà di Ingegneria (Pavia)
Completed first year exams (average grade: 29.8/30).

September 2001 – July 2006

Diploma di maturità scientifica (scientific high school) (100/100)

Liceo Scientifico G. Ferraris (Taranto)
Dissertation: “Fiat Lux”

PERSONAL SKILLS

Current Research Interests

Statistical Mechanics, Network Theory and Phase Transitions, Network Geometry, Dynamical systems, interdependent and multilayer networks, Dynamics at first-order transitions: percolation, synchronization and spin models, Physical Networks, Micro-structure & self-assembly.

Mother tongue(s)	Italian				
Other language(s)	Understanding		Speaking		Writing
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C1	C1	B2	C1
Hebrew	A1	A1	A1	A1	-
Spanish	A1	A1	A1	-	-
French	A1	A1	-	-	-

Computer skills *Programming in:* Python, C++, Matlab, Mathematica.
Typesetting: L^AT_EX, Overleaf, Word.
OS's: MacOS's, Ubuntu, Microsoft Windows.
Graphics programs: Adobe Photoshop, Keynote, ParaView.

ADDITIONAL INFORMATION

Awards

Diploma di Merito, 2006.
Awarded by the Rotary Club – Taranto, Distretto n. 2120 (Italia).
Motivations: “*For his distinction in commitment, profit and moral skills during the high-school studies.*”

Prize “Giulio Soliani”, 2016.
Awarded by the “Department of Physics and Mathematics, E. de Giorgi” (Lecce, IT).
Motivations: “*Best 2016 M. Sc. thesis in Th. Physics, Math. Physics, Biomath. at UniSalento’.*”

Presidential Scholarship “Milgat Hanasi”, 2016–2019.
Awarded by the “The Presidential Office, Bar-Ilan University’ (Israel).
Motivations: “*Outstanding Doctoral Fellow*”.

PUBLICATIONS

In what below, the daggers denote equal contributions.

- 2016
- C. Del Genio, J. Gómez-Gardeñes, **I. Bonamassa**, S. Boccaletti. "Synchronization in networks with multiple interaction layers", *Science Advances* **2**(11), e1601679 (2016).
 - T. Qiu, S. Boccaletti, **I. Bonamassa**, Y. Zou, J. Zhou, Z. Liu, S. Guan. "Synchronization and Bellerophon states in conformist and contrarian oscillators", *Sci. Rep.* **6**, 36713 (2016).
- 2017
- F. Lazaridis, B. Gross, P. Argyrakis, **I. Bonamassa**, S. Havlin, R. Cohen. "Spontaneous repulsion in the $A + B$ reaction on coupled networks", *Phys. Rev. E* **97**(4), 040301 (2017).
- 2018
- L. Shekhtman, M. Danziger, **I. Bonamassa**, S. Buldyrev, G. Caldarelli, V. Zlatić, S. Havlin. "Critical field-exponents for secure message-passing in modular networks", *NJP* **20**(5), 053001 (2018).
 - T. Qiu, **I. Bonamassa**, S. Boccaletti, Z. Liu, S. Guan. "Rhythmic synchronization and hybrid collective states of globally coupled oscillators", *Sci. Rep.* **8**(1), 12950 (2018).
- 2019
- M. M. Danziger[†], **I. Bonamassa**[†], S. Boccaletti, S. Havlin. "Dynamic interdependence and competition in multilayer networks", *Nature Physics* **15**(2), 178 (2019).
 - **I. Bonamassa**[†], B. Gross[†], M. Danziger, S. Havlin. "Critical stretching of mean-field behaviors in spatial networks", *Physical Review Letters* **123**(8), 088301 (2019).
- 2020
- **I. Bonamassa**, M. Calvanese Strinati, A. Chan, O. Gotes, B. Gross, S. Havlin, M. Leo, S. Havlin. "Geometric characterization of SARS-CoV-2 pandemic events", arxiv:2007.10450v1 (2020).
- 2021
- B. Gross **I. Bonamassa**, S. Havlin. "Interdependent transport via percolation backbones in spatial networks", *Physica A: Statistical Mechanics and its Applications*, **567**:125644 (2021).
 - M. Boguñá, **I. Bonamassa**, M. De Domenico, S. Havlin, D. Krioukov, M. A. Serrano. "Network geometry", *Nature Reviews Physics* **3**, 114–135 (2021).
 - S. Boccaletti, H. Bi, T. Qiu, **I. Bonamassa**, S. Guan. "Chunking Rhythmic Synchronization: Bellerophon States and Quantized Clusters of Globally Coupled Phase Oscillators" In: *The Many Facets of Complexity Science*, pp. 103-114. Springer (2021).
- 2022
- **I. Bonamassa**, B. Gross, S. Havlin. "Realizing interdependent couplings as thermal or higher-order interactions", arXiv:2110.08907 (2022).
 - B. Gross[†], **I. Bonamassa**[†], S. Havlin, "Fractal fluctuations at mixed-order transitions in interdependent networks", *Physical Review Letters* **129**(26), 268301 (2022).

- 2023
- **I. Bonamassa**[†], B. Gross[†], M. Leev[†], I. Volotsenko, A. Frydman, S. Havlin, "Interdependent Superconducting Networks", *Nature Physics* **19**, 1163–1170 (2023).
 - **I. Bonamassa**, A. Frydman, "A multilayer superconductor acts as an interdependent network", *Nature Physics* **19**, 1086–1087 (2023).
 - B. Gross, **I. Bonamassa**, S. Havlin, "Dynamics of cascades in spatial interdependent networks", *Chaos: An Interdisciplinary Journal of Nonlinear Science* **33**(10), 103116 (2023).
 - **I. Bonamassa**., B. Ráth, M. Pósfai, M. Abért, D. Keliger, B. Szegedy, J. Kertész, L. Lovász, A.–L. Barabási, "Logarithmic kinetics and bundling in physical networks", submitted (2023).
- 2024
- X. Pan, J. Zhou, Y. Zhou, S. Boccaletti, **I. Bonamassa**, "Robustness of interdependent hypergraphs: A bipartite network framework", *Phys. Rev. Research* **6** (1), 013049 (2024).
 - B. Gross, I. Volotsenko, **I. Bonamassa**, S. Havlin & A. Frydman "Microscopic origin of abrupt transition in interdependent superconducting networks", arXiv:2403.03050 (2024).
 - **I. Bonamassa**, B. Gross, J. Kertész, S. Havlin, "Hybrid spinodals for long-range cascades", arXiv:2401.09313v1 (2024).
 - B. Gross, **I. Bonamassa**, S. Havlin, "Microscopic intervention yields abrupt transition in interdependent magnetic networks", *Physical Review Letters* **132** (22), 227401 (2024).
 - G. Pete, Á. Timár, S. Ó. Stefánsson, **I. Bonamassa**, M. Pósfai, "Physical networks as network-of-networks", *Nature Communications* **15**(1), 4882 (2024).
 - **I. Bonamassa**, "Strange Kinetics Shape Network Growth, *Physics* **17**: 96 (2024).

CONFERENCES & POSTERS

- 2015
- "Messengers of knowledge", invited talk: "Complex Networks, An introduction".
- 2016
- "15 years of ITA/ISR", invited talk: "Networks: the simple and the complex".
- 2016
- "Giulio Soliani Prize", invited talk: "The beauty and simplicity behind complexity".
- 2018
- "NETSci18", contr. talk: "Coupled collective phenomena in multilayer complex systems".
- 2019
- "COMPLENET19", contr. talk: "Interdependence and competition in multilayer networks".
- 2019
- "CCEGN19", poster: "Critical stretching and extreme variations in spatial networks".
- 2019
- "CCS2019", invited talk: "Towards a physical theory of interdependent interactions".
- 2020
- "NETSci20", contr. talk: "Integrating interdependence into physical higher-order interactions".
- 2021
- "Advances in interacting complex systems 2021", invited talk: "Theory and models of interdependent systems".
- 2021
- "Talks in Complexity", Dip. Mat. and Physics, E. de Giorgi; invited talk: "On the statistical physics of interdependent systems".
- 2022
- "Mathematics of Large Networks", A. Rényi Institute; contr. talk: "Critical stretching and non-monotonic variations in random geometric networks".
- 2022
- "DYNASNET 2022 meeting", Lednice (Cz. Rep.); contr. talk: "Bundling in physical networks".
- 2023
- "NETSci23", Vienna; contr. talk: "Physics and Complexity of Interdependent Networks".
- 2023
- "STATPHYS28", Tokyo; contr. talk: "Physics and Complexity of Interdependent Systems".
- 2024
- "OBERSEMINAR, Dynamics", Technische Uni. München; invited talk: "Hybrid critical phenomena for long-range cascades at mixed-order transitions".
- 2024
- "COMPASS", Uni. Michigan; invited talk: "Packing physical networks".
- 2024
- "PHYSNET2", Satellite NetSci24; introductory talk: "Physical Networks".
- 2024
- "NETSci24", Quebec; contr. talk: "Chimeric critical phenomena of long-range cascades".

SCHOOLS & WORKSHOPS

- 16.07.2015
- "Network Geometry" at Queen Mary University (London).
- 1/8.09.2018
- "V Mediterranean School of Complex Networks" at Salina (Italy).
- 6/10.05.2019
- CCGEN19: "Critical and Collective Effects in Graphs and Networks 2019" at Les-Houches School of Physics, Les Houches (France).
- 23.02.2021
- EXPLICS: "Advances in interacting complex systems".
- 08/13.05.2022
- MLN22: "Mathematics of Large Networks", A. Rényi Institute, Budapest.
- 07/10.06.2022
- "CSH/CEU Workshop", CSH Vienna.
- 07/21.07.2023
- FWNL23: "Focused Workshop on Networks and Their Limits", A. Rényi Institute, Budapest.
- 05/08.02.2024
- Dynasnet Retreat Workshop in Visegrád, Budapest.
- 15/19.07.2024
- FWNL24: "Focused Workshop on Networks and Their Limits", A. Rényi Institute, Budapest.

ORGANIZER

- 11.07.2023 Satellite, NetSci23: "*Physical Networks*": <https://sites.google.com/view/physnet23>.
17.06.2024 Satellite, NetSci24: "*Physical Networks II*"; <https://sites.google.com/view/physnet24/phynet24>.
2022–2024 Dynasnet (CEU/Rényi/NSI) Biweekly Working Group Meetings, organizer.

TEACHING & SUPERVISION

- 2016/19 Co-supervisor of M.Sc./B.Sc./Ph.D. students. BIU: B. Gross, L. Yavetz; CEU: J. Yamamoto.
2017/18 Teaching assistant: "Dynamical Systems and Chaos" (by Prof. D. Kessler).
2021/22 Teaching: "Physics" at Liceo Scientifico Paritario "Istituto Plateja", Taranto.

VISITING

- Mar./Apr. 2018 Visiting student: Phys. Dept. @ East China Normal Uni.; hosts: Proff. S. Guan & Z. Liu.
Sep./Oct. 2019 Visiting student: Phys. Dept. @ Boston Uni. ; hosts: Proff. W. Klein, H. Gould, E. Stanley.

GRANT APPLICATIONS

The list below contains the grant applications I actively contributed designing/writing.

- 2018/19 MOST/MAECI bilateral grant, "EXPLICS", PI's: Prof. S. Havlin, Prof. S. Lepri (funded).
2019/20 ISF, "Dynamics of interconnected and interdependent networks", PI: Prof. S. Havlin (funded).
2017/18/19/20 ERC Advanced Grant, "UNIMOX", PI: Prof. S. Havlin (not funded).
2021/23 MOST/MAECI bilateral grant, "BULBUL", PI's: Prof. A. Barra, Prof. I. Kanter (funded).

ACADEMIC SERVICE

- 2016 — I actively serve as referee for: *Nature Physics*, *Nature Communications*, *Science Advances*, *Physical Review Letters*, *Physical Review E*, *Physical Review Research*, *Scientific Reports*, *Entropy*, *PLOS ONE*, *PNASnexus*, *Entropy*, *Network Neuroscience*.
2023 — Program Committee member of NetSci23, NetSciX24, CCS24.
2024 — Editorial Board Member of American Journal of Physics and Applications, Science PG.

ATTACHMENTS

- 1 Seminars given during the M. Sc. and B. Sc. studies at the Uni. of Lecce (2009-2014);
- 2 Transcripts of my B.Sc. degree, M.Sc. degree and Ph.D. degree.
- 3 Dichiarazione di valore del titolo di dottorato conseguito in Israele in data 14/11/21.

Attachment 1: Seminars given during the M. Sc./B. Sc. studies at the Uni. of Lecce

During my M. Sc. and B. Sc. studies, personal readings and studies often lying outside the standard courses' topics led me to present a series of talks at the University of Lecce, listed below. They are the result of personal interests and some of them are accompanied by short term papers available at my webpage (ivanbms2011.wix.com/physivan).

- *The Physics of Phyllotaxis: how plants play with math* (2014);
We give an overview of the mathematical and physical aspects behind the study of phyllotaxis (i.e. the study of pattern arising from the distribution of plant organs). In particular, we review the fundamental theorem of phyllotaxis and describe some physical models which aim to explain the abundance of Fibonacci patterns in plants; the latter approach will lead us to introduce some fascinating physical mechanism, like symmetry breaking mechanism and quasi-bifurcation diagrams.
- *Semiclassical potentials for primes and Riemann zeros* (2013);
In the last twenty years there have been many applications of tools coming from Quantum Mechanics or Statistical Mechanics to Number Theory, mainly inspired by the *Hilbert–Pólya conjecture*. The problem has been mostly discussed in the context of the semiclassical approximation of Quantum Mechanics or, viceversa, in semiclassical quantization of Classical Mechanics. Here we review the findings made by G. Mussardo in 1998 by following the WKB formalism and apply the same procedure to the critical zeros of the Riemann ζ function, further showing some recent results regarding the fractal nature of the related semiclassical potentials.
- *Quantum signatures of chaos in many body systems* (2013);
This talk was presented for the Nuclear Physics (M. Sc.) class exam. It represents a part of a personal review entitled “*Quantum chaos, a travel through billiards, primes and nuclei, riding periodic orbits*”. In the latter, the main features of Quantum Chaos are explained, starting from Random Matrix Theory, then moving towards the theory of periodic orbits where the WKB approximation and the semiclassical quantization procedures of integrable, separately integrable and chaotic classical systems are described. These results allows one to arrive eventually at the Gutzwiller trace formula, which relates the spectral density of the quantized system to the primitive periodic orbits of its classical analogue. This remarkable formula is then applied to obtain some semiclassical expressions in RMT that have been recently applied to study the distribution of the binding energy fluctuations in nuclei.
- *Black Hole Thermodynamics* (2012);
Thanks to the seminal papers of J. Bekenstein (1973) and S. Hawking (1974), black holes seem to behave like black bodies characterized by an entropy $S_{BH} = k_B \mathcal{A}_H / 4\ell_P^2$, where \mathcal{A}_H is the area of the event horizon, k_B the Boltzmann constant and $\ell_P^2 \equiv \hbar G / c^3$ the Planck area. These results pose the problem to identify the microscopic degrees of freedom responsible for such an entropy, which is attainable only within a proper quantum theory of gravity. With this talk we review some classical and semiclassical aspects of the problem, ending with some recent counting techniques introduced in Loop Quantum Gravity.
- *An introduction to Ergodic Number Theory* (2011);
Recently, a lot of research has involved three branches of Mathematics: Number Theory (NT), Ergodic Theory (ET) and the Theory of Dynamical Systems. The existence of profound connections between the last two was already known in late XIX century, while the possibility of linking ET and NT only begun in the second half of the XX century. Different ergodic concepts of dynamical systems fit naturally in number theoretical problems and are giving rise to a new area of Mathematics, called Ergodic Number Theory. We give a brief introduction to the main results obtained so far, speculating about some possible connections with Statistical Physics.
- *The Fermi–Pasta–Ulam problem* (2009).
In 1953 E. Fermi, J. Pasta and S. Ulam conducted some numerical calculations, aiming to study the long–time behavior of a linear chain of N oscillators coupled with non–linear (cubic or quartic) nearest neighbor interactions. Remarkably, after having excited the first normal mode with a certain amount of energy, they found that the system never thermalizes, but oscillates periodically among phase–space states arbitrarily near to the initial one, eventually returning exactly to the starting configuration. Later on, M. Kruskal and N. Zabusky explained this apparent paradox as the appearance of stable *solitonic excitations* in the continuum limit of the FPU model. In this talk we introduce the main aspects of the problem, further showing the details of the continuum limit.



FACOLTA' DI SCIENZE MATEMATICHE, FISICHE E NATURALI

Numero Registro : 2015261862/M408

Matricola : 10062058

VISTI GLI ATTI D'UFFICIO, SI CERTIFICA, A RICHIESTA DELL'INTERESSATO CHE

Il Sig. BONAMASSA IVAN, nato il 24/11/1987 a TARANTO (TA), ha superato presso questa Università l'esame finale di LAUREA DI PRIMO LIVELLO IN FISICA (25 - CLASSE DELLE LAUREE IN SCIENZE E TECNOLOGIE FISICHE di cui al D.M. 509/1999), in data 29/04/2010 con la votazione 110/110 e lode.

Al titolo conseguito compete la qualifica accademica di DOTTORE (di cui al decreto MIUR n. 270/2004, art.13, comma 7).

Per il conseguimento del suddetto titolo ha sostenuto e superato i seguenti esami:

Esame		Esito	Voto	CFU	A. F.	S.S.D.	Data	Corso Didat.(*)
00567	GEOMETRIA	Convalidata	27/30	8	C	MAT/03	05/02/2007	24 L030
00016	ANALISI MATEMATICA I	Convalidata	30/30	8	A	MAT/05	06/02/2007	24 L030
00605	INFORMATICA	Convalidata	30/30	5	A	INF/01	12/03/2007	24 L030
00017	ANALISI MATEMATICA II	Convalidata	30/30	8	A	MAT/05	03/07/2007	24 L030
10882	LABORATORIO DI FISICA COMPUTAZIONALE	Superata	30/30 LODE	3	D	INF/01	21/12/2007	24 L030
03967	LABORATORIO I	Superata	30/30	6	B	FIS/01	30/01/2008	24 L030
03750	ANALISI MATEMATICA III	Superata	25/30	8	C	MAT/05	12/02/2008	24 L030
10886	INTRODUZIONE ALLA FISICA MODERNA	Superata	30/30	8	B	FIS/02	27/06/2008	24 L030
00801	LINGUA INGLESE	Superata	Idoneo	3	E		03/07/2008	24 L030
10880	FISICA III	Superata	27/30	8	B	FIS/01	23/07/2008	24 L030
10883	FISICA IV	Superata	28/30	8	B	FIS/01	17/09/2008	24 L030
00512	FISICA II	Convalidata	30/30 LODE	8	B	FIS/01	18/12/2008	24 L030
00511	FISICA I	Convalidata	30/30	8	B	FIS/01	18/12/2008	24 L030
03968	LABORATORIO II	Superata	30/30 LODE	6	B	FIS/01	13/01/2009	24 L030
06938	STATISTICA ED ANALISI NUMERICA	Superata	30/30	5	A	MAT/06	13/02/2009	24 L030
07563	LABORATORIO III E LABORATORIO IV	Superata	30/30	=			17/03/2009	24 L030
10881	LABORATORIO III	Superata	30/30	6	B	FIS/01	17/03/2009	24 L030
10884	LABORATORIO IV	Superata	30/30	6	B	FIS/01	17/03/2009	24 L030
11926	LABORATORIO V	Superata	30/30	6	B	FIS/01	22/05/2009	24 L030
13006	FISICA TEORICA I	Superata	30/30 LODE	10	B	FIS/02	29/05/2009	24 L030
13183	ATTIVITA' SEMINARIALI	Superata	Effettuato	6	F		17/07/2009	24 L030
13044	FISICA TEORICA II	Superata	30/30 LODE	6	D	FIS/02	09/10/2009	24 L030
01479	STRUTTURA DELLA MATERIA	Superata	30/30	8	B	FIS/03	20/11/2009	24 L030
14311	CHIMICA	Superata	30/30 LODE	8	C	CHIM/03	17/12/2009	24 L030
06939	FISICA NUCLEARE E SUBNUCLEARE	Superata	29/30	7	B	FIS/04	25/02/2010	24 L030
06983	APPLICAZIONI DI INFORMATICA	Superata	27/30	3	F	INF/01	15/03/2010	24 L030
00881	METODI MATEMATICI DELLA FISICA	Superata	29/30	8	B	FIS/02	12/04/2010	24 L030
10221	PROVA FINALE	Superata	Effettuato	6	E		29/04/2010	24 L030



DIPARTIMENTO DI MATEMATICA E FISICA "ENNIO DE GIORGI"

Numero Registro : 2015261874/M408

Matricola : 10086716

VISTI GLI ATTI D'UFFICIO, SI CERTIFICA, A RICHIESTA DELL'INTERESSATO CHE

Il Sig. BONAMASSA IVAN, nato il 24/11/1987 a TARANTO (TA), ha superato presso questa Università l'esame finale di LAUREA MAGISTRALE IN FISICA (LM-17 - CLASSE DELLE LAUREE MAGISTRALI IN FISICA di cui al D.M. 270/2004), in data 29/04/2015 con la votazione 110/110 e lode.

Al titolo conseguito compete la qualifica accademica di DOTTORE MAGISTRALE (di cui al decreto MIUR n. 270/2004, art.13, comma 7).

Lo studente è in possesso del titolo precedente Laurea di Primo Livello in FISICA Classe 25 - Classe delle lauree in scienze e tecnologie fisiche - D.M. 509/1999.

Per il conseguimento del suddetto titolo ha sostenuto e superato i seguenti esami:

Esame	Esito	Voto	CFU	A. F.	S.S.D.	Data	Corso Didat. (*)
01942 FISICA DEI SISTEMI DINAMICI	Superata	30/30 LODE	=			29/04/2011	24 LM38
A001469 FISICA DEI SISTEMI DINAMICI B	Superata	30/30 LODE	3	B	FIS/02	29/04/2011	24 LM38
A001467 FISICA DEI SISTEMI DINAMICI A	Superata	30/30 LODE	3	B	FIS/02	29/04/2011	24 LM38
13007 ASTROFISICA GENERALE	Superata	30/30	6	B	FIS/05	21/12/2011	24 LM38
13043 TEORIA DEI GRUPPI E APPLICAZIONI FISICHE	Superata	30/30 LODE	6	D	FIS/02	23/03/2012	24 LB23
A002261 ASTROFISICA TEORICA	Superata	30/30 LODE	6	D	FIS/05	29/06/2012	24 LM38
A002245 FISICA NUCLEARE E SUBNUCLEARE	Superata	30/30 LODE	6	B	FIS/04	26/03/2013	24 LM38
A001459 FISICA DEI SISTEMI NON LINEARI	Superata	30/30 LODE	=			14/05/2013	24 LM38
A001463 FISICA DEI SISTEMI NON LINEARI B	Superata	30/30 LODE	3	C	FIS/02	14/05/2013	24 LM38
A001461 FISICA DEI SISTEMI NON LINEARI A	Superata	30/30 LODE	3	C	FIS/02	14/05/2013	24 LM38
A002258 GRAVITAZIONE E COSMOLOGIA	Superata	30/30	6	C	FIS/05	13/06/2013	24 LM38
A002244 FISICA TEORICA	Superata	30/30 LODE	6	B	FIS/02	31/07/2013	24 LM38
00881 METODI MATEMATICI DELLA FISICA	Superata	30/30 LODE	6	B	FIS/02	11/11/2013	24 LM38
A002263 TEORIA QUANTISTICA DEI CAMPI	Superata	30/30 LODE	8	B	FIS/02	17/03/2014	24 LM38
01479 STRUTTURA DELLA MATERIA	Superata	30/30 LODE	8	B	FIS/03	19/05/2014	24 LM38
13046 FISICA STATISTICA	Superata	30/30 LODE	6	B	FIS/02	15/07/2014	24 LM38
04163 LINGUA INGLESE	Superata	Idoneo	3	F		08/10/2014	24 LM38
A002246 LABORATORIO	Superata	30/30	8	B	FIS/01	02/02/2015	24 LM38
A002923 PROVA FINALE	Superata	Idoneo	37	E		29/04/2015	24 LM38

14/11/2021

This is to certify that Dr. Ivan Bonamassa (Id. No. YA7293823)
fulfilled all the requirements towards the degree of “Doctor of Philosophy”
in the Department of Physics.

Dr. Ivan Bonamassa is entitled to his Ph.D degree as of 14/11/2021.

Sincerely,

Prof. Ronit Sarid
Dean, School of Graduate Studies

Transcript

Name: Bonamassa, Ivan

ID: YA7293823

Study Program: Phd.

Track: Physics (regular)

Department of Physics

Year	Code	Session	A	B	S	Course Description	Credit	Grade
2015-2016	86818	Lecture		2.00		Methods of Mathematical Physics	2.00	
2015-2016	86818	Exercise		2.00		Methods of Mathematical Physics	2.00	
2015-2016	86943	Optional colloquium	2.00	2.00		Colloquium and Instruction		Pass
2015-2016	86953	Optional colloquium	2.00	2.00		Colloquium in Biophysics		Pass
2016-2017	86944	Optional colloquium	2.00	2.00		Colloquium and Instruction		Pass
2017-2018	86731	Lecture		3.00		The Physics of Nano	3.00	99
2017-2018	86945	Optional colloquium	2.00	2.00		Colloquium and Instruction		Pass
2018-2019	86743	Lecture	4.00			Phase Transition and Critical Phenomena	4.00	100
2018-2019	86886	Lecture		2.00		Nonlinear Dynamics and Chaos	2.00	100
2018-2019	86886	Exercise		1.00		Nonlinear Dynamics and Chaos	1.00	
2018-2019	86888	Lecture	3.00			Physics of Complex Systems	3.00	95
2018-2019	86946	Optional colloquium	2.00	2.00		Colloquium and Instruction		Pass
2018-2019	86976	Optional colloquium	2.00	2.00		Seminar/Statistical Physics		Pass
2020-2021	86999	Dissertation				Dissertation		

בס"ד, י"ז כסלו תשפ"ב

09:14 21/11/2021



Nov 21, 2021

Transcript

Name: Bonamassa, Ivan

ID: YA7293823

Study Program: Phd.

Track: Physics (regular)

Scholastic Index: 98.62

Accumulated Credits: 13.00 Credits included in Scholastic Index: 13.00



Nov 21, 2021

Transcript

Name: Bonamassa, Ivan

ID: YA7293823

Study Program: Phd.

Track: Physics (regular)

Department	Accumulated Credit	Credit included in Scholastic Index	Scholastic Index
Department of Physics	13.00	13.00	98.62
General	13.00	13.00	98.62
General, (weighted) calculated without Jewish Studies	13.00	13.00	98.62

* - Not Included in Scholastic Index

Stamp and Signature

Eligible for Phd. degree as of: Nov. 14, 2021

Notes:

- The student meets the exemption requirements for English as a foreign language.
- Without the signature of the Registrar and the University seal, the report is not considered official.

Con l'aiuto del Cielo, 4 Tevet 5782 [data ebraica]
08/12/2021

ATTESTATO

Attesto con il presente che il Dr. Ivan Bonamassa, passaporto num. YA7293823, del Dipartimento di Fisica,
ha portato a termine gli obblighi di studio per il titolo di Dottore di Ricerca e la sua tesi di dottorato è stata approvata.

Titolo dell'elaborato:

Quando la moltitudine fa la differenza. Esplorando i fenomeni collettivi accoppiati in sistemi dinamici a più livelli

Il Dr. Bonamassa ha diritto a ricevere il titolo di Dottore in Filosofia a far data dal 14/11/2021.

[a destra timbro lineare con sigla sovrapposta e recante la dicitura: Università Bar-Ilan, Scuola di Studi Avanzati]

Distinti saluti,

[firma: Ronit Sarid]

Prof. Ronit Sarid
Preside della Scuola di Studi Avanzati

Studi di Dottorato

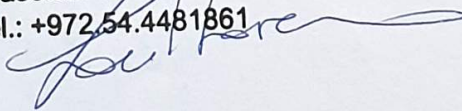
Tel: 03-5318458/556 • Fax: 03-7384003 • Phd.office@mail.biu.ac.il • www.biu.ac.il/toar3

Università Bar-Ilan (RA), Ramat Gan 5290002, Israele • www.biu.ac.il

"Io sottoscritta Sarah Parenzo, traduttrice di riferimento dell'Ambasciata d'Italia in Tel Aviv, dichiaro che la presente traduzione in lingua italiana è conforme al testo del documento allegato, scritto in lingua ebraica".

SARAH PARENZO

**"Traduttore di riferimento
dell'Ambasciata d'Italia in Tel Aviv"**
Tel.: +972.54.4481861

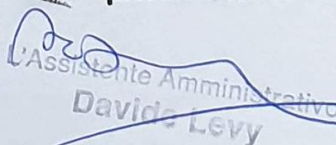


AMBASCIATA D'ITALIA — TEL AVIV

**VISTO: per la traduzione in lingua italiana
conforme all'unito testo in lingua**

Tel Aviv,

p. l'Ambasciatore


L'Assistente Amministrativo
Davide Levy

27 DEC 2021

AMBASCIATA D'ITALIA
TEL AVIV
27/12/2021 Num. registro: 2658
BONAMASSA IVAN
Art. I.C.: 72A
Euro: 13,000
Valuta: 49,699
Arrot.: 50,000



SARAH PAREN-
Traduttrice di rif.
del'Ambasciata d'U.
Tel.: +972

Tel.: +972.54.4481861
dell'Ambasciata d'Italia in Tel Aviv
"Triduttore di riferimento
SARAH FARENZO

el Aviv"

ב"ה, ד' טבת תשפ"ב
08/12/2021

אישור

אני מאשרת בזאת כי ד"ר איוון בונמסה דרכון מס. YA7293823, מהמחלקה לפיזיקה,

סיים את כל חובותיו הלימודיים לתואר השלישי ועבודת הדוקטור שלו אושרה.

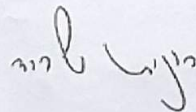
שם העבודה:

כאשר יותר הוא שונה, תופעות קולקטיביות מוצמדות במערכות דינמיות רב שכבתיות

When more is different, Exploring Coupled Collective Phenomena in Multilayer
Dynamical Systems

ד"ר בונמסה זכאי לקבלת התואר "דוקטור לפילוסופיה" החל מתאריך 14/11/2021.

בכבוד רב,



פרופ' רונית שריד

דיקנית בית הספר ללימודים מתקדמים

אוניברסיטת בר-אילן
ביה"ס ללימודים מתקדמים



APOSTILLE
(CONVENTION DE LA HAYE DU 5 OCTOBRE 1961)

- | | | |
|--|---|-----|
| 1. STATE OF ISRAEL | מדינת ישראל | 1. |
| 2. THIS PUBLIC DOCUMENT HAS BEEN SIGNED BY MR./MS | מסמך ציבורי זה נחתם ביד מר/גב' שרייבר שושנה SHRIBER SHOSANA | 2. |
| 3. ACTING IN THE CAPACITY OF HEAD OF LIAISON SECTION | המכהן בתור מנהלת לשכת קש"ח | 3. |
| 4. BEARS THE SEAL/STAMP OF THE MINISTRY OF | נושא את החותם/חותמת של משרד החינוך EDUCATION | 4. |
| 5. CERTIFIED AT THE MINISTRY OF FOREIGN AFFAIRS | אושר במשרד החוץ | 5. |
| 6. THE | ביום 20/12/2021 | 6. |
| 7. BY | אפרת דגה EFRAT DAGA
האגף לעניינים קונסולריים CONSULAR AFFAIRS DIVISION | 7. |
| 8. NO 2046134. | מס' 2046134 | 8. |
| 9. SEAL/STAMP | חותם/חותמת | 9. |
| 10. SIGNATURE, JERUSALEM | חתימה, ירושלים | 10. |



STATE OF ISRAEL

MINISTRY OF EDUCATION

This is to certify that the signature of

נועה שויז
on the document is similar to the signature in our files.

Signature אפרת שויז

Date 20.12.21



Ambasciata d'Italia
Tel Aviv

Cancelleria Consolare

DICHIARAZIONE DI VALORE

L'Ambasciata d'Italia in Tel Aviv,

premessi che

il sig. **Ivan BONAMASSA**, cittadino **italiano**, nato a **Taranto**, il **24/11/1987**, identificato con il passaporto italiano n. **YA7293823**, ha qui presentato richiesta di rilascio di Dichiarazione di Valore per il titolo di studio di **Dottore in Filosofia Ph.d. in Fisica**

DICHIARA CHE

- l'attestato diritto al titolo è stato rilasciato al sig. **Ivan BONAMASSA**, dall'**Università di Bar Ilan, Ramat Gan**, Israele, in data **14/11/2021**;
- la predetta istituzione è istituzione **pubblica** di livello universitario dell'ordinamento **locale**;
- il corso di studio presso la predetta istituzione al termine del quale è stato conseguito il titolo è della durata legale di **6 anni** e prevede la discussione di una tesi finale, il cui titolo è "Quando la moltitudine fa la differenza. Esplorando I fenomeni collettivi accoppiati in sistemi dinamici a più livelli" (in inglese "When is more different, Exploring Coupled Collective Phenomena in Multilayer Dynamical Systems");
- l'ammissione al predetto corso è condizionata al possesso dei seguenti requisiti: **Laurea di II grado**;
- la durata legale in loco del percorso formativo complessivo dal primo anno di scuola primaria al conseguimento del predetto titolo è di **26 anni** di formazione.
- le competenti autorità locali dichiarano che la firma del Funzionario del Ministero dell'Educazione e della Cultura apposta sull'attestato è autentica e che il documento appare del tutto regolare;

La presente Dichiarazione di Valore non implica alcun riconoscimento, equipollenza od omologazione del titolo di studio a cui fa riferimento; è un documento di natura esclusivamente informativa, mirante a fornire, riguardo al titolo estero in oggetto, ogni elemento utile per consentire, alle Autorità italiane competenti, una valutazione del titolo stesso ai fini del suo riconoscimento nell'ordinamento italiano ai sensi della normativa vigente.

Tel Aviv,

27 DEC 2021

AMBASCIATA D'ITALIA TEL AVIV	
27/12/2021	Num. registro: 2659
BONAMASSA IVAN	
Art. T.C.: 66N	
Euro:	41,000
Valuta:	156,743
Amot.:	157,000



Il Capo della Cancelleria Consolare
Emanuele Oldani



Presidenza del Consiglio dei Ministri

DIPARTIMENTO DELLA FUNZIONE PUBBLICA
UFFICIO PER L'ORGANIZZAZIONE ED IL LAVORO PUBBLICO
Servizio per la programmazione delle assunzioni e la mobilità

Al dott. Ivan BONAMASSA

ivan.bonamassa@pec.it

scriviunibo@pec.unibo.it

e, p.c.

Al Ministero dell'università e della
ricerca - Segretariato Generale
Direzione generale degli ordinamenti
della formazione superiore e del diritto
allo studio
dgsinfs@postacert.istruzione.it

OGGETTO: Trasmissione del provvedimento di equivalenza del titolo di studio

Con riferimento alla Sua richiesta, acquisito il parere favorevole del Ministero dell'università e della ricerca, si trasmette il provvedimento con il quale si stabilisce, ai sensi dell'art. 38 del decreto legislativo 30 marzo 2001, n. 165, come modificato dall'art. 8 del decreto-legge 9 febbraio 2012, n. 5, convertito, con modificazioni, dalla legge 4 aprile 2012, n. 35, l'equivalenza del Suo titolo di studio al titolo accademico di **Dottore di Ricerca** conseguito presso le università italiane che consente l'inserimento nella graduatoria ai fini dell'eventuale assunzione, *a seguito di espletamento della procedura di valutazione per il reclutamento di 1 posto da ricercatore a tempo determinato ai sensi dell'art. 24 comma 3 lettera a) (junior) per il settore concorsuale 01/a4 fisica matematica, per il settore scientifico disciplinare "mat/07" fisica matematica (Alma Mater Studiorum Università di Bologna P.D. 6552/2021).*

IL DIRETTORE DELL'UFFICIO

Riccardo Sisti



Firmato digitalmente da SISTI
RICCARDO
C=IT
O=PRESIDENZA CONSIGLIO DEI
MINISTRI